H2M LABS, INC.

ENVIRONMENTAL TESTING LABORATORY

STATEMENT OF QUALIFICATIONS

H2M LABS, INC.

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Submitted By:

H2M LABS, INC.
575 Broad Hollow Road
Melville, New York 11747

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www.h2mlabs.com

2003

QUALIFICATIONS

H2M LABS, INC.

QUALIFICATIONS

SCOPE OF SERVICES:

- *Bacteriology*
- *Organic / Inorganic*
- *Sewage / Sludge*
- *Hazardous Waste*
- *Leachate*
- *Pesticides / Herbicides*
- *Potable Water*
- *Manufactured Gas Plant (MGP)*
- *Air Analysis*
- *Laboratory Data Validation*
- *Special Studies*

PROFESSIONAL STAFF:

H2M's dedicated professional staff of chemists, biologists and environmental scientists provides the laboratory with experience that exceeds USEPA-required experience levels. H2M encourages professional development through seminars, workshops, and participation at technical conferences and cross training.

Senior laboratory managers have provided consistent and effective management of H2M's continuing growth, with an average professional tenure of more than a decade at H2M.

QUALITY ASSURANCE/ QUALITY CONTROL:

QA/QC are an integral part of the laboratory procedures H2M uses when conducting all analysis.

Basic QA/QC consists of proficiency tests, replicate analyses and spiked samples that verify analytical accuracy. To retain approval, proficiency samples must be performed on a routine basis.

H2M has consistently met the standards for approval and has an excellent record of accuracy. H2M has been awarded the ACIL Seal of Excellence Award.

In the environmental field, proper decisions depend on accurate data. For 45 years, H2M Labs, Inc. (H2M) has been providing environmental analyses consistently and accurately, with an emphasis on responsive service. Today, H2M is ranked among the nation's 100 largest environmental laboratories, and a leader in the Northeast. It is equally proud to serve many of those clients who began with H2M in 1957.

H2M holds National Environmental Laboratory Approval Program (NELAP) accreditation, with primacy in New York State. H2M was one of the first laboratories in New York to undergo the stringent NELAP audit procedure, and be awarded certification.

H2M is state-approved in New York, New Jersey, Connecticut, Massachusetts, Pennsylvania, and Maryland to perform analyses in bacteriology; wet and automated chemistry; gas and liquid chromatography; ICP/MS, atomic absorption and ICP spectrophotometry; and GC/mass spectrometry. Staffed by expert chemists, biologists, toxicologists and technicians, the laboratory is fully equipped to perform water quality tests; industrial waste and wastewater; soil; municipal sewage, solid wastes, tissues and dredged materials; as well as to assess the effectiveness of pollution control methods for wastewater treatment facilities, solid waste disposal programs and air quality protection measures.

H2M has been consistently chosen to conduct analytical programs for regulatory agencies at all governmental levels based on its outstanding Quality Assurance/Quality Control program. H2M provides laboratory services for various engineering firms with New York State Department of Environmental Conservation (NYSDEC) Standby Contracts. H2M routinely analyzes samples using NYSDEC Analytical Service Protocol (ASP) Contract Laboratory Services (CLP) methodology. The laboratory routinely analyses samples requiring full United States Environmental Protection Agency (USEPA) CLP-type documentation and quality control procedures.

H2M also has an established data validation section. Under the supervision of the QA Manager, this group has provided review of data from laboratories, and is responsible for the data validation of both internal and external CLP reporting documents.

H2M has successfully conducted analytical, research and development, and data validation work for the USEPA, NYSDEC, New Jersey Department of Environmental Protection, New York City Department of Sanitation (NYCDOS), New York City Health Department, Dormitory Authority of New York State, and other agencies.

H2M LABS, INC.

INSTRUMENTATION:
H2M's laboratory facilities are extensive with technically advanced automated equipment and a modern data processing system to assure controlled testing procedure and accurate reporting.

H2M's advanced instrumentation includes:

- *ICP/Mass Spectrometer*
- *ICP (sequential and simultaneous)*
- *GC/Mass Spectrometers*
- *GC with Perkin Elmer and Nelson Analytical*
- *Liquid Chromatograph (HPLC)*
- *Graphite Furnace and Flame Atomic Absorption Spectrophotometer*
- *Technicon 4-Channel Auto Analyzer*
- *TOX Analyzer*
- *TOC Analyzer*
- *Automatic TKN Analyzer*
- *Auto Titrator Systems*
- *Ion Chromatograph*

H2M has a state-of-the-art LIMS system, which provides computerized input, work-in-progress, and report procedures for all samples processed. Direct instrument interface with LIMS allows for the direct input of results.

H2M provides many formats of Electronic Diskette Deliverables (EDD) for easy use of data by its clients. H2M provides formats such as GIS Key, EQuIS, and many customized formats. H2M also has the capability of providing a full data package in PDF format on CD, for ease of data storage.

The laboratory provides water supply monitoring and analysis for public water supply districts of varying sizes as well as non-community systems to assure compliance with all federal, state and local regulations. H2M also serves industry with a variety of wastewater testing in conjunction with National Pollution Discharge Elimination System (NPDES), for New York (SPDES) and New Jersey (NJPDES) permits, and monitors the performance of municipal wastewater treatment plants via effluent analysis.

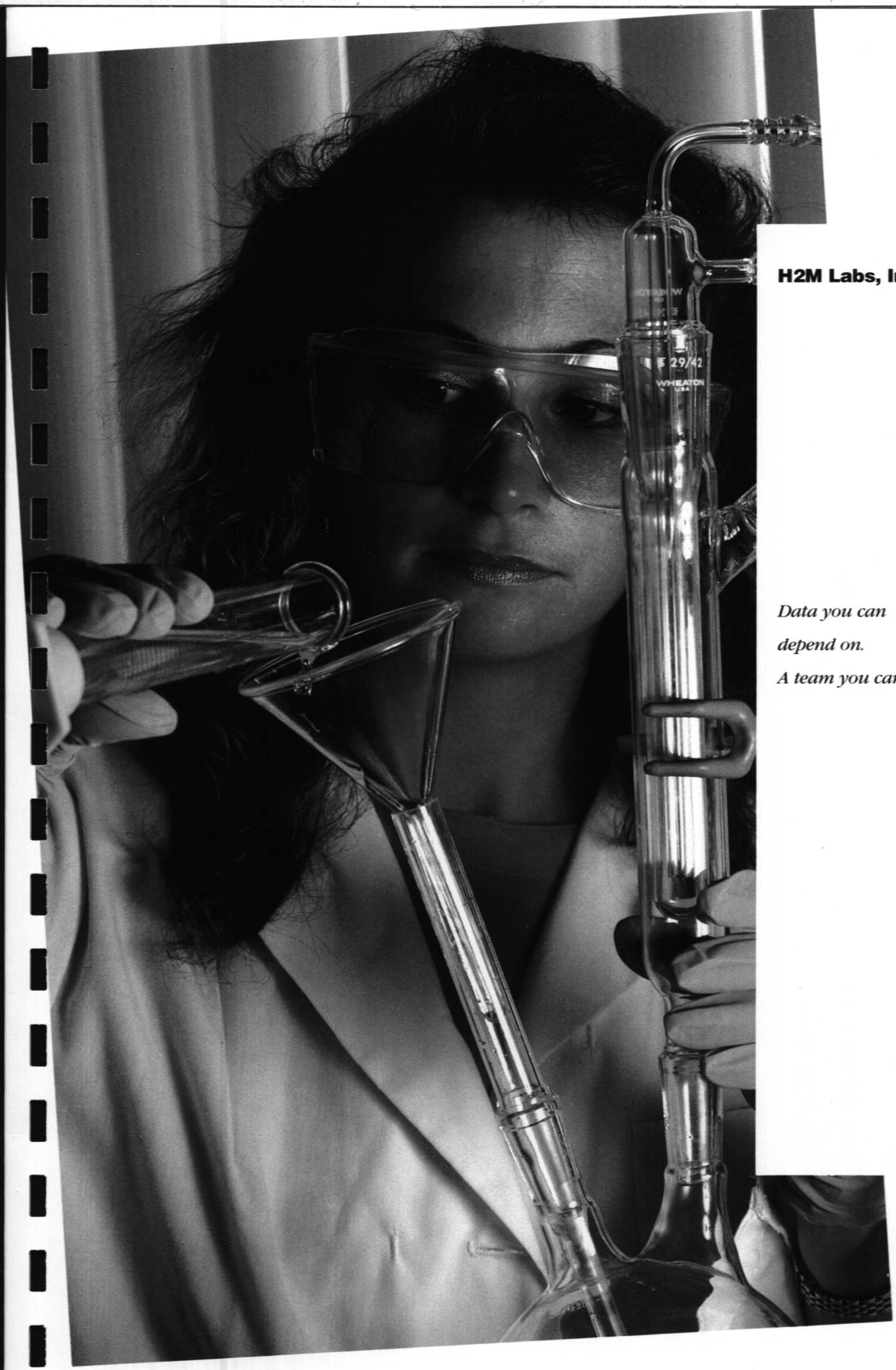
H2M is routinely involved in special projects, of which many have contracted turnaround times and require data deliverables. Examples include:

- Manufactured Gas Plant analytical studies for a major energy supplier.
- Unregulated Contaminant Monitoring Rule (UCMR) analytical studies for major water suppliers under the List 1 EPA regulations.
- Lead screening for the USEPA, Indian Health Service.
- Oil spill analysis for NYSDEC.
- Landfill monitoring and sampling for the NYCDOS , and in the Towns of Southampton, Southold, Brookhaven, Oyster Bay and Islip, New York.
- Water corrosion study and SAS projects for the USEPA.
- Analysis of dredged materials along the Hudson River for the New York City Department of Corrections.

H2M developed its organic testing capability prior to the establishment of many approved methods. The laboratory was a forerunner in the development of working protocols which have since become industry standards. H2M was also the first commercial laboratory approved for the analysis of volatile organics by the purge and trap method in New York State.

Additionally, H2M has developed numerous procedures on both potable and non-potable matrices, requiring special extraction recovery techniques. In testing for aldicarb (Temik), H2M, in conjunction with Union Carbide Corporation, developed the procedure for routine analysis of trace concentrations in drinking water supplies located above a sole source aquifer. The laboratory has also independently developed a method for testing polar volatile organics, i.e. in drinking water (ketones).

Agencies, engineering firms, and industry turn to H2M for accurate data. Meeting the highest standards of quality, compliance, ethics and customer service, H2M is the recipient of the American Council of Independent Laboratories (ACIL) Seal of Excellence for the second consecutive year.

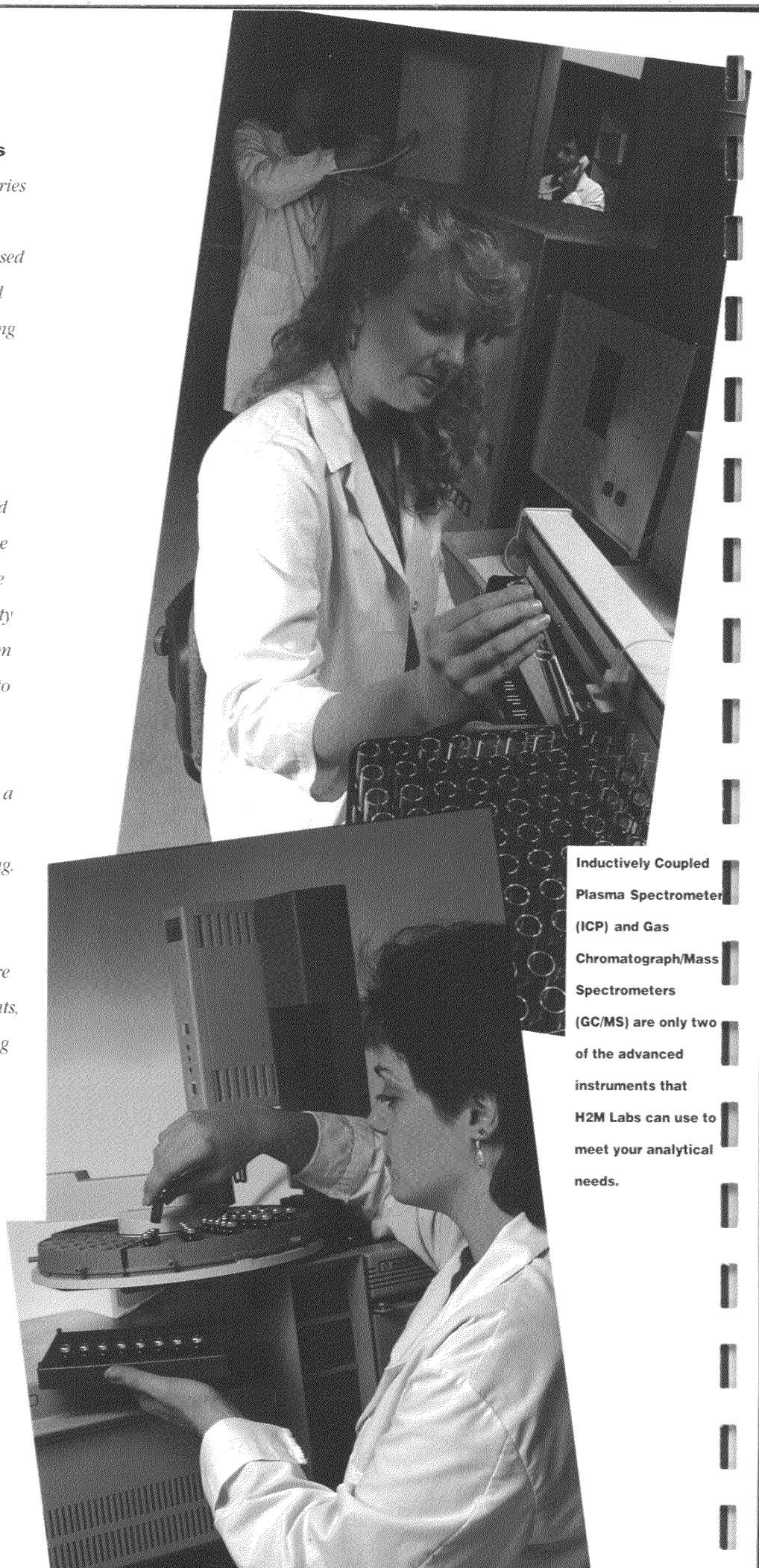


H2M Labs, Inc.

Data you can
depend on.
A team you can trust.

State of the Art Laboratory Services

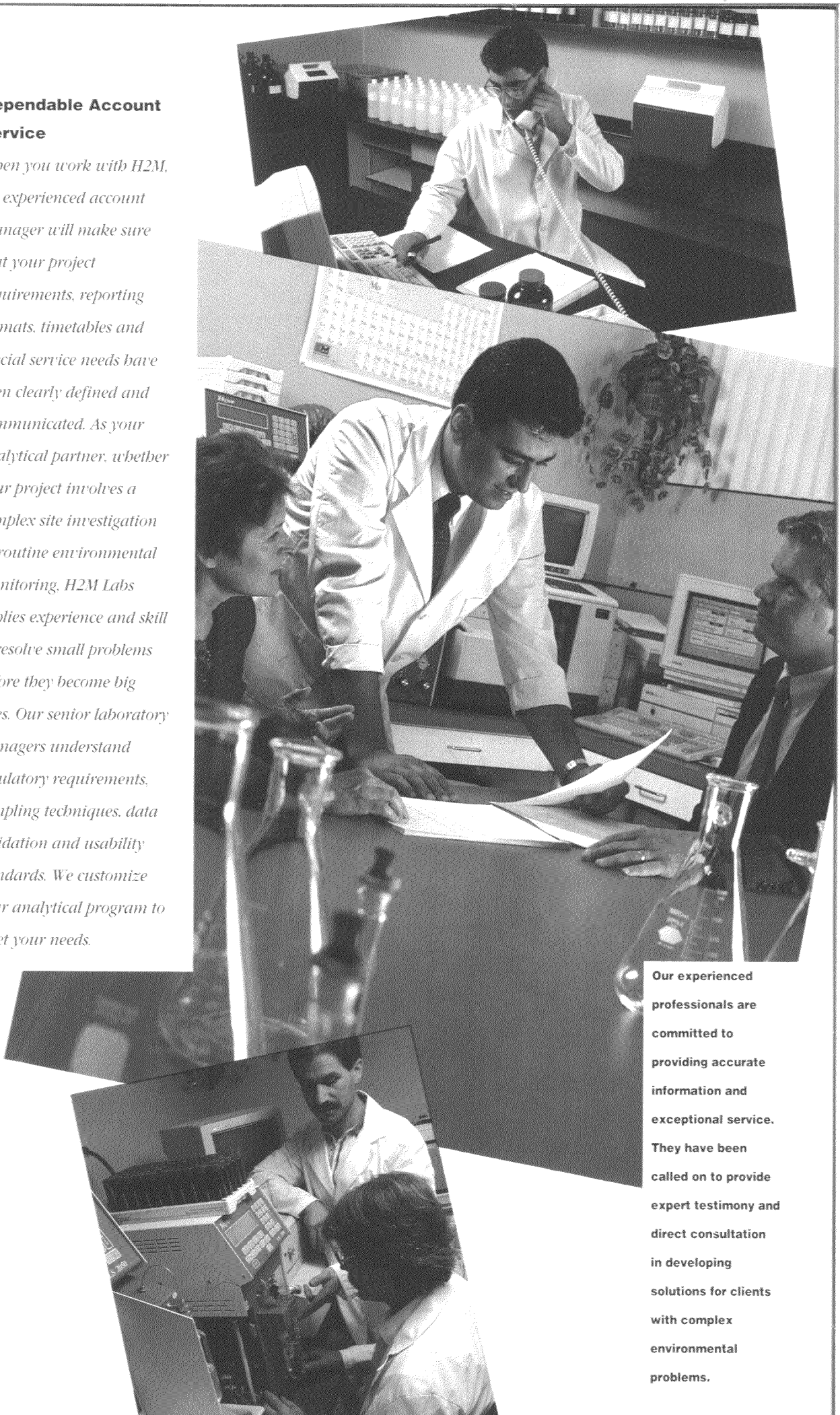
Environmental laboratories are changing. In the last decade, some labs promised far more than they could deliver. In today's exacting business and regulatory climate, a lab must offer you more than the latest analytical instruments. Sample management and reporting systems must be equally sophisticated. The Quality Assurance/Quality Control (QA/QC) program must function smoothly to assure that consistent, legally defensible data is produced on schedule, in a format you can use for informed decision making. The staff must be experienced, involved in continued training, aware of regulatory developments, and committed to meeting your needs. That's the definition of "state of the art" that we use at H2M Labs.



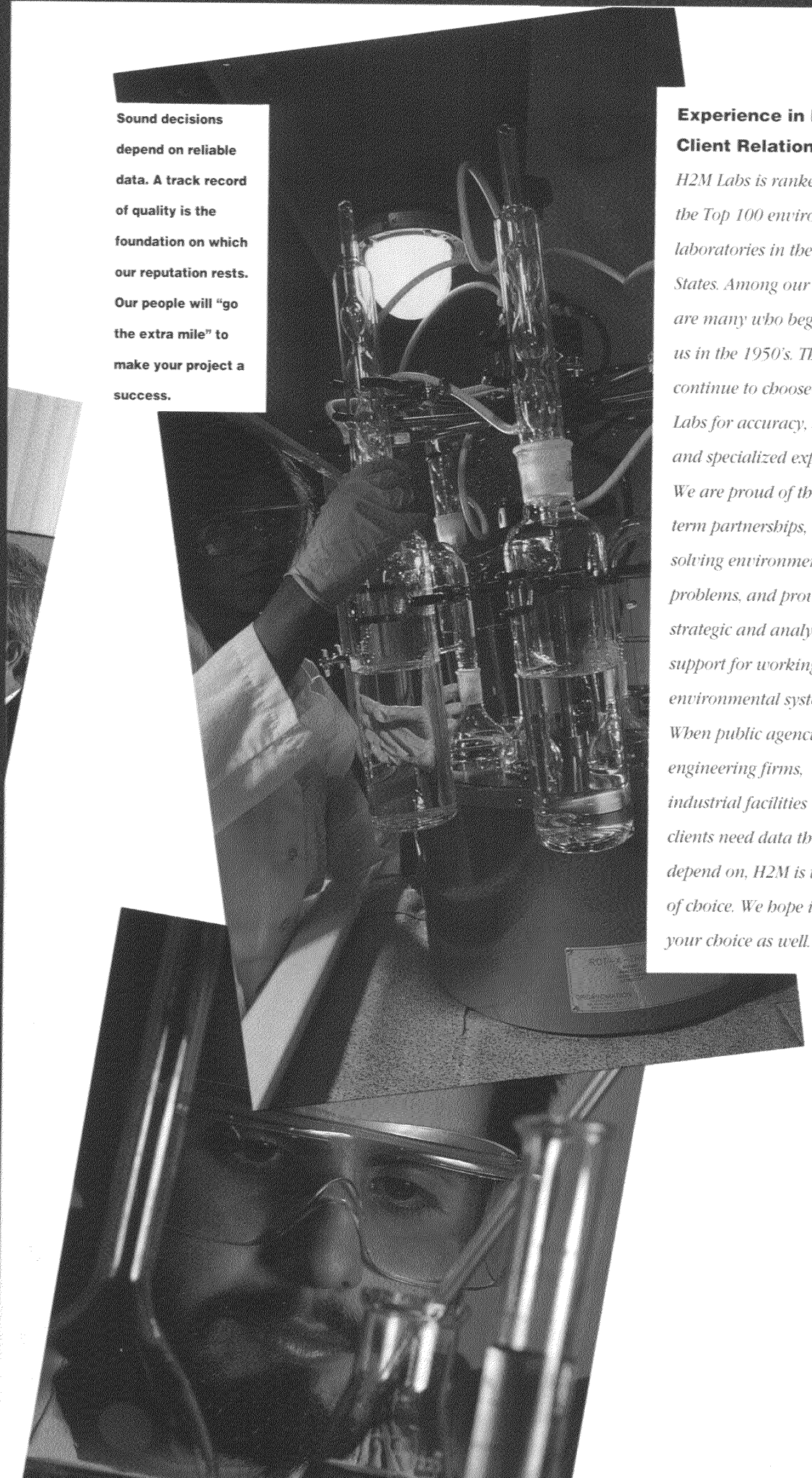
Inductively Coupled Plasma Spectrometer (ICP) and Gas Chromatograph/Mass Spectrometers (GC/MS) are only two of the advanced instruments that H2M Labs can use to meet your analytical needs.

Dependable Account Service

When you work with H2M, an experienced account manager will make sure that your project requirements, reporting formats, timetables and special service needs have been clearly defined and communicated. As your analytical partner, whether your project involves a complex site investigation or routine environmental monitoring, H2M Labs applies experience and skill to resolve small problems before they become big ones. Our senior laboratory managers understand regulatory requirements, sampling techniques, data validation and usability standards. We customize your analytical program to meet your needs.



Our experienced professionals are committed to providing accurate information and exceptional service. They have been called on to provide expert testimony and direct consultation in developing solutions for clients with complex environmental problems.



Sound decisions depend on reliable data. A track record of quality is the foundation on which our reputation rests. Our people will "go the extra mile" to make your project a success.

Experience in Building Client Relationships

H2M Labs is ranked among the Top 100 environmental laboratories in the United States. Among our clients are many who began with us in the 1950's. They continue to choose H2M Labs for accuracy, service, and specialized expertise. We are proud of these long-term partnerships, built on solving environmental problems, and providing strategic and analytical support for working environmental systems. When public agencies, engineering firms, industrial facilities or other clients need data they can depend on, H2M is their lab of choice. We hope it will be your choice as well.

Laboratory Services

H2M Labs is a full service environmental and industrial analytical laboratory offering a wide range of routine and specialized testing programs: full organic and inorganic sample analysis, long and short term field sampling programs, data validation, data interpretation and consultation services. Laboratory facilities are extensive and technologically advanced, including both instrumentation and a proprietary computerized laboratory information management system (LIMS). H2M Labs provides quality analyses for potable/non-potable water, industrial process water, effluents, sewage, soils, air, solid and hazardous waste, leachate, sludges and dredge spoils nationwide. The laboratory serves public and private sector clients from engineering consultants and industrial facilities to municipalities and public agencies.

Water, Wastewater, Soil and Hazardous Waste Analyses	*USEPA and NYS methodologies, including CLP for Target Compound List (TCL); Target Analyte List (TAL); Priority Pollutants (PP); Part 360 Landfill Parameters; Appendix IX; NPDES; ECRA analytical services.*
Waste Characterization (RCRA)	*Ignitability; Corrosivity; Reactivity; Zero-headspace analysis (ZHE); full Toxic Characteristics Leaching Procedure (TCLP); EP Toxicity.*
Petroleum Products Analyses	*Aromatic hydrocarbon screening; petroleum products identification and "finger-printing"; petroleum hydrocarbons quantification by GC, IR, and gravimetric techniques; "STARS"/underground storage tank monitoring.*
Air Analyses	*Organics including volatile organic compounds (VOCs) by adsorbent trapping techniques or whole air sampling (SUMMA® canisters and Tedlar bags); Volatile Organic Sampling Train (VOST); semi-volatile organics such as chlorinated and organophosphorous pesticides; PCBs and polynuclear aromatic hydrocarbons (PAHs); inorganics including metals, formaldehyde, H_2S and SO_2.*
Drinking Water Analyses	*Regulated and unregulated organic compounds such as VOCs, trihalomethanes and trihalomethane potential; synthetic organic compounds (SOCs) including herbicides, pesticides, carbamates by HPLC, PCBs, ethylene dibromide, dibromochloropropane; primary and secondary inorganics including metals, general chemistry analytes, lead solder analysis and microbiological testing; ICR compounds.*

H2M LABS, INC.

An Employee Owned Company

Winter 2001

Lab News

Unregulated Contaminant Monitoring Rule

The **Safe Drinking Water Act** requires community water systems that serve more than 10,000 persons to monitor their water for the presence of unregulated contaminants. The purpose of the monitoring is to collect data to support the EPA's decision whether or not to regulate contaminants, such as those on the Drinking Water Contaminant Candidate List, to protect public health.

The EPA has organized the contaminants into three lists based on the availability of analytical methods to detect their presence in drinking water: *List 1-Assessment Monitoring* consists of 12 chemical contaminants for which there are analytical methods currently available: *List 2-Screening Survey* lists 16 contaminants for which new methods will be used; and *List 3-Prescreening Testing* consists of nine contaminants for which analytical methods are being researched.

H2M Labs is currently approved to conduct testing for List 1-Assessment Monitoring. Two workshops were given at H2M on May 30 and 31, 2001 to inform our clients of UCMR requirements. Sampling frequency, collection procedures, quality control and data reporting and approval procedures were discussed.

For information on future workshops or to learn more about UCMR, contact labs@h2m.com.

New Technology

H2M brought in the millennium with a state of the art Laboratory Information Management System (**LIMS**). The software utilized by H2M is Omega from Khemia, Inc. All lab instrumentation is directly interfaced into the system allowing for enhanced efficiency while improving the quality of the data produced.

This comprehensive system covers report generation, purchasing, chemical inventory, standard preparation, price quotes and invoice generation.

H2M is also implementing a Contract Laboratory Protocol (**CLP**) and Electronic Diskette Deliverable (**EDD**) modules. The CLP database allows for form generation linking the database with the Omega LIMS. Customized electronic deliverables are now produced to meet the diverse needs of our clients.

We now also have the ability to produce full data packages in a CD- ROM format.

H2M is committed to providing our clients with a high quality product in a timely fashion.

Joann M. Slavin, Vice President and Laboratory Manager, was elected chair of the New York Association of Approved Environmental Laboratories

H2M LABS, INC.

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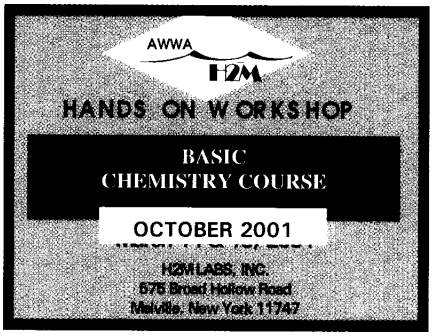
Providing 45 years of environmental analysis with skilled professionals and advanced technology.

Visit us at: www.h2mlabs.com
E-mail: labs@h2m.com

Laboratory Workshop

A Basic Laboratory Skills Workshop was hosted by H2M Labs for the **American Water Works Association** (AWWA) on March 14 and 15, 2001.

The two one-day workshops were well received by the participants, attended primarily by water utility personnel. The course was a practical approach to laboratory analysis, including why and how lab analyses take place. It covered real-world situations such as dealing with customer concerns, calibrating equipment and the importance of the lab data. The hands-on sample analysis aspect of the program was the highlight of the session.



Attendees received a total of **6.0 contact hours** approved by the **New York State Department of Health.** An AWWA Basic Chemistry Course was offered on October 10, 2001.

H2M Receives National Accreditation

H2M Labs is ranked among the nation's 100 largest environmental laboratories. And now, H2M is among the first group of environmental laboratories to receive nationwide accreditation from the **National Environmental Laboratory Accreditation Program** (**NELAP**). The designation "NELAP-accredited" signifies that H2M is now recognized as meeting the highest standards of quality and is in compliance with national standards. To be certified, the laboratory underwent extensive on-site audits and proficiency testing, as well as policy and procedural review by the accrediting authority.

The USEPA-sponsored NELAP certification covers testing under many federal and state programs including the Safe Drinking Water Act, the Clean Water Act, the Clean Air Act and the Resource Conservation Recovery Act.

Business Development

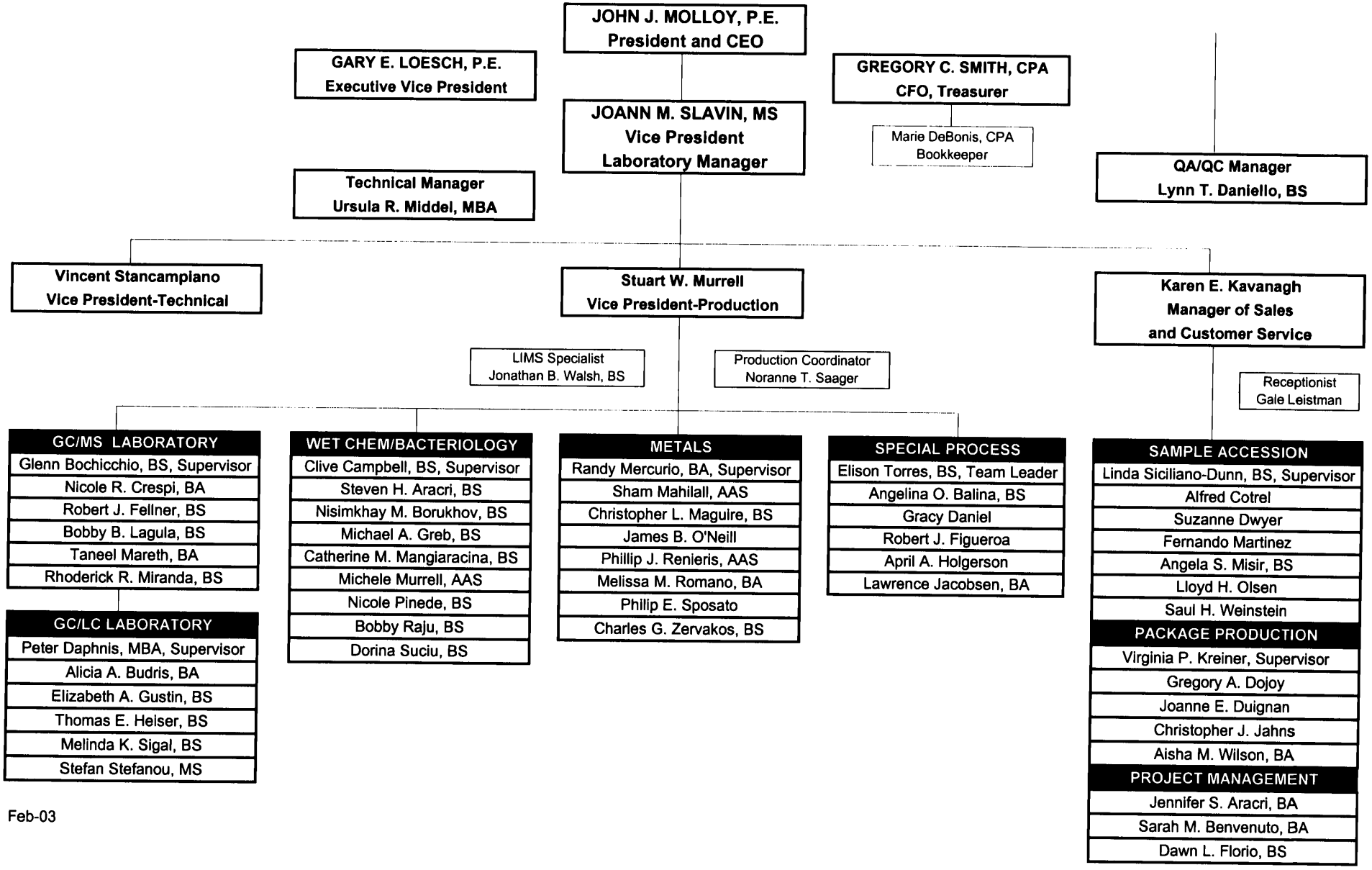
H2M Labs continues to expand its personalized customer relations services and we are pleased to announce our new project manager, Sarah Benvenuto, as an addition to the Client Service Department.

Sarah has a background in communications and human relations.

Please contact Sarah at (631) 694-3040 ext. 1268 or labs@h2m.com to discuss any upcoming projects or "what's new" at H2M.

ORGANIZATION/RESPONSIBILITIES

LAB ORGANIZATION CHART



Feb-03

H2M LABS, INC.

ORGANIZATION AND RESPONSIBILITIES

Laboratory Manager: Joann M. Slavin oversees day-to-day operations of the laboratory.

QA/QC Manager: Lynn T. Daniello reviews data and is responsible for laboratory analyses and quality control (QC).

Production Manager: Stuart M. Murrell oversees the analytical department supervisors. He also prioritizes testing and client invoicing.

Manager of Sales and Customer Service: Karen E. Kavanagh oversees the sample accession/receiving department, package production department, and coordinates project management. She is also responsible for the sales department.

Receiving Supervisor: Linda Siciliano-Dunn coordinates bottle preparation and sample receipt, serves as sample custodian, and ensures proper execution of chain-of-custody procedures.

Technical Manager: Ursula R. Middel provides technical guidance and data review of CLP sample packages for completeness and compliance with CLP requirement.

GC/MS Supervisor: Glenn K. Bocchicchio supervises the operation of the GC/MS laboratory. He reviews analyses and QC data.

GC/LC Supervisor: Peter Daphnis supervises the operations of the GC laboratory. He reviews GC analyses and QC data.

Metals Supervisor: Randy J. Mercurio supervises the metals laboratory and reviews analyses and QC data.

Special Process Supervisor: Ellison L. Torres supervises sample preparation procedures for both inorganic and organic analyses, and RCRA characteristic procedures.

Wet Chemistry Supervisor: Clive M. Campbell supervises the wet chemistry and bacteriology laboratories, and reviews analyses and QC data.

In both the Organics and Inorganics Departments, H2M scientists perform analyses under direct management of the supervisors. The responsibility of the scientists is to perform analyses according to established and documented procedures, calibrate and maintain equipment and adhere to all quality control requirements.

All new employees receive supervised training when they report for duty. Depending upon the work required of these individuals, the training period varies. Training new employees includes a review of laboratory techniques, safety requirements and intensive on-the-job training. After a four-month review period, the new employee's progress will be reviewed. To keep H2M employees current on new techniques, they are encouraged to attend seminars and conferences on subjects and techniques beneficial to their job requirements. Employees on H2M's more sophisticated equipment are encouraged to attend specialized training by the instrument manufacturers.

RESUMES

H2M LABS, INC.

JOHN J. MOLLOY, P.E.

President and CEO

PROFESSIONAL EXPERIENCE

H2M (1974 - Present)

EDUCATION

B.E., Chemical Engineering, Manhattan College, 1967

REGISTRATIONS/ CERTIFICATIONS

Licensed Professional Engineer, New York (1977)

Director, Environmental Laboratory Approval Program -New York, New Jersey, Connecticut, Massachusetts, Pennsylvania and Delaware

Certified Health and Safety Operations at Hazardous Waste Sites (OSHA)

Dale Carnegie Leadership Training for Managers Course, 2000

OFFICES

American Council of Independent Laboratories [ACIL]:
Secretary, Board of Directors 2002-present
Board of Directors-Environmental Section, 2000 – 2001
Eastern Division:
Chairman, 1996-1997
Secretary/Treasurer, 2000–2001

New York State Association of Approved Environmental Laboratories
Director, 1989 –1995
Chairman, 1989 –1993

Town of Huntington Chamber of Commerce:
Director, 1989 –1995
Committee for Better Government:
Vice-Chairman, 2000 – 2001
Director, 1995 – 2001

Town of Hempstead
Business Council, 1989-1992

Boys Scouts of America Suffolk County Council
Director, 1995 –2001

MEMBERSHIPS

American Water Works Association

Environmental Management Association

Long Island Water Conference

National Society of Professional Engineers

New York State Society of Professional Engineers

Water Environmental Federation

Mr. Molloy is President and Chief Executive Officer of the H2M group of firms that includes: Holzmacher, McLendon & Murrell, P.C.; H2M Labs, Inc.; H2M Associates, Inc.; H2M Architects & Engineers, Inc. and H2M Construction Management, Inc. Mr. Molloy is responsible for all facets of corporate management including administration, finance; staffing and budgeting; planning and development; and marketing.

In his professional capacity with Holzmacher, McLendon & Murrell, P.C., Mr. Molloy directs engineering programs for a wide-array of the firm's clients. His experience includes all phases of project engineering and management including feasibility studies, pilot studies, planning studies, cost estimating, design services and construction management. Mr. Molloy has provided professional services to government and industrial clients covering most spheres of environmental engineering, air pollution control; water and wastewater; and, solid and hazardous waste management.

Since assuming direction of H2M Labs, Inc. in the late 1970's, Mr. Molloy has been the key principal responsible for its growth and development, overseeing all aspects of management including planning; budgeting; sales and marketing; and quality control and quality assurance.

Mr. Molloy began his professional career as a project engineer in the chemical process industry. He has also served as an air pollution control engineer for the City of New York where he was involved in the testing and evaluation of air emissions for industrial processes. With H2M he has been responsible for the assessment of numerous industrial sites. The extent and severity of site contamination has been assessed both privately and with regulatory agency overview. He has worked on programs throughout the eastern region of the United States that have included soil borings and analysis, groundwater monitoring well installation, sampling and analysis, and remediation. The projects have varied in scope from Phase I and Phase II real estate liability assessments through formal remedial investigation and feasibility studies at hazardous waste sites.

Mr. Molloy has participated in and managed hundreds of projects relating to water quality protection, supply, treatment and system development; industrial wastewater treatment; hazardous and solid waste management; and, site evaluation and remediation. He was the project manager for a major Long Island water project to remove volatile organic compounds by air stripping. This five million gallon per day system became operational in the spring of 1985 and was one of the first such treatment systems in the region. Mr. Molloy has applied his treatment expertise to many additional applications for contaminated public supply wells and groundwater remediation projects, employing air strippers, as well as carbon adsorption units.

JOHN J. MOLLOY, P.E.

(continued)

PROFESSIONAL PAPERS:

Molloy, John J. and John E. Osborn. **Hazardous Waste, Soil & Groundwater Contamination: The Law, Strategies and Technology Solutions for the 1990s.** National Asbestos Council, Pittsburgh, Pennsylvania, April 1991.

Molloy, John J. **Industrial Property Transactions: Protecting Yourself Against the Liabilities.** Institute for International Research Environmental Compliance Conference, Chicago, Illinois, October 1990.

Molloy, John J. **Industrial Property Transactions.** New York Water Pollution Control Association, Inc., New York, New York, January 1990.

Molloy, John J. **Air Stripping for Organics.** American Water Works Association, Toronto, Canada, April 1985.

Mr. Molloy serves in the capacity of H2M's project director for the following water supply clients. In all cases, water supply is obtained from a sole-source aquifer that has been impacted by contamination and where treatment has been implemented.

- Hicksville Water District -- Ongoing contract for professional engineering services covering water supply, treatment, storage and distribution for this community of 48,000.
- South Huntington Water District -- Ongoing contract for professional engineering services covering water supply, treatment, storage and distribution for this community of 55,000.

Mr. Molloy also serves in the capacity of H2M's Principal-in-Charge for a number of key programs and clients. He brings 30 years of professional experience in all areas of engineering, planning and the environmental sciences. His input and direction is essential in a wide variety of the firm's engagements and is applied in solving clients' issues and problems. ■

H2M LABS, INC.

JOANN M. SLAVIN

Vice President, Laboratory Manager

PROFESSIONAL EXPERIENCE

H2M (1980 - Present)

EDUCATION

M.S., Toxicology, St. John's University 1984

B.S., Toxicology, St. John's University 1980

Dale Carnegie Leadership training for Managers, 2000

Certified Health and Safety Operations at Hazardous Waste Sites (OSHA)

OFFICES

H2M Labs, Inc. Board of Directors

New York State Association of Approved Environmental Laboratories - Director (1999 to present)

New York State Association of Approved Environmental Laboratories - Board of Directors (1995 to present)

New York State Association of Approved Environmental Laboratories - Secretary/Treasurer (1997 - 1999)

MEMBERSHIPS

American Chemical Society

American Chemical Society - Safety and Health Section

American Council for Independent Laboratories

New York Association of Approved Environmental Laboratories

Former Memberships:

American Academy for the Advancement of Science

American Society of Mass Spectroscopy

International Association of Quality Circles, Long Island Chapter

New York Academy of Sciences

Rho Chi Pharmaceutical Honor Society

Society of Forensic Toxicologists

PUBLISHED PAPER

Slavin, Joann M., Ursula R. Middel and Ellen R. Kelly. **Environmental Chemistry and Analysis of Regulated Compounds.** Environmental Science & Technology Handbook, Government Institutes, Inc., 1994.

As vice president and laboratory manager, Ms. Slavin is responsible for and directs all laboratory operations and activities. She maintains all records for laboratory operations, including reports, billing and purchasing. She is responsible for all contract administration and serves as liaison between lab and client. She directs 65 scientists and technicians, and manages the programs necessary to conduct the organic, inorganic and bacteriological services of the laboratory. She also reviews and supervises the methods, protocols and guidelines for sample collection and analysis based upon USEPA and state contract requirements and chain-of-custody procedures.

Ms. Slavins' responsibilities include the day to day management of laboratory procedures and reporting of results. Her duties include the monitoring of performance standard in QC and QA, monitoring the validity of the analysis performed in the laboratory and the data generated to assure reliable results and to provide technical guidance and educational direction to the laboratory staff.

Ms. Slavin is currently the Chair of the New York Association of Approved Environmental Laboratories (NYAAEL) and a member of the Technical Affairs Committee which meets with state agencies such as NYS Department of Health Environmental Laboratory Approval Program (ELAP) and NYSDEC to provide technical guidance on regulatory issues that impact the environmental testing industry.

As the Laboratory's safety officer, OSHA representative and trained toxicologist, Ms. Slavin supervises all aspects of occupational safety and health programs. She has designed safety protocols for the safe handling and disposal of hazardous materials. She has completed the OSHA 40 hour hazardous materials training course and maintains the certification with yearly eight hour refresher training.

Ms. Slavin attended a course on the interpretation of mass spectra at the Finnigan Institute. She reviews the identifications of non-targeted components in the GC/MS Laboratory. She also attended a course in Denver, Colorado on the compliance criteria for inorganic and organic USEPA CLP data packages. She also attended two USEPA-sponsored seminars/symposia discussing CLP and associated criteria and a training course in Total Quality Management (TQM).

Prior experience includes QA Manager of the laboratory, GC/MS supervisor for volatile and semi-volatile organics; analysis of pesticides, PCBs, herbicides, volatiles and semi-volatile organics by GC and priority pollutant and HSL by GC/MS; semi-volatile, pesticides and herbicide sample preparation and clean-up procedures. ■

H2M LABS, INC.

LYNN T. DANIELLO

QA/QC Manager

PROFESSIONAL EXPERIENCE

H2M (1984 - Present)

EDUCATION

Graduate study in Geophysics, Texas A&M University

B.S., Earth Science, Adelphi University

MEMBERSHIPS

American Society for Quality

American Water Works Association

Ms. Daniello's responsibilities include the day-to-day management of laboratory procedures and reporting of results. Her duties include the monitoring of performance standards in QC and QA, monitoring the validity of the analysis performed in the laboratory and the data generated to assure reliable results and to provide technical guidance and education and direction to the laboratory staff. Ms. Daniello is responsible for the NELAC certification, coordination of performance evaluation studies and maintaining certifications in varying states.

She is project officer and primary contact for our routine analytical services contract with the New York City Department of Sanitation. She has successfully completed courses in Microsoft Access for the development of automating various client electronic deliverables.

Prior experience at H2M included wet chemical analyses on water and wastewater samples. She is proficient in both routine and CLP analyses, reporting for phenols, cyanide and metals, and the operation of the Technicon inorganic analyzer. She assisted in the bacteriology laboratory in recording and interpreting results. She successfully completed an Applied Research Laboratories 3410 ICP training course and the New York State Department of Health basic environmental health course. ■

H2M LABS, INC.

VINCENT STANCAMPIANO

Vice President, Technical Advisor

PROFESSIONAL EXPERIENCE

H2M (1973 - Present)

EDUCATION

A.A.S., Air and Water Pollution Control, Sullivan County Community College

Sample Collection and Laboratory Training, U.S. Environmental Protection Agency

Air and Water Sample Collection and Testing Procedures, New York City Laboratories

MEMBERSHIP:

American Association for the Advancement of Science

American Society of Military Engineers

Mr. Stancampiano is a technical advisor and client liaison for major accounts and has assisted clients in negotiations with regulatory agencies. His strong technical background and comprehensive understanding of the environmental field make Mr. Stancampiano a highly successful client ombudsman. He also consults with potential clients to define and discuss their analytical and regulatory compliance needs. Mr. Stancampiano's years of scientific experience, together with his extensive knowledge of the laboratory's capabilities, make him uniquely qualified to present the services of H2M Labs, Inc.

As an experienced data validator, Mr. Stancampiano reviews the metals and inorganic parameter data packages for compliance with USEPA Contract Laboratory Protocol. He also has extensive experience conducting laboratory audits to ensure that laboratories meet regulatory or contract compliance.

He formerly served as H2M's Supervisor of Inorganic Chemistry where he supervised laboratory technicians in analyses of water, sewage and industrial/hazardous wastes, metals, flash point, ignitability, EP TOX (extraction procedure), corrosivity and toxicity tests; automated analyses for inorganic constituents via Technicon and total organic carbon analysis via Dohrmann Envirotech TOC analyzer. ■

H2M LABS, INC.

STUART W. MURRELL

Vice President, Production Manager

PROFESSIONAL EXPERIENCE

H2M (1975 - Present)

EDUCATION

Course work in Business Management, State University of New York at Farmingdale

COURSES

SQL*LIMS - Key Personnel, Training and Advanced Training

MS Access

Mr. Murrell has 26 years of laboratory experience at H2M. His responsibilities encompass production oversight of all analytical departments. This includes prioritizing testing, ensuring all analyses are performed within holding times, and liaison with service departments. He assists in the planning and scheduling of analytical events, monitors laboratory productivity and acts as liaison with the computer department.

Mr. Murrell monitors production capacity levels in the various departments and monitors on-time performance. He has taken an active and integral part in the developments of the Laboratory Information Management System (LIMS) which is used to manage laboratory operations. ■

H2M LABS, INC.

KAREN E. KAVANAGH

Manager of Sales and Customer Service

PROFESSIONAL EXPERIENCE

H2M (1989 - Present)

EDUCATION

Course work towards B.S., Biology, State University of New York at Stony Brook

Dale Carnegie Course, 2000

Dale Carnegie Sales Training Course, 2002

As Customer Service Manager, Ms. Kavanagh's responsibility includes management of all client related, administrative, project management and package production functions of the laboratory.

In this position, Ms. Kavanagh applies her laboratory background, communication skills and project management experience to coordinate the receiving and package production department functions, as well as provide project management to current clients. She is responsible for preparation of analytical cost quotations and detailed technical laboratory proposals.

Ms. Kavanagh oversees the preparation of the daily status sheet for all chain of custody samples and works with the production manager to monitor the status of these samples as they go through the analytical process.

As primary client liaison for H2M's major engineering, consulting and industrial clients, Ms. Kavanagh provides assistance in the coordination and organization of their analytical services. She works directly with clients to assure the correct methodologies, quality control requirements and deliverables are requested at the inception of each project. She also attends conferences and trade shows as a representative of the laboratory. Ms. Kavanagh is also the laboratory liaison to H2M's large client base of municipal and private water suppliers. She works closely with these clients, providing information regarding new and changing testing requirements.

Ms. Kavanagh's experience includes eight years as an account executive, servicing H2M's large client base. She also has experience in semi-volatile extractions, sample concentration, cleanup and other preparation. She was also responsible for inorganic sample preparation including metals digestions, and performed RCRA testing (flashpoint, reactivity and corrosivity). ■

H2M LABS, INC.

URSULA R. MIDDEL

Scientist VI, Technical Manager

PROFESSIONAL EXPERIENCE

H2M (1977 - Present)

EDUCATION

M.B.A., Business Administration, Dowling College, 1990

Chemical Engineering, Ohm-Polytechnikum, Germany, 1962

MEMBERSHIPS

American Chemical Society, Environmental Division

American Chemical Society-Long Island, Environmental Committee

Delta Mu Delta

AWARDS

H2M Group Employee Excellence Award, 1990

PUBLISHED PAPER

Slavin, Joann M., Ursula R. Middel and Ellen R. Kelly. **Environmental Chemistry and Analysis of Regulated Compounds.** Environmental Science & Technology Handbook, Government Institutes, Inc., 1994.

Ms. Middel is responsible for research for special projects, technical guidance and development, and implementation of new methodologies. This includes keeping instrumentation up to the latest developments. Under her guidance, H2M has excelled in performing many tasks for unusual types of analyses for the United States Environmental Protection Agency (USEPA) Special Analytical Services (SAS) projects. She is also responsible for staff training and updates to the laboratory Standard Operating Procedures manual to include new analyses and revisions.

Ms. Middel conducts a safety orientation seminar for all new employees, as well as in-service seminars on various analytical topics. She is specifically involved with review of the operations of the special process lab for GC and GC/MS sample preparation.

Her responsibilities also include the review of in-house data packages completeness, accuracy and contract compliance for GC and GC/MS analyses. Ms. Middel has successfully completed numerous software training programs and has frequently attended USEPA sponsored seminars on analytical methods and quality assurance. She also gave a technical presentation in environmental symposia (EAS, WTQA).

As former supervisor of the GC laboratory, she developed a comprehensive understanding of New York State Department of Environmental Conservation (NYSDEC) CLP protocols and deliverables. She has participated in a training session for organic data validation given by the NYSDEC. Apart from review of H2M's in-house CLP packages, she has also conducted data validation of data packages from other laboratories for government agencies and engineering firms for organic and radiological tests. Since no USEPA guidelines are available for radiological analyses, she has developed validation protocols for tritium and SIRA C13 testing. Ms. Middel has been instrumental in developing H2M's expertise in air analyses, in particular for low level analyses by sorbent tubes, canisters and VOST tubes well before air analyses were developed in other laboratories. H2M protocols were ahead of the methodologies published by the USEPA.

Her prior experience includes sales engineer for gas chromatographs, QC supervisor in an aircraft factory where she also gained experience in GC installation, repair and application problems, and research in U/TH analysis for Columbia University. ■

H2M LABS, INC.

SUPERVISORS

GC/MS LABORATORY

PROFESSIONAL EXPERIENCE

H2M Labs, Inc., (1984 - Present)

EDUCATION

B.S., Biology, University of Hawaii 1982

SPECIALIZED COURSES

Hewlett Packard Systems Manager
Hewlett Packard Mass Spectral Interpretation
Superincos Quantitation Procedures, Finnigan Mat Institute
Target Compound Analysis - Autoquan, Finnigan Mat Institute

MEMBERSHIP

American Chemical Society

AWARDS

H2M Group Employee Excellence Award, 1990

GC/LC LABORATORY

PROFESSIONAL EXPERIENCE

H2M (1986 - Present)

EDUCATION

M.B.A., St. John's University, 1998
B.A., Chemistry, City University of New York - Queens College 1983

MEMBERSHIP

American Chemical Society

AWARDS

H2M Group Employee Excellence Award, 1989

METALS LABORATORY

PROFESSIONAL EXPERIENCE

H2M (2000-Present)

EDUCATION

B.A., Biology, New York University, 2000

SPECIAL PROCESS LAB

PROFESSIONAL EXPERIE' CE

H2M (1997 to Present)

EDUCATION

B.S., Biochemistry, University of Santo Tomas

GLENN K. BOCHICCHIO, Scientist VI

As supervisor of the GC/MS laboratory, Mr. Bochicchio's responsibilities include scheduling of analyses and staff, quality control, maintenance of instrumentation, calibration and programming of the GC/MS system, interpretation of results, implementation of test protocols and the training and supervision of chemists in the GC/MS laboratory. Prior to supervisor, Mr. Bochicchio is responsible for the analysis of semi-volatile priority pollutants and TCL compounds by GC/MS, analysis and reporting of data, spectra interpretation, data system management and instrumental quality control. He attended a GC/MS in-house training course designed by Hewlett Packard to specifically meet the needs of the laboratory personnel. Mr. Bochicchio has performed wet chemical analysis for sulfate, cyanide, total alkalinity, and dissolved carbon dioxide. In the organic section, he prepared samples for analysis and has conducted instrumental analysis of pesticides, PCB's, and herbicides, including interpretation and reporting of data. Prior experience included wet and instrument analysis of plating solutions, wastewater and treatment operation, and hazardous waste management including collection, transportation, storage and manifestation.

PETER DAPHNIS, Scientist IV

As supervisor of the GC/LC lab, Mr. Daphnis' responsibilities include scheduling of analyses, quality control, maintenance of instrumentation, calibration and programming of the GC and LC systems; interpretation of results; implementation of test protocols, staff training and development, and the supervision of GC and extraction utilizing gas chromatography. He performs set-up, calibration and maintenance of instruments, interprets computer generated reports, review of data, and maintenance of quality control charts. Mr. Daphnis is experienced in the analysis of water and soils using the approved methodologies for the priority pollutants, target compound list and RCRA compounds. He supervises all steps in the analysis, including instrument calibration, sample setup data reductions and reporting following QA/QC protocols and CLP.

RANDY J. MERCURIO, Scientist II

Mr. Mercurio is responsible for the analysis of trace metals by ICP, ICP/MS and GFAA using USEPA methods and CLP reporting. He is also responsible for scheduling of analysis and staff, quality control in the metals department, instrument maintenance and repair, and training of staff and review of CLP inorganic report packages. He maintains inventory of supplies and develops new methods.

ELISON C. TORRES, Scientist II

As Team Leader, Mr. Torres is Mr. Torres is responsible for the coordination and scheduling of the extraction of pesticides/PCBs, herbicides and base neutral and acid extractable compounds. He is experienced in all phases of sample preparation. Previous experience at H2M includes all phases of gas chromatography, drinking water and CLP reporting. He is an expert in the operation and maintenance of Perkin Elmer and Hewlett Packard gas chromatography and particularly adept at troubleshooting and instrument maintenance.

SUPERVISORS

CLIVE M. CAMPBELL, Scientist III

Mr. Cambell's responsibilities include scheduling of analysis and staff, staff training, quality control and supervision of the wet chemistry, automated chemistry and bacteriology laboratories. He oversees the analyses for a variety of inorganic compounds in water, wastewater, soil and hazardous waste; and reviews laboratory reports and CLP data packages for correctness and completeness. Additionally, Mr. Campbell also reviews and implements new analytical methods and instrument maintenance in the wet and auto chemistry sections. Before joining H2M, Mr. Campbell was a Wet Chemistry Supervisor and QA Supervisor.

WET CHEM/BACTERIOLOGY

PROFESSIONAL EXPERIENCE

H2M (2002 - Present)

EDUCATION

B.S., Chemistry, State University of New York at Old Westbury, 1999

LINDA SICILIANO-DUNN, Technician VI

Ms. Siciliano-Dunn supervises a team of seven laboratory assistants and samplers and is the primary laboratory sample custodian. She oversees chain-of-custody procedures, preparation of sample kits, scheduling sampling and sample pick-up and logging samples into the laboratory LIMS system. She also acts as liaison with county health departments and water suppliers regarding changes in monitoring requirements and setting up sampling programs. Prior to this position, Ms. Siciliano-Dunn assisted the laboratory production manager in all phases of laboratory operations and production. Her responsibilities included the input and preliminary review of analytical results, generation of laboratory analytical reports and weekly production of invoices. She also assisted in the month end closing and generated monthly backlog reports. Ms. Siciliano-Dunn was also the project manager for H2M's contract with the New York City Department of Sanitation.

RECEIVING DEPARTMENT

PROFESSIONAL EXPERIENCE

H2M (1993 - Present)

NYTEST (1992 - 1993)

EDUCATION

B.S., Natural Resources, Cornell University, 1992

Total Quality Management Business Training Course

VIRGINIA KREINER, Project Supervisor

Ms. Kreiner is responsible for all aspects of contract-required data deliverables, including organization, packaging, copying and delivery of data packages. She is responsible for package assembly and routing through appropriate channels for typing and QA/QC review. She also generates inorganic CLP packages using Ward Scientific report generating software and prepares Electronic Diskette Deliverables in various formats required by H2M's clients.

PRODUCTION DEPARTMENT

PROFESSIONAL EXPERIENCE

H2M (1999 - Present)

EDUCATION

A.S., Secretarial Science, Queensboro Community College, 1974

PROJECT MANAGEMENT

EXPERIENCE:
H2M (1997 - Present)

EXPERIENCE:
B.A., Biology, State University of New York at Stony Brook, 1997

JENNIFER ARACRI, Scientist I, Project Manager

As project manager, Ms. Aracri assists clients and potential clients with their regulatory and analytical testing needs through completion of the project. She provides assistance in the coordination and organization of analytical services for H2M's major engineering, consulting and industrial clients. She works with clients to assure the correct methodologies, quality control requirements and deliverables are requested at the inception of each project. Ms. Aracri also provides analytical cost quotations to current and potential clients. She was the supervisor of the sample preparation department. She has performed the extraction of environmental samples including semi-volatile GC and GC/MS extractions and concentration, including pesticide, herbicide and semi-volatile compounds, TCLP extractions, and sample cleanup including GPC and Florisil. As supervisor, Ms. Aracri was responsible for scheduling the extractions staff, monitoring work flow to meet tight holding times, maintaining sample prep equipment and instrumentation, and training staff in extraction procedures.

EXPERIENCE:
H2M (2001 - Present)

EXPERIENCE:
B.A., Communications and Human Relations, Western Connecticut State University, 2001

SARAH M. BENVENUTO, Project Manager

Ms. Benvenuto assists clients and potential clients with their regulatory and analytical testing needs through completion of the project. She provides assistance in the coordination and organization of analytical services for a major utility client. She works with them to assure the correct methodologies, quality control requirements and deliverables to meet this regulatory and project requirements.

EXPERIENCE:
H2M (2000 - Present)

EXPERIENCE:
B.S, Geology, State University of New York at Cortland, 1996

DAWN L. FLORIO, Project Manager

Ms. Florio assists clients and potential clients with their regulatory and analytical testing needs through completion of the project. She provides assistance to major clients in the coordination and organization of analytical services, working with them to assure the correct methodologies, quality control requirements and deliverables to meet this regulatory and project requirements. Ms. Florio prepares the daily status report for all chain of custody work received at the laboratory.

FACILITIES/EQUIPMENT

FACILITIES

H2M Labs, Inc. is located at 575 Broad Hollow Road, Melville, New York 11747. Broad Hollow Road is also identified as Route 110. It is conveniently located at Exit 49, South of the Long Island Expressway (Route 495).

The laboratory occupies approximately 10,000 square feet. It is staffed with over 60 technically qualified people whose educational backgrounds vary, depending on specific job functions.

The laboratory currently operates on a staggered shift: Monday to Friday, double shift, 6 a.m. to midnight; Saturday and Sunday, single shift, 9 a.m. to 5 p.m. (except for bacteriology, which is a seven-day per week operation). The sample receiving section is open 7 a.m. to 6 p.m., Monday through Friday. Arrangements for receipt of samples on weekends or after normal hours are made upon request.

The laboratory is subdivided into five sections:

1. Shipping/Receiving
2. Inorganic Chemistry
3. Organic Chemistry (GC)
4. Organic Chemistry (GC/MS)
5. Special Process

The recent acquisition of the Nelson Turbochrone data system, coupled with the Finnegan Formaster data software for Pesticide/PCB, completes our automated reporting system for the CLP reporting requirements. This, along with the Telecations software for metals data and the Aquarius software for the GC/MS data, maximizes the output for the data reporting process.

HANDLING AND DISPOSAL OF HAZARDOUS MATERIALS

The laboratory is aware of the potential hazards associated with handling highly toxic materials. Therefore, a special process laboratory was designed and built to accommodate this type of sample. This area of the laboratory was designed to handle these samples with no significant threat to the safety and health of our staff.

All employees working in this laboratory receive sufficient instruction to allow them to work safety. There are always at least two employees working in this area at the same time.

This facility is equipped with double sets of doors between this section and the rest of the facility. Access is limited to authorized personnel only. Separate areas are provided within the special process laboratory for changing street clothing to special disposable protective clothing. A washer/dryer is used to launder work clothes to prevent transfer of any contamination. A shower area is provided to be utilized at the end of the workday.

The laboratory area was designed to be self-contained to minimize the possibility of contamination. It is supplied with a continuous fresh air supply.

Hoods are available for use and each is designed for specific functions:

- Opening of coolers with sample containers
- Prescreening of samples aliquots taken
- Extraction of sample aliquots
- Evaporation and concentration

The performance of the hoods is monitored on a routine basis. The hoods, manufactured by Kewune, are stainless steel, coved-corner hoods to minimize any absorption of hazardous materials on the work surface. The hood exhausts are filtered through activated carbon filters to prevent contamination of the environment. The water supply of certain hoods is collected and analyzed to assure proper disposal in accordance with government regulations.

Flammable cabinets are equipped for storage of reagents for use in this area, and an additional exhaust vent is provided. The walls and floors of this area are sealed with an epoxy-coated covering to minimize absorption of the surface.

Safety equipment provided in the laboratory includes safety showers, emergency eye washes, fire extinguishers, fire blankets, spill control kits, emergency lighting and self-contained, breathing devices. All standard precautions are taken when analyzing samples such as goggles, gloves and, in certain cases, face masks.

The laboratory is also designed so that the personnel could be viewed while analyses are performed in all areas of the facility. Support equipment is provided outside the laboratory for rescue operations, if necessary.

Samples collected from drum or hazardous waste sites must be disposed of in a proper manner. After analyses, samples that have high concentrations of targeted analytes are segregated and disposed of in the same manner as general lab wastes. This procedure is as follows:

- All laboratory wastes are held in the laboratory in the Article XII room.
- Wastes are segregated by classification (i.e. flammable solvents, corrosive waste, EP toxic metal wastes, and reactive wastes).
- Waste logs are maintained for each waste container. Lab personnel indicate in the log the specific waste being deposited, the volume and date. Each log should be initialed.
- Wastes are held in a Department of Transportation-approved container. The container is properly labeled.
- A waste profile sheet is prepared for each waste shipment.

H2M LABS, INC.

LABORATORY SAFETY

Workers in a laboratory are exposed to a wide variety of hazards, including chemicals, gases, fire or explosion, electric shock and bacteriological contamination. Accidents or injuries are always caused in some way and they can be prevented. The following safety rules are designed to help you work in a safe and accident-free environment. It is incumbent to read and follow these rules. Following these rules is a part of good laboratory practice and will keep the workplace safe for ourselves and co-workers.

- Wearing protective gear (lab coats, gloves and goggles) is required when working with chemicals or hazardous materials. Sandals or open-toe shoes are prohibited in the laboratory.
- Any work involving the use of solvents, toxic or flammable gases or the release of hazardous products must be conducted under the hoods.
- Smoking, eating or drinking is prohibited in all laboratory areas.
- All pipetting should be done by mechanical means, never by mouth.
- All chemical compounds should be considered toxic unless known to be otherwise.
- Acid must be added to water, never the reverse.
- All reagent bottles must be properly labeled.
- Large bottles of corrosive chemicals should be stored below head level and transported in protective carrying containers.
- Chemicals should be stored in the appropriate cabinets and not stored with incompatible chemicals. All gases must be chained in place. Gas tanks should never be stored near a source of heat.
- Be familiar with solvents, reagents and chemicals used in the laboratory by carefully reading the labels prior to usage and following the safety recommendations listed. Additional information on these chemicals is available on the material safety data sheets.
- Employees should know the location and use of emergency showers, eyewash stations, fire extinguishers and all first aid kits.
- In case of accidental contact with corrosive liquids, exposed area should be flushed with copious amounts of water. If the eyes are involved, this flushing should continue for at least 15 minutes. The victim should then be taken to the nearest emergency room.
- Be alert to any unsafe condition that may develop in the lab and notify your supervisor at once.
- Entertaining visitors in the laboratory is prohibited. Visitors must be seen in the lobby, office area or cafeteria.
- Cleanliness and orderliness are important in minimizing accidents in the laboratory.
- No one is to work alone in the laboratory.

H2M LABS, INC.

SAFETY AND HEALTH POLICY

In 1971, Congress enacted the Occupational Safety and Health Act (OSHA) "to assure, so far as possible, every working man and woman in the nation safe and healthful working conditions, and to preserve our human resources." It also declares that "each employee has the duty to comply with safety and health standards, and all rules, regulations and orders are issued pursuant to the OSHA which are applicable to his own actions and conduct."

This company accepts its responsibility for the safety of its personnel. It is our objective to provide a safe and healthful work environment. Prevention is the overall goal of our Safety and Health Plan. We are prepared to take all steps necessary to ensure the safety of our workers.

All safety rules and regulations must be observed at all times and in all areas of the laboratory. Employees are expected to be familiar with the equipment and materials with which they work and expected to use the safety equipment provided. This is a basic responsibility of all employees in the company.

The Section Heads are responsible for ensuring that their departments are in compliance with the health and safety rules of our company. It is their duty to report any noncompliance of the rules and regulations immediately to the Safety Officer. This responsibility does not minimize the responsibility to each employee for her/his safety and the safety of her/his fellow employees. Appropriate corrective action will be taken with those who fail to follow safety rules and regulations.

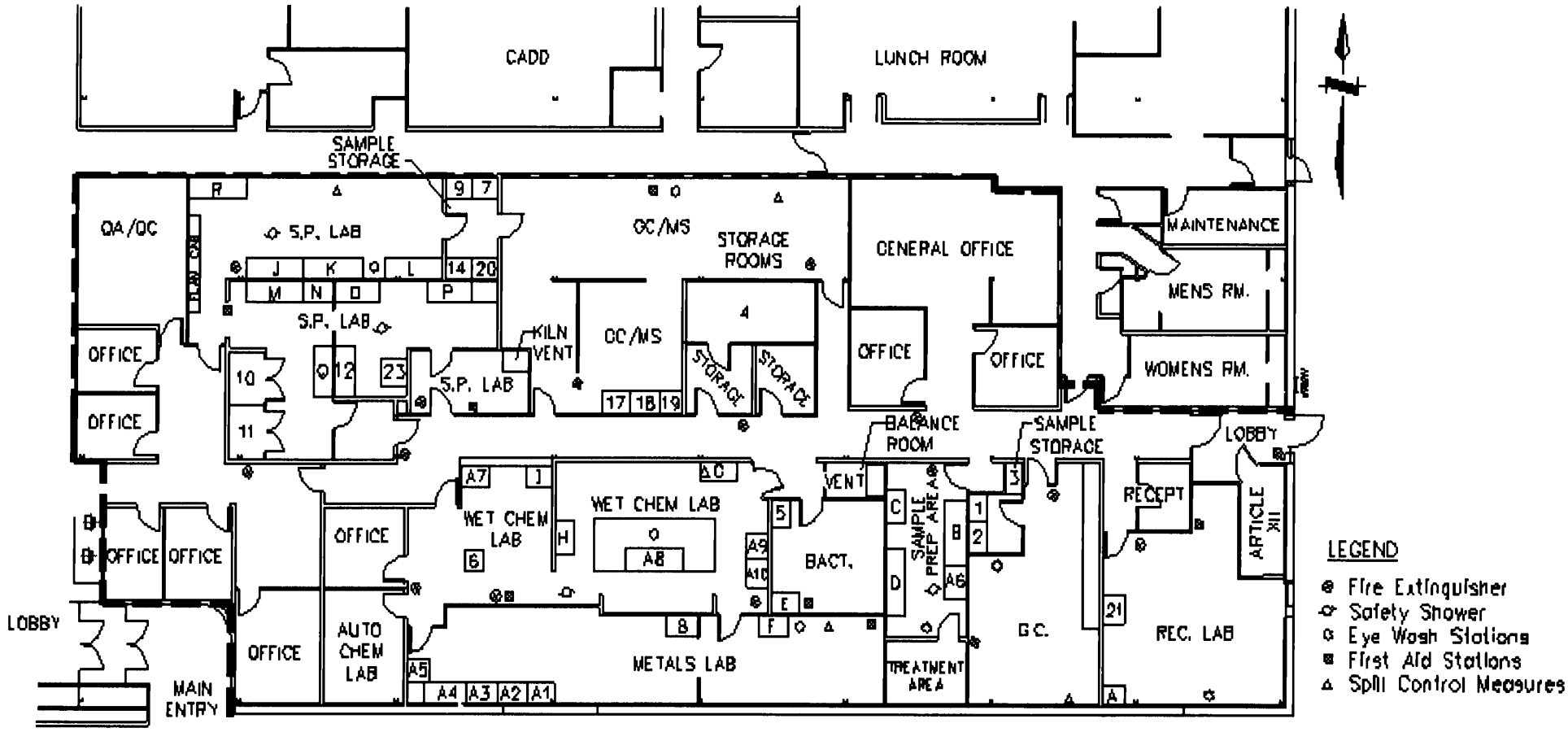
We consider the safety of our personnel to be of primary importance. The cooperation of employees and management in following this policy will provide a safe and healthful environment.

John J. Molloy, P.E.

Joann M. Slavin

This Health and Safety Policy was prepared and in effect 10/30/86. Signed originals are on file and can be supplied upon request.

LABORATORY FLOOR PLAN



REFRIGERATOR NUMBER	REFRIGERATOR NUMBER	CABINET NUMBER (METALS)	FUME HOODS	FUME HOODS (SPECIAL PROCESS)
1 - Standards (GC)	12 - Drinking H2O BNA/Pest Samples	A1 - Water (not digested)	A - Receiving-3' hood	J - 8' hood Concentrations
2 - Potable H2O Samples VOA (GC)	13 - Not in Use	A2 - Water (not digested)	B - Inorganic Sample Prep-8' hood	K - 8' hood
3 - Not in Use	14 - Semi-volatile Extracts Non-Evidentiary	A3 - Furnace Digestate	C - Inorganic Sample Prep-4' hood	I - 8' hood Auto-extractions Standard Prep
4 - Walk-in Refrigerator	15 - Not in Use	A4 - Evening Access	D - Inorganic Sample Prep-8' hood	M - 8' hood w/sink
5 - Bacteriology Lab Samples	16 - Not Currently in Use	A5 - Flame Digestate	E - None	N - 4' hood
6 - Wet Chem Routine	17 - GC/MS Volatile Evidentiary	A6 - Evidentiary Sample Digestate	F - Metals Lab-4' hood	O - 6' hood
7 - Wet Chem	18 - VOA Standards Freezer	A7 - Flame Digestate	G - Wet Chem Lab-5' hood	P - 6' hood Herbicide Extractions
8 - Metals CLP	19 - GC/MS Volatile Non-Evidentiary	A8 - Flame Digestate	H - Wet Chem Lab-5' hood	Q - 6' hood Soil Extractions
9 - BNA Extracts	20 - Semi-VOA Standards Freezer	A9 - Furnace Digestate	I - Wet Chem Lab-4' hood	R 10' hood Atuo Extractions
10- Routine BNA/Pest Samples	21 - Receiving	A10- Furnace Digestate		
11- CLP BNA/Pest Samples	22 Not in Use			
	23 Semi-volatile Extracts			

Note: Limited Access Laboratories (locked) are: GC, GC/MS, Metals, Bacteriology, Special Process
Revised 4/00

H2M LABS, INC.

H2M LABS, INC.

INORGANIC ANALYSIS	MANUFACTURER	NO.	MODEL	YEAR
Balance	Ohaus	1	CS200	2002
	Sartorius	1	1612	1971
	Ohaus	1	SC4010	1997
	Ohaus	1	GT4100	1999
Autoanalyzer with 586 PC w/Printer, AACE Software, Linear Autosampler	Bran & Luebbe	1	TRAACS 800 *2-Channel*	1996
Block Digestors	Westco	1	BD40	1989
	Tecator	1	1015	1977
Halide Analyzer (TOX):				
▪ Purgeable Organic Halide(POX)	Dohrmann Xertex	1	DX-20	1984
▪ Adsorption Module		1	AD-2	1984
▪ Microcoulometrix Analyzer Module		1	MC-1	1984
Refrigerator-Walk-in (16' x 8')		1		1998
Refrigerator-Locking (no spark interior)	Fisher Scientific	1		1984
Refrigerator-Locking	Fisher Scientific	1		1989
Envirotech Organic Analyzer (TOC):	Dohrmann w/autosmplr	1	DC190	1993
▪ Boat Sampling Module		1	183	1991
TOC Analyzer w/Pentium III PC, TOC Talk software and autosampler	Teckmar-Dohrman	1	Apollo 9000	2000
Dissolved Oxygen Meters	Yellow	1	51-A	1975
	Springs Instruments	1	57	1984
COD Apparatus	Hach	1	Micro Block	1988
Centrifuge	Fisher Scientific	1		1957
Drying Ovens	Fisher Scientific	1	CL ISOTEMP500	1980
	Precision Scientific	1	STG80	1992
Dessicator	VWR	1		1997
Muffle Furnace	Thermoline	1	62700	2002
pH Meters	Orion	1	310	
	Orion	1	420A	2000
	Fisher Scientific	1	Accument 10	1993
	Corning	1	Scholar 425	2002
Spectrophotometers	Sequoia-Turner	1	340	1989
	Milton Roy	1	Genesys 5	1995
	Thermo Spectronic	1	Spectronic20Dx	2002
IR Spectrophotometer	Buck	1	HC404	1990
Analytical Nephelometer	Hach	1	2424	1977
Specific Ion Electrodes	Cole Palmer	2	2750231	2000
Midi Cyanide Distillation	Andrews Glass	1	795310-12	1994
Distillation Systems (Phenol and Flouride)	Westco	1	East Dist	1996
Autoclave	Market Forge	3	STM-E Type C	1984,1989,2003
Conductivity Meter	VWR Scientific	2	2052	2000, 2002
Solid Phase Extractor for Oil and Grease	Horizon	1	3000XL	2002
Solid Phase Extractor Controller	Horizon	1	3000XL	2002
Microscope	Nikon	1	Labobot 104	1983
Automatic Pipetting Machine	Scientific Equip. Prod.	1	40	1983,1984
Auto Titrator	Visco	1	Titroline Alpha	1998
Coliform Incubator Bath	Labline	1	Aquabat	2001
Incubators	Fisher Scientific	1	307	1988
	Fisher Scientific	1	[BOD]	1989
	Precision	1	815	2002
Water Purification System	Millipore	1	Alpha Q	1997
Dishwasher	Kenmore	1	Ultrawash 665	2000

Prepared: 4/90 Revised: 1/03

H2M LABS, INC.

ORGANIC ANALYSIS (GC/MS)	MANUFACTURER	NO.	MODEL	YEAR
Computer:	Hewlett Packard	1	5996A	1984
▪ Combined Wiley & NBS Data Base w/Wiswisser Line Notation	Hewlett Packard		59868A	1984
▪ Aquarius Software	Hewlett Packard			1984
▪ Winchester Disk Drive	Hewlett Packard			1984
▪ Printer	Hewlett Packard	5	LaserJet 4	1995
GC/MS A Series Data System w/Micro 24 SPU & 304 Mb Disk Drive:	Hewlett Packard	1	59870C	1990
▪ GC/LC/MS Software	Hewlett Packard	1	59872C	1990
▪ Mass Spectral Library	Hewlett Packard	1	59868C	1990
Chemstation/Enviroquart	Hewlett Packard	5	1701AA	1998
GC Mainframes	Hewlett Packard	2	5890A	1987, 1988
	Hewlett Packard	1	5970	1990
	Hewlett Packard	3	5890 Series II	1995
	Hewlett Packard	2	6890	1998, 2001
MSD Quadropole Bench Top MS	Hewlett Packard	3	5970	1988, 1990
	Hewlett Packard	1	5971	1993
	Hewlett Packard	1	5972	1995
	Hewlett Packard	2	5973	1998, 2001
Graphics Display Terminals	Hewlett Packard	1	2393A	2001
Printers	Hewlett Packard	1	LaserJet 5	1998
	Hewlett Packard	1	LaserJet 4100	2001
Autoinjectors	Hewlett Packard	3	7673A	1989, 1990
	Hewlett Packard	1	7683	2001
	HP Injector Modules	2	18593A	
Automatic Liquid Samplers	Tekmar	2	ALS2016	1988, 1989
	Dynatech	1	PTA-30W/S	1993
	Env. Sample Tech Inc.	1	Archon	1998
	Varian	1	Archon	1998
Cryogenic Cap. Interface	Tekmar	1	M2000	1987
Liquid Sample Concentrators	Tekmar	4	LSC2000	1988, 1989
	O.I. Analytical	2	OI4560	1993
Moisture Control Module	Tekmar	1	14-4700	1990
Tube Desorber for 16 Sorbent Tubes	Envirochem	1	8916	1992
ORGANIC ANALYSIS (GC)	**MANUFACTURER**	**NO.**	**MODEL**	**YEAR**
Gas Chromatographs	Perkin Elmer	1	8500	1988
	Perkin Elmer	2	9000	1991, 1992
	Hewlett Packard	2	5890A	1987,1989
	Hewlett Pakcard	3	6890	1998,2000,2002
GC with Autosampler	Perkin Elmer	1	Autosystem XL	1996
Electrolytic Conductivity Detectors	Perkin Elmer	2	1000	1988,1993
Flame Ionization Detectors	Perkin Elmer	1	N611	1993
PID Photo Ionization Detectors	HNU	2		1988,1993
Electron Capture Detectors	Hewlett Packard	4		87,89,98,00,02
	Perkin Elmer	4		1993,1996
Micro Electron Capture Detectors	Hewlett Packard	6		1998,2000,2002
Nitrogen Phosphorus Detectors	Perkin Elmer	1		1992
Computing Integrators/Data Systems	Hewlett Packard	2	3392A 2-Channel	1987,1989
	Perkin Elmer/Nelson	3	Turbochrom 4,6	1989,92,95,00
Autoinjectors	Hewlett Packard	2	7673A	1987,1989
	Hewlett Packard	3	7683	1998,2000,2002
	Perkin Elmer	2	AutoSys. 9000	1991,1992
Q.C. Software	Chemsoft	1	Clip Wizard	1994
Purging Apparatus	Tekmar	1	LSC-2000	1988
	Tekmar	1	LSC-3000	1994
Automatic Liquid Samplers	Tekmar	1	ALS2050	1990
	Dynatech	1	PTA-30	1994

Prepared: 4/90 Revised: 1/03

H2M LABS, INC.

ORGANIC ANALYSIS (HPLC)	MANUFACTURER	NO.	MODEL	YEAR
HPLC SYSTEM I: Carbamate Analysis 531				
Post Column Derivatizer (used for 531 & 547 Analysis)	Pickering	1	PCX-5200	2001
▪ System Controller	Shimadzu	1	SCL-10AVP	2001
▪ Liquid Chromatograph	Shimadzu	1	LC-10ADVP	2001
▪ Mixer	Shimadzu	1	FCV-10ALVP	2001
▪ Degasser	Shimadzu	1	DGU-14A	2001
▪ Auto Injector	Shimadzu	1	SIL-10ADVP	2001
▪ Fluorescence Detector	Shimadzu	1	RF-10AXL	2001
HPLC SYSTEM I: Glyphosate Analysis 547				
▪ Quartiery Solvent Pump	Hewlett Packard	1	1050	1989
▪ Autosampler	Hewlett Packard	1	1050	1989
▪ Progressive Fluorescence Detector	Shimadzu	1	RF535	1989
HPLC SYSTEM II: Diquat Analysis 549				
▪ Autosampler	Perkin Elmer	1	155 200	1993
▪ Binary LC Pump	Perkin Elmer	1	250	1993
▪ Diode Array Detector	Perkin Elmer	1	235C	1993
Water Purification System	Barnstead	1	Nanopure II	1989
SPECIAL PROCESS/SAMPLE PREP	**MANUFACTURER**	**NO.**	**MODEL**	**YEAR**
Automated GPC System	Zymark	1	Benchmate	1996
GPC Pump	Zymark	1	300	1996
Fraction Collector	Zymark	1	200	1996
Data System	Omega	1		1995
TCLP Tumblers	Environ. Express	1	10-position	1990
	Analytical Testing	1	4-position	1987
Zero Headspace Extractors	Environ. Express	8		1990,1993
	Analytical Testing	4	C-102	1987,1989
UV Detector	Rainin	1	Dynamax	1991
Continuous Liquid/Liquid Extractor	Organomation	3	Rot-X-Tracth	1991,1993,1997
Agitator	Analytical Testing	2	DC-18	1987
Sonic Disruptors	Tekmar	1	TSDB-500	1986
	Tekmar	1	TSD-602	1994
ICC Clinical Centrifuge	Int'l Equipment Co.		ICC Clinical	1985
Sartorius Balance	Brinkmann Instru.	2	1002	1987
Blue M Oven	General Signal	1		1986
Water Bath	Precision Scientific	1	Thelco84	1984
	Lab Line	1		1990
Concentrator	Zymark	1	Turbo-Vap	1996
Turbo-Vap Evaporation Workstations	Zymark	1	200	1989
		1	640	1991
Evaporators	Organomation	1	PN-Evap,12-pos.	1992
Kiln	Cress	2	Firemate FE27	1989, 2002
Automated Solid Phase Extractor	Horizon	2	SPE-DEX 4790	2001
Automoted Solid Phase Extractor Controller	Horizon	1	SPE-DEX	2001
Dry Disk	Horizon	2	SDS-100	2001
Pensky-Martens Flash Point Tester	Petrotest	1	12-1624	2002
METAL ANALYSIS	**MANUFACTURER**	**NO.**	**MODEL**	**YEAR**
Atomic Absorption Spectrophotometer	Varian	1	AA400	1992
Graphite Furnace	Perkin Elmer	1	HGA5100/Zeeman	1988
	Varian	1	AA400/Zeeman	1992
Auto Sampler for Graphite Furnace	Perkin Elmer	1	AS-60	1989
	Varian	1	AA1400	1992
Automated Mercury System	Leeman	1	PS200	1992
Inductively Coupled Plasma (ICP)	ThermoJarrell Ash-61E	1	Trace Simultaneous	1994
Inductively Coupled Plasma (ICP)	ThermoJarrell Ash-61E	1	Trace Sim.- dual view	1996
ICP - MS	ThermoElemental	1	X7	2002
Auto Sampler for ICP-MS	Cetac Technologies	1	ASX-510	2002
EDL Lamp and Supply	Perkin Elmer	1	System 2	1992
	Photron	2	Super Lamp AS/SE	1992
Ultrasonic Nebulizer	Cetac Technologies	1	U5000AT	1999
CLP Reporting Software	Ward	2	Edrwin	1998
Water Bath	Buekel Grant	1	PB-3600	2002
Hotblock	Environmental Express	1	SC154	2002

EXPERIENCE

H2M LABS, INC.

ANALYTICAL SUPPORT SERVICES

CLIENT:
Keyspan Corporation
Brooklyn, New York

CONTACT:
Michael Tucker
Section Manager-Lab Services
(718) 963-5480

CONTRACT AMOUNT:
$250,000 (2001)

COMPLETION:
2001 - 2004

H2M Labs, Inc. is one of a select number of laboratories that have analytical services agreements with **KeySpan Corporation** for work generated from Brooklyn and Long Island, New York locations.

KeySpan, a member of the S&P 500, is the largest distributor of natural gas in the Northeast, with 2.5 million gas customers. KeySpan is also the largest investor-owned electric generator in New York State and operates Long Island Power Authority's electric system serving 1.1 million customers. With headquarters in Brooklyn, Boston and Long Island, KeySpan also manages a dynamic portfolio of service companies.

Various sample streams are generated for a utility company of this size.

- Semi-annual monitoring of 50 groundwater wells for BTEX and PAH constituents
- Analysis of SPDES monitoring samples from various plants and site locations; immediate notification of parameters exceeding permit requirements is necessary for this program
- Used oil sampling for a variety of parameters including BTEX and Total Organic Halogens and Flashpoint
- RCRA closure of Long Island location
- Sediment dredging project
- Manufactured Gas Plant (MGP) Programs

Currently, H2M is providing services for an MGP site on Long Island, which includes: 80 groundwater samples for BTEX and PAHs; 40 soils for TCL volatile and semi-volatile organics; 80 cesspool samples for TCL volatile and semi-volatile organics, and RCRA metals.

H2M LABS, INC.

ANALYTICAL SUPPORT SERVICES

CLIENT:
Conestoga-Rovers & Associates
Niagara Falls, New York

CONTACT:
Denise Anderson
Lead Project Chemist
(716) 297-6150

CONTRACT AMOUNT:
Varies

COMPLETION:
Ongoing since 1989

Conestoga Rovers & Associates (CRA), headquartered in Ontario, Canada, provides consulting engineering services throughout North America. CRA's services include project management, analytical project setup, data validation, and database management for much of the work performed under our **Glenn Springs Holdings, Inc.** analytical services contract.

H2M Labs, Inc. has maintained a strong relationship with CRA since 1989. The following are a selection of ongoing projects:

- Soil sampling site investigation project in New York State for CRA with 1900 soil samples analyzed for arsenic. Ten percent of all samples are also analyzed for additional metals, total organic carbon, and pesticides. All analyses are being conducted according to NYSDEC ASP Category B methodologies and reporting requirements with full disk deliverables in EQuIS format.
- Ongoing quarterly sampling program at a chemical site on Long Island, New York. Analysis is provided for EPA OLM 4.0 Volatile Organics. Full EPA CLP data deliverables are provided along with EQuIS format EDDs. H2M has provided analytical services on this site since 1997.
- In conjunction with ongoing site work in Harriman and Hamptonburgh, New York, analysis includes semi-annual groundwater monitoring program, several rounds of natural attenuation parameter monitoring, soil sampling and test pit programs. H2M has provided analytical services for this site since 1998 and in accordance to NYSDEC ASP methodologies and reporting requirements, with full disk deliverables in EQuIS format.

H2M LABS, INC.

ANALYTICAL SUPPORT SERVICES

CLIENT:
Glenn Springs Holdings, Inc.
Lexington, Kentucky

CONTACT:
Al Meek, Contracts Manager
(859) 543-2100

CONTRACT AMOUNT:
Based on services required
$500,000 (2001) annual average

COMPLETION:
Ongoing since 1998
Current contact - 2003

Occidental Chemical/Glenn Springs Holdings, Inc. (GSHI) is a major national chemical manufacturing corporation. H2M Labs, Inc., one of its few select laboratories, has been under contract with GSHI since 1998 providing all of their national analytical services required.

Analysis provided under this contract ranges from initial Remedial Investigation/Feasibility Study investigations, ongoing landfill and groundwater monitoring projects, SPDES analysis, treatability study programs, and required plant monitoring samples.

Much of the analysis requires Site Specific Parameter List (SSPL) analysis, monitoring for chemicals specific to each plant or site. Many specialized methods are utilized under this contract:

- SSPL Selected Ion Monitoring Micro-extraction Analysis
- Hexachlorobenzene by ECD
- Selected Gas Analysis for Methane, Ethane, Ethene
- Gasoline / Diesel Range Organics (GRO/DRO)
- Formaldehyde by Method 8315
- NAPL and DNAPL testing

Analysis under this contract requires full data package, or batch QC deliverables, with EquIS 4-file format electronic diskette deliverables.

H2M LABS, INC.

ANALYTICAL ANALYSIS

CLIENT:
Shaw Group
Somerset, New Jersey

CONTACT:
Edmund Wysocki
Project Manager
(732) 560-4232

John Golden
GW Task Manager
(732) 560-4227

Michael Murray
SW/SD Task Manger
(732) 469-5599

CONTRACT AMOUNT:
$450,000 - $500,000 per year

COMPLETION:
Ongoing since 1998

Data analysis is performed for the **Fresh Kills Landfill** located in Staten Island, New York. A variety of sample matrices are collected by **Shaw Group** (formerly IT Corporation) including groundwater, surface water, landfill leachate and sediment samples. These samples are analyzed by H2M labs, Inc. for landfill leachate indicator parameters and the Appendix 33 list.

The samples are analyzed and reported with the deliverable requirements of the NYSDEC ASP 10/95 and the Quality Assurance Project Plan (QAPjP). Electronic deliverables are provided in the ITEMS format. The following methods are used:

- Method 95-3: Chlorinated Pesticides/PCBs
- Method 8151: Chlorinated Herbicides
- Method 95-1: Volatile Organics
- Method 95-2: BNAs
- Method 200 series: Metals Analysis
- General Chemistry Methods as per QAPjP

Groundwater samples are collected quarterly. Surface water and sediment samples are collected annually. Additional monthly monitoring of a treatment facility is also performed. As the project has continued, additional analyses have been added, as required, including a project-specific grain size analysis.

SPDES monitoring was performed monthly under this contract for IT Corporation until March 2002, when the responsibilities of monitoring was transferred to another consultant. H2M still provides analytical services under contract with the new firm.

In addition to the regularly scheduled analyses, H2M has provided quick turnaround time analysis and reporting for special sample requests.

H2M LABS, INC.

DATA VALIDATION SERVICES

CLIENT:
New York City
Department of Sanitation
New York City, New York

CONTACT:
Ted Nabavi, CHMM
(212) 837-8458

CONTRACT AMOUNT:
$490,000

COMPLETION:
Ongoing since 1994

Data validation is required for the **New York Department of Sanitation** Leachate Mitigation System Project at **Fresh Kills Landfill.** A variety of matrices are analyzed such as groundwater, surface water, landfill leachate and sediment samples. These samples are analyzed by H2M Labs, Inc. for landfill leachate indicator parameters and the Appendix 33 list.

The samples were analyzed and reported with the deliverable requirements of the NYSDEC ASP 9/89. The following methods were used:

- Method 8081: Chlorinated Pesticides/PCBs
- Method 8151: Chlorinated Herbicides
- Method 8260: Volatile Organics
- Method 8270: BNAs
- Method 8141: Organophosphorus Pesticides
- Method 200 series: Metals Analysis
- General Chemistry Methods as per QAPjP

The validation was performed in compliance with the NYSDEC Remedial Investigation/Feasibility Study data validation requirements in order to determine the validity of the results submitted and to insure compliance with the NYSDEC ASP and the project specific modifications to the ASP. The data validation was completed within two weeks from receipt of the data package from IT Corporation.

In addition to data validation, H2M performed laboratory audits and provided technical assistance to the NYCDOS.

In 1998, the data validation was subcontracted to an independent validator, since H2M won the analytical contract. H2M administers the contract, while direct contact with the validator is through Shaw Group, formerly IT Corporation, to avoid conflict of interest. The current analyses are performed in accordance with NYSDEC ASP 10/95 and the project specific QAPjP.

H2M LABS, INC.

GROUND AND SURFACE WATER COLLECTION

CLIENT:
New York City
Department of Sanitation
New York, New York

CONTACT:
Ted Nabavi, CHMM
(212) 837-8458

CONTRACT AMOUNT:
$2.5 million

COMPLETION:
1989 - 1998

H2M Labs, Inc. performed sampling and analysis in support of the Remedial Investigation/Feasibility Study investigations at **New York City Department of Sanitation's Edgemere Landfill**, Queens, New York.

Matrixes tested include soil, water, sediment and air. Samples collected were analyzed for the following parameters:

- TCL Volatile Organics
- TCL Semi-volatile Organics
- TAL Metals and Cyanide
- TCL Pesticides/PCBs
- General Chemistries to include New York City Bureau of Municipal Waste Parameters

All analysis were analyzed according to New York State Department of Environmental Conservation ASP CLP methodologies and reporting requirements with full disk deliverables.

In addition to the listed parameters, H2M coordinated special sampling events with the New York City Department of Sanitation, including monthly monitoring of an on-site treatment facility, and other miscellaneous requested analyses.

H2M LABS, INC.

GROUNDWATER AND SOIL ANALYSIS

CLIENT:
STV Inc.
New York, New York

CONTACT:
Vincent Frisina
(212) 777-4400

CONTRACT AMOUNT:
$300,000

COMPLETION:
2001

H2M Labs, Inc. performed analysis for **STV, Inc.** in support of the JFK Airport light rail project. Matrixes tested include soil and groundwater samples analyzed for the following:

- TCL Volatile Organics
- TCL Semi-Volatile Organics
- TAL Metals and Cyanide
- TCL Pesticides/PCB
- General Wet Chemistries

All samples are reported utilizing New York State Department of Environmental Conservation ASPB deliverables.

H2M LABS, INC.

CERTIFICATIONS

STATE	CERTIFICATION NUMBER	EXPIRATION DATE	CATEGORIES
New York	10478	4/1/03	Potable, Non-potable, Solid and Hazardous Waste, Air and Emissions, CLP **NELAC Certification**
New Jersey	73158	6/30/04	Microbiology, Chemistry, Metals, Organics
Pennsylvania	68-350	7/1/04	Microbiology, Inorganics, Organics
Massachusetts	M-NY026	6/30/04	Metals, Wet Chemistry, Organics
Connecticut	PH-0435	6/30/03	Bacteria, Inorganic Chemicals, Organic Chemicals
Maryland	208	3/31/03	Metals, Inorganics, Pesticides, VOCs, Herbicides
Louisiana	02056	6/30/03	Metals, Inorganics, Pesticides, VOCs, Herbicides

Individual parameters of certification for each state are indicated on specific certificates. Attached please find copies of New York, Connecticut and Massachusetts certifications. Please contact our office for copies of certifications from any other states.

STATE OF NEW YORK
DEPARTMENT OF HEALTH

Wadsworth Center The Governor Nelson A. Rockefeller Empire State Plaza P.O. Box 509 Albany, New York 12201-0509

Antonia C. Novello, M.D., M.P.H., Dr.P.H.
Commissioner

Dennis P. Whalen
Executive Deputy Commissioner

February 7, 2001

Dear Laboratory Director,

The effective date, nationwide, for granting accreditation under the National Environmental Laboratory Accreditation Program (NELAP) was January 24, 2001. I congratulate you that, effective January 24, 2001, your laboratory is NELAP-accredited, having demonstrated compliance with the National Environmental Laboratory Accreditation Conference (NELAC) standards. New York is your NELAP Primary Accrediting Authority (PAA), either because your laboratory is located in New York, or because your laboratory is in a non-NELAP state and you selected New York as your PAA.

Enclosed are revised certificates of accreditation. They are as follows:

NELAP certificates. These certificates bear the NELAP logo in the bottom right-hand corner, and you have received one certificate for each category of accreditation. These certificates list those fields of testing (EPA Program - Method - Analyte) that are within the scope of NELAC and for which your laboratory has satisfied the NELAC requirements.

ELAP certificates. These certificates do not bear the NELAP logo. They list any remaining fields of testing for which you are accredited in New York, but do not have NELAP accreditation. Those remaining fields of testing are either outside the scope of NELAC, or are within the scope of NELAC but your laboratory has not yet satisfied the NELAC PT requirements or has not provided us with method citations.

Please note that either certificate may also reflect recent accreditation changes based on your PT performance. Your old certificates must now be returned to this office.

Your NELAP certificates will be amended and re-issued any time additional fields of testing are added to your accreditation (e.g., if your laboratory meets the NELAC PT requirements for additional analytes, or provides us with any missing method citations).

The designation "NELAP-accredited" demonstrates that your laboratory is recognized nationally to have met the highest standard of quality. Your laboratory is now permitted, and encouraged, to use the enclosed NELAC logo. The NELAC Standard (Section 6.8) strictly defines and limits the use of "NELAP accreditation" and the NELAC logo. If you would like to receive electronically a high-resolution image of the logo ("tif" format), please e-mail the program office at elap@health.state.ny.us

Please do not hesitate to contact the program office at (518) 485-5570 if you have any questions about your certificates or your NELAP accreditation.

Yours sincerely,

Kenneth W. Jackson, Ph.D.
Director, Environmental Laboratory Approval Program

NYSDOH - WADSWORTH CENTER - ELAP - PO BOX 509 - ALBANY NY 12201-0509
Phone: 518-485-5570 www.wadsworth.org/labcert Fax: 518-485-5568

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Antonia C. Novello, M.D., M.P.H., Dr.P.H. Commissioner

Expires 12:01 AM April 01, 2003
Issued May 08, 2002
Revised September 10, 2002

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. JOHN J. MOLLOY
H2M LABS INC
575 BROAD HOLLOW ROAD
MELVILLE NY 11747 USA

NY Lab Id No: 10478
EPA Lab Code: NY00026

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards for the category ENVIRONMENTAL ANALYSES POTABLE WATER
All approved analytes are listed below:

Drinking Water Bacteriology	
Coliform, Total	40 CFR, 141.21 (F) 6i
	SM18 9221 D
	SM18 9223
Standard Plate Count	SM 18 9215B
Drinking Water Chlorinated Acids	
2,4,5-TP (Silvex)	EPA 515.1
2,4-D	EPA 515.1
Dalapon	EPA 515.1
Dicamba	EPA 515.1
Dinoseb	EPA 515.1
Pentachlorophenol	EPA 515.1
	EPA 525.2
Pichloram	EPA 515.1
Drinking Water Metals I	
Arsenic, Total	EPA 200.7
	EPA 200.8
	EPA 200.9
Barium, Total	EPA 200.7
	EPA 200.8
Cadmium, Total	EPA 200.7
	EPA 200.8
Drinking Water Metals I	
Chromium, Total	EPA 200.7
	EPA 200.8
Copper, Total	EPA 200.7
	EPA 200.8
Iron, Total	EPA 200.7
Lead, Total	EPA 200.8
	EPA 200.9
Manganese, Total	EPA 200.7
	EPA 200.8
Mercury, Total	EPA 200.8
	EPA 245.1
	EPA 245.2
Selenium, Total	EPA 200.8
	EPA 200.9
Silver, Total	EPA 200.7
	EPA 200.8
Sodium, Total	EPA 200.7
Zinc, Total	EPA 200.7
	EPA 200.8
Drinking Water Metals II	
Antimony, Total	EPA 200.8

Serial No.: 17349

Property of the New York State Department of Health. Valid only at the address shown. Must be conspicuously posted. Valid certificates have a raised seal and may be verified by calling (518) 485-5570.

DOH-3317 (3/97)

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Antonia C. Novello, M.D., M.P.H., Dr.P.H. Commissioner

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Drinking Water Metals II

Antimony, Total	EPA 200.9
Beryllium, Total	EPA 200.7
	EPA 200.8
Nickel, Total	EPA 200.7
	EPA 200.8
Thallium, Total	EPA 200.8
	EPA 200.9

Drinking Water Methylcarbamate Pesticides

3-Hydroxy Carbofuran	EPA 531.1
Aldicarb	EPA 531.1
Aldicarb Sulfone	EPA 531.1
Aldicarb Sulfoxide	EPA 531.1
Carbaryl	EPA 531.1
Carbofuran	EPA 531.1
Methomyl	EPA 531.1
Oxamyl	EPA 531.1

Drinking Water Miscellaneous

Benzo(a)pyrene	EPA 525.2
Bis(2-ethylhexyl) phthalate	EPA 525.2
Di (2-ethylhexyl) adipate	EPA 525.2
Diquat	EPA 549.2

Drinking Water Miscellaneous

Glyphosate	EPA 547
Hexachlorobenzene	EPA 525.2
Hexachlorocyclopentadiene	EPA 525.2
Methyl tert-butyl ether	EPA 502.2/NYS MOD (SEE ITEM 198.
	EPA 524.2
PCB,Total (as decachlorobiphenyl)	EPA 508A
Propachlor	EPA 525.2

Drinking Water Non-Metals

Alkalinity	SM18 2320-B
Calcium Hardness	EPA 200.7
Chloride	EPA 325.2
Color	EPA 110.2
	SM 18/19 2120B
Corrosivity	SM 18/19 2330
Cyanide	SM18 4500-CN-E
Fluoride, Total	SM18 4500-F-C
Hydrogen Ion (pH)	EPA 150.1
Nitrate (as N)	EPA 353.2
Silica, Dissolved	EPA 200.7
Solids, Total Dissolved	SM18 2540C
Sulfate (as SO4)	EPA 375.2

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Drinking Water Trihalomethanes	
Dibromochloromethane	EPA 524.2
Microextractibles	
1,2-Dibromo-3-chloropropane	EPA 504.1
1,2-Dibromoethane	EPA 504.1
Polychlorinated Biphenyls	
PCB-1016	EPA 505
	EPA 508.1
	EPA 525.2
PCB-1221	EPA 505
	EPA 508.1
	EPA 525.2
PCB-1232	EPA 505
	EPA 508.1
	EPA 525.2
PCB-1242	EPA 505
	EPA 508.1
	EPA 525.2
PCB-1248	EPA 505
	EPA 508.1
	EPA 525.2
PCB-1254	EPA 505

Polychlorinated Biphenyls	
PCB-1254	EPA 508.1
	EPA 525.2
PCB-1260	EPA 505
	EPA 508.1
	EPA 525.2
Volatile Aromatics	
1,2,3-Trichlorobenzene	EPA 502.2
	EPA 524.2
1,2,4-Trichlorobenzene	EPA 502.2
	EPA 524.2
1,2,4-Trimethylbenzene	EPA 502.2
	EPA 524.2
1,2-Dichlorobenzene	EPA 502.2
	EPA 524.2
1,3,5-Trimethylbenzene	EPA 502.2
	EPA 524.2
1,3-Dichlorobenzene	EPA 502.2
	EPA 524.2
1,4-Dichlorobenzene	EPA 502.2
	EPA 524.2
2-Chlorotoluene	EPA 502.2

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WADSWORTH CENTER

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All approved analytes are listed below:

Volatile Aromatics	
2-Chlorotoluene	EPA 524.2
4-Chlorotoluene	EPA 502.2
	EPA 524.2
Benzene	EPA 502.2
	EPA 524.2
Bromobenzene	EPA 502.2
	EPA 524.2
Chlorobenzene	EPA 502.2
	EPA 524.2
Ethyl benzene	EPA 502.2
	EPA 524.2
Hexachlorobutadiene	EPA 502.2
	EPA 524.2
Isopropylbenzene	EPA 502.2
	EPA 524.2
m-Xylene	EPA 502.2
	EPA 524.2
n-Butylbenzene	EPA 502.2
	EPA 524.2
n-Propylbenzene	EPA 502.2
	EPA 524.2

Volatile Aromatics	
o-Xylene	EPA 502.2
	EPA 524.2
p-Isopropyltoluene (P-Cymene)	EPA 502.2
	EPA 524.2
p-Xylene	EPA 502.2
	EPA 524.2
sec-Butylbenzene	EPA 502.2
	EPA 524.2
Styrene	EPA 502.2
	EPA 524.2
tert-Butylbenzene	EPA 502.2
	EPA 524.2
Toluene	EPA 502.2
	EPA 524.2
Volatile Halocarbons	
1,1,1,2-Tetrachloroethane	EPA 502.2
	EPA 524.2
1,1,1-Trichloroethane	EPA 502.2
	EPA 524.2
1,1,2,2-Tetrachloroethane	EPA 502.2
	EPA 524.2

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DOH-3317 (3/97)

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Antonia C. Novello, M.D., M.P.H., Dr.P.H. Commissioner

Expires 12:01 AM April 01, 2003
Issued May 08, 2002
Revised September 10, 2002

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. JOHN J. MOLLOY
H2M LABS INC
575 BROAD HOLLOW ROAD
MELVILLE NY 11747 USA

NY Lab Id No: 10478
EPA Lab Code: NY00026

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards for the category ENVIRONMENTAL ANALYSES POTABLE WATER
All approved analytes are listed below:

Volatile Halocarbons	
1,1,2-Trichloroethane	EPA 502.2
	EPA 524.2
1,1-Dichloroethane	EPA 502.2
	EPA 524.2
1,1-Dichloroethene	EPA 502.2
	EPA 524.2
1,1-Dichloropropene	EPA 502.2
	EPA 524.2
1,2,3-Trichloropropane	EPA 502.2
	EPA 524.2
1,2-Dichloroethane	EPA 502.2
	EPA 524.2
1,2-Dichloropropane	EPA 502.2
	EPA 524.2
1,3-Dichloropropane	EPA 502.2
	EPA 524.2
2,2-Dichloropropane	EPA 502.2
	EPA 524.2
Bromochloromethane	EPA 502.2
	EPA 524.2
Bromomethane	EPA 502.2

Volatile Halocarbons	
Bromomethane	EPA 524.2
Carbon tetrachloride	EPA 502.2
	EPA 524.2
Chloroethane	EPA 502.2
	EPA 524.2
Chloromethane	EPA 502.2
	EPA 524.2
cis-1,2-Dichloroethene	EPA 502.2
	EPA 524.2
cis-1,3-Dichloropropene	EPA 502.2
	EPA 524.2
Dibromomethane	EPA 502.2
	EPA 524.2
Dichlorodifluoromethane	EPA 502.2
	EPA 524.2
Methylene chloride	EPA 502.2
	EPA 524.2
Tetrachloroethene	EPA 502.2
	EPA 524.2
trans-1,2-Dichloroethene	EPA 502.2
	EPA 524.2

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Volatile Halocarbons

trans-1,3-Dichloropropene	EPA 502.2
	EPA 524.2
Trichloroethene	EPA 502.2
	EPA 524.2
Trichlorofluoromethane	EPA 502.2
	EPA 524.2
Vinyl chloride	EPA 502.2
	EPA 524.2

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ENVIRONMENTAL ANALYSES POTABLE WATER
All approved subcategories and/or analytes are listed below:

Drinking Water Miscellaneous	
Butachlor	EPA 525.2
Drinking Water Non-Metals	
Nitrite (as N)	EPA 353.2
Orthophosphate (as P)	EPA 365.1
	SM18 4500-P E
Specific Conductance	EPA 120.1
	SM18 2510B

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All approved analytes are listed below:

Acrolein and Acrylonitrile

Acrolein	EPA 624
Acrylonitrile	EPA 624

Atrazine and Carbaryl

Atrazine	EPA1978,p 25

Benzidines

3,3 -dichlorobenzidine	EPA 625
Benzidine	EPA 625

Chlorinated Hydrocarbon Pesticides

4,4 -DDE	EPA 608
4,4 -DDT	EPA 608
4,4-DDD	EPA 608
Aldrin	EPA 608
alpha-BHC	EPA 608
beta-BHC	EPA 608
Captan	SM18 6630B
Chlordane Total	EPA 608
delta-BHC	EPA 608
Dichloran	SM18 6630B
Dieldrin	EPA 608
Endosulfan I	EPA 608
Endosulfan II	EPA 608
Endosulfan sulfate	EPA 608
Endrin	EPA 608

Chlorinated Hydrocarbon Pesticides

Endrin aldehyde	EPA 608
Heptachlor	EPA 608
Heptachlor epoxide	EPA 608
Lindane	EPA 608
Methoxychlor	SM18 6630B
Mirex	SM18 6630B
PCNB	SM18 6630C
Strobane	SM18 6630C
Toxaphene	EPA 608
Trifluralin	SM18 6630B

Chlorinated Hydrocarbons

1,2,4-Trichlorobenzene	EPA 625
2-Chloronaphthalene	EPA 625
Hexachlorobenzene	EPA 625
Hexachlorobutadiene	EPA 625
Hexachlorocyclopentadiene	EPA 625
Hexachloroethane	EPA 625

Chlorophenoxy Acid Pesticides

2,4,5-T	EPA 1978, p.115
	SM18 6640B
2,4,5-TP (Silvex)	EPA 1978, p.115
	SM18 6640B
2,4-D	EPA 1978, p.115

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Chlorophenoxy Acid Pesticides	
2,4-D	SM18 6640B
Dicamba	EPA 1978, p.115
Demand	
Biochemical Oxygen Demand	EPA 405.1
Chemical Oxygen Demand	EPA 410.4
Haloethers	
4-Bromophenylphenyl ether	EPA 625
4-Chlorophenylphenyl ether	EPA 625
Bis (2-chloroisopropyl) ether	EPA 625
Bis(2-chloroethoxy)methane	EPA 625
Bis(2-chloroethyl)ether	EPA 625
Mineral	
Acidity	EPA 305.1
Alkalinity	EPA 310.1
Calcium Hardness	EPA 200.7
Chloride	EPA 325.2
Fluoride, Total	EPA 340.2
Hardness, Total	EPA 130.2
	EPA 200.7
Sulfate (as SO4)	EPA 375.1
	EPA 375.4
Nitroaromatics and Isophorone	
2,4-Dinitrotoluene	EPA 625
2,6-Dinitrotoluene	EPA 625
Isophorone	EPA 625
Nitrobenzene	EPA 625
Nitrosoamines	
N-Nitrosodimethylamine	EPA 625
N-Nitrosodi-n-propylamine	EPA 625
N-Nitrosodiphenylamine	EPA 625
Nutrient	
Ammonia (as N)	EPA 350.1
	EPA 350.2
	EPA 350.3
Kjeldahl Nitrogen, Total	EPA 351.2
Nitrate (as N)	EPA 353.2
Orthophosphate (as P)	EPA 365.1
	EPA 365.2
Phosphorus, Total	EPA 365.1
	EPA 365.2
Organophosphate Pesticides	
Azinphos methyl	EPA1978,p.25
Demeton-O	EPA1978,p.25
Demeton-S	SM15, p.S51
Diazinon	EPA1978,p.25

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Organophosphate Pesticides	
Disulfoton	EPA1978,p.25
Malathion	EPA1978,p.25
Parathion ethyl	EPA1978,p.25
Parathion methyl	EPA1978,p.25
Phthalate Esters	
Benzyl butyl phthalate	EPA 625
Bis(2-ethylhexyl) phthalate	EPA 625
Diethyl phthalate	EPA 625
Dimethyl phthalate	EPA 625
Di-n-butyl phthalate	EPA 625
Di-n-octyl phthalate	EPA 625
Polychlorinated Biphenyls	
PCB-1016	EPA 608
PCB-1221	EPA 608
PCB-1232	EPA 608
PCB-1242	EPA 608
PCB-1248	EPA 608
PCB-1254	EPA 608
PCB-1260	EPA 608
Polynuclear Aromatics	
Acenaphthene	EPA 625
Acenaphthylene	EPA 625
Anthracene	EPA 625
Polynuclear Aromatics	
Benzo(a)anthracene	EPA 625
Benzo(a)pyrene	EPA 625
Benzo(b)fluoranthene	EPA 625
Benzo(ghi)perylene	EPA 625
Benzo(k)fluoranthene	EPA 625
Chrysene	EPA 625
Dibenzo(a,h)anthracene	EPA 625
Fluoranthene	EPA 625
Fluorene	EPA 625
Indeno(1,2,3-cd)pyrene	EPA 625
Naphthalene	EPA 625
Phenanthrene	EPA 625
Pyrene	EPA 625
Priority Pollutant Phenols	
2,4,5-Trichlorophenol	CLP 95-2
	SW-846 8270C
2,4,6-Trichlorophenol	EPA 625
2,4-Dichlorophenol	EPA 625
2,4-Dimethylphenol	EPA 625
2,4-Dinitrophenol	EPA 625
2-Chlorophenol	EPA 625
2-Methyl-4,6-dinitrophenol	EPA 625
2-Nitrophenol	EPA 625

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Priority Pollutant Phenols	
4-Chloro-3-methylphenol	EPA 625
4-Nitrophenol	EPA 625
Pentachlorophenol	EPA 625
Phenol	EPA 625
Purgeable Aromatics	
1,2-Dichlorobenzene	EPA 601
	EPA 602
	EPA 624
	EPA 625
1,3-Dichlorobenzene	EPA 601
	EPA 602
	EPA 624
	EPA 625
1,4-Dichlorobenzene	EPA 601
	EPA 602
	EPA 624
	EPA 625
Benzene	EPA 602
	EPA 624
Chlorobenzene	EPA 601
	EPA 602
	EPA 624
Ethyl benzene	EPA 602

Purgeable Aromatics	
Ethyl benzene	EPA 624
Toluene	EPA 602
	EPA 624
Total Xylenes	EPA 602
	EPA 624
Purgeable Halocarbons	
1,1,1-Trichloroethane	EPA 601
	EPA 624
1,1,2,2-Tetrachloroethane	EPA 601
	EPA 624
1,1,2-Trichloroethane	EPA 601
	EPA 624
1,1-Dichloroethane	EPA 601
	EPA 624
1,1-Dichloroethene	EPA 601
	EPA 624
1,2-Dichloroethane	EPA 601
	EPA 624
1,2-Dichloroethene (total)	EPA 601
	EPA 624
1,2-Dichloropropane	EPA 601
	EPA 624
2-Chloroethylvinyl ether	EPA 601

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Purgeable Halocarbons	
2-Chloroethylvinyl ether	EPA 624
Bromodichloromethane	EPA 601
	EPA 624
Bromoform	EPA 601
	EPA 624
Bromomethane	EPA 601
	EPA 624
Carbon tetrachloride	EPA 601
	EPA 624
Chloroethane	EPA 601
	EPA 624
Chloroform	EPA 601
	EPA 624
Chloromethane	EPA 601
	EPA 624
cis-1,3-Dichloropropene	EPA 601
	EPA 624
Dibromochloromethane	EPA 601
	EPA 624
Dichlorodifluoromethane	EPA 601
	EPA 624
Methylene chloride	EPA 601
	EPA 624
Tetrachloroethene	EPA 601

Purgeable Halocarbons	
Tetrachloroethene	EPA 624
trans-1,3-Dichloropropene	EPA 601
	EPA 624
Trichloroethene	EPA 601
	EPA 624
Trichlorofluoromethane	EPA 601
	EPA 624
Vinyl chloride	EPA 601
	EPA 624
Residue	
Solids, Total	EPA 160.3
Solids, Total Dissolved	EPA 160.1
Solids, Total Suspended	EPA 160.2
Volatile Chlorinated Organics	
Benzyl chloride	EPA 1978, p. 130
Wastewater Bacteriology	
Coliform, fecal	SM18, 9221 E - MPN
Coliform, Total	SM18, 9221B - MPN
Standard Plate Count	SM 18 9215B
Wastewater Metals I	
Barium, Total	EPA 200.7
	EPA 200.8

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All approved analytes are listed below:

Wastewater Metals I	
Cadmium, Total	EPA 200.7
	EPA 200.8
Calcium, Total	EPA 200.7
Chromium, Total	EPA 200.7
	EPA 200.8
Copper, Total	EPA 200.7
	EPA 200.8
Iron, Total	EPA 200.7
Lead, Total	EPA 200.7
	EPA 200.8
Magnesium, Total	EPA 200.7
Manganese, Total	EPA 200.7
	EPA 200.8
Nickel, Total	EPA 200.7
	EPA 200.8
Potassium, Total	EPA 200.7
Silver, Total	EPA 200.7
	EPA 200.8
Sodium, Total	EPA 200.7
Wastewater Metals II	
Aluminum, Total	EPA 200.7
	EPA 200.8
Antimony, Total	EPA 200.7

Wastewater Metals II	
Antimony, Total	EPA 200.8
Arsenic, Total	EPA 200.7
	EPA 200.8
Beryllium, Total	EPA 200.7
	EPA 200.8
Mercury, Total	EPA 200.8
	EPA 245.1
	EPA 245.2
Selenium, Total	EPA 200.7
	EPA 200.8
Vanadium, Total	EPA 200.7
	EPA 200.8
Zinc, Total	EPA 200.7
	EPA 200.8
Wastewater Metals III	
Cobalt, Total	EPA 200.7
	EPA 200.8
Gold, Total	EPA 231.1
Molybdenum, Total	EPA 200.7
Thallium, Total	EPA 200.7
	EPA 200.8
Tin, Total	EPA 200.7
Titanium, Total	EPA 200.7

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All approved analytes are listed below:

Wastewater Miscellaneous

Boron, Total	EPA 200.7
Bromide	EPA 320.1
Color	SM 18/19 2120B
Corrosivity	SM 18/19 2330
Cyanide, Total	EPA 335.2
Hydrogen Ion (pH)	EPA 150.1
Oil & Grease Total Recoverabl	EPA 1664-A
	EPA 413.1
Organic Carbon, Total	EPA 415.1
Phenols	EPA 420.1
Silica, Dissolved	EPA 200.7
Specific Conductance	EPA 120.1
Sulfide (as S)	EPA 376.1
Surfactant (MBAS)	EPA 425.1
Temperature	EPA 170.1

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ENVIRONMENTAL ANALYSES NON POTABLE WATER
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Chlorinated Hydrocarbon Pesticides	
Isodrin	SM15, p. S73
Nutrient	
Nitrite (as N)	EPA 353.2
	EPA 354.1
TCLP Additional Compounds	
Cresol	SW-846 8270C
Methylethyl ketone (2-butanon	SW-846 8015 B
	SW-846 8260B
Pyridine	SW-846 8270C
	SW-846 8260B
Wastewater Metals II	
Chromium VI	EPA 200.7
	SM 18 3500-CrD

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All approved analytes are listed below:

Acrolein and Acrylonitrile

Acrolein	SW-846 8260B
Acrylonitrile	SW-846 8260B

Characteristic Testing

Corrosivity	SW846 1110
E.P. Toxicity	SW846 1310
Ignitability	SW846 1010
Reactivity	SW846 Ch7, Sec. 7.3
TCLP	FED REG 1311

Chlorinated Hydrocarbon Pesticides

4,4 -DDE	SW-846 8081A
4,4 -DDT	SW-846 8081A
4,4-DDD	SW-846 8081A
Aldrin	SW-846 8081A
alpha-BHC	SW-846 8081A
beta-BHC	SW-846 8081A
Chlordane Total	SW-846 8081A
delta-BHC	SW-846 8081A
Dieldrin	SW-846 8081A
Endosulfan I	SW-846 8081A
Endosulfan II	SW-846 8081A
Endosulfan sulfate	SW-846 8081A
Endrin	SW-846 8081A
Endrin aldehyde	SW-846 8081A

Chlorinated Hydrocarbon Pesticides

Heptachlor	SW-846 8081A
Heptachlor epoxide	SW-846 8081A
Lindane	SW-846 8081A
Methoxychlor	SW-846 8081A
Toxaphene	SW-846 8081A

Chlorinated Hydrocarbons

1,2,4-Trichlorobenzene	SW-846 8270C
2-Chloronaphthalene	SW-846 8270C
Hexachlorobenzene	SW-846 8270C
Hexachlorobutadiene	SW-846 8270C
Hexachlorocyclopentadiene	SW-846 8270C
Hexachloroethane	SW-846 8270C

Chlorophenoxy Acid Pesticides

2,4,5-T	SW846 8151-A
2,4,5-TP (Silvex)	SW846 8151-A
2,4-D	SW846 8151-A
Dicamba	SW846 8151-A

Haloethers

Bis (2-chloroisopropyl) ether	SW-846 8270C
Bis(2-chloroethoxy)methane	SW-846 8270C

Metals I

Barium, Total	SW-846 6010B

Serial No.: 16399

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DOH-3317 (3/97)

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Antonia C. Novello, M.D., M.P.H., Dr.P.H. Commissioner

Expires 12:01 AM April 01, 2003
Issued May 08, 2002
Revised July 05, 2002

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. JOHN J. MOLLOY
H2M LABS INC
575 BROAD HOLLOW ROAD
MELVILLE NY 11747 USA

NY Lab Id No: 10478
EPA Lab Code: NY00026

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards for the category ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved analytes are listed below:

Metals I	
Barium, Total	SW-846 6020
Cadmium, Total	SW-846 6010B
	SW-846 6020
Chromium, Total	SW-846 6010B
	SW-846 6020
Lead, Total	SW-846 6010B
	SW-846 6020
Nickel, Total	SW-846 6010B
	SW-846 6020
Silver, Total	SW-846 6010B
	SW-846 6020
	SW-846 7760A
Metals II	
Antimony, Total	SW-846 6010B
	SW-846 6020
Arsenic, Total	SW-846 6010B
	SW-846 6020
Selenium, Total	SW-846 6010B
	SW-846 6020
Miscellaneous	
Cyanide, Total	SW-846 9010B
Hydrogen Ion (pH)	SW-846 9040B
	SW-846 9045C

Miscellaneous	
Lead in Paint	ASTM D-3335-85A
	SW-846 6010B
Sulfide (as S)	SW-846 9030B
Nitroaromatics and Isophorone	
2,4-Dinitrotoluene	SW-846 8270C
2,6-Dinitrotoluene	SW-846 8270C
Isophorone	CLP 95-2
	SW-846 8270C
Nitrobenzene	SW-846 8270C
Organophosphate Pesticides	
Azinphos methyl	SW846 8141A
Demeton-O	SW846 8141A
Demeton-S	SW846 8141A
Diazinon	SW846 8141A
Disulfoton	SW846 8141A
Malathion	SW846 8141A
Parathion ethyl	SW846 8141A
Parathion methyl	SW846 8141A
Phthalate Esters	
Benzyl butyl phthalate	SW-846 8270C
Bis(2-ethylhexyl) phthalate	SW-846 8270C
Diethyl phthalate	SW-846 8270C
Dimethyl phthalate	SW-846 8270C

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All approved analytes are listed below:

Phthalate Esters	
Di-n-butyl phthalate	SW-846 8270C
Di-n-octyl phthalate	SW-846 8270C
Polychlorinated Biphenyls	
PCB-1016	SW-846 8082
PCB-1221	SW-846 8082
PCB-1232	SW-846 8082
PCB-1242	SW-846 8082
PCB-1248	SW-846 8082
PCB-1254	SW-846 8082
PCB-1260	SW-846 8082
Polynuclear Aromatic Hydrocarbons	
Acenaphthene	SW-846 8270C
Acenaphthylene	SW-846 8270C
Anthracene	SW-846 8270C
Benzo(a)anthracene	SW-846 8270C
Benzo(a)pyrene	SW-846 8270C
Benzo(b)fluoranthene	SW-846 8270C
Benzo(ghi)perylene	SW-846 8270C
Chrysene	SW-846 8270C
Dibenzo(a,h)anthracene	SW-846 8270C
Fluoranthene	SW-846 8270C
Fluorene	SW-846 8270C
Indeno(1,2,3-cd)pyrene	SW-846 8270C

Polynuclear Aromatic Hydrocarbons	
Naphthalene	SW-846 8270C
Phenanthrene	SW-846 8270C
Pyrene	SW-846 8270C
Priority Pollutant Phenols	
2,4,6-Trichlorophenol	SW-846 8270C
2,4-Dichlorophenol	SW-846 8270C
2,4-Dimethylphenol	SW-846 8270C
2,4-Dinitrophenol	SW-846 8270C
2-Chlorophenol	SW-846 8270C
2-Methyl-4,6-dinitrophenol	SW-846 8270C
2-Nitrophenol	SW-846 8270C
4-Chloro-3-methylphenol	SW-846 8270C
4-Nitrophenol	SW-846 8270C
Pentachlorophenol	SW-846 8270C
Phenol	SW-846 8270C
Purgeable Aromatics	
1,2-Dichlorobenzene	SW-846 8021B
	SW-846 8260B
1,3-Dichlorobenzene	SW-846 8021B
	SW-846 8260B
1,4-Dichlorobenzene	SW-846 8021B
	SW-846 8260B

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is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards for the category ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved analytes are listed below:

Purgeable Halocarbons

Bromomethane	SW-846 8021B
	SW-846 8260B

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ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved subcategories and/or analytes are listed below:

Metals II	
Chromium VI	SW-846 7196A
Mercury, Total	SW846 7470A
	SW846 7471A
Purgeable Aromatics	
Benzene	SW-846 8021B
	SW-846 8260B
Chlorobenzene	SW-846 8021B
	SW-846 8260B
Ethyl benzene	SW-846 8021B
	SW-846 8260B
Toluene	SW-846 8021B
	SW-846 8260B
Total Xylenes	SW-846 8021B
	SW-846 8260B
Purgeable Halocarbons	
1,1,1-Trichloroethane	SW-846 8021B
	SW-846 8260B
1,1,2,2-Tetrachloroethane	SW-846 8021B
	SW-846 8260B
1,1,2-Trichloroethane	SW-846 8021B
	SW-846 8260B
1,1-Dichloroethane	SW-846 8021B
	SW-846 8260B

Purgeable Halocarbons	
1,1-Dichloroethene	SW-846 8021B
	SW-846 8260B
1,2-Dichloroethane	SW-846 8021B
	SW-846 8260B
1,2-Dichloropropane	SW-846 8021B
	SW-846 8260B
2-Chloroethylvinyl ether	SW-846 8021B
	SW-846 8260B
Bromodichloromethane	SW-846 8021B
	SW-846 8260B
Bromoform	SW-846 8021B
	SW-846 8260B
Carbon tetrachloride	SW-846 8021B
	SW-846 8260B
Chloroethane	SW-846 8021B
	SW-846 8260B
Chloroform	SW-846 8021B
	SW-846 8260B
Chloromethane	SW-846 8021B
	SW-846 8260B
cis-1,3-Dichloropropene	SW-846 8021B
	SW-846 8260B
Dibromochloromethane	SW-846 8021B
	SW-846 8260B

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ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved subcategories and/or analytes are listed below:

Purgeable Halocarbons

Dichlorodifluoromethane	SW-846 8021B
	SW-846 8260B
Methylene chloride	SW-846 8021B
	SW-846 8260B
Tetrachloroethene	SW-846 8021B
	SW-846 8260B
trans-1,3-Dichloropropene	SW-846 8021B
	SW-846 8260B
Trichloroethene	SW-846 8021B
	SW-846 8260B
Trichlorofluoromethane	SW-846 8021B
	SW-846 8260B
Vinyl chloride	SW-846 8021B
	SW-846 8260B

Volatile Chlorinate Organics

Benzyl chloride	Method Not Specified

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All approved analytes are listed below:

Chlorinated Hydrocarbon Pesticides	
4,4 -DDT	NIOSH 2, VOL. 3 S274
Aldrin	NIOSH 4, VOL. 1 5502
Chlordane Total	NYS DOH APC-34
Dieldrin	NIOSH 2, VOL. 3 S283
Endrin	NIOSH 2, VOL. 6 S284
Heptachlor	NIOSH 2, VOL. 5 S287
Lindane	NIOSH 4, VOL. 1 5502
Toxaphene	NIOSH 2, VOL. 2 S67
Chlorinated Hydrocarbons	
1,2,4-Trichlorobenzene	EPA TO-14
Hexachlorobutadiene	EPA TO-14
Metals I	
Lead, Total	EPA 200.7
	EPA 239.1
Metals II	
Mercury, Total	EPA 245.1
Miscellaneous Air	
Formaldehyde	MASA 2 116
Polychlorinated Biphenyls	
PCB-1016	NYS DOH 311-1
PCB-1221	NYS DOH 311-1
PCB-1232	NYS DOH 311-1
Polychlorinated Biphenyls	
PCB-1242	NYS DOH 311-1
PCB-1248	NYS DOH 311-1
PCB-1254	NYS DOH 311-1
PCB-1260	NYS DOH 311-1
Polynuclear Aromatics	
Benzo(a)pyrene	40 CFR PART 50 1984 APP B
Naphthalene	EPA TO-14
Purgeable Aromatics	
1,2-Dichlorobenzene	40 CFR PART 60 1984 METH 18
	EPA TO-14
1,4-Dichlorobenzene	40 CFR PART 60 1984 METH 18
	EPA TO-14
Benzene	40 CFR PART 60 1984 METH 18
Chlorobenzene	EPA TO-14
Ethyl benzene	40 CFR PART 60 1984 METH 18
Toluene	EPA TO-14
Total Xylenes	40 CFR PART 60 1984 METH 18
Purgeable Halocarbons	
1,1,2,2-Tetrachloroethane	EPA TO-14
1,1-Dichloroethane	EPA TO-14
1,1-Dichloroethene	40 CFR PART 60 1984 METH 18
1,2-Dichloroethane	EPA TO-14
1,2-Dichloropropane	40 CFR PART 60 1984 METH 18

Serial No.: 16401

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DOH-3317 (3/97)

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

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575 BROAD HOLLOW ROAD
MELVILLE NY 11747 USA

NY Lab Id No: 10478
EPA Lab Code: NY00026

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards for the category ENVIRONMENTAL ANALYSES AIR AND EMISSIONS
All approved analytes are listed below:

Purgeable Halocarbons

Carbon tetrachloride	40 CFR PART 60 1984 METH 18
Chloroform	40 CFR PART 60 1984 METH 18
Methylene chloride	EPA TO-14
Tetrachloroethene	EPA TO-14
Vinyl chloride	40 CFR, PART 61 1984 APP. B METH

Serial No.: 16401

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DOH-3317 (3/97)

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H2M LABS INC
575 BROAD HOLLOW ROAD
MELVILLE NY 11747 USA

NY Lab Id No: 10478
EPA Lab Code: NY00026

is hereby APPROVED as an Environmental Laboratory for the category
ENVIRONMENTAL ANALYSES ANALYTICAL SERVICES PROTOCOL
All approved subcategories and/or analytes are listed below:

CLP PCB/Pesticides
CLP Semi-Volatile Organics
CLP Volatile Organics
CLP Inorganics

Serial No.: 16402

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DOH-3317 (3/97)

State of Connecticut, Department of Public Health

Approved Environmental Laboratory

THIS IS TO CERTIFY THAT THE LABORATORY DESCRIBED BELOW HAS BEEN APPROVED BY THE STATE DEPARTMENT OF PUBLIC HEALTH PURSUANT TO APPLICABLE PROVISIONS OF THE PUBLIC HEALTH CODE AND GENERAL STATUTES OF CONNECTICUT, FOR MAKING THE EXAMINATIONS, DETERMINATIONS OR TESTS SPECIFIED BELOW WHICH HAVE BEEN AUTHORIZED IN WRITING BY THAT DEPARTMENT

H2M LABS, INC.

LOCATED AT 575 Broad Hollow Road IN Melville, New York 11747

AND REGISTERED IN THE NAME OF John J. Molloy

THIS CERTIFICATE IS ISSUED IN THE NAME OF John J. Molloy WHO HAS BEEN DESIGNATED BY THE REGISTRANT TO BE IN CHARGE OF THE LABORATORY WORK COVERED BY THIS CERTIFICATE OF APPROVAL AS FOLLOWS:

POTABLE WATER, WASTEWATER, SOLID WASTE/SOIL
Examination for:
BACTERIA
INORGANIC CHEMICALS
ORGANIC CHEMICALS

PAINT CHIPS
Examination for:
LEAD

SEE COMPUTER PRINT-OUT FOR SPECIFIC TESTS APPROVED

THIS CERTIFICATE EXPIRES JUNE 30, 2003 AND IS REVOCABLE FOR CAUSE BY THE STATE DEPARTMENT OF PUBLIC HEALTH

DATED AT HARTFORD, CONNECTICUT, THIS 2nd DAY OF July 2001

PH- 0435

Thomas K. Sturgeon

DIRECTOR, DIVISION OF ENVIRONMENTAL HEALTH

CONNECTICUT DEPARTMENT OF PUBLIC HEALTH
BUREAU OF REGULATORY SERVICES
410 CAPITOL AVENUE
HARTFORD, CT 06134
ENVIRONMENTAL LABORATORY CERTIFICATION SECTION

H2M LABS, INC.

CT PUBLIC HEALTH APPROVAL NUMBER:
PH- 0435

DATE ISSUED: July 25, 2001
EXPIRATION DATE: June 30 , 2003

ADDRESS:
575 Broad Hollow Road
Melville, NY 11747

DIRECTOR:
John J. Molloy

CO-DIRECTOR(S):

REGISTRANT:
John J. Molloy

Reviewed and Approved by Supervising Environmental Lab Consultant:
Nicholas P. Macellatti Jr.

APPROVED ANALYTES LIST

[TESTS *APPROVED* INDICATED BY "✓"]

	POTABLE WATER	WASTEWATER	SOLID WASTE/SOIL
MICROBIOLOGY			
Total Coliform			
a. Membrane Filter Technique			
b. Chromogenic/Fluorogenic Substrate Test - Colilert	✓		
c. Chromogenic/Fluorogenic Substrate Test - Colisure			
d. Multiple Tube Fermentation	✓	✓	
e. E*Colite Test			
f. m-ColiBlue24 Test			
g. Presence/Absence Technique			
Fecal Coliform			
a. Membrane Filter Technique			
b. Multiple Tube Fermentation		✓	
Fecal Streptococcus			
a. Membrane Filter Technique			
b. Multiple Tube Fermentation			

APPROVED ANALYTES LIST

[TESTS *APPROVED* INDICATED BY "✓"]

	POTABLE WATER	WASTEWATER	SOLID WASTE/SOIL
MICROBIOLOGY			
Enterococcus			
a. Membrane Filter Technique			
b. Enterolert			
Heterotrophic Plate Count			
a. Pour Plate Method	✓	✓	
b. Spread Plate Method			
c. Membrane Filter Method			
Other			
a. Microscopic Particulate Analysis			
b. Giardia			
c. Cryptosporidium			
d. Plankton			

APPROVED ANALYTES LIST

[TESTS *APPROVED* INDICATED BY "✓"]

	POTABLE WATER	WASTEWATER	SOLID WASTE/SOIL
CHEMISTRY			
Inorganic Chemicals:			
Physical Exams:			
Color	✓	✓	
Odor			
Turbidity			
pH	✓	✓	
Conductivity	✓	✓	✓
Temperature		✓	
Minerals:			
Acidity		✓	
Alkalinity	✓	✓	
Hardness (Ca)	✓	✓	
Hardness (Total)		✓	
Sulfate		✓	
Sulfide		✓	
Sulfite		✓	
Bromide			
Chloride	✓	✓	✓
Fluoride	✓	✓	
Chlorine			
Nutrients:			
Ammonia		✓	
Kjeldahl Nitrogen		✓	
Nitrate	✓	✓	
Nitrite	✓	✓	
Ortho-phosphate	✓	✓	
Total Phosphorus		✓	

ENVIRONMENTAL LABORATORY CERTIFICATION SECTION

APPROVED ANALYTES LIST

[TESTS *APPROVED* INDICATED BY "✓"]

	POTABLE WATER	WASTEWATER	SOLID WASTE/SOIL
Demands:			
BOD		✓	
COD		✓	
TOC		✓	
CBOD			
Metals:			
Aluminum			
Antimony	✓	✓	
Arsenic	✓	✓	✓
Barium	✓	✓	✓
Beryllium	✓	✓	
Boron		✓	
Cadmium	✓	✓	✓
Calcium		✓	
Chromium	✓	✓	
Cobalt		✓	✓
Copper	✓	✓	
Iron	✓	✓	
Lead	✓	✓	
Magnesium		✓	
Manganese	✓	✓	
Mercury	✓	✓	
Molybdenum		✓	
Nickel	✓	✓	✓
Potassium		✓	
Selenium	✓	✓	
Silver	✓	✓	✓
Sodium	✓	✓	✓
Strontium		✓	
Thallium	✓	✓	
Tin		✓	
Titanium		✓	
Vanadium		✓	
Zinc	✓	✓	

APPROVED ANALYTES LIST

[TESTS *APPROVED* INDICATED BY "✓"]

	POTABLE WATER	WASTEWATER	SOLID WASTE/SOIL
Miscellaneous:			
Total Solids		✓	
Total Dissolved Solids	✓	✓	
Total Volatile Solids			
Total Suspended Solids		✓	
Chromium VI		✓	
Cyanide	✓	✓	✓
Silica	✓	✓	✓
Surfactants		✓	
Ignitability			
Corrosivity	✓		✓
			✓

Environmental Lead:	
Paint Chips	✓
Dust Wipes	
Soil	

	POTABLE WATER	WASTEWATER	SOLID WASTE/SOIL
Inorganic Disinfection Byproducts			
Organic Chemicals:			
Miscellaneous:			
Acrolein & Acrylonitrile		✓	✓
Base/Neutrals & Acids		✓	✓
Benzidine			
Chlorinated Hydrocarbons		✓	✓
Dioxins & Furans			
Haloacetic Acids			
Haloethers			
Herbicides	✓	✓	✓
Naphthalene		✓	✓

APPROVED ANALYTES LIST

[TESTS *APPROVED* INDICATED BY "✓"]

	POTABLE WATER	WASTEWATER	SOLID WASTE/SOIL
Organic Chemicals:			
Miscellaneous: (Continued)			
Nitroaromatics/Isophorone		✓	✓
Nitrosamines		✓	
PCBs	✓	✓	
PCBs in Oil			
Perchlorate			
Pesticides	✓		
Phenols/Phenolics		✓	✓
Phthalate Esters		✓	✓
PAHs	✓	✓	✓
Purgeable Aromatics	✓	✓	✓
Purgeable Halocarbons	✓	✓	✓
		✓	✓
ETPH		✓	✓
Oil &Grease			
TPH			
TOX			
Gross Hydrocarbons			
Organic Disinfection ByProducts			

APPROVED ANALYTES LIST

[TESTS *APPROVED* INDICATED BY "✓"]

~ Drinking Water:

SYNTHETIC ORGANIC CHEMICALS

PHASE II

Alachlor	✓
Aldicarb	✓
Aldicarb Sulfoxide	✓
Aldicarb Sulfone	✓
Atrazine	✓
Carbofuran	✓
Chlordane	✓
Dibromochloropropane	✓
2,4-D	✓
Ethylene Dibromide	✓
Heptachlor	✓
Heptachlor epoxide	✓
Lindane	✓
Methoxychlor	✓
PCBs	✓
PCB (as DCB)	✓
Pentachlorophenol	✓
Toxaphene	✓
2,4,5-TP (Silvex)	✓

PHASE V

Dalapon	✓
Di-(ethylhexyl) phthalate	✓
Di-(ethylhexyl) adipate	✓
Dinoseb	✓
Diquat	✓
Endothall	
Endrin	✓
Glyphosate	✓
Hexachlorobenzene	✓
Hexachlorocyclopentadiene	✓
Oxamyl (Vydate)	✓
Benzo (a) pyrene	✓
Picloram	✓
Simazine	✓
2,3,7,8-TCDD (Dioxin)	

VOCs	✓
THMs	✓

Unregulated

Carbamates	✓
Herbicides	✓
Chlorinated Pests.	✓
N& P Pesticides	✓

The Commonwealth of Massachusetts

Department of Environmental Protection

Division of Environmental Analysis

Senator William X. Wall Experiment Station

certifies

M- NY026

H2M LABS INC
575 BROAD HOLLOW RD
MELVILLE, NY 11747-0000

Laboratory Director: John J. Molloy

for the analysis of NON POTABLE WATER (CHEMISTRY)
POTABLE WATER (CHEMISTRY)

pursuant to 310 CMR 42.00

This certificate supersedes all previous Massachusetts certificates issued to this laboratory. The laboratory is regulated by and shall be responsible for being in compliance with Massachusetts regulations at 310 CMR 42.00.

This certificate is valid only when accompanied by the latest dated Certified Parameter List as issued by the Massachusetts D.E.P. Contact the Division of Environmental Analysis to verify the current certification status of the laboratory.

Certification is no guarantee of the validity of the data. This certification is subject to unannounced laboratory inspections.

Oscar C. Jacobs

Director, Division of Environmental Analysis

Issued: 01 JUL 2002

Expires: 30 JUN 2003

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Certified Parameter List as of: 01 JUL 2002

M- NY026 HZM LABS INC
MELVILLE NY

NON POTABLE WATER (CHEMISTRY) **Effective Date** 21 JUN 2002 **Expiration Date** 30 JUN 2003

Analytes and Methods

ALUMINUM	EPA 200.7
ANTIMONY	EPA 200.7
ARSENIC	EPA 200.7
BERYLLIUM	EPA 200.7
CADMIUM	EPA 200.7
CHROMIUM	EPA 200.7
COBALT	EPA 200.7
COPPER	EPA 200.7
IRON	EPA 200.7
LEAD	EPA 200.7
MANGANESE	EPA 200.7
MERCURY	EPA 245.1
MOLYBDENUM	EPA 200.7
NICKEL	EPA 200.7
SELENIUM	EPA 200.7
SILVER	EPA 200.7
THALLIUM	EPA 200.7
TITANIUM	EPA 200.7
VANADIUM	EPA 200.7
ZINC	EPA 200.7
PH	EPA 150.1
SPECIFIC CONDUCTIVITY	EPA 120.1
TOTAL DISSOLVED SOLIDS	EPA 160.1
TOTAL HARDNESS (CACO3)	EPA 200.7
CALCIUM	EPA 200.7
MAGNESIUM	EPA 200.7
SODIUM	EPA 200.7
POTASSIUM	EPA 200.7
TOTAL ALKALINITY	EPA 310.1
CHLORIDE	EPA 325.1
CHLORIDE	EPA 325.2
FLUORIDE	EPA 340.2
SULFATE	EPA 375.4
AMMONIA-N	EPA 350.1
NITRATE-N	EPA 353.2
KJELDAHL-N	EPA 351.2
ORTHOPHOSPHATE	EPA 365.2
TOTAL PHOSPHORUS	EPA 365.2
TOTAL PHOSPHORUS	EPA 365.1
NON-FILTERABLE RESIDUE	EPA 160.2
TOTAL PHENOLICS	EPA 420.1
VOLATILE HALOCARBONS	EPA 624
VOLATILE AROMATICS	EPA 624
CHLORDANE	EPA 608
ALDRIN	EPA 608
DIELDRIN	EPA 608
DDD	EPA 608
DDT	EPA 608
HEPTACHLOR	EPA 608
HEPTACHLOR EPOXIDE	EPA 608
POLYCHLORINATED BIPHENYLS (WATER)	EPA 608

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Certified Parameter List as of: 01 JUL 2002

M-NY026 H2M LABS INC
MELVILLE NY

POTABLE WATER (CHEMISTRY) Effective Date 21 JUN 2002 Expiration Date 30 JUN 2003

Analytes and Methods

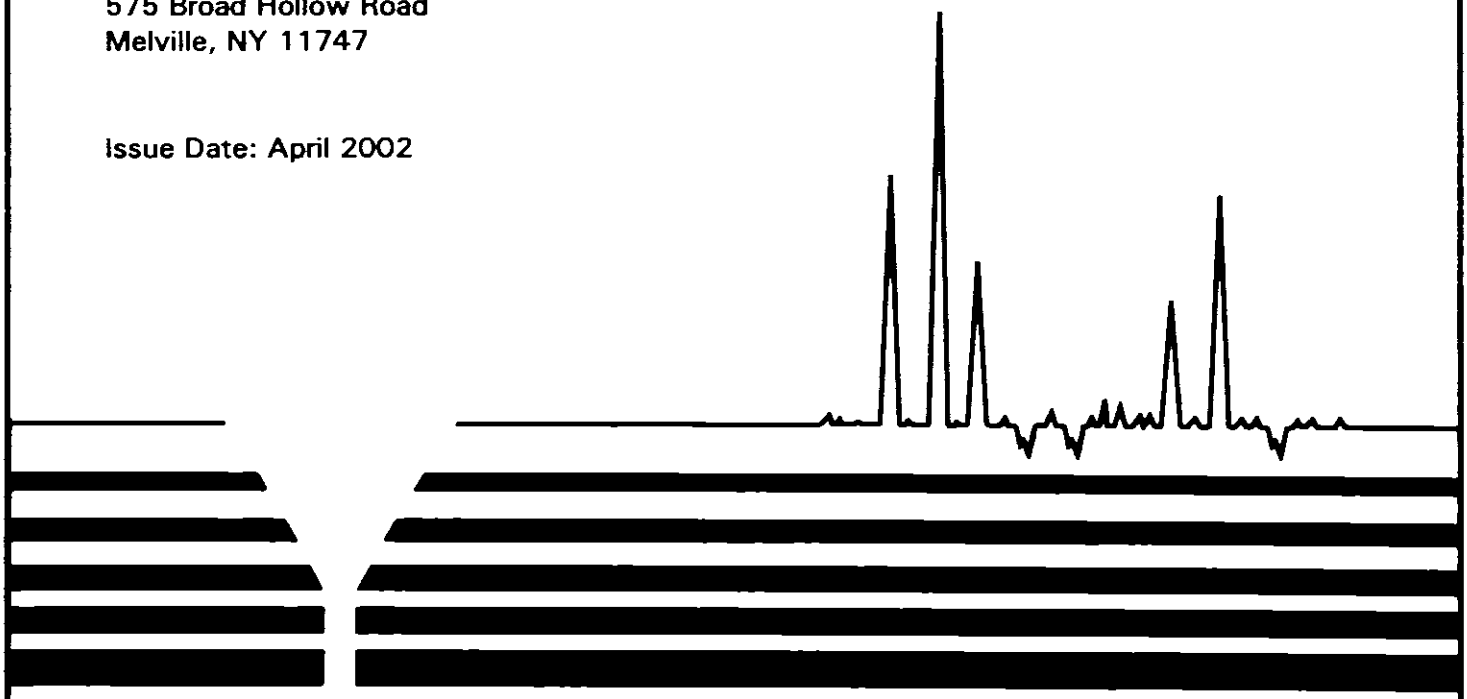
ANTIMONY	EPA 200.9	VYDATE	EPA 531.1
ARSENIC	EPA 200.9	POLYNUCLEAR AROMATIC HYDROCARBO	EPA 525.2
BARIUM	EPA 200.7	ADIPATES/PHTHALATES	EPA 525.2
BERYLLIUM	EPA 200.7	TRIHALOMETHANES	EPA 502.2
CADMIUM	EPA 200.7	VOLATILE ORGANIC COMPOUNDS	EPA 502.2
CHROMIUM	EPA 200.7	VOLATILE ORGANIC COMPOUNDS	EPA 524.2
COPPER	EPA 200.7	1,2-DIBROMOETHANE	EPA 504.1
LEAD	EPA 200.9	1,2-DIBROMO-3-CHLOROPROPANE	EPA 504.1
MERCURY	EPA 245.1		
NICKEL	EPA 200.7		
SELENIUM	EPA 200.9		
THALLIUM	EPA 200.9		
NITRATE-N	EPA 353.2		
NITRITE-N	EPA 353.2		
FLUORIDE	SM 4500-F-C		
SODIUM	EPA 200.7		
CYANIDE	SM 4500-CN-C,E		
CALCIUM	EPA 200.7		
TOTAL ALKALINITY	SM 2320B		
TOTAL DISSOLVED SOLIDS	SM 2540C		
PH	EPA 150.1		
POLYCHLORINATED BIPHENYLS	EPA 508A		
DALAPON	EPA 515.1		
DINOSEB	EPA 515.1		
PENTACHLOROPHENOL	EPA 515.1		
PICLORAM	EPA 515.1		
ALACHLOR	EPA 525.2		
ATRAZINE	EPA 525.2		
CHLORDANE	EPA 505		
ENDRIN	EPA 505		
HEPTACHLOR	EPA 505		
HEPTACHLOR EPOXIDE	EPA 505		
HEXACHLOROBENZENE	EPA 525.2		
HEXACHLOROCYCLOPENTADIENE	EPA 525.2		
LINDANE	EPA 505		
METHOXYCHLOR	EPA 505		
SIMAZINE	EPA 525.2		
TOXAPHENE	EPA 505		
ALDICARB	EPA 531.1		
ALDICARB SULFONE	EPA 531.1		
ALDICARB SULFOXIDE	EPA 531.1		
CARBOFURAN	EPA 531.1		

COPY #18

QUALITY ASSURANCE QUALITY CONTROL MANUAL

Submitted By:
H2M LABS, INC.
575 Broad Hollow Road
Melville, NY 11747

Issue Date: April 2002



H2M LABS, INC.

Environmental Testing Laboratories
575 Broad Hollow Road, Melville, New York 11747

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SECTION 1.0

1.0 ORGANIZATION AND PERSONNEL

1.1 QA Policy and Objectives

The purpose of the quality manual is to establish and document the policy and objectives for, and its commitment to good laboratory practice and quality of testing services. The manual documents the activity required and frequency established to obtain these requirements. The manual also defines the role and responsibilities of all management and technical personnel. The requirements established in the QA manual must be communicated to and understood by the staff. The QA Manager maintains the oversight of the QA manual.

Both Quality Assurance and Quality Control are integral parts in the production of laboratory data.

Quality Assurance ensures that the data provided are of known quality. The QA program involves management review and oversight in all stages of data collection from planning the project to delivery of the completed report.

In the planning stage, the QA process defines the data quality criteria and implements QC systems to measure the quality of the data being generated.

During analyses, the QA process ensures that the QC system is operating properly and that any noncompliance's uncovered by the QC system are corrected.

During data review, the QA process assesses the quality of the data obtained to determine its suitability to support its intended use. The objectives of a QA program are to maintain data integrity, validity and usability. The program ensures the end user that the laboratory results generated are of acceptable precision and accuracy. Problems are detected and corrective action procedures implemented to maintain the reliability of the data.

Documentation is required to prove the data is technically sound and legally defensible.

Quality control involves the day-to-day activities that are required to produce data of known quality and to substantiate it. These activities include precision, accuracy, detection limits and other qualitative and quantitative indicators used to access the data.

The information acquired from these activities is used to evaluate the need for corrective action. If required, corrective measures are implemented to generate data of acceptable quality. The quality control process includes the day-to-day documentation of the information necessary to substantiate the results produced.

The validity of all data generated is assessed for precision, accuracy, comparability, completeness, and representativeness. The evaluation procedures, as well as the equation for calculation of the parameter, are defined below.

- Collecting and analyzing replicate samples assesses precision. The precision is calculated as the percent difference between the values obtained for duplicates. Ten percent of the samples are run in duplicate. The following formula is used.

$$\% D = \frac{\frac{V2 - V1}{V1 + V2}}{2} \times 100$$

- Accuracy is evaluated by comparing determined results to true or known values of quality control or check samples. Calibration of methods and instruments is referenced to traceable standards. Analyses of spiked samples are also used to evaluate data accuracy. At least once a month, a quality control sample (known) is analyzed. For calculation of the accuracy, the following formula applies:

$$\% \text{ Error} = \frac{\text{observed-known}}{\text{known}} \times 100$$

- Data comparability is assured by the use of standard methodology.
- Data completeness is defined as having all the support and audit data to document the reported results. Completeness is accomplished by comparison of the project objectives and required outputs to the report.
- Representativeness is assured by collecting samples that are indicative of actual conditions.

H2M Labs, Inc. is committed to reaching and routinely reporting work in conformance to the NELAC standards.

- The laboratory is staffed by trained professionals and with a well-equipped laboratory facility.
- H2M participates in the proficiency testing program operated by the New York State Environmental Laboratory Approval program.
- The laboratory has implemented the requirements of a NELAC quality system.
- Annual internal audits with management review are performed as are biennial assessments by the New York State Environmental Laboratory Approval Program.
- Timely results are submitted to our clients.

The management of H2M Labs Inc. is committed to meeting this objective and thereby ensuring our clients with technically defensible laboratory test results.

1.1.1 Accredited Test Methods

Potable Water

Analyte	Method	Reference
Total coliform p/a	pa coliform	SM18,9221d
E.coli p/a	ec +mug	40cfr,141.21(f) 6i
Total coliform and E.coli p/a	Colilert	SM18,9223
Standard plate count	Pour plate	SM18,9215b
Alkalinity	Titrimetric	SM18,2320b
Antimony	Platform furnace	EPA 200.9
Antimony	ICP/MS	EPA 200.8
Arsenic	Platform furnace	EPA 200.9
Arsenic	ICP	EPA 200.7
Arsenic	ICP/MS	EPA 200.8
Barium	ICP	EPA 200.7
Barium	ICP/MS	EPA 200.8
Beryllium	ICP	EPA 200.7
Beryllium	ICP/MS	EPA 200.8
Cadmium	ICP	EPA 200.7
Cadmium	ICP/MS	EPA 200.8
Calcium	ICP	EPA 200.7
Chloride	Auto. Colorimetric	EPA 325.2
Chromium	ICP	EPA 200.7
Chromium	ICP/MS	EPA 200.8
Color	Visual	SM18,2120b
Conductivity	Wheatstone	SM18,2510b
Copper	ICP	EPA 200.7
Copper	ICP/MS	EPA 200.8
Corrosivity	Langlier sat.	SM16.203
Cyanide	Manual spec.	SM18,4500 CN E
Fluoride	Potentiometric	SM 18 4500 F C
Iron	ICP	EPA 200.7
Lead	Platform furnace	EPA 200/9
Lead	ICP/MS	EPA 200.8
Manganese	ICP	EPA 200.7
Manganese	ICP/MS	EPA 200.8
Mercury	Manual cold vapor	EPA 245.1
Mercury	ICP/MS	EPA 200.8
Nickel	ICP	EPA 200.7
Nickel	ICP/MS	EPA 200.8
Nitrate	Auto Cd red.	EPA 353.2
Nitrite	Auto Cd red.	EPA 353.2
Orthophosphate	Colorimetric	SM 18, 4500 p e
PH	Electrometric	EPA 150.1
Selenium	Platform furnace	EPA 200.9
Selenium	ICP/MS	EPA 200.8

Analyte	Method	Reference
Silica	ICP	EPA 200.7
Silver	ICP	EPA 200.7
Silver	ICP/MS	EPA 200.8
Sodium	ICP	EPA 200.7
Sulfate	Auto methyl	EPA 375.2
Sulfate	Turbidimetric	EPA 375.4
Thallium	Platform furnace	EPA 200.9
Thallium	ICP/MS	EPA 200.8
Zinc	ICP	EPA 200.7
Zinc	ICP/MS	EPA 200.8
Total filterable residue	Gravimetric	SM18,2540 c
Benzene	GC	EPA 502.2
Benzene	GC/MS	EPA 524.2
Benzo(a)pyrene	liq/solid ext gc/ms	EPA 525.2
Bromobenzene	GC	EPA 502.2
Bromobenzene	GC/MS	EPA 524.2
Bromochloromethane	GC	EPA 502.2
Bromochloromethane	GC/MS	EPA 524.2
Bromodichloromethane	GC	EPA 502.2
Bromodichloromethane	GC/MS	EPA 524.2
Bromoform	GC	EPA 502.2
Bromoform	GC/MS	EPA 524.2
Bromomethane	GC	EPA 502.2
Bromomethane	GC/MS	EPA 524.2
n butyl benzene	GC	EPA 502.2
n butyl benzene	GC/MS	EPA 524.2
Sec butyl benzene	GC	EPA 502.2
Sec butyl benzene	GC/MS	EPA 524.2
Tert butyl benzene	GC	EPA 502.2
Tert butyl benzene	GC/MS	EPA 524.2
Carbon tetrachloride	GC	EPA 502.2
Carbon tetrachloride	GC/MS	EPA 524.2
Chorobenzene	GC	EPA 502.2
Chlorobenzene	GC/MS	EPA 524.2
Chloroethane	GC	EPA 502.2
Chloroethane	GC/MS	EPA 524.2
Chloroform	GC	EPA 502.2
Chloroform	GC/MS	EPA 524.2
Chloromethane	GC	EPA 502.2
Chloromethane	GC/MS	EPA 524.2
2 chlorotoluene	GC	EPA 502.2
2 chlorotoluene	GC/MS	EPA 524.2
4 chlorotoluene	GC	EPA 502.2
4 chlorotoluene	GC/MS	EPA 524.2
Dibromochloromethane	GC	EPA 502.2

Analyte	Method	Reference
Dibromochloromethane	GC/MS	EPA 524.2
1,2 dibromo 3 chloropropane	GC MICRO	EPA 504.1
1,2 dibromoethane	GC MICRO	EPA 504.1
1,2 dichlorobenzene	GC	EPA 502.2
1,2 dichlorobenzene	GC/MS	EPA 524.2
1,3 dichlorobenzene	GC	EPA 502.2
1,3 dichlorobenzene	GC/MS	EPA 524.2
1,4 dichlorobenzene	GC	EPA 502.2
1,4 dichlorobenzene	GC/MS	EPA 524.2
Dichlorofluoromethane	GC	EPA 502.2
Dichlorofluoromethane	GC/MS	EPA 524.2
1,1 dichloroethane	GC	EPA 502.2
1,1 dichloroethane	GC/MS	EPA 524.2
1,2 dichloroethane	GC	EPA 502.2
1,2 dichloroethane	GC/MS	EPA 524.2
1,1 dichloroethene	GC	EPA 502.2
1,1 dichloroethene	GC/MS	EPA 524.2
Cis- 1,2 dichloroethene	GC	EPA 502.2
Cis- 1,2 dichloroethene	GC/MS	EPA 524.2
Trans- 1,2 dichloroethene	GC	EPA 502.2
Trans- 1,2 dichloroethene	GC/MS	EPA 524.2
1,2 dichloropropane	GC	EPA 502.2
1,2 dichloropropane	GC/MS	EPA 524.2
1,3 dichloropropane	GC	EPA 502.2
1,3 dichloropropane	GC/MS	EPA 524.2
2,2 dichloropropane	GC	EPA 502.2
2,2 dichloropropane	GC/MS	EPA 524.2
1,1 dichloropropene	GC	EPA 502.2
1,1 dichloropropene	GC/MS	EPA 524.2
Cis- 1,3 dichloropropene	GC	EPA 502.2
Cis- 1,3 dichloropropene	GC/MS	EPA 524.2
Trans-1,3 dichloropropene	GC	EPA 502.2
Trans-1,3 dichloropropene	GC/MS	EPA 524.2
Di(2 ethylhexyl)adipate	GC/MS	EPA 525.1
Di(2ethylhexyl)phthalate	GC/MS	EPA 525.1
Ethyl benzene	GC	EPA 502.2
Ethyl benzene	GC/MS	EPA 524.2
Hexachlorobenzene	GC/MS	EPA 525.2
Hexachlorobutadiene	GC	EPA 502.2
Hexachlorobutadiene	GC/MS	EPA 524.2
Hexachlorocyclopentadiene	GC/MS	EPA 525.2
Isopropyl benzene	GC	EPA 502.2
Isopropyl benzene	GC/MS	EPA 524.2
4 isopropyl toluene(p-cymene)	GC	EPA 502.2
4 isopropyl toluene(p-cymene)	GC/MS	EPA 524.2

Analyte	Method	Reference
Methylene chloride	GC	EPA 502.2
Methylene chloride	GC/MS	EPA 524.2
MTBE	GC	EPA 502.2
MTBE	GC/MS	EPA 524.2
Pentachlorophenol	GC/MS	EPA 525.2
Polychlorinated biphenyls	GC ECD	EPA 505
n propyl benzene	GC	EPA 502.2
n propyl benzene	GC/MS	EPA 524.2
Styrene	GC	EPA 502.2
Styrene	GC/MS	EPA 524.2
1,1,1,2 tetrachloroethane	GC	EPA 502.2
1,1,1,2tetrachloroethane	GC/MS	EPA 524.2
1,1,2,2, tetrachloroethane	GC	EPA 502.2
1,1,2,2, tetrachloroethane	GC/MS	EPA 524.2
Tetrachloroethene	GC	EPA 502.2
Tetrachloroethene	GC/MS	EPA 524.2
Toluene	GC	EPA 502.2
Toluene	GC/MS	EPA 524.2
1,2,3 trichlorobenzene	GC	EPA 502.2
1,2,3, trichlorobenzene	GC/MS	EPA 524.2
1,2,4 trichlorobenzene	GC	EPA 502.2
1,2,4 trichlorobenzene	GC/MS	EPA 524.2
1,1,1, trichloroethane	GC	EPA 502.2
1,1,1, trichloroethane	GC/MS	EPA 524.2
1,1,2 trichloroethane	GC	EPA 502.2
1,1,2, trichloroethane	GC/MS	EPA 524.2
Trichloroethene	GC	EPA 502.2
Trichloroethene	GC/MS	EPA 524.2
Trichlorofluoromethane	GC	EPA 502.2
Trichlorofluoromethane	GC/MS	EPA 524.2
1,2,3, trichloropropane	GC	EPA 502.2
1,2,3, trichloropropane	GC/MS	EPA 524.2
1,2,4, trimethylbenzene	GC	EPA 502.2
1,2,4,trimethylbenzene	GC/MS	EPA 524.2
1,3,5 trimethylbenzene	GC	EPA 502.2
1,3,5 trimethylbenzene	GC/MS	EPA 524.2
Vinyl chloride	GC	EPA 502.2
Vinyl chloride	GC/MS	EPA 524.2
m-xylene	GC	EPA 502.2
m-xylene	GC/MS	EPA 524.2
o-xylene	GC	EPA 502.2
o-xylene	GC/MS	EPA 524.2
p-xylene	GC	EPA 502.2
p-xylene	GC/MS	EPA 524.2

Analyte	Method	Reference
Alachlor	GC/MS	EPA 525.2
Aldicarb	HPLC	EPA 531.1
Aldicarb sulfoxide	HPLC	EPA 531.1
Aldicarb sulfone	HPLC	EPA 531.1
Aldrin	GC ECD	EPA 505
Atrazine	GC/MS	EPA 525.2
Butachlor	GC/MS	EPA 525.2
Carbaryl	HPLC	EPA 531.1
Carbofuran	HPLC	EPA 531.1
Chlordane	GC ECD	EPA 505
2,4- D	GC ECD	EPA 515.1
Dalapon	GC ECD	EPA 515.1
Dicamba	GC ECD	EPA 515.1
Dieldrin	GC ECD	EPA 505
Dinoseb	GC ECD	EPA 515.1
Diquat	L/S HPLC	EPA 549
Endrin	GC ECD	EPA 505
Glyphosate	HPLC	EPA 547
Heptachlor	GC ECD	EPA 505
Heptachlor epoxide	GC ECD	EPA 505
3- hydroxycarbofuran	HPLC	EPA 531.1
Lindane	GC ECD	EPA 505
Methomyl	HPLC	EPA 531.1
Methoxychlor	GC ECD	EPA 505
Metribuzin	GC/MS	EPA 525.2
Oxamyl	HPLC	EPA 531.1
Pichloram	GC ECD	EPA 515.1
Silvex 2,4,5 TP	EC ECD	EPA 515.1
Simazine	GC/MS	EPA 525.2
Toxaphene	GC ECD	EPA 505

Water and Wastewater

Analyte	Method	Reference
Fecal coliform	Multiple Tube	SM18,9221c&e
Total coliform	Multiple Tube	SM18,9221b
Standard plate count	Pour Plate	SM18,9215b
Acidity	Titrimetric	EPA 305.1
Alkalinity	Titrimetric	SM18,2320b
Aluminum	ICP	EPA 200.7
Aluminum	ICP/MS	EPA 200.8
Ammonia	Auto Phenate	EPA 350.1
Antimony	ICP	EPA 200.7
Antimony	ICP/MS	EPA 200.8

Analyte	Method	Reference
Arsenic	ICP	EPA 200.7
Arsenic	ICP/MS	EPA 200.8
Barium	ICP	EPA 200.7
Barium	ICP/MS	EPA 200.8
Beryllium	ICP	EPA 200.7
Beryllium	ICP/MS	EPA 200.8
BOD5	Electrode	EPA 405.1
CBOD5	Electrode	SM 18 5210B
Boron	ICP	EPA 200.7
Boron	ICP/MS	EPA 200.8
Bromide	Titrimetric	EPA 320.1
Cadmium	ICP	EPA 200.7
Cadmium	ICP/MS	EPA 200.8
Calcium	ICP	EPA 200.7
COD	Spectrophometric	EPA 410.4
Chloride	Auto Color	EPA 325.2
Hexavalent chromium	Colorimetric	SM18,3500-CR-D
Chromium	ICP	EPA 200.7
Chromium	ICP/MS	EPA 200.8
Chromium	Colorimetric	SM18,3500-CR-D
Cobalt	ICP	EPA 200.7
Cobalt	ICP/MS	EPA 200.8
Color	Visual	SM18,2120B
Copper	ICP	EPA 200.7
Copper	ICP/MS	EPA 200.8
Cyanide	Manual /Spec	EPA 335.2
Cyanide, Amenable to chlorination	Manual /Spec	EPA 335.1
Fluoride	Electrode	SM18,4500F-C
Hardness	ICP	EPA 200.7
PH	Electrode	EPA 150.1
Iron	ICP	EPA 200.7
TKN	Semiauto Block	EPA 351.2
Lead	ICP	EPA 200.7
Lead	ICP/MS	EPA 200.8
Magnesium	ICP	EPA 200.7
Magnesium	ICP/MS	EPA 200.8
Manganese	ICP	EPA 200.7
Manganese	ICP/MS	EPA 200.8
Mercury	Manual Cold Vapor	EPA 245.1
Mercury	ICP/MS	EPA 200.8
Molybdenum	ICP	EPA 200.7
Molybdenum	ICP/MS	EPA 200.8
Nickel	ICP	EPA 200.7

Analyte	Method	Reference
Nickel	ICP/MS	EPA 200.8
Nitrate	Auto Cd Red	EPA 353.2
Nitrite	Auto Cd Red	EPA 353.2
Total rec. O&G	Freon	EPA 413.1
Total rec. O&G	Hexane	EPA 1664
Orthophosphate	Ascorbic Acid Auto	EPA 365.1
Dissolved oxygen	Electrode	EPA 360.2
Organic Nitrogen		EPA 351.2
Total organic carbon	Comb or Oxid	EPA 415.1
Turbidity	Nephlometric	EPA 180.1
Total phenolics	Manual Dist/Colorimetric	EPA 420.1
Total phosphorus	Colorimetric	EPA 365.1
Total phosphorus	ICP	EPA 200.7
Potassium	ICP	EPA 200.7
Total residue (TS)	Gravimetric	EPA 160.3
Filterable residue(TDS)	Gravimetric	EPA 160.1
Nonfilterable residue(TSS)	Gravimetric	EPA 160.2
Selenium	ICP	EPA 200.7
Selenium	ICP/MS	EPA 200.8
Silica	ICP	EPA 200.7
Silver	ICP	EPA 200.7
Silver	ICP/MS	EPA 200.8
Sodium	ICP	EPA 200.7
Specific conductance	Wheatstone	EPA 120.1
Sulfate	Turbidimetric	EPA 375.4
Sulfide	Titrimetric	EPA 376.1
Sulfite	Titrimetric	EPA 377.1
Surfactant	Colorimetric	EPA 425.1
Temperature	Thermometric	EPA 170.1
Thallium	ICP	EPA 200.7
Thallium	ICP/MS	EPA 200.8
Tin	ICP	EPA 200.7
Titanium	ICP	EPA 200.7
Turbidity	Nephelometric	EPA 180.1
Vanadium	ICP	EPA 200.7
Vanadium	ICP/MS	EPA 200.8
Zinc	ICP	EPA 200.7
Zinc	ICP/MS	EPA 200.8
Aldrin	GC-ECD	EPA 608
Alpha bhc	GC-ECD	EPA 608
Beta bhc	GC-ECD	EPA 608
Delta bhc	GC-ECD	EPA 608
Gamma bhc	GC-ECD	EPA 608

Analyte	Method	Reference
2,4-D	GC-ECD	EPA '78 P115
4,4' DDD	GC-ECD	EPA 608
4,4' DDE	GC-ECD	EPA 608
4,4' DDT	GC-ECD	EPA 608
Dieldrin	GC-ECD	EPA 608
Endosulfan1	GC-ECD	EPA 608
Endosulfan 2	GC-ECD	EPA 608
Endosulfan sulfate	GC-ECD	EPA 608
Endrin	GC-ECD	EPA 608
Endrin aldehyde	GC-ECD	EPA 608
Heptachlor	GC-ECD	EPA 608
Heptachlor epoxide	GC-ECD	EPA 608
Methoxychlor	GC-ECD	EPA 608
Mirex	GC-ECD	EPA 608
2,4,5-T	GC-ECD	EPA '78 P115
2,4,5 TP(silvex)	GC-ECD	EPA '78 P115
Toxaphene	GC-ECD	EPA 608
Acenaphthene	GC/MS	EPA 625
Acenaphthylene	GC/MS	EPA 625
Acrolein	GC/MS	EPA 624
Acrylonitrile	GC/MS	EPA 624
Anthracene	GC/MS	EPA 625
Benzene	GC	EPA 602
Benzene	GC/MS	EPA 624
Benzidine	GC/MS	EPA 625
Benzo(a) anthracene	GC/MS	EPA 625
Benzo(a) pyrene	GC/MS	EPA 625
Benzo(b) fluoranthene	GC/MS	EPA 625
Benzo(g,h,I) perylene	GC/MS	EPA 625
Benzo(k) fluoranthene	GC/MS	EPA 625
Butyl benzyl phthalate	GC/MS	EPA 625
Bis 2 chlorethoxymethane	GC/MS	EPA 625
Bis (2 chloroethyl) ether	GC/MS	EPA 625
Bis (2 ethylhexyl) phthalate	GC/MS	EPA 625
Bromodichloromethane	GC	EPA 601
Bromodichloromethane	GC/MS	EPA 624
Bromoform	GC	EPA 601
Bromoform	GC/MS	EPA 624
Bromomethane	GC	EPA 601
Bromomethane	GC/MS	EPA 624
4 bromophenyl phenyl ether	GC/MS	EPA 625
Carbon tetrachloride	GC	EPA 601

Analyte	Method	Reference
Carbon tetrachloride	GC/MS	EPA 624
4 chloro 3 methylphenol	GC/MS	EPA 625
Chlorobenzene	GC	EPA 601
Chlorobenzene	GC	EPA 602
Chlorobenzene	GC/MS	EPA 624
Chloroethane	GC	EPA 601
Chloroethane	GC/MS	EPA 624
2 chloroethylvinylether	GC	EPA 601
2 chloroethylvinylether	GC/MS	EPA 624
Chloroform	GC	EPA 601
Chloroform	GC/MS	EPA 624
Chloromethane	GC	EPA 601
Chloromethane	GC/MS	EPA 624
2-chloronapthalene	GC/MS	EPA 625
2 chlorophenol	GC/MS	EPA 625
4-chlorophenylphenylether	GC/MS	EPA 625
Chrysene	GC/MS	EPA 625
Total creosols	GC/MS	EPA 625
Dibenzo(a,h) anthracene	GC/MS	EPA 625
Dibromochloromethane	GC	EPA 601
Dibromochloromethane	GC/MS	EPA 624
1,2 dichlorobenzene	GC	EPA 601
1,2 dichlorobenzene	GC	EPA 602
1,2 dichlorobenzene	GC/MS	EPA 624
1,2 dichlorobenzene	GC/MS	EPA 625
1,3 dichlorobenzene	GC	EPA 601
1,3 dichlorobenzene	GC	EPA 602
1,3 dichlorobenzene	GC/MS	EPA 624
1,3 dichlorobenzene	GC/MS	EPA 625
1,4 dichlorobenzene	GC	EPA 601
1,4 dichlorobenzene	GC	EPA 602
1,4 dichlorobenzene	GC/MS	EPA 624
1,4 dichlorobenzene	GC/MS	EPA 625
3,3' dichlorobenzidine	GC/MS	EPA 625
Dichlorodifluoromethane	GC	EPA 601
Dichlorodifluoromethane	GC/MS	EPA 624
1,1 dichloroethane	GC	EPA 601
1,1 dichloroethane	GC/MS	EPA 624
1,2 dichloroethane	GC	EPA 601
1,2 dichloroethane	GC/MS	EPA 624
1,1 dichloroethene	GC	EPA 624
1,1 dichloroethene	GC/MS	EPA 624

Analyte	Method	Reference
Trans-1,2 dichloroethene	GC	EPA 601
Trans-1,2 dichloroethene	GC/MS	EPA 624
2,4 dichlorophenol	GC/MS	EPA 625
2,4 dichlorophenol	GC/MS	EPA 625
1,2 dichloropropane	GC	EPA 601
1,2 dichloropropane	GC/MS	EPA 624
Cis-1,3 dichloropropene	GC	EPA 624
Cis-1,3 dichloropropene	GC/MS	EPA 624
Trans-1,3 dichloropropene	GC	EPA 624
Trans-1,3 dichloropropene	GC/MS	EPA 624
Diethylphthalate	GC/MS	EPA 625
2,4 dimethyphenol	GC/MS	EPA 625
Dimethylphthalate	GC/MS	EPA 625
Di-n-butyl phthalate	GC/MS	EPA 625
Di-n-octyl phthalate	GC/MS	EPA 625
2,4 dinitrophenol	GC/MS	EPA 625
2,4 dinitrotoluene	GC/MS	EPA 625
2,6 dinitrotoluene	GC/MS	EPA 625
Fluoranthene	GC/MS	EPA 625
Fluorene	GC/MS	EPA 625
Hexachlorobenzene	GC/MS	EPA 625
Hexachlorobutadiene	GC/MS	EPA 625
Hexachloroethane	GC/MS	EPA 625
Indeno(1,2,3,c,d)pyrene	GC/MS	EPA 625
Isophorone	GC/MS	EPA 625
Methylene chloride	GC	EPA 624
Methylene chloride	GC/MS	EPA 624
Methyl ethyl ketone	GC	EPA 601
Methyl ethyl ketone	GC/MS	EPA 624
MTBE	GC/MS	EPA 524.2
2 methyl,4,6 dinitrophenol	GC/MS	EPA 625
Napthalene	GC/MS	EPA 625
Nitrobenzene	GC/MS	EPA 625
2-nitrophenol	GC/MS	EPA 625
4-nitrophenol	GC/MS	EPA 625
n-nitrosodimethylamine	GC/MS	EPA 625
n-nitrosodi-n-propylamine	GC/MS	EPA 625
n-nitrosodiphenylamine	GC/MS	EPA 625
2,2-oxybis(1-chloropropane)	GC/MS	EPA 625
PCB1016	GC	EPA 608
PCB1221	GC	EPA 608
PCB1232	GC	EPA 608
PCB1242	GC	EPA 608

Analyte	Method	Reference
PCB1248	GC	EPA 608
PCB1254	GC	EPA 608
PCB1260	GC	EPA 608
Pentachlorophenol	GC/MS	EPA 625
Phenanthrene	GC/MS	EPA 625
Phenol	GC/MS	EPA 625
Pyrene	GC/MS	EPA 625
Pyridine	GC/MS	EPA 625
1,1,2,2 tetrachloroethane	GC	EPA 601
1,1,2,2 tetrachloroethane	GC/MS	EPA 624
Tetrachloroethene	GC	EPA 601
Tetrachloroethene	GC/MS	EPA 624
Toluene	GC	EPA 601
Toluene	GC/MS	EPA 624
1,2,4 trichlorobenzene	GC/MS	EPA 625
1,1,1 trichloroethane	GC	EPA 601
1,1,1 trichloroethane	GC/MS	EPA 624
1,1,2 trichloroethane	GC	EPA 601
1,1,2 trichloroethane	GC/MS	EPA 624
Trichloroethene	GC	EPA 601
Trichloroethene	GC/MS	EPA 624
Trichlorofluoromethane	GC	EPA 601
Trichlorofluoromethane	GC/MS	EPA 624
2,4,5 trichlorophenol	GC/MS	EPA 625
2,4,6 trichlorophenol	GC/MS	EPA 625
Vinyl chloride	GC	EPA 601
Vinyl chloride	GC/MS	EPA 624
M xylene	GC	EPA 601
M xylene	GC/MS	EPA 624
P xylene	GC	EPA 601
P xylene	GC/MS	EPA 624
O xylene	GC	EPA 601
O xylene	GC/MS	EPA 624
Benzyl Chloride		EPA 1978, p. 130

Solid and Hazardous Waste

Analyte	Method	Reference
Ignitability	Pensky Martin	1010
Corrosivity	Steel	1110
Reactivity	Cyanide/Sulfide	chtr 7
Toxicity	E.P.Toxicity	1310
Toxicity	TCLP Toxicity	1311
Antimony	ICP	3050/6010

Analyte	Method	Reference
Antimony	ICP/MS	6020
Arsenic	ICP	3050/6010
Arsenic	ICP/MS	6020
Barium	ICP	3050/6010B
Barium	ICP/MS	6020
Cadmium	ICP	3050/6010B
Cadmium	ICP/MS	6020
Chromium	ICP	3050/6010B
Chromium	ICP/MS	6020
Hexavalent chromium	Colorimetric	7196A
Cyanide	Man/Colorimetric	9010B
pH	Electrode	9040B
Lead	ICP	3050/6010B
Lead	ICP/MS	6020
Lead in paint	ICP	SM17,3120b
Lead in wipes	ICP	3050/6010B
Mercury	Man. Cold Vapor	7470a
Nickel	ICP	3050/6010B
Nickel	ICP/MS	6020
Selenium	ICP	3050/6010B
Selenium	ICP/MS	6020
Silver	ICP/MS	6020
Silver	ICP	3050/6010B
Sulfide	Titrimetric	9030
Acenaphthene	GC/MS	8270C
Acenaphthylene	GC/MS	8270C
Acrolein	GC/MS	8260B
Acrylonitrile	GC/MS	8260B
Anthracene	GC/MS	8270C
Benzene	GC	8021B
Benzene	GC/MS	8260B
Benzo(a) anthracene	GC/MS	8270C
Benzo(a)pyrene	GC/MS	8270C
Benzo(b)fluoranthene	GC/MS	8270C
Benzo(g,h,I)perylene	GC/MS	8270C
Benzo(k)fluoranthene	GC/MS	8270C
di-n-butylphthalate	GC/MS	8270C
bis(2 chlorethoxymethane)	GC/MS	8270C
bis(2 ethylhexylphthalate)	GC/MS	8270C
Bromodichloromethane	GC/MS	8021B
Bromodichloromethane	GC/MS	8260B
Bromoform	GC	8021B
Bromoform	GC/MS	8260B
Bromomethane	GC	8021B

Analyte	Method	Reference
Bromomethane	GC/MS	8260B
Benzyl Chloride	GC/MS	8270C
Carbon tetrachloride	GC	8021B
Carbon tetrachloride	GC/MS	8260B
4 chloro 3 methylphenol	GC/MS	8270C
Chlorobenzene	GC	8021B
Chlorobenzene	GC/MS	8260B
Chloroethane	GC	8021B
Chloroethane	GC/MS	8260B
2 chloroethylvinylether	GC	8021B
2 chloroethylvinylether	GC/MS	8260B
Chloroform	GC	8021B
Chloroform	GC/MS	8260B
Chloromethane	GC	8021B
Chloromethane	GC/MS	8260B
2 chloronapthalene	GC/MS	8270C
2 chlorophenol	GC/MS	8270C
Chrysene	GC/MS	8270C
Total Cresol	GC/MS	8270C
Dibenz(a,h,)anthracene	GC/MS	8270C
Dibromochloromethane	GC	8021B
Dibromochloromethane	GC/MS	8260B
1,2 dichlorobenzene	GC	8021B
1,2 dichlorobenzene	GC/MS	8260B
1,3 dichlorobenzene	GC	8021B
1,3 dichlorobenzene	GC/MS	8260B
1,4 dichlorobenzene	GC	8021B
1,4 dichlorobenzene	GC/MS	8260B
Dichlorodifluoromethane	GC	8021B
Dichlorodifluoromethane	GC/MS	8260B
1,1 dichloroethane	GC	8021B
1,1 dichloroethane	GC/MS	8260B
1,2 dichloroethane	GC	8021B
1,2 dichloroethane	GC/MS	8260B
1,1 dichloroethene	GC	8260B
1,1 dichloroethene	GC/MS	8260B
Trans 1,2 dichloroethene	GC	8021B
Trans 1,2 dichloroethene	GC/MS	8260B
2,4 dichlorophenol	GC/MS	8270C
2,4 dichlorophenol	GC/MS	8270C
1,2 dichloropropane	GC	8021B
1,2 dichloropropane	GC/MS	8260B
1,3 dichloropropene	GC	8021B
1,3 dichloropropene	GC/MS	8260B

Analyte	Method	Reference
Diethylphthalate	GC/MS	8270C
2,4 dimethylphenol	GC/MS	8270C
Dimethylphthalate	GC/MS	8270C
di-n-butyl phthalate	GC/MS	8270C
di-n-octy-phthalate	GC/MS	8270C
2,4 dinitrophenol	GC/MS	8270C
2,4 dinitrotoluene	GC/MS	8270C
2,6 dinitrotoluene	GC/MS	8270C
Ethyl benzene	GC	8021B
Ethyl benzene	GC/MS	8260B
Fluoranthene	GC/MS	8270C
Fluorene	GC/MS	8270C
Hexachlorobenzene	GC/MS	8270C
Hexachlorobutadiene	GC/MS	8270C
Hexachlorocyclopentadiene	GC/MS	8270C
Hexachloroethane	GC/MS	8270C
Indeno(1,2,3,c,d)pyrene	GC/MS	8270C
Isophorone	GC/MS	8270C
Methylene chloride	GC	8021B
Methylene chloride	GC/MS	8260B
Methyl ethyl ketone	GC	8021B
Methyl ethyl ketone	GC/MS	8260B
2 methyl 4,6 dinitrophenol	GC/MS	8270C
Napthalene	GC/MS	8270C
Nitrobenzene	GC/MS	8270C
2-Nitrophenol	GC/MS	8270C
4-Nitrophenol	GC/MS	8270C
2,2 oxybis (1 chloropropane)	GC/MS	8260B
PCB1016	GC	8082
PCB1221	GC	8082
PCB1232	GC	8082
PCB1242	GC	8082
PCB1248	GC	8082
PCB1254	GC	8082
PCB1260	GC	8082
Pentachlorophenol	GC/MS	8270C
Phenanthrene	GC/MS	8270C
Phenol	GC/MS	8270C
Pyrene	GC/MS	8270C
Pyridine	GC/MS	8270C
1,1,2,2,tetrachloroethane	GC	8021B
1,1,2,2,tetrachloroethane	GC/MS	8260B
1,1,1,2 tetrachloroethane	GC	8021B
1,1,1,2 tetrachloroethane	GC/MS	8260B

Analyte	Method	Reference
Tetrachloroethene	GC	8021B
Tetrachloroethene	GC/MS	8260B
Toluene	GC	8021B
Toluene	GC/MS	8260B
1,2,4 trichlorobenzene	GC/MS	8270C
1,1,1 trichloroethane	GC	8021B
1,1,1 trichloroethane	GC/MS	8260B
1,1,2 trichlorethane	GC	8021B
1,1,2 trichlorethane	GC/MS	8260B
Trichloroethene	GC	8021B
Trichloroethene	GC/MS	8260B
Trichlorofluoromethane	GC	8021B
Trichlorofluoromethane	GC/MS	8260B
2,4,5 trichlorophenol	GC/MS	8270C
2,4,6 trichlorophenol	GC/MS	8270C
Vinyl chloride	GC	8021B
Vinyl chloride	GC	8260B
o xylene	GC	8021B
o xylene	GC/MS	8260B
p xylene	GC	8021B
p xylene	GC/MS	8260B
m xylene	GC	8021B
m xylene	GC/MS	8260B
Aldrin	GC	8081A
Alpha BHC	GC	8081A
Beta BHC	GC	8081A
Delta BHC	GC	8081A
Gamma BHC	GC	8081A
Chlordane	GC	8081A
2,4 D	GC	8151A
4,4' DDD	GC	8081A
4,4 DDE	GC	8081A
4,4'DDT	GC	8081A
Diazinon	GC	8141A
Dicamba	GC	8151A
Dieldrin	GC	8081A
Disulfaton	GC	8141A
Endosulfan1	GC	8081A
Endosulfan2	GC	8081A
Endosulfan sulfate	GC	8081A
Endrin	GC	8081A
Endrin aldehyde	GC	8081A
Heptachlor	GC	8081A
Heptachlor epoxide	GC	8081A

Analyte	Method	Reference
Malathion	GC	8141A
Methoxychlor	GC	8081A
Parathion ethyl	GC	8141A
Parathion methyl	GC	8141A
2,4,5 T	GC	8151A
2,4,5 TP (silvex)	GC	8151A
Toxaphene	GC	8081A

Air and Emissions

Analyte	Method	Reference
Lead, Total	ICP	EPA 200.7
Mercury, Total	Cold Vapor	EPA 245.1
Benzene	GC/MS	40CFR, Part 60, 7/1/84, App.A, Meth.18
Ethyl benzene	GC/MS	40CFR, Part 60, 7/1/84, App.A, Meth.18
Xylenes, Total	GC/MS	40CFR, Part 60, 7/1/84, App.A, Meth.18
Carbon tetrachloride	GC/MS	40CFR, Part 60, 7/1/84, App.A, Meth.18
Chloroform	GC/MS	40CFR, Part 60, 7/1/84, App.A, Meth.18
1,2 dichlorobenzene	GC/MS	40CFR, Part 60, 7/1/84, App.A, Meth.18
1,3 dichlorobenzene	GC/MS	40CFR, Part 60, 7/1/84, App.A, Meth.18
1,4 dichlorobenzene	GC/MS	40CFR, Part 60, 7/1/84, App.A, Meth.18
Chlorobenzene	GC/MS	40CFR, Part 60, 7/1/84, App.A, Meth.18
Toluene	GC/MS	40CFR, Part 60, 7/1/84, App.A, Meth.18
1,2,4 trichlorobenzene	GC/MS	40CFR, Part 60, 7/1/84, App.A,

Toluene	GC/MS	Meth.18 40CFR, Part 60, 7/1/84, App.A,
1,1,2,2-Tetrachloroethane	GC/MS	Meth.18 40CFR, Part 60, 7/1/84, App.A,
1,1-Dichloroethane	GC/MS	Meth.18 40CFR, Part 60, 7/1/84, App.A,
1,2-Dichloroethane	GC/MS	Meth.18 40CFR, Part 60, 7/1/84, App.A,
Methylene Chloride	GC/MS	Meth.18 40CFR, Part 60, 7/1/84, App.A,
Tetrachloroethene	GC/MS	Meth.18 40CFR, Part 60, 7/1/84, App.A,
Vinyl Chloride	GC/MS	Meth.18 40CFR, Part 60, 7/1/84, App.A,
Naphthalene	GC/MS	Meth.18 40CFR, Part 60, 7/1/84, App.A,
Hexachloroethane	GC/MS	Meth.18 40CFR, Part 60, 7/1/84, App.A,
Hexachlorobutadiene	GC/MS	Meth.18 40CFR, Part 60, 7/1/84, App.A,
Benzyl Chloride	GC/MS	Meth.18 40CFR, Part 60, 7/1/84, App.A,
Benzo (a) pyrene	GC/MS	Meth.18 40CFR, Part 50, 7/1/84, App.B, followed by method 625
Formaldehyde	Colorimetric	MASA2(116)
PCB 1016	GC	8082
PCB 1221	GC	8082
PCB1242	GC	8082
PCB1248	GC	8082
PCB1254	GC	8082
PCB1260	GC	8082
Chlordane	GC	8081A

Reference	
EPA 1983	"Methods of Chemical Analysis of Water and Wastes", EPA 600/4-79-020, March 1983, March 1979
SM 18	"Standard Methods for the Examination of Water and Wastewater", 18th edition
EPA 502.2, 505, 515.1, 531.1	"Methods for the Determination of Organic Compounds in Drinking Water", EPA 600/4-88-039, July 1991
EPA 547, 551	"Methods for the Determination of Organic Compounds in Drinking Water" Supplement 1, EPA 600-4-90-020, July 1990
EPA 1994	EPA Methods 200.2, 200.7, 200.8, 200.9 – "Methods for the Determination of Metals in Environmental Samples" Supplemental 1, EPA 600/R-94/111, May 1994
40 CFR, Part 136, October 26, 1984	"Part VIII EPA 40 CFR, Part 136, Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act, October 1984
40CFR, Part 60, July 1,1984, App.A	Method 18
40 CFR, Part 50, July 1,1984 App.B	EPA method 625

1.2 QA Management

1.2.1 Organization

Organization chart

1.2.2 Assignment of QC and QA responsibilities.

The individuals named below perform the functions described in the management of typical projects.

Lab Director	John J. Molloy P.E is responsible for all technical and quality operations in the laboratory

Lab Manager	Joann M. Slavin oversees day-to-day operations of the analyses. She is responsible for arranging and overseeing all support services including instrument service contracts, subcontracting agreements and physical maintenance of the lab. She interacts with department supervisors to schedule and provide supervision to ensure adherence to lab documented procedures. Ms. Slavin reviews educational and training credentials to ensure compliance with requirements.
QA Manager	Lynn T. Daniello is responsible for the quality system and its implementation
Production Manager	Stuart M. Murrell supervises the production capability of all departments. He prioritizes testing and is responsible for completeness and correctness of reports.
Technical Manager	Ursula R. Middel provides technical guidance and data review of sample packages for completeness and compliance. She is also responsible for initial and ongoing training of staff.
Customer Service Manager	Karen Kavanagh supervises the bottle preparation and sample-accessioning department, as well as the project managers.
GC/MS Supervisor	Glenn K. Bocchicchio supervises the operation of the GC/MS laboratory. He reviews analyses and implementation and oversight of QC data.
GC Supervisor	Peter Daphnis supervises the operations of the GC laboratory. He reviews GC analyses and implementation and oversight of QC data.
Special Process Supervisor	Ellison Torres supervises sample preparation procedures for organic analyses, and RCRA characteristic-procedures. He is responsible for the oversight and QC of the processes.
Inorganic Supervisor	Heidi J. Bogner supervises wet chemistry and bacteriology laboratories. She reviews analyses and implementation and oversight of QC data.
Metals Supervisor	Randy Mercurio supervises the metals laboratory including digestion and analyses. He also reviews analyses and implementation and oversight of QC data.
Package Production Supervisor	Virginia Kreiner is responsible for data package coordination and verification of correctness and completeness of data.

Receiving Supervisor	Linda Siciliano-Dunn coordinates bottle preparation and sample receipt, serves as sample custodian, and ensures proper execution of chain-of-custody procedures.

Analysts

All analysts are responsible for complying with all QA/QC requirements that pertain to their job function.

In both the organic and inorganic departments, H2M scientists perform analyses under direct management of the supervisors. The responsibility of the scientists is to perform analyses according to the established and documented procedures, calibrate and maintain equipment and adhere to all quality control requirements.

1.2.2.1 Job Descriptions

Laboratory Director

A bachelors degree in the chemical, environmental, biological sciences, physical sciences or engineering and at least two years of experience in environmental analysis is required.

For microbiology, a minimum of an associated degree and four college semester credits is required for analysis of total coliform, fecal coliform and standard plate count unless grandfathered in the position.

Laboratory Manager

The laboratory manager is responsible for and directs the operations and activities of the laboratory, including the receipt, analysis and delivery of all work performed by the laboratory. Through departmental supervisors, he schedules and manages all work in the organic, inorganic and bacteriology labs.

Minimum requirements are a bachelors degree in chemistry or biology or a related science and a degree in Business Administration, five years supervisory experience, good written and verbal communication skills, and strong laboratory background.

Quality Assurance Manager

The Laboratory Quality Assurance Manager is responsible for developing, implementing and monitoring the required systems and controls to assure company compliance with established regulatory and industry standards.

The QA manager implements the QA/QC program, reviews all analytical reports and oversees chain-of custody policies. The QA manager also performs data validation of CLP packages for correctness and completeness; is liaison to regulatory agencies for issues of proficiency testing and certification and functions as the Corporate Safety Officer.

The QA manager will have at least a degree in chemistry, bacteriology, biology or related science, preferably a graduate degree, excellent organizational and communication skills, experience in quality assurance procedures and a minimum of five years of relevant experience.

Technical Manager

Is responsible for CLP data review for completeness and correctness, technical guidance, and development of new methods and special projects. The technical manager also assists section supervisors with training and staff development.

Minimum requirements include undergraduate and graduate degree in chemistry or related science, five years of analytical and supervisory experience, and good communication skills.

Laboratory Scientist

Performs chemical tests on a variety of environmental samples often using sophisticated instrumentation under supervision. Maintain and monitor QA/QC requirements associated with test. Maintain instrumentation in optimum operational condition and analyze and report data for work assigned.

Minimum requirements are a bachelor's degree in appropriate scientific disciplined. With experience and/or education employees can advance from Scientist I to II, III, IV & V. this rating of levels in documented in the Human Resource Dept.

Laboratory Technician

Performs routine laboratory testing or sample preparation under the direct supervision of a section supervisor. Technicians perform routine analytical tasks according to standard operating procedures. They operate and maintain lab instruments and maintain required quality control for each test.

Minimum requirements for technician I are a high school diploma with an associates degree preferred in a technical course of study. Employees can advance to technician II, III, IV or V with experience. This rating of levels is documented in the Human Resource Dept.

Data Package/QC Coordinators

Maintain and monitor the QA/QC and project elements of CLP projects. Input methods data into CLP reporting packages and produce custom spreadsheets and diskettes. Coordinators, review external and internal chain of custody for accuracy and completeness. Assist the lab manager in prioritizing projects, prepare and mail completed data packages, prepare and distribute workbooks and communicate with clients regarding the status of or problems associated with their projects.

Minimum requirements are an associate's degree with one year of experience or a high school diploma and three years experience strong word processing and data entry skills essential as well as strong organizational and good communication skills.

Laboratory Section Supervisors

The supervisors of the operational sections of the laboratory: GC, GC/MS, metals, wet chemistry, sample preparation, QA/QC and receiving, direct the daily activities of the section and supervise the staff in their section. They are responsible for directing and distributing daily work, employee training, maintaining and monitoring quality control programs, maintenance of instrumentation and operating supplies. They also implement new tests and protocols, review and approve data completed by section personnel and analyze and report samples.

Minimum requirements are a bachelor's degree in chemistry or related science or an associate degree and at least four years of related laboratory experience.

The following are qualifications required for performing CLP (Contract Laboratory Protocol) analysis.

GC/MS Laboratory Supervisor

A bachelor's degree in chemistry or the physical sciences and three years of relevant laboratory experience, including one year in a supervisory capacity is required.

A GC/MS Operator shall be a person with at least a bachelor's degree in

chemistry or the physical sciences, and one year of experience in operating and maintaining a GC/MS data system. Three years of operating and maintaining a GC/MS data system may be substituted for the educational requirements

Mass Spectral Interpretation Specialist shall be a person with at least a bachelor's degree in chemistry or the physical sciences, who has successfully completed a specialized training course in mass spectral interpretation and has at least two years experience in mass spectral interpretation.

Pesticide Residue Analyst shall be a person with at least a bachelor's degree in chemistry or the physical sciences, and two years of experience in operating and maintaining a gas chromatograph and interpreting gas chromatograms.

Organic Sample Preparation Supervisor shall be a person with at least a bachelor's degree in chemistry or the physical sciences and at least three years of organic laboratory experience, including at least one year in a supervisory capacity.

Extraction/Concentration Expert shall be a person with at least a high school diploma, including one course in chemistry and one year of experience in an analytical chemistry laboratory.

Inductively Coupled Plasma (ICP) Spectroscopist shall be a person with at least a bachelor's degree in chemistry or the physical sciences, who has successfully completed specialized training courses in ICP spectroscopy and has two years of applied experience in ICP analysis of environmental samples.

ICP Operator shall be a person with at least a bachelor's degree in chemistry or the physical sciences, and one year of experience in the operation and maintenance of ICP instrumentation, or, in lieu of the educational requirement, four years of experience in the operation and maintenance of ICP instrumentation.

Atomic Absorption (AA) Operator shall be a person with at least a bachelor's degree in chemistry or the physical sciences, and a minimum of one year experience in operating and maintaining AA instrumentation for frame, graphite, furnace and cold vapor techniques, or, in lieu of the educational requirement, three years of experience in operating and maintaining AA instrumentation.

Inorganic Sample Preparation Specialist shall be a person with at least a high school diploma, successful completion of a college level course in

general chemistry or it equivalent, and six months experience in analytical chemistry.

Classical Chemistry Analyst shall be a person with at least a bachelor's degree in chemistry or the physical science, and six months experience in classical chemistry laboratory procedures or in lieu of the education requirement, two and one half years of experience performing classical chemistry analysis.

1.2.3 Reporting Relationships

The QA Manager reports directly to the Laboratory Director. The functions of the QA Manager are independent from laboratory operations. In the absence of the QA Manager, Ursula Middel, the Technical Manager or Joann Slavin, the Laboratory Manager will perform those duties.

The Laboratory Manager reports directly to the Laboratory Director. The Lab Manager is responsible for lab operations.

The Technical Manager and the Production Manager report directly to the Lab Manager.

All analysts report to the Supervisors of their respective departments. All analytical supervisors report to the Production Manager. The Receiving Department, Package Production and Project Management report to the Client Services Manager.

1.2.4 QA Document Control Procedures

All records, documents and manuals generated by the laboratory must be maintained and controlled through a document control system. This system allows for retrieval of information such as lab reports, raw data as well as control of manuals, documents and Standard Operating Procedures produced.

The purpose of the document control system is to ensure that only the most recent versions are available to the appropriate personnel, that revisions are timely and that the document receives the required approvals.

The Quality Assurance Manager is responsible for the document control system and maintains a master list of the location of all documents and their current revision.

The Laboratory Director and the Quality Assurance Manager approve all newly released documents and revised documents.

The Quality Assurance Manager will maintain one copy of an obsolete document. Each page of the document product contains the revision date,

revision number, document number and title. Controlled documents will have an approval signature page, a revision change record and a distribution list. Uncontrolled copies will not include this information.

1.2.4.1. Lab Reports and Data Packages

Lab reports generated through the LIMS are maintained on the system. The information is backed up to a tape on a daily basis. Current lab reports for routine analysis (the previous year) are also maintained in binders, alphabetically and stored in the general office area.

Hard copies of Data Packages are generated in individual departments. These packages are alphabetized and stored in the QC department for a period of three to six months. The packages are then boxed. Each box is labeled with a consecutive number. A notebook is in use, which lists the box number and all data packages, which are stored in the box. The box is transferred to an off site document storage facility at Central Avenue in Farmingdale, NY. The data packages are stored for a length of time determined by the contract but on average for at least five years.

1.2.4.2 Raw data and logbooks

For instruments connected to a P.C., the data files are backed up daily to the network and maintained for five years (ten years for potable water).

Logbooks, which, for manual tests contain the raw data and for automated tests containing analytical sequence information, are used in the lab. Templates of the books are maintained in the QC department and new books are generated and issued through this department. The books are given a book number and are signed out by the QC department, which maintains a record of all logbooks. After completion, the logbooks are stored in the lab for a minimum of one year or less and then numbered and a log corresponding to the books in the box are maintained.

1.2.4.3 Training Records

Initial orientation and on going training is documented. Lynn T. Daniello, the QA Manager, maintains an employee file. Records regarding the progression and completion of test samples are collected by the technical manager or QA Manager and kept in an employee file. Progression of training is monitored and tables for the departments are maintained, reflecting the tests that can be performed by each analyst. These tables are periodically updated in the computer system to provide a reference for management regarding the capabilities of the staff.

1.2.4.4 Employee File

The QA Manager maintains a file for each employee , which documents any continuing education, outside training or seminars attended. This file also contains the ethics training, transcript information, IDC and continuing verification information.

1.2.4.5 Standard Operating Procedures and Manuals

Directories are established on the computer, which lists the SOP's, and manuals present within that directory. A main directory is established which lists all directories and the SOP's listed within. SOP's and the QAM are maintained by revision number and date. Only the most recent SOP's and QA manuals are given to the employees. The employees must sign a statement indicating the SOP and QA Manual name, revision date, revision number that they have read and are currently using. The SOP's used in the lab and the QA Manual is available to the analysts that perform those functions.

1.2.4.6 Audit, Proficiency Results and Certification Information

H2M Labs participates in the semi-annual New York State ELAP and the New Jersey DEP proficiency testing programs. The results are used to evaluate the data produced. All raw data needed to reconstruct the analysis are retained in the laboratory.

Outside suppliers of standards are also used to obtain reference standards. The certificate of analysis is on file in the lab. Blind samples from ERA are interspersed into the lab periodically by the QA Manager.

Hard copies of audit responses, proficiency results as well as the corrective measures implemented, are documented and filed by the QA manager along with correspondence to the state pertaining to certification.

1.2.4.7 Lab Approved Signatures

Lab reports generated by H2M Labs, Inc. must be approved prior to release to client except if data is stamped "Preliminary Results". The approved signatures are, the Lab Director, John J. Molloy P.E., the Lab Manager, Joann M. Slavin and the QA Manager, Lynn T. Daniello.

Case narratives, which are part of a data package and list any non-compliance's pertaining to the package, require a signature that certifies that the analyses were performed in accordance with the said requirements. The individual that reviewed the data package signs the narratives.

The individual that reports a data package, signs a form (see figure 1.2)

indicating that it was reported truthfully. This form is included at the end of each data package fraction.

In the case where the person requiring a signature for the narrative or chain of custody is not present it is permitted to either sign the persons name followed by your initials or sign your name followed by "for" and the individuals name.

1.2.5. QA Program Assessment Procedures

The QA Manager, Lynn T. Daniello, has the responsibility for the quality system and its implementation. In case of absence, the Technical Manager, Ursula R. Middel or the Lab Manager, Joann Slavin takes on these duties.

Performing, monitoring and documenting the day-to-day quality control requirements of the method are the responsibility of the individual analysts performing the test. The departmental supervisors are responsible for overseeing the performance and compliance with these requirements. The QA Manager is responsible for ensuring that these criteria are met. The assessment of the QA Program is accomplished by both external and internal measures:

1.2.5.1. External Measures:

Audits- outside accrediting bodies performs audits of the quality systems to verify compliance. A State or other Government Agency or Independent Auditors may perform this. A report is issued stating a deficiency and a response is generated indicating the corrective measures taken and the date effective.

Data Validation- an independent review of the data produced in the laboratory is done on a routine basis. The data is reviewed for accuracy, precision, correctness and compliance in comparison to the requirements of the project. A report is issued and any non-compliance (if present) is addressed.

Proficiency Samples- State Agencies as well as outside vendors such as ERA and APG provide scheduled proficiency samples for various parameters. The NYSDOH proficiency samples are performed twice a year per sample type (e.g. hazardous waste, potable water). The samples are incorporated into the analytical system and results reported. These results are graded and deemed acceptable/unacceptable. No response is required for an acceptable response. In the case of an unacceptable response, a review of the test and its accompanying QC is performed and the cause of the unacceptable result is investigated. A report listing the cause and the corrective action is generated.

1.2.5.2. Internal Measures:

Double Blind Samples-On a random basis, the QA Manager commissions an outside supplier of check samples to send in a double blind sample. A double blind sample is one that the true value is not known and that it is a check sample put into the system is also not known. The full range of services provided to the customer is checked including turn around time, correctness, and customer service. A report is generated documenting the accuracy of the results submitted and also the accuracy compared to other laboratories.

Systems/Internal Audits- several different types of audit procedures are used in the laboratory. These include the following:

(a) Non-conformance Summary Reports: Figure 1.1 is an example of non-conformance summary report used in the laboratory. The form is utilized intra- as well as interdepartmental to note any deficiencies, systematic or human errors for specific samples. The non-conformance report is prepared by the analyst and distributed to the technical manager. A meeting is scheduled with the department, if necessary to discuss and resolve the non-conformance issues. The QA/QC manager is consulted if procedural changes need to be implemented.

(b) LIMS Holding Time Worksheet: The Access-based LIMS system has the capability to monitor samples and required analyses by holding time. A daily printout lists the sample and the date by which it must be prepared/analyzed. The Production Manager meets with the department supervisors to ensure that holding times are met.

(c) Intradepartmental QC Review: All departments have a review procedure performed by the analyst to make sure that all samples as well as all associated QC are performed.

(d) Data Package Review: All data packages are reviewed by the Technical Manager, department supervisors, QA/QC Manager or Lab Manager.

(e) Internal Audit of Chain-of-Custody (COC): The QA/QC Manager (or designated representative) conducts random audits of the internal COC records. A sample is tracked throughout the internal custody of the department to ensure consistency. Since all COC documentation is submitted in the data packages, the COC is also reviewed at that time.

(f) Internal Audit of QC Measure: The QA/QC Manager (or designated representative) conducts random inspections of the various lab departments. This may be formal (use of checklist) or informal. These inspections include logbook review, QC records, standard preparation

logs and instrument maintenance records.

(g) Data Package Status Summary: On a weekly basis, an update of the status of data packages is prepared in the customer service department and given to all managers and supervisors to monitor the progress of the data packages. Corrective measures are taken if the department reporting the various components of the package is not on schedule.

1.2.5.3. Standard Operating Procedures

Methodologies, custody procedures, bottle preparation and reporting of data are all documented in laboratory prepared standard operating procedure manuals.

The data generated in all departments is analyzed by specific methodologies, which, in most cases, originate from federal publications. The methods in use have undergone initial method startup and most have been performed in the lab for many years: (inorganic parameters-over 30 years, organic over 20 years). The staff is trained on the proper use of the instruments and the QC requirements of the individual methods and protocols.

The SOP's are available to all staff performing the methods. The employee is required to sign a statement that he or she has read, understands and complies with the most recent version of the SOP.

1.2.5.4 Corrective Action Procedures

All employees have the authority to implement corrective action. Set procedures are in place in the laboratory to monitor and verify compliance. Each employee is given SOP's in which set requirements are documented. Any employee may initiate these measures. Procedures are in place to determine the root cause of the problem. This is performed by following a problem from inception and determining the true cause of the problem and correcting it.

There are several procedures in place in the laboratory by which quality problems are detected and documented. Monitoring of corrective action is done by observing trend analysis to determine if the same problem is reoccurring. These can be performed by monitoring the non-conformance form over time. Non-conformance reports are a means of reporting non-compliances to management. The cause of the non-compliance is investigated and corrective measures taken. Problems in quality can be detected throughout the system. Measures are instituted to detect and inform management as early in the process as possible.

There are several procedures in place in the laboratory by which quality

calibration. At all times the sample results must be bracketed by calibration standards. The initial calibration must be verified daily with a midpoint standard and a blank unless specified otherwise in the method. Analysis cannot proceed unless an acceptable calibration is produced unless covered under the exceptionally permitted departures from procedure. Continuing calibrations of the instruments is required at the frequency established in the method. The continuing calibration is usually analyzed at the midpoint unless otherwise stated by the method. Accuracy at other concentration levels is verified by the use of a lab fortified blank at those levels or analyzing another calibration standard at the anticipated concentration level expected e.g. for potable samples a lower concentration level standard is analyzed and for non-potable samples a higher standard is run.

Standards and reagents
Documentation recording information regarding standards and reagents received in the lab is maintained in the individual departments. Records documenting the purity, source and traceability of all standards, including the date of receipt, date opened and expiration date. If the standard requires unusual storage conditions this information is also present in the logbook. Certificates documenting the purity of standards are filed if received with the standard.

Records relating to reagent and standard preparation, including traceability to purchased stocks or neat compounds, date of preparation and preparer's initials are documented. For most standard mixes only a dilution is required. This is documented in the standard logbook. Reagent and standard labels are also documented with the date received, date opened. Prepared standard labels list the date received, date opened, standard ID number and preparer's initials.

1.3 Review of New Work

Due to the increase in products used in the environment, new test methods and procedures are required to be added to the scope of testing in the lab.

There are varying degrees of the addition of new work. These include:

1. The addition of an analyte to an existing scan.
2. Complete start-up of an established method.
3. Analyte requested with no established method.

1.3.1 The Addition of an Analyte to an Existing Scan

The analytical method is reviewed to determine if its use is appropriate for the new analyte. The standard is purchased from a commercial vendor and prepared. If the analyte is available from more than one source, a second source may be purchased to verify the calibration standard. The standard is analyzed to determine its elution time in the scan.

A calibration curve is produced to determine linearity. If preparatory steps are required four replicates of the standard are carried through all phases of the method. The initial start-up procedure is documented. A MDL or IDL is performed and the detection limit is determined.

The samples and standards are analyzed in the same sequence of the method and added analyte is added to the calibration file for identification and quantitation.

An in-house SOP is written and used by the analysts. Demonstration of capability is maintained on file.

1.3.2 Complete Start-Up of an Established Method

The method is obtained and reviewed by the Technical Manager or Supervisor to determine if the instrumentation and reagents needed by the method are available.

If required instrumentation is available, the reagents, standards and supplies needed are gathered/purchased.

If more than one analyte is quantified in the method, the analytes may be analyzed individually to determine elution time initially.

If the required analytes are available from more than one source, a second source may be purchased to verify the calibration standard. A calibration curve is produced to determine linearity.

If preparatory steps are required, four replicates of the standard are carried through all phases of the method and compared to the established QC of the method. The initial start-up procedure is documented. A MDL or IDL is performed and the detection limit is determined.

The samples, standard and blanks are carried through the procedure and the QC is compared to the method QC acceptance criteria. An internal SOP is written and used by the analysts and the demonstration of capability is maintained on file.

1.3.3 Analyte Requested With No Established Method

The analyte to be analyzed is researched and reviewed by the Technical Manager for chemical formula and other relation information.

The Merck Index and CRC Handbook are reviewed for boiling point, vapor pressure etc. to determine the type of compound. After determining the type of compound, it is reviewed to see if it can be analyzed by an existing method. If not, perhaps a modification to the method would allow its use or a new procedure could be envisioned and tried.

Different approaches to testing the analyte may be tried, comparing the efficiency of the various approaches. The method, which allows for acceptable precision and accuracy, is used.

If more than one analyte is quantified in the method, the analytes may be analyzed individually to determine elution time initially.

If the required analytes are available from more than one source, a second source may be purchased to verify the calibration standard. A calibration curve is produced to determine linearity.

If preparatory steps are required, four replicates of the standard are carried through all phases of the method and compared to the established QC of the method. The initial start-up procedure is documented. A MDL or IDL is performed and the detection limit is determined.

The samples, standard and blanks are carried through the procedure and the QC is compared to the method QC acceptance criteria. An internal SOP is written and used by the analysts and the demonstration of capability is maintained on file.

1.4 Conflict of Interest

Procedures are in place to ensure that employees are free of conflict of interest. The H2M personnel Manual on page 3.5 documents the company policy. This includes the receipt of gifts and ownership in other businesses. Policies are in place regarding "Moonlighting". The Personnel manual also includes ways in which to deal with employee problems and conflict resolution. The Human Resources Department is available to all employees for guidance.

1.5 Confidentiality

The confidentiality of client results is ensured by policies in place in the lab. All results are held in confidence. Sample results are not released to others without pre-authorized permission by the client or a written release request allowing transmittal of the data to an outside source.

1.6 Subcontracting

Samples are subcontracted to other labs if we do not perform an analysis; instruments are down or due to an overload of work. No samples are subcontracted to an outside lab without prior permission of the client. Prior to shipping of samples, the specific client requirements are reviewed with the laboratory; this may include specific methods, reporting and detection limits, and quality control requirements. It may require the submission of a SOP from a project QAPjP if needed. Once the requirements are reviewed with the lab, a copy of their state certification or that the lab is NELAC approved for those analytes is reviewed and maintained on file. The lab is also informed that the results are to be generated on their laboratory's report form and submitted to our laboratory. Results may be transcribed onto H2M's lab report with the

qualifier that the results were performed by an outside lab. H2M lab report show the test subcontracted out and have the notation" see attached."

Copies of this information are maintained in a client file. The information need only be filled out once for an ongoing project. The Receiving Department will maintain a file with the certifications of laboratories that we subcontract work to and will update the certifications on an annual basis. It is the responsibility of the person giving the quote or setting up the project to notify the client that we will be subcontracting the tests and to complete the subcontracting log, request the certification from the lab (if we don't already use them), and to forward the certification to the receiving department to file.

The file can be located at S:\LABSHARE\NELACLOGS\ and the file is Subcontractor log.doc

1.7 Purchasing

Non-capital purchases in the laboratory are centralized. The decision of the vendor from which to purchase products from is dependent on several factors. These may include: the quality of the product must be of an adequate quality to ensure confidence in the lab results reported and the cost must be fair. If no independent assurance of the quality is available, the lab must document that the product was inspected, calibrated or otherwise verified before use. The availability and price of the product is also considered when choosing a vendor. "Standing orders" are arranged as often as to possible to ensure a constant supply of disposable materials while not requiring storage on site. Records of all suppliers are maintained.

1.8 Contract Review

The Project Manager reviews contracts thoroughly prior to acceptance of any samples. Criteria such as required methods, detection limits, personnel requirements and turn around time are compared with the labs capabilities. At this time guidance from the various departments and/or QC and Administration are provided. If a project specific quality plan is provided, it is reviewed in the above manner. The contract is than reviewed for legal considerations by the project manager. Any questions or issues may be discussed with an Officer of the Company for approval. Any questions, modifications or changes to the contract are then discussed and resolved prior to agreeing to the terms of the contract. An amendment to the contract may be included if needed. The mutually agreed upon contract is then signed by an authorized representative of the firm.

FIGURE 1.1

NON-CONFORMANCE SUMMARY FORM

Sample Number:

Problem:

Supervisor: Date:

Cause:

Analyst Responsible:

Corrective Action:

Action to Prevent Reoccurrence:

Signed: _____ Date: _____

FIGURE 1.2

DATA PACKAGE SIGNATURE FORM

SDG # _____

SCAN _____

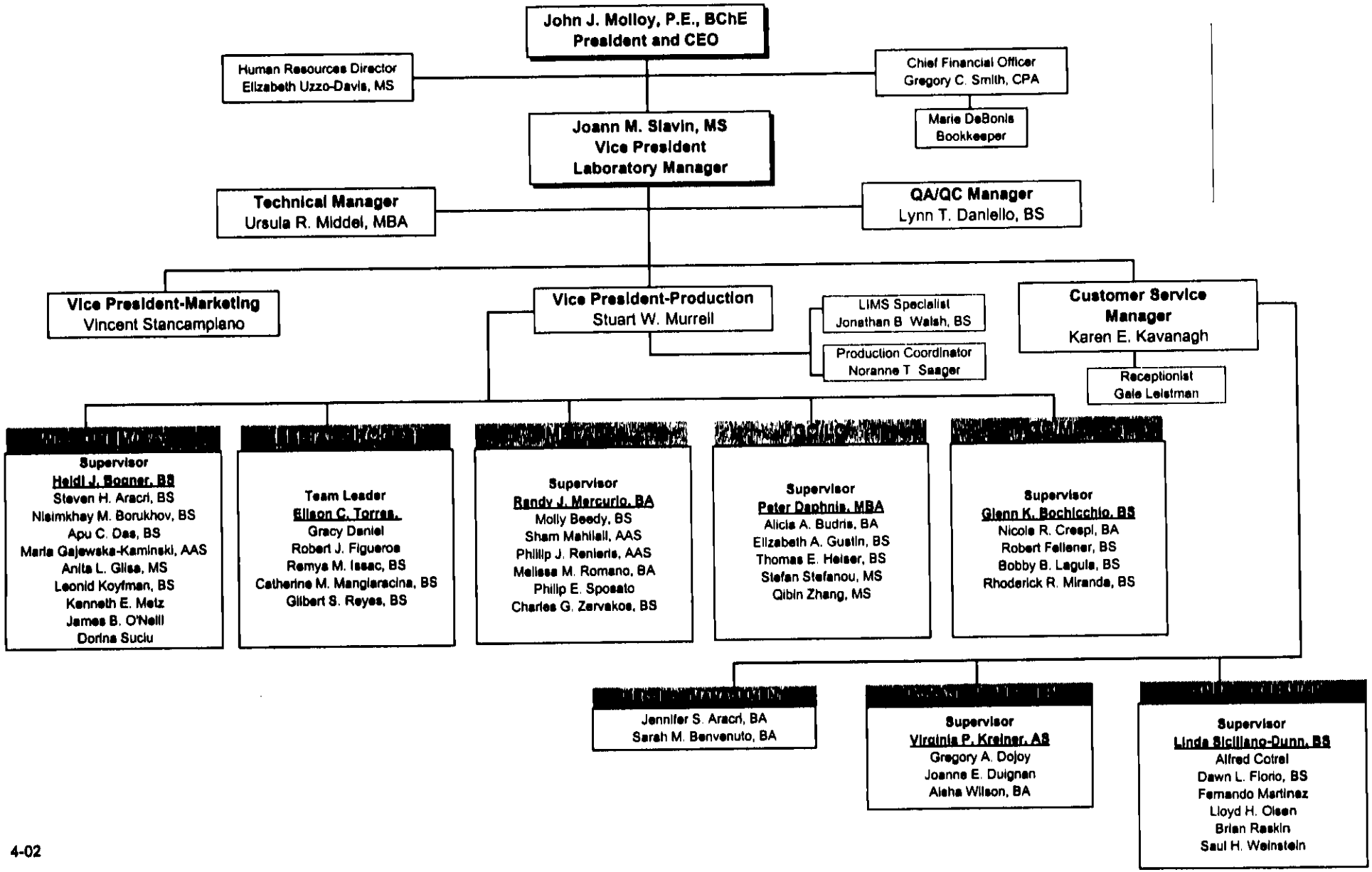
This data package was reported by the undersigned. This reporting includes data calculations, manual edits if necessary and compilation of raw data. The information presented is true and correct to the best of my knowledge.

Signature: _____

Date: _____

SECTION 2.0

ORGANIZATIONAL CHART



2.0 PERSONNEL

2.1 Resumes (See attachments)

2.2 Organizational Chart (See Figure 2-2)

2.3 Training

Employee training is an ongoing process and also includes extensive, supervised cross training. For new employees, it begins with a company orientation, followed by laboratory safety orientation in which employees are familiarized with laboratory hazards, safety policies, and the use of material safety data sheets and laboratory emergency evacuation procedures. Specific training continues in the employee's laboratory section. The employee is extensively trained in the use of instrumentation, equipment, techniques and theory of the tasks in his/her specific job description.

New employees receive supervised training upon reporting for duty. The training period varies depending upon the work required of these individuals. Training of new employees includes a review of laboratory techniques, safety requirements and intensive on-the-job training. After a four-month review period, the new employee's progress will be reviewed. Initial Demonstrations of Capability are performed for each method that the new employee will be performing. A new procedure of giving the employee a written test after a four-month period is being implemented. The employee will take the test and must receive a passing score of 70%. If the employee does not pass the test, retraining will be required and an additional test taken.

As employees remain in the assigned departments, they are continuously trained in different methods to provide cross training. The technical manager or QA manager maintains records of staff training in the various departments in order to assure coverage and sufficient backup of trained personnel.

2.3.1. Orientation

The Human Resource Manager presents company policy, benefits and other aspects of the personnel manual to the new employee. Each employee receives a personnel manual also under the direction of the Human Resources Manager. The Human Resources Manager informs the employee that there is an open door policy and the employee should be free to discuss any problems or difficulties with them. The technical manager/safety officer then gives the employee a laboratory orientation. The section supervisor shows the new employee the facilities and introduces him/her to laboratory personnel. General aspects of establishing a successful working relationship as well as group dynamics are discussed. The importance of honesty, integrity, dependability, and providing correct data is stressed.

If the employee is assigned to a technical, receiving or sampling section of the laboratory, he/she will be scheduled for a pre-employment

physical at that time. It is company policy that all employees who routinely work with samples, chemicals or reagents have a comprehensive employment physical and annual physicals thereafter.

Because of the inherent dangers involved in working in a laboratory, safety measures are discussed in detail, as it is the responsibility of each technician to employ safe laboratory practices. He/she should bring any unsafe conditions to the attention of his/her supervisor, safety officer or laboratory manager. The laboratory safety policy is read and discussed with the new employee. Additional material on lab safety is given to the employee for later reading. The required use of protective clothing is discussed and each employee is given goggles and sized for laboratory coats. The employee is shown how to use and understand the information from product warning labels and material safety data sheets. The material safety data sheets exist for every chemical used in the laboratory and readily available to all employees. Handout material regarding safety measures (Figure 2.1) provides additional information.

Also explained in the orientation is the emergency fire evacuation plan, location of fire extinguishers, emergency showers and eye wash stations. The employee learns the location of North Shore University Hospital in Plainview where accidents are treated when necessary. The alarm and security system is demonstrated and the employee is given the appropriate security code for his/her section.

2.3.2. Job

The employee is given the SOP to read and to sign that he has read, understands and complies with its requirements (see figure 2-3). The analyst is also given all or specific pertinent sections of the QA Manual to read and to sign. The analyst is assigned to an experienced analyst for specific job training. It is the supervisor's responsibility to follow the training schedule. Training includes theoretical explanation as well as hands-on demonstrations. Emphasized are the proper techniques for handling and storing flammable liquids, use of hoods and laboratory glassware, safety procedures, QC and record keeping, and use of the laboratory information management system.

After an interim time of working together with an experienced analyst, the newly trained employee demonstrates his capability for a specific test. This is documented formally by the demonstration of capability summary form and signed off by management. The QA Manager maintains all raw data associated with the "DOC" on file. The demonstration of capabilities must be made prior to analyzing samples. Standards or blind samples of which the analyst does not know the true value concentrations are prepared. The analytes are diluted into a clean volume of sample and given to the analyst to test. The concentration level used is approximately 10 times the expected MDL. Four aliquots are prepared and tested. The mean recovery and the standard deviation

are calculated for each parameter of interest. This information is compared against the method QC criteria or if not available, against in-house control limits. If the parameters meet the required limits analysis may proceed. If not, performance is deemed unacceptable for that parameter and corrective measures are taken to determine the problem. Analysis is not permitted until acceptable performance has been demonstrated. A certification statement is completed and the statement and raw data are placed in the employee files. (See figure 2-4). The newly trained analyst is permitted to perform sample analysis independently, still under close supervision of the instructor.

The Technical Manager monitors progression of training of individuals in the various tasks. Tables for the departments are maintained, reflecting the tests that can be performed by each analyst. These tables are periodically updated in the computer system to provide a reference for management about capabilities of each employee to perform testing and training requirements. The analyst's capabilities are verified annually by various means such as proficiency testing, Lab fortified blank analysis, Blind duplicate testing or another DOC.

2.3.3. Seminars, Continuing Education

Seminars are scheduled on a yearly basis. These seminars may cover special interest subjects such as quality control, sample tracking, new methods, updates to regulations, waste disposal, etc. Managers and/or department heads specially qualified in the particular subject conduct these seminars. For instance, supervisors of the analytical departments are called upon to inform analysts in the sample preparation departments about analytical aspects in their department. This increases the awareness for certain requirements during the preparation of the samples. These seminars therefore not only serve to increase knowledge but also provide a means to develop understanding and communication between departments.

To keep employees current on new techniques, employees are also encouraged to attend outside seminars and conferences on subjects and techniques beneficial to their job requirements, and specialized training offered by the instrument manufacturers.

Internal group training by outside vendors also is provided for equipment and software enhancements. This may also be used to disseminate training information such as troubleshooting of instruments or new columns available.

Tuition reimbursement is also offered to employees who take relevant courses, and dues reimbursement is provided for professional society memberships.

2.3.4 Record Keeping

Documentation generated during the employees initial hiring is

maintained in the Human Resources Department. This may include job application, employment history and a summary of educational background. The QA Manager maintains transcript records, on-going training records and the initial and on-going demonstration of capabilities in individual employee files.

Documentation verifying that the employee has read ,understands and complies with the SOP's, QA Manual and the Ethics Policy are also maintained.

2.3.5 Ethics Policy Agreement

It is the policy of H2M Labs that all employees at all times shall conduct themselves and the business of H2M Labs in an honest and ethical manner. Compliance with this policy will be strictly enforced.

Unethical behavior or fraud is, among other things, falsification of data or records, (such as sampling or sample handling records), laboratory worksheets or logbooks, instrument settings or data, sample results or laboratory analysis reports and date and time of analysis. Violators of this policy are subject to immediate dismissal.

Unacceptable behavior includes such misconduct as, lack of adherence to company and method requirements (including procedures for instrument calibration, quality control, standard and reagent preparation, sample handling, sample preparation and analysis).

The following is a list of some unacceptable and fraudulent activities. This list is not intended to be all-inclusive:

- Making up data or other sampling and analysis information.
- Misrepresentation of QC samples and spikes as being extracted or digested when they were not.
- Falsification of the clock setting or improper recording of dates and times on any document.
- Improper peak integration.
- Improper GC/MS tuning.
- Improper calibration/QC analysis.
- File substitution.
- Deletion of non-compliant data.
- Improper alteration of analytical conditions.
- Unwarranted manipulation of computer software.
- Failure to notify management of sample or data errors.

Information regarding ethics concerns, questions or reports of suspected unethical behavior could be directed to Lynn T. Daniello,, Quality Assurance Manager or to Liz Davis, Human Resource Manager.

2.3.6 Standard Operation Procedures

Copies of SOP's are available to all staff. The SOP lists the title, revision number the effective date and signatures of the approving

authority. Each method SOP contains the following information or references where the information may be found. The information listed in the SOP may not be in the following order:

- Identification of test method
- Applicable matrix or matrices
- Detection limit
- Scope and application ,including compounds to be analyzed
- Summary of the test method
- Definitions
- Interference's
- Safety
- Equipment and supplies
- Reagents and standards
- Sample collection, preservation, and storage
- quality control
- calibration and standardization
- calculations
- method performance
- pollution prevention
- data assessment and acceptance criteria
- corrective action for out of control data
- contingencies for handling out of control data
- waste management
- references
- any tables, diagrams, flow charts and validation data

FIGURE 2.1

ORIENTATION FOR NEW EMPLOYEES

Date:_____

The undersigning employees participated in an orientation session conducted by:_____ covering general obligations of laboratory personnel.

Safety considerations were discussed and the following documents and safety equipment were handed out.

1. Safety and Health Policy
2. Laboratory Safety
3. Memo: "On the job injuries"
4. Map to hospital
5. Map to CIM
6. Accident Report
7. Safety Instructions
8. Goggles

Participants:

JOHN J. MOLLOY, P.E.

President and CEO

PROFESSIONAL EXPERIENCE

H2M (1974 - Present)

EDUCATION

B.E., Chemical Engineering, Manhattan College, 1967

REGISTRATIONS/ CERTIFICATIONS

Licensed Professional Engineer, New York (1977)

Director, Environmental Laboratory- New York, New Jersey, Connecticut, Massachusetts, Pennsylvania and Delaware

Certified Health and Safety Operations at Hazardous Waste Sites (OSHA)

Dale Carnegie Leadership Training for Managers Course, 2000

OFFICES

American Counsel of Independent Laboratories [ACIL]:
- National Board of Directors, Environmental, 2000 – 2001
- Eastern Division:
  - Chairman, 1996-97
  - Secretary/Treasurer, 2000 –01

Boys Scouts of America Suffolk County Council
- Director, 1995 –2001

Huntington Township Chamber of Commerce:
- Director, 1989 –1995
- Committee for Better Government:
  - Director, 1995 – 2001
  - Vice-Chairman, 2000 – 2001

New York State Association of Approved Environmental Laboratories
- Chairman, 1989 –1993
- Director, 1989 –1995

MEMBERSHIPS

American Water Works Association

Environmental Management Association

Long Island Water Conference

National Society of Professional Engineers

New York State Society of Professional Engineers

Water Environmental Federation

Mr. Molloy is President and Chief Executive Officer of the H2M group of firms that includes: Holzmacher, McLendon & Murrell, P.C.; H2M Labs, Inc.; H2M Associates, Inc. and H2M Construction Management, Inc. Mr. Molloy is responsible for all facets of corporate management including administration, finance; staffing and budgeting; planning and development; and marketing.

In his professional capacity with Holzmacher, McLendon & Murrell, P.C., Mr. Molloy directs engineering programs for a wide-array of the firm's clients. His experience includes all phases of project engineering and management including feasibility studies, pilot studies, planning studies, cost estimating, design services and construction management. Mr. Molloy has provided professional services to government and industrial clients covering most spheres of environmental engineering, air pollution control; water and wastewater; and, solid and hazardous waste management.

Since assuming direction of H2M Labs, Inc. in the late 1970's, Mr. Molloy has been the key principal responsible for its growth and development, overseeing all aspects of management including planning; budgeting; sales and marketing; and quality control and quality assurance.

Mr. Molloy began his professional career as a project engineer in the chemical process industry. He has also served as an air pollution control engineer for the City of New York where he was involved in the testing and evaluation of air emissions for industrial processes. With H2M he has been responsible for the assessment of numerous industrial sites. The extent and severity of site contamination has been assessed both privately and with regulatory agency overview. He has worked on programs throughout the eastern region of the United States that have included soil borings and analysis, groundwater monitoring well installation, sampling and analysis, and remediation. The projects have varied in scope from Phase I and Phase II real estate liability assessments through formal remedial investigation and feasibility studies at hazardous waste sites.

Mr. Molloy has participated in and managed hundreds of projects relating to water quality protection, supply, treatment and system development; industrial wastewater treatment; hazardous and solid waste management; and, site evaluation and remediation. He was the project manager for a major Long Island water project to remove volatile organic compounds by air stripping. This five million gallon per day system became operational in the spring of 1985 and was one of the first such treatment systems in the region. Mr. Molloy has applied his treatment expertise to many additional applications for contaminated public supply wells and groundwater remediation projects, employing air strippers, as well as carbon adsorption units.

(continued)

PROFESSIONAL PAPERS:

Molloy, John J. and John E. Osborn. **Hazardous Waste, Soil & Groundwater Contamination: The Law, Strategies and Technology Solutions for the 1990s.** National Asbestos Council, Pittsburgh, Pennsylvania, April 1991.

Molloy, John J. **Industrial Property Transactions: Protecting Yourself Against the Liabilities.** Institute for International Research Environmental Compliance Conference, Chicago, Illinois, October 1990.

Molloy, John J. **Industrial Property Transactions.** New York Water Pollution Control Association, Inc., New York, New York, January 1990.

Molloy, John J. **Air Stripping for Organics.** American Water Works Association, Toronto, Canada, April 1985.

Mr. Molloy serves in the capacity of H2M's project director for the following water supply clients. In all cases, water supply is obtained from a sole-source aquifer that has been impacted by contamination and where treatment has been implemented.

- Hicksville Water District -- Ongoing contract for professional engineering services covering water supply, treatment, storage and distribution for this community of 48,000.
- South Huntington Water District -- Ongoing contract for professional engineering services covering water supply, treatment, storage and distribution for this community of 55,000.

Mr. Molloy also serves in the capacity of H2M's Principal-in-Charge for a number of key programs and clients. He brings 30 years of professional experience in all areas of engineering, planning and the environmental sciences. His input and direction is essential in a wide variety of the firm's engagements and is applied in solving clients' issues and problems. ■

JOANN M. SLAVIN

Vice President, Laboratory Manager

PROFESSIONAL EXPERIENCE

H2M (1980 - Present)

EDUCATION

M.S., Toxicology, St. John's University 1984

B.S., Toxicology, St. John's University 1980

Dale Carnegie Leadership training for Managers, 2000

MEMBERSHIPS

American Chemical Society

American Chemical Society - Safety and Health Section

American Council for Independent Laboratories

New York Association of Approved Environmental Laboratories

Former Memberships:

American Academy for the Advancement of Science

American Society of Mass Spectroscopy

International Association of Quality Circles, Long Island Chapter

New York Academy of Sciences

Rho Chi Pharmaceutical Honor Society

Society of Forensic Toxicologists

OFFICES

H2M Labs, Inc. Board of Directors

New York State Association of Approved Environmental Laboratories - Director (1999 to present)

New York State Association of Approved Environmental Laboratories - Board of Directors (1995 to present)

New York State Association of Approved Environmental Laboratories - Secretary/Treasurer (1997 1999)

PUBLISHED PAPER

Slavin, Joann M., Ursula R. Middel and Ellen R. Kelly. **Environmental Chemistry and Analysis of Regulated Compounds.** Environmental Science & Technology Handbook, Government Institutes, Inc., 1994.

As vice president and laboratory manager, Ms. Slavin is responsible for and directs all laboratory operations and activities. She maintains all records for laboratory operations, including reports, billing and purchasing. She is responsible for all contract administration and serves as liaison between lab and client. She directs 65 scientists and technicians, and manages the programs necessary to conduct the organic, inorganic and bacteriological services of the laboratory. She also reviews and supervises the methods, protocols and guidelines for sample collection and analysis based upon USEPA and state contract requirements and chain-of-custody procedures.

Ms. Slavins' responsibilities include the day to day management of laboratory procedures and reporting of results. Her duties include the monitoring of performance standard in QC and QA, monitoring the validity of the analysis performed in the laboratory and the data generated to assure reliable results and to provide technical guidance and educational direction to the laboratory staff.

Ms. Slavin is currently the Chair of the New York Association of Approved Environmental Laboratories (NYAAEL) and a member of the Technical Affairs Committee which meets with state agencies such as NYS Department of Health Environmental Laboratory Approval Program (ELAP) and NYSDEC to provide technical guidance on regulatory issues that impact the environmental testing industry.

As the Laboratory's safety officer, OSHA representative and trained toxicologist, Ms. Slavin supervises all aspects of occupational safety and health programs. She has designed safety protocols for the safe handling and disposal of hazardous materials. She has completed the OSHA 40 hour hazardous materials training course and maintains the certification with yearly eight hour refresher training.

Ms. Slavin attended a course on the interpretation of mass spectra at the Finnigan Institute. She reviews the identifications of non-targeted components in the GC/MS Laboratory. She also attended a course in Denver, Colorado on the compliance criteria for inorganic and organic USEPA CLP data packages. She also attended two USEPA-sponsored seminars/symposia discussing CLP and associated criteria and a training course in Total Quality Management (TQM).

Prior experience includes QA Manager of the laboratory, GC/MS supervisor for volatile and semi-volatile organics; analysis of pesticides, PCBs, herbicides, volatiles and semi-volatile organics by GC and priority pollutant and HSL by GC/MS; semi-volatile, pesticides and herbicide sample preparation and clean-up procedures. ■

STUART W. MURRELL

Vice President, Production Manager

PROFESSIONAL EXPERIENCE

H2M (1975 - Present)

EDUCATION

Course work in Business Management, State University of New York at Farmingdale

COURSES

SQL*LIMS - Key Personnel, Training and Advanced Training

MS Access

Mr. Murrell has 26 years of laboratory experience at H2M. His responsibilities encompass production oversight of all analytical departments. This includes prioritizing testing, ensuring all analyses are performed within holding times, and liaison with service departments. He assists in the planning and scheduling of analytical events, monitors laboratory productivity and acts as liaison with the computer department.

Mr. Murrell monitors production capacity levels in the various departments and monitors on-time performance. He has taken an active and integral part in the developments of the Laboratory Information Management System (LIMS) which is used to manage laboratory operations. ■

VINCENT STANCAMPIANO

Vice President, Director of Marketing

PROFESSIONAL EXPERIENCE

H2M (1973 - Present)

EDUCATION

A.A.S., Air and Water Pollution Control, Sullivan County Community College

Sample Collection and Laboratory Training, U.S. Environmental Protection Agency

Air and Water Sample Collection and Testing Procedures, New York City Laboratories

MEMBERSHIP:

American Association for the Advancement of Science

American Society of Military Engineers

Mr. Stancampiano is the laboratory Director of Marketing and coordinates all of H2M's sales and marketing efforts. He assists clients to plan and organize their analytical programs and coordinates their lab services. He is client liaison for major accounts and has assisted clients in negotiations with regulatory agencies. His strong technical background and comprehensive understanding of the environmental field make Mr. Stancampiano a highly successful client ombudsman. He also consults with potential clients to define and discuss their analytical and regulatory compliance needs. Mr. Stancampiano's years of scientific experience, together with his extensive knowledge of the laboratory's capabilities, make him uniquely qualified to present the services of H2M Labs, Inc.

As an experienced data validator, Mr. Stancampiano reviews the metals and inorganic parameter data packages for compliance with USEPA Contract Laboratory Protocol. He also has extensive experience conducting laboratory audits to ensure that laboratories meet regulatory or contract compliance.

He formerly served as H2M's Supervisor of Inorganic Chemistry where he supervised laboratory technicians in analyses of water, sewage and industrial/hazardous wastes, metals, flash point, ignitability, EP TOX (extraction procedure), corrosivity and toxicity tests; automated analyses for inorganic constituents via Technicon and total organic carbon analysis via Dohrmann Envirotech TOC analyzer. ■

LYNN T. DANIELLO

QA/QC Manager

PROFESSIONAL EXPERIENCE

H2M (1984 - Present)

EDUCATION

Graduate study in Geophysics, Texas A&M University

B.S., Earth Science, Adelphi University

MEMBERSHIPS

American Water Works Association

Ms. Daniello's responsibilities include the day-to-day management of laboratory procedures and reporting of results. Her duties include the monitoring of performance standards in QC and QA, monitoring the validity of the analysis performed in the laboratory and the data generated to assure reliable results and to provide technical guidance and education and direction to the laboratory staff. Ms. Daniello is responsible for the NELAC certification, coordination of performance evaluation studies and maintaining certifications in varying states.

She is project officer and primary contact for our routine analytical services contract with the New York City Department of Sanitation. She has successfully completed courses in Microsoft Access for the development of automating various client electronic deliverables.

Prior experience at H2M included wet chemical analyses on water and wastewater samples. She is proficient in both routine and CLP analyses and reporting for phenols, cyanide and metals and primary operator of the Technicon inorganic analyzer. She assisted in the bacteriology laboratory in recording and interpreting results, operated the Applied Research Laboratories ICP and was special project coordinator for the inorganic chemistry section. She successfully completed an Applied Research Laboratories 3410 ICP training course and the New York State Department of Health basic environmental health course. ■

KAREN E. KAVANAGH

Customer Service Manager

PROFESSIONAL EXPERIENCE

H2M (1989 - Present)

EDUCATION

Course work towards B.S., Biology, State University of New York at Stony Brook

The Dale Carnegie Course, 2000

Dale Carnegie Sales Training Course, 1992

As Customer Service Manager, Ms. Kavanagh's responsibility includes management of all client related, administrative, project management and package production functions of the laboratory.

In this position, Ms. Kavanagh applies her laboratory background, communication skills and project management experience to coordinate the receiving and package production department functions, as well as provide project management to current clients. She is responsible for preparation of analytical cost quotations and detailed technical laboratory proposals.

Ms. Kavanagh prepares a daily status sheet for all chain of custody samples and works with the production manager to monitor the status of these samples as they go through the analytical process.

As primary client liaison for H2M's major engineering, consulting and industrial clients, Ms. Kavanagh provides assistance in the coordination and organization of their analytical services. She works directly with clients to assure the correct methodologies, quality control requirements and deliverables are requested at the inception of each project. She also attends conferences and trade shows as a representative of the laboratory. Ms. Kavanagh is also the laboratory liaison to H2M's large client base of municipal and private water suppliers. She works closely with these clients, providing information regarding new and changing testing requirements.

Ms. Kavanagh's experience includes eight years as an account executive, servicing H2M's large client base. She also has experience in semi-volatile extractions, sample concentration, cleanup and other preparation. She was also responsible for inorganic sample preparation including metals digestions, and performed RCRA testing (flashpoint, reactivity and corrosivity). ■

PACKAGE PRODUCTION PROJECT MANAGEMENT

PROFESSIONAL EXPERIENCE

H2M (1999 - Present)

EDUCATION

A.S., Secretarial Science, Queensboro Community College, 1974

VIRGINIA KREINER, Project Supervisor

Ms. Kreiner is responsible for all aspects of contract-required data deliverables, including organization, packaging, copying and delivery of data packages. She is responsible for package assembly and routing through appropriate channels for typing and QA/QC review. She also generates inorganic CLP packages using Ward Scientific report generating software and prepares Electronic Diskette Deliverables in various formats required by H2M's clients.

PROFESSIONAL EXPERIENCE

H2M (1997 - Present)

EDUCATION

B.A., Biology, State University of New York at Stony Brook, 1997

JENNIFER ARACRI, Scientist I, Project Manager

As project manager, Ms. Aracri assists clients and potential clients with their regulatory and analytical testing needs through completion of the project. She provides assistance in the coordination and organization of analytical services for H2M's major engineering, consulting and industrial clients. She works with clients to assure the correct methodologies, quality control requirements and deliverables are requested at the inception of each project. Ms. Aracri also provides analytical cost quotations to current and potential clients. She was the supervisor of the sample preparation department. She has performed the extraction of environmental samples including semi-volatile GC and GC/MS extractions and concentration, including pesticide, herbicide and semi-volatile compounds, TCLP extractions, and sample cleanup including GPC and Florisil. As supervisor, Ms. Aracri was responsible for scheduling the extractions staff, monitoring work flow to meet tight holding times, maintaining sample prep equipment and instrumentation, and training staff in extraction procedures.

PROFESSIONAL EXPERIENCE

H2M (2001 - Present)

EDUCATION

B.A., Communications and Human Relations, Western Connecticut State University

SARAH BENVENUTO, Project Manager

Ms. Benvenuto assists clients and potential clients with their regulatory and analytical testing needs through completion of the project. She provides assistance in the coordination and organization of analytical services for a major utility client. She works with them to assure the correct methodologies, quality control requirements and deliverables to meet this regulatory and project requirements.

PROFESSIONAL EXPERIENCE

H2M (2000 - Present)

GREGORY A. DOJOY, Project Coordinator

Mr. Dojoy's primary responsibility is the preparation of Electronic Diskette Deliverables in various formats required by H2M's clients. He is very proficient in producing EQuIS format deliverables. Mr. Dojoy is also an assistant project manager for a major client and coordinates the quarterly scheduling of the project.

PROFESSIONAL EXPERIENCE

H2M (1983 - Present)

EDUCATION

Course work in Business Administration, State University of New York at Farmingdale

Paralegal Studies Certificate, New York Institute of Technology

JOANNE E. DUIGNAN, Package Production

Ms. Duignan is responsible for contract-required data deliverables. This includes organization, packaging, copying and delivery as well as working with the customer service and production managers to coordinate the efforts of the analytical laboratory sections to ensure timely completion. She is also responsible for assembling the data package and routing it through appropriate channels for QA/QC review and typing. She also formats inorganic CLP data using Ward Scientific CLP software package, and prepares Electronic Diskette Deliverables in various formats required by H2M's clients.

PACKAGE PRODUCTION
PROJECT MANAGEMENT

PROFESSIONAL EXPERIENCE

H2M (2002 - Present)

EDUCATION

B.A., Mass Communication, Clark Atlanta University

ALISHA WILSON, Package Production

Ms. Wilson is responsible for all aspects of contract-required data deliverables, including organization, packaging, copying and delivery. She is responsible for package assembly and routing through appropriate channels for typing and QA/QC review.

URSULA R. MIDDEL

Scientist VI, Technical Manager

PROFESSIONAL EXPERIENCE

H2M (1977 - Present)

EDUCATION

M.B.A., Business Administration, Dowling College, 1990

Chemical Engineering, Ohm-Polytechnikum, Germany, 1962

MEMBERSHIPS

American Chemical Society, Environmental Division

American Chemical Society-Long Island, Environmental Committee

Delta Mu Delta

AWARDS

H2M Group Employee Excellence Award, 1990

PUBLISHED PAPER

Slavin, Joann M., Ursula R. Middel and Ellen R. Kelly. **Environmental Chemistry and Analysis of Regulated Compounds.** Environmental Science & Technology Handbook, Government Institutes, Inc., 1994.

Ms. Middel is responsible for research for special projects, technical guidance and development, and implementation of new methodologies. This includes keeping instrumentation up to the latest developments. Under her guidance, H2M has excelled in performing many tasks for unusual types of analyses for the United States Environmental Protection Agency (USEPA) Special Analytical Services (SAS) projects. She is also responsible for staff training and updates to the laboratory Standard Operating Procedures manual to include new analyses and revisions.

Ms. Middel conducts a safety orientation seminar for all new employees, as well as in-service seminars on various analytical topics. She is specifically involved with review of the operations of the special process lab for GC and GC/MS sample preparation.

Her responsibilities also include the review of in-house data packages completeness, accuracy and contract compliance for GC and GC/MS analyses. Ms. Middel has successfully completed numerous software training programs and has frequently attended USEPA sponsored seminars on analytical methods and quality assurance. She also gave a technical presentation in environmental symposia (EAS, WTQA).

As former supervisor of the GC and GC/MS laboratories, she developed a comprehensive understanding of New York State Department of Environmental Conservation (NYSDEC) CLP protocols and deliverables. She has participated in a training session for organic data validation given by the NYSDEC. Apart from review of H2M's in-house CLP packages, she has also conducted data validation of data packages from other laboratories for government agencies and engineering firms for organic and radiological tests. Since no USEPA guidelines are available for radiological analyses, she has developed validation protocols for tritium and SIRA C13 testing. Ms. Middel has been instrumental in developing H2M's expertise in air analyses, in particular for low level analyses by sorbent tubes, canisters and VOST tubes well before air analyses were developed in other laboratories. H2M protocols were ahead of the methodologies published by the USEPA.

Her prior experience includes sales engineer for gas chromatographs, QC supervisor in an aircraft factory where she also gained experience in GC installation, repair and application problems, and research in U/TH analysis for Columbia University. ■

GAS CHROMATOGRAPHY/ MASS SPECTROMETRY LAB

PROFESSIONAL EXPERIENCE
H2M Labs, Inc., (1984 - Present)
EDUCATION
B.S., Biology, University of Hawaii 1982
SPECIALIZED COURSES
Hewlett Packard Systems Manager
Hewlett Packard Mass Spectral Interpretation
Superincos Quantitation Procedures, Finnigan Mat Institute
Target Compound Analysis - Autoquan, Finnigan Mat Institute
MEMBERSHIP
American Chemical Society
AWARDS
H2M Group Employee Excellence Award, 1990

GLENN K. BOCHICCHIO, Scientist VI
Supervisor of GC/MS Laboratory

As supervisor of the GC/MS laboratory, Mr. Bochicchio's responsibilities include scheduling of analyses and staff, quality control, maintenance of instrumentation, calibration and programming of the GC/MS system, interpretation of results, implementation of test protocols and the training and supervision of chemists in the GC/MS laboratory. Prior to supervisor, Mr. Bochicchio is responsible for the analysis of semi-volatile priority pollutants and TCL compounds by GC/MS, analysis and reporting of data, spectra interpretation, data system management and instrumental quality control. He attended a GC/MS in-house training course designed by Hewlett Packard to specifically meet the needs of the laboratory personnel. Mr. Bochicchio has performed wet chemical analysis for sulfate, cyanide, total alkalinity, and dissolved carbon dioxide. In the organic section, he prepared samples for analysis and has conducted instrumental analysis of pesticides, PCB's, and herbicides, including interpretation and reporting of data. Prior experience included wet and instrument analysis of plating solutions, wastewater and treatment operation, and hazardous waste management including collection, transportation, storage and manifestation.

PROFESSIONAL EXPERIENCE
H2M (1994 - Present)
EDUCATION
B.A., Biology, State University of New York at Oneonta, 1990

NICOLE R. CRESPI, Scientist III

Ms. Crespi is responsible for the analysis and reporting of semi-volatile organics and TCL compounds according to USEPA methods and CLP reporting requirements. She performs equipment maintenance and system QA/QC checks for precision and accuracy.

PROFESSIONAL EXPERIENCE
H2M (1994 - Present)
EDUCATION
B.S., Chemistry, University of Santo Tomas, Manila, 1992

RHODERICK R. MIRANDA, Scientist III

Mr. Miranda is responsible for the extraction of pesticides/PCBs, herbicides and base neutral and acid extractable compounds. He is experienced in all phases of sample preparation. Previous experience at H2M includes all phases of gas chromatography, drinking water and CLP reporting. He is an expert in the operation and maintenance of Perkin Elmer and Hewlett Packard gas chromatographs, and particularly adept at troubleshooting and instrument maintenance.

PROFESSIONAL EXPERIENCE
H2M (2002 - Present)
EDUCATION
B.S., Chemistry, University of Minnesota

ROBERT FELLNER, Scientist II

Mr. Fellner is responsible for the analysis and reporting of volatile organics and TCL compounds according to USEPA methods and CLP reporting requirements. His prior experience includes analysis of volatile and semi-volatile analysis by GC/MS.

PROFESSIONAL EXPERIENCE
H2M (2000 - Present)
EDUCATION
B.S., Chemistry, Far Eastern University

BOBBY B. LAGULA, Scientist II

Mr. Lagula is responsible for the analysis and reporting of volatile organics and TCL compounds according to USEPA methods and CLP reporting requirements. His prior experience includes analysis of volatile and semi-volatile analysis by GC/MS.

GAS CHROMATOGRAPHY/ LIQUID CHROMATOGRAPHY LAB

PETER DAPHNIS, Scientist IV
Supervisor of GC/LC Laboratory

PROFESSIONAL EXPERIENCE
H2M (1986 - Present)

EDUCATION
M.B.A., St. John's University, 1998
B.A., Chemistry, City University of New York - Queens College 1983

MEMBERSHIP
American Chemical Society

AWARDS
H2M Group Employee Excellence Award, 1989

As supervisor of the GC/LC lab, Mr. Daphnis' responsibilities include scheduling of analyses, quality control, maintenance of instrumentation, calibration and programming of the GC and LC systems; interpretation of results; implementation of test protocols, staff training and development, and the supervision of GC and extraction utilizing gas chromatography. He performs set-up, calibration and maintenance of instruments, interprets computer generated reports, review of data, and maintenance of quality control charts. Mr. Daphnis is experienced in the analysis of water and soils using the approved methodologies for the priority pollutants, target compound list and RCRA compounds. He supervises all steps in the analysis, including instrument calibration, sample setup data reductions and reporting following QA/QC protocols and CLP.

STEFANOS STEFANOU, Scientist VI

PROFESSIONAL EXPERIENCE
H2M (1985 - Present)

EDUCATION
M.S., Organic Chemistry, Adelphi University, 1990
B.S., Chemistry, Pace University

PUBLISHED PAPER
Dong, Michael W., Jeffrey X. Duggan, and Stefan Stefanou. **A Quick-Turnaround HPLC Method for the Analysis of Polynuclear Aromatic Hydrocarbons in Soil, Water, and Waste Oil.** LC/GC, November 1993.

Mr. Stefanou is experienced in the analysis of water and soils using the approved methodologies for the priority pollutants, target compound list and RCRA compounds. He has performed analysis of pesticide compounds for all method start-ups and in-house method development on HPLC instrumentation. He implemented the start up and analysis of the USEPA Phase II and V drinking water organics by GC and LC. He has also been called upon to perform specialized analysis for the USEPA under the laboratory's special analytical services contract.

ALICIA A. BUDRIS, Scientist II

PROFESSIONAL EXPERIENCE
H2M (2000 - Present)

EDUCATION
B.A., Anthropology, State University of New York at Stony Brook

Ms. Budris is responsible for the analysis and reporting of pesticides, PCBs, and herbicides by GC/ECD. She is proficient with HPLC, GC, UV and IR instrumentation. Prior to H2M, she has over six years of laboratory experience, R&D applications and troubleshooting, as well as experience in the analysis of pharmaceuticals.

THOMAS E. HEISER, Scientist II

PROFESSIONAL EXPERIENCE
H2M (2001 - Present)

EDUCATION
B.A. Biology, Hofstra University, 1995

Mr. Heiser has over six years experience in the analysis of volatile and semi-volatile analytes by GC/MS for soil, potable water, non-potable water and air. He is also experienced in pesticide and herbicide analysis using GC and HPLC.

ELIZABETH A. GUSTIN, Scientist II

PROFESSIONAL EXPERIENCE
H2M (1994 - Present)

EDUCATION
B.S., Environmental Science, Lynchburg College, Virginia, 1992

Ms. Gustin is responsible for the analysis and reporting of pesticides, PCB's, herbicides and organophosphates by gas chromatography, and CLP analysis using HP and PE dual ECD Gas Chromatographs, as well as HPLC. Prior experience includes four years in H2M's Wet Chemistry Laboratory. Her experience included performing traditional wet chemical analysis of water, wastewater, drinking water, soils and sediments. She is completely trained to analyze samples for all parameters and is knowledgeable in CLP reporting.

GAS CHROMATOGRAPHY/ LIQUID CHROMATOGRAPHY LAB

PROFESSIONAL EXPERIENCE

H2M (1998 - Present)

EDUCATION

M.S., Environmental Engineering and Water Resources, Villanova University, 1998
B.S., Environmental Engineering, Hefei University, China, 1984

QIBIN ZHANG, Scientist II

Mr. Zhang is responsible for the analysis and reporting of pesticides, PCBs, and herbicides by GC/ECD. He is experienced with all phases of GC. He is experienced in sample concentration, solvent exchange, TCLP extraction and RCRA testing, as well as various types of sample cleanup including GPC, floracil and sulfur. Mr. Zhang's research experience includes the study of hazardous organic compounds, QC testing for volatile organics, chemical testing for TOC, Ci, Hg, Cu, Fe, Pb. Prior experience includes nine years of GC work with concentration in PCB analysis, extraction of pesticides/PCBs, and BNA extractable compounds.

SPECIAL PROCESS LABORATORY

PROFESSIONAL EXPERIENCE
H2M (1997 to Present)

EDUCATION
B.S., Biochemistry, University of Santo Tomas

ELISON C. TORRES, Scientist II
Team Leader

As Team Leader, Mr. Torres is Mr. Torres is responsible for the coordination and scheduling of the extraction of pesticides/PCBs, herbicides and base neutral and acid extractable compounds. He is experienced in all phases of sample preparation. Previous experience at H2M includes all phases of gas chromatography, drinking water and CLP reporting. He is an expert in the operation and maintenance of Perkin Elmer and Hewlett Packard gas chromatography and particularly adept at troubleshooting and instrument maintenance.

PROFESSIONAL EXPERIENCE
H2M (2000 - Present)

EDUCATION
B.S., Biology, State University of New York at Stony Brook, 2000

CATHERINE MANGIARACINA, Scientist I

Ms. Mangiaracina is responsible for the extraction of pesticides/PCBs, base neutrals and acid extractable compounds. She is experienced in sample concentration, solvent exchange, TCLP extraction and RCRA testing.

PROFESSIONAL EXPERIENCE
H2M (2002 - Present)

EDUCATION
B.S., Medical Biology, Mahatma Gandhi, University, India

REMYA M. ISAACS, Scientist I

Ms. Isaacs is responsible for the extraction of herbicides and pesticides in soil and water busing USEPA methods.

PROFESSIONAL EXPERIENCE
H2M (2002 - Present)

EDUCATION
B.S., Chemistry, Far Eastern University, Philippines

GILBERT S. REYES, Scientist I

Mr. Reyes is responsible for the extraction of pesticides in drinking water using solid phase and liquid/liquid techniques.

PROFESSIONAL EXPERIENCE
H2M (1998 Present)

GRACY DANIEL, Technician I

Ms. Daniel is responsible for sample preparation of environmental samples. She preps glassware, weighs samples and performs filtrations. Ms. Daniel does extraction for PCBs in soil, water, and solid phase extraction for potable water pesticides as well as base-neutral-acid-extractable analytes.

PROFESSIONAL EXPERIENCE
H2M (1999 - Present)

EDUCATION
Suffolk County Community College
Lab Assistant Training Program, Career and Employment Institute

ROBERT J. FIGUEROA, Technician I

Mr. Figueroa is responsible for the extraction of pesticide/PCB and base neutral acid extractable compounds in environmental samples. His primary responsibility is the extraction of pesticides and BNAs in liquid samples using continuous liquid/liquid extractions. He does TCLP prep and flash point analysis. He also worked in H2M's wet chemistry laboratory prior to special process. Prior experience also includes two years of sample preparation at another environmental laboratory.

WET CHEMISTRY LABORATORY

HEIDI J. BOGNER, Scientist III
Supervisor of Wet Chemistry/Bacteriology Laboratory

PROFESSIONAL EXPERIENCE
H2M (1988 - Present)

EDUCATION
B.S., Biology, William Patterson College, 1985

Ms. Bogner's responsibilities include scheduling of analysis and staff, staff training, quality control and supervision of the wet chemistry, automated chemistry and bacteriology laboratories. She oversees the analyses for a variety of inorganic compounds in water, wastewater, soil and hazardous waste. She reviews laboratory reports and CLP data packages for correctness and completeness. Additionally, Ms. Bogner also reviews and implements new analytical methods and instrument maintenance in the wet and auto chemistry sections. Before joining H2M, Ms. Bogner spent almost two years performing traditional wet chemical analysis on water, wastewater, soils, sediment and sludge in a New Jersey environmental testing laboratory.

MARIA GAJEWSKA-KAMINSKI, Scientist II

PROFESSIONAL EXPERIENCE
H2M (1997 - Present)

EDUCATION
A.A.S., Technical Chemistry, State Technical School of Warsaw, 1962

Ms. Gajewska-Kaminski has extensive experience in traditional wet chemistry analysis of environmental samples. Primary area of responsibilities at H2M is the analysis of alkalinity and cyanide. She also performs analysis of detergents and fluoride. Before joining H2M, Ms. Gajewska-Kaminski spent seven years performing inorganic environmental analysis at another laboratory.

ANITA L. GLISA, Scientist II

PROFESSIONAL EXPERIENCE
H2M (1999 - Present)

EDUCATION
M.S., Marine Science, Long Island University, 1980
B.S., Biology, Mt. Saint Vincent, 1976

As a bacteriologist, Ms. Glisa performs routine examination of water and wastewater samples for total coliform and E-coli according to standard methods, microscopic examination of samples, sterilization, and equipment setup. She also trains and supervises staff in microbiology, purchases materials, equipment and maintains quality control for the department. She also performs speciation of coliform organisms.

STEVEN H. ARACRI, Scientist I

PROFESSIONAL EXPERIENCE
H2M (2000 - Present)

EDUCATION
B.S., Biology, State University of New York at Stony Brook, 1998

Mr. Aracri is responsible for the analysis of petroleum hydrocarbons, oil and grease, sulfates, BOD, COD and cyanide. He is also experienced in the analysis of samples using H2M's automated chemistry analyzer, the TRAACS 800.

NISIMKHAY M. BORUKHOV, Scientist I

PROFESSIONAL EXPERIENCE
H2M (1999 - Present)

EDUCATION
B.S., Chemistry, Bukhara U. Uzkokistan, USSR

Mr. Borukhov has over 25 years experience in environmental analysis. He performs wet chemistry analysis with a focus on total phenolic and color, turbidity, ammonia and TKN preparation.

APU C. DAS, Scientist I

PROFESSIONAL EXPERIENCE
H2M (2000 - Present)

EDUCATION
B.S, Biochemistry, Dhaka University, Bangladesh, 1997
Course work towards B.S. Computer Science, LaGuardia Comm. College

Mr. Das is responsible for the analysis of samples including solids, BODs, COD and automated chemistry.

WET CHEMISTRY LABORATORY

PROFESSIONAL EXPERIENCE

H2M (2001 - Present)

EDUCATION

B.S., Biology and Chemistry, State University of Chernovtsy, Ukraine, 1976

PROFESSIONAL EXPERIENCE

H2M (2002 - Present)

EDUCATION

B.S., Inorganic Chemistry, Minor in Organic Chemistry, Misuara Polytechnical University 1989

PROFESSIONAL EXPERIENCE

H2M (1988 - Present)

EDUCATION

State University of New York at Farmingdale

AWARDS/HONORS

H2M Group Employee Excellence Award, 1994

PROFESSIONAL EXPERIENCE

H2M (1997 - Present)

EDUCATION

Lab Assistant Training Program

LEONID KOYFMAN, Scientist I

Mr. Koyfman performs wet chemistry analysis, specifically BODs.

DORINA SUCIU, Scientist I

Ms. Suciu is responsible for the analysis of petroleum hydrocarbons, oil and grease, sulfates, COD and fluoride.

KENNETH E. METZ, Technician II

Mr. Metz is responsible for the analysis of petroleum hydrocarbons, oil and grease, sulfates, BOD, COD and cyanide. He is also experienced in the analysis of samples using H2M's automated chemistry analyzer, the TRAACS 800. As a highly versatile technician, Mr. Metz can perform virtually all wet chemistry analysis including, cyanide, phenols, hexavalent chromium, solids, TOC and TOX. Prior to joining the wet chem group, Mr. Metz was a laboratory assistant in H2M's receiving department.

JAMES B. O'NEILL, Technician I

Mr. O'Neill performs wet chemistry analysis, specifically total, suspended and dissolved solids, alkalinity, pH, and inorganic preparation. He performs traditional wet chemical analysis of water, wastewater, drinking water, soils and sediments. Mr. O'Neill also is backup bacteriologist.

METALS LABORATORY

PROFESSIONAL EXPERIENCE
H2M (2000-Present)

EDUCATION
B.A., Biology, New York University, 2000

RANDY J. MERCURIO, Scientist II
Supervisor of Metals Laboratory

Mr. Mercurio is responsible for the analysis of trace metals by ICP, ICP/MS and GFAA using USEPA methods and CLP reporting. He is also responsible for scheduling of analysis and staff, quality control in the metals department, instrument maintenance and repair, and training of staff and review of CLP inorganic report packages. He maintains inventory of supplies and develops new methods.

PROFESSIONAL EXPERIENCE
H2M (1988 - Present)

EDUCATION
B.S., Chemistry, State University of New York at Stony Brook, 1987

AWARDS/HONORS
H2M Group Employee Excellence Award, 1991

CHARLES G. ZERVAKOS, Scientist IV

Mr. Zervakos is responsible for the analyses of trace metals by atomic absorption and inductively coupled plasma spectrophotometer using USEPA methods and CLP reporting, as well as quality control in the metals department, instrument maintenance and repair, and training of staff and review of CLP inorganic report packages. Mr. Zervakos also possesses unique expertise in computer software and hardware, and has designed quality control software for the laboratory. As an inorganic instrumentation specialist, Mr. Zervakos has implemented, set-up, and maintained all metals and wet chemistry instruments. He has coordinated service calls, monitored instrument service logs and conducted training on the use and care of the laboratory's Inductively ICP, AA Spectrophotometers, TOX and TOC analyzers.

PROFESSIONAL EXPERIENCE
H2M (2001 - Present)

EDUCATION
B.S., Natural Resources/Environ. Science, University of Main

MOLLY BEEDY, Scientist I

Ms. Beedy is responsible for the analysis of trace metals by ICP and GFAA using USEPA methods and CLP reporting.

PROFESSIONAL EXPERIENCE
H2M (1997-Present)

EDUCATION
A.A.S., Pre-Pharmacy, Bronx Community College, 1988

SHAM MAHILALL, Scientist I

Mr. Mahilall has over 10 years of lab experience performing a wide variety of analytical procedures in an industrial setting. He is responsible for performing a variety of preparative analytical procedures on sample matrices requiring metals analysis. Ms. Mahilall performs acid digestions on waters, soils, industrial influents and other solid sample types including lead solder scrapings, paint chips and surface wipes. He is versed in both routine and ASP CLP inorganic preparation methodologies.

PROFESSIONAL EXPERIENCE
H2M (2001 - Present)

EDUCATION
B.A., Biology, Massachusetts College of Liberal Arts, 1999

MELISSA M. ROMANO, Scientist I

Ms. Romano is responsible for the analysis of mercury by cold vapor analysis using USEPA methods and CLP reporting.

PROFESSIONAL EXPERIENCE
H2M (2000-Present)

EDUCATION
Course work towards B.S. in Forensic Science, Nassau Community and John Jay Colleges

PHILIP E. SPOSATO, Scientist I

Mr. Sposato is responsible for the analysis of trace metals by atomic absorption and inductively coupled plasma spectrophotometer using USEPA methods and CLP reporting. Prior experience includes preparative procedures for metals.

PROFESSIONAL EXPERIENCE

H2M (1998-Present)
Pednault Laboratories (1998)

EDUCATION

A.A.S., Lab Technology, Suffolk County Community College, 1993

PHILIP J. RENIERES, Technician IV

Mr. Renieres is responsible for the analyses of trace metals by atomic absorption and inductively coupled plasma spectrophotometer using USEPA methods and CLP reporting. Prior experience includes trace metal analyses by atomic absorption in an environmental laboratory.

LINDA SICILINO-DUNN

Supervisor of Sample Handling, Shipping and Receiving

PROFESSIONAL EXPERIENCE

H2M (1993 - Present)

NYTEST (1992 - 1993)

EDUCATION

B.S., Natural Resources, Cornell University, 1992

Total Quality Management Business Training Course

Ms. Siciliano-Dunn supervises a team of seven laboratory assistants and samplers and is the primary laboratory sample custodian. She oversees chain-of-custody procedures, preparation of sample kits, scheduling sampling and sample pick-up and logging samples into the laboratory LIMS system. She also acts as liaison with county health departments and water suppliers regarding changes in monitoring requirements and setting up sampling programs.

Prior to this position, Ms. Siciliano-Dunn assisted the laboratory production manager in all phases of laboratory operations and production. Her responsibilities included the input and preliminary review of analytical results, generation of laboratory analytical reports and weekly production of invoices. She also assisted in the month end closing and generated monthly backlog reports.

Ms. Siciliano-Dunn was also the project manager for H2M's contract with the New York City Department of Sanitation. ■

JONATHAN B. WALSH

LIMS Specialist

PROFESSIONAL EXPERIENCE

H2M (1985 - Present)

NYTest (1984 to 1985)

EDUCATION

B.S., Chemistry, Syracuse University, 1983

AWARDS/HONORS

H2M Group Employee Excellence Award, 1989

Mr. Walsh is the laboratory Senior Computer Programmer. He is proficient in MS Access programming and is instrumental in customizing and implementation of our Omega LIMS.

Due to his extensive knowledge in computer electronics, Mr. Walsh has a special aptitude for troubleshooting and instrument maintenance, and acts as in-house engineer rebuilding, overhauling, modifying and interfacing laboratory equipment.

His capabilities encompass atomic absorption/emission, GC volatiles, GC/MS extractables/volatiles and most forms of spectroscopy. He has developed and built an accessory instrument designed to automatically spike sorbent tubes for air analyses. He conducted method validations for new procedures, such as mercaptan in air analyses, and has constructed a system that can draw measured quantities of air from summa canisters for analysis on Tekmar and HP instrumentation.

For VOST tube analysis, he has configured a system that can perform sample splitting, and includes an eight position VOST autosampler, converted from a 16-position autosampler. A patent for this unit has been obtained. Past experience includes potable water, groundwater, industrial wastewater analysis for purgeable organic compounds by purge/trap procedures, instrument calibration, setup, analysis, data reduction and reporting, following full QA/QC protocols. He attended a GC/MS training course designed by Hewlett Packard specifically for H2M. ■

SECTION 3.0

3.0 FACILITIES AND EQUIPMENT

3.1 Facilities

H2M Labs, Inc. is located at 575 Broad Hollow Road (Route 110), Melville, New York 11747, Exit 49 South of the Long Island Expressway (495). The laboratory is approximately 10,400 square feet in size (see Floor Plan).

The laboratory is subdivided into six sections:

- Shipping/Receiving
- Inorganic Chemistry (wet chemistry)
- Inorganic Chemistry (metals)
- Organic Chemistry (GC)
- Organic Chemistry (GC/MS)
- Special Process Laboratory

Figure 1 shows the floor plan of the laboratory.

The staff consists of 60 + technically qualified scientists, technicians, and support staff whose educational backgrounds vary, depending on specific job functions.

The laboratory currently operates Monday to Friday 7:00 a.m. to 11:00 p.m., Saturday and Sunday 9:00 a.m. to 3:00 p.m. If deliveries must be made later than 6:00 p.m. on weekdays, or anytime on weekends, the laboratory must be contacted in advance so that arrangements can be made with our staff to ensure proper receipt of samples.

The balance is located in a separate room to minimize drafts and humidity fluctuations.

The air supply is designed so as to minimize cross-contamination in various lab areas (e.g. sample preparation and volatile organic analysis). The air supply is monitored via computer and records of temperature fluctuations and humidity changes can be reviewed.

Specific work areas are defined and access is controlled. Only authorized laboratory personnel and escorted signed-in visitors may enter the work area.

Good housekeeping measures are employed to avoid the possibility of contamination and from a safety point of view.

Security

The entire building is equipped with a security system monitored by a private alarm company. The laboratory area is divided into separate zones. The access doors to these areas are wired with sensors so that the zones can be operated

individually. Keys to the laboratory are assigned to key personnel. The number of keys and persons responsible are controlled. Keys are signed for by the individual and handed in to Human Resources if employment ends.

This limits the access of unauthorized personnel for entering work areas with hazardous chemicals.

Backup copies of instrument operating systems as well as GC/MS files are maintained in a fireproof room outside the laboratory. A copy of the LIMS is stored off site as well.

3.2 Preventive Maintenance

All efforts are made to prevent unscheduled downtime of any equipment and instrumentation. The department supervisors are responsible for proper functioning of all instruments and schedule routine servicing. They are also responsible for stocking accessories and replacement parts. In case of any failure or malfunction, or if QC procedures indicate that the instrument is "out of control", the supervisors assist with troubleshooting, consult with the technical manager and electronics specialist and may schedule service. Any equipment suspected of improper operation is removed from service, repaired and not used until acceptable performance is demonstrated.

Maintenance logbooks are maintained for all equipment to document repairs and corrective actions performed to keep the instruments performing optimally.

Major instrumentation and software are under manufacturers service contracts. Table 3-1 lists requirements for major equipment.

Equipment

3.3 The laboratory has and maintains all equipment necessary to perform the tests for which it holds accreditation.

3.3.1 Analytical Balance

Balances are serviced annually by:

Sartorius
Technical Service Division
131 Heartland Boulevard
Edgewood, NY 11717
(631) 254-4249

A certificate of service is received, as is a service sticker to be placed on the balance.

The balance is checked in the working range daily with NIST traceable class S weights in the range of interest and documented in a logbook.

3.3.2 pH Meters

The pH meter is calibrated each day of use. The pH meter is calibrated with a standard buffer having a pH of 7.0. The slope is then checked with standard buffers having a known pH of 4.0 and 10.0. An acceptable actual reading from these buffers is in the target value ± 0.2 pH units.

This information is listed in the pH logbook.

3.3.3 Conductivity Meter and Cell

The conductivity cell constant is determined annually using a 0.01M potassium chloride solution. This is documented with a calibration sticker on the meter.

The conductivity meter and cell should be calibrated with a 0.001 M potassium chloride daily or with each use whichever is less frequent. An acceptable actual reading is within 20% of the target value. This is entered into a logbook.

3.3.4 Dissolved Oxygen Meter

The D. O. meter and probe is calibrated daily or with each use. The meter is calibrated according to the manufacturer instructions and checked using the Winkler method. This information is documented in a logbook

3.3.5 Turbidimeters

Turbidimeters are checked daily or with each use with a standard in the range of interest and documented.

3.3.6 Thermometers

All thermometers in use in the laboratory are calibrated against a certified NIST thermometer at a similar temperature.

The NIST thermometers are calibrated on an annual basis by:

National Calibration Services
15 Sheen Plaza
Plainview, NY 11803
(516) 694-5594

A record of certification is maintained on file.

The working thermometers are checked against the NIST thermometer. The thermometers are labeled with a unique ID number and the correction factor. This is documented in a logbook.

3.3.7 Refrigerators

The temperature readings of laboratory refrigerators are monitored daily. The acceptable temperature is from 0° to 5° C. These readings are taken using a dedicated and calibrated thermometer with its bulb

immersed in a liquid and kept in the refrigerator. Each refrigerator is assigned an ID number and a logbook of the temperature is maintained.

3.3.8 Biochemical Oxygen Demand (BOD) Incubators

The BOD incubators should maintain a temperature of 20° ± 1° C. The temperature readings are monitored daily using a calibrated dedicated thermometer with its bulb immersed in a liquid and kept in the incubator. A logbook of the temperature readings is maintained.

3.3.9 Bacteriological Incubators

The temperature readings of the bacteriological incubators is maintained at 35° ± 0.5° and verified daily.

The temperature is monitored for each shelf in the incubator with a separate thermometer. A dedicated thermometer is immersed in a liquid and calibrated against the NIST thermometer. This information is maintained in a bound logbook.

Water bath incubators used for the determination of fecal coliform is maintained at a temperature of 44.5° ± 0.2° C. A calibrated, dedicated thermometer with graduations no greater than 0.1° C and its bulb immersed in the water bath are measure daily. A logbook of the temperature is maintained.

3.3.10 Ovens

Ovens used for drying and/or sterilization are maintained at the target temperature ± 1° C. The thermometer is immersed in sand. The thermometer readings are documented at the start and end of the drying cycle.

3.3.11 Autoclaves

Autoclaves must maintain sterilization temperatures and required pressures during the sterilization cycle and complete the entire cycle within 45 minutes when a 10 –12 minute sterilization period is used. The autoclaves are equipped with a separate thermometer and pressure gauge.

Autoclave tape is used on all bottles and spore strips are used to verify the correct temperature and pressure. This information is documented in a logbook.

3.3.12 Volumetric Dispensing Devices

Eppendorfs ® and other automatic pipets and automatic dilution/dispensing devices are maintained in proper working order.

Mechanical volumetric dispensing devices shall be calibrated quarterly. The calibration procedure is as follows:

Using the principle that 1.0 mL of water = 1.0 gms, pipet an appropriate volume of distilled water into a tarred vessel on an analytical balance. Calculate the % accuracy and % error. e.g. a fixed delivery pipet of 100 microliters (0.1 mL) yields a result of 0.097 gms when weighed on an analytical balance. The expected value should be 0.1 gms. Thus, the accuracy is:

$$\frac{0.097}{0.1} x\,100 = 97\% \text{ or } 3\% \text{ error}$$

This information is documented in a logbook. This is performed on a quarterly basis.

Syringes used in the laboratory have a certificate from the vendor that documents the accuracy.

3.4 Equipment and Backup Alternatives

New instrumentation is continuously acquired to upgrade our capability as well as remain in the technological forefront of our industry. All major laboratory equipment is tabulated in the equipment list. Table 3.2 lists the current equipment list. Redundancy of major equipment such as ICP's, GC/MS's and GC's are in place. Service contracts for the major equipment is renewed annually. Spare parts and expendable items such as columns are maintained as stock.

3.5 Waste Generation, Storage and Disposal

Samples that are not hazardous or contaminated are disposed of through conventional means. Under no circumstances are any hazardous wastes discharged into any sink or drain.

Both bulk and small quantity hazardous wastes are initially accumulated in the section of the laboratory where they are generated. Bulk wastes are initially stored in containers ranging from one liter to five gallons in size. Upon accumulation of a maximum of five gallons in size. It is transferred to a designated 55-gallon drum in the hazardous waste storage facility by the department supervisor or authorized person designated and trained to transfer the waste.

The major quantity of wastes generated is segregated into the 55-gallon drums as follows: waste acids, waste methylene chloride/chloroform, waste ether, and waste granular activated carbon. The remaining hazardous wastes that are generated in small quantities primarily consisting of contaminated samples, prepared samples, and expired or off spec analytical standards.

The waste storage facility was designed and constructed according to Article XII of the Suffolk County Sanitary Code. This room includes secondary containment for fifteen (15) 55-gallon drums, explosion proof lighting/HVAC systems, and a fire suppression system. The storage facility is located adjacent to the laboratory's eastern lobby. The waste storage facility is restricted and is controlled by the receiving department. In order to gain access to the waste storage facility, a list of types and quantities of wastes to be transferred is first submitted to the waster overseer who in turn maintains the lists of wastes transferred.

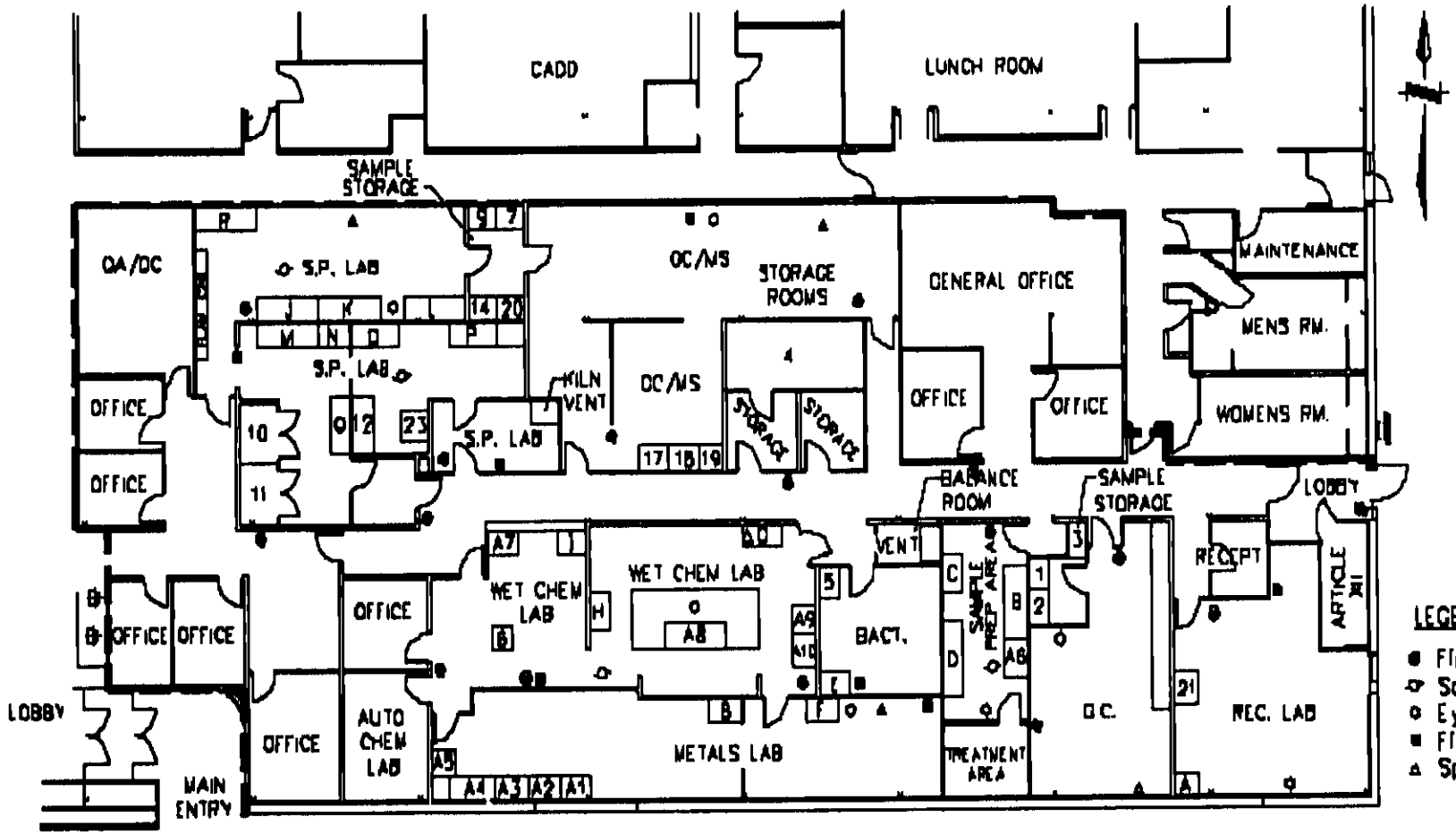
All hazardous wastes are accumulated and stored for disposal by a fully licensed transporter and treatment, storage and disposal facility (TSD) under NYSDEC and/or USEPA regulations. During transfer of wastes from the storage room by the disposal contractor, spill control equipment is maintained at hand to respond to potential spills. All wastes are conducted through physical treatment and/or incineration.

TABLE 3.1

PREVENTIVE MAINTENANCE REQUIREMENT

Instrument	Items checked/serviced	Frequency	Documentation
Analytical Balance	Internal weight train, gears, electronics	Annual	Service sticker
PH meter	Electronics checked	Daily	Logbook
Atomic absorption	Graphite ring changing	As needed	Logbook
Spectrophotometer	Sample capillary system	As needed	Logbook
ICP	Sample capillary nebulizer	As needed	Logbook
Spectrophotometer	Pump winding	Weekly	Logbook
	Lens cleaning	Quarterly	Logbook
G.C.	Change column	As needed	Logbook
	PID lamp cleanup	Monthly	Logbook
	Furnace tube replacement	Quarterly	Logbook
	Septa change	Monthly	Logbook
	Change inj. port insert	Monthly	Logbook
	Clip column	As needed	
G.C./M.S.	Clean source	As needed	Logbook
	Change insert	Daily	Logbook
	Replace septa	Daily	Logbook
	Clip column	As needed	Logbook
	Swab inj. Port	As needed	Logbook
	Change vacuum pump oil	Annually	Logbook

LABORATORY FLOOR PLAN



REFRIGERATOR NUMBER	REFRIGERATOR NUMBER	CABINET NUMBER (METALS)	FUME HOODS	FUME HOODS (SPECIAL PROCESS)
1 - Standards (GC)	12 - Drinking H2O BNA/Pest Samples	A1 - Water (not digested)	A - Receiving-3' hood	J - 8' hood Concentrations
2 - Potable H2O Samples VOA (GC)	13 - Not In Use	A2 - Water (not digested)	B - Inorganic Sample Prep-8' hood	K - 8' hood
3 - Not In Use	14 - Semi-volatile Extracts Non-Evidentiary	A3 - Furnace Digestate	C - Inorganic Sample Prep-4' hood	I - 8' hood Auto-extractions Standard F
4 - Walk-In Refrigerator	15 - Not In Use	A4 - Evening Access	D - Inorganic Sample Prep-8' hood	M - 8' hood w/sink
5 - Bacteriology Lab Samples	16 - Not Currently In Use	A5 - Flame Digestate	E - None	N - 4' hood
6 - Wet Chem Routine	17 - GC/MS Volatile Evidentiary	A6 - Evidentiary Sample Digestate	F - Metals Lab-4' hood	O - 6' hood
7 - Wet Chem	18 - VOA Standards Freezer	A7 - Flame Digestate	G - Wet Chem Lab-5' hood	P - 6' hood Herbicide Extractions
8 - Metals CLP	19 - GC/MS Volatile Non-Evidentiary	A8 - Flame Digestate	H - Wet Chem Lab-5' hood	Q - 6' hood Soil Extractions
9 - BNA Extracts	20 - Semi-VOA Standards Freezer	A9 - Furnace Digestate	I - Wet Chem Lab-4' hood	R 10' hood At uo Extractions
10- Routine BNA/Pest Samples	21 - Receiving	A10- Furnace Digestate		
11- CLP BNA/Pest Samples	22 Not In Use			
	23 Semi-volatile Extracts			

Note: Limited Access Laboratories (locked) are: GC, GC/MS, Metals, Bacteriology, Special Process
Revised 4/00

MAJOR LABORATORY EQUIPMENT

ORGANIC ANALYSIS (GC/MS)	MANUFACTURER	NO.	MODEL	YEAR
Computer:	Hewlett Packard	1	5996A	1984
▪ Combined Wiley & NBS Data Base w/Wiswisser Line Notation	Hewlett Packard		59868A	1984
▪ Aquarius Software	Hewlett Packard			1984
▪ Winchester Disk Drive	Hewlett Packard			1984
▪ Printer	Hewlett Packard	5	LaserJet 4	1995
GC/MS A Series Data System w/Micro 24 SPU & 304 Mb Disk Drive:	Hewlett Packard	1	59870C	1990
▪ GC/LC/MS Software	Hewlett Packard	1	59872C	1990
▪ Mass Spectral Library	Hewlett Packard	1	59868C	1990
	Target, Thru-put Systems	2	Forms/Diskette	2000
Chemstation/Enviroquart	Hewlett Packard	5	1701AA	1998
GC Mainframes	Hewlett Packard	2	5890A	1987,1988
	Hewlett Packard	1	5970	1990
	Hewlett Packard	3	5890 Ser. II	1995
MSD Quadropole Bench Top MS	Hewlett Packard	2	6890	1998, 2001
	Hewlett Packard	3	5970	1988,1990
	Hewlett Packard	1	5971	1993
	Hewlett Packard	1	5972	1995
	Hewlett Packard	2	5973	1998, 2001
Graphics Display Terminals	Hewlett Packard	1	2393A	1988
Printer	Hewlett Packard	1	LaserJet 5	1998
	Hewlett Packard	1	LaserJet 4100	2001
Autoinjector	Hewlett Packard	3	7673A	1989, 1990
	Hewlett Packard	1	7683	2001
	HP Injector Modules	2	18593A	
Automatic Liquid Samplers	Tekmar	2	ALS2016	1988,1989
	Dynatech	1	PTA-30W/S	1993
	Env. Sample Tech Inc.	1	Archon	1998
	Varian	1	Archon	1998
Cryogenic Cap. Interface	Tekmar	1	M2000	1987
Liquid Sample Concentrators	Tekmar	4	LSC2000	1988,1989
		2	OI4560	1993
Moisture Control Module	Tekmar	1	14-4700	1990
Tube Desorber for 16 Sorbent Tubes	Envirochem	1	8916	1992
ORGANIC ANALYSIS (HPLC)	**MANUFACTURER**	**NO.**	**MODEL**	**YEAR**
HPLC SYSTEM I: Carbamate Analysis 531				
Post Column Derivatizer (used for both 531 & 547 Analysis)	Pickering	1	PCX-5200	2001
• System Controller	Shamadzu	1	SCL-10AVP	2001
• Liquid Chromatograph	Shamadzu	1	LC-10ADVP	2001
• Mixer	Shamadzu	1	FCV-10ALVP	2001
• Degasser	Shamadzu	1	DGU-14A	2001
• Auto Injector	Shamadzu	1	SIL-10ADVP	2001
• Fluorescence Detector	Shamadzu	1	RF-10AXL	2001
HPLC SYSTEM I: Glyphosate Analysis 547				
• Quartiery Solvent Pump	Hewlett Packard	1	1050	1989
• Autosampler	Hewlett Packard	1	1050	1989
• Progressive Fluorescence Detector	Shamadzu	1	RF535	1989
HPLC SYSTEM II: Diquat Analysis 549				
• Autosampler	Perkin Elmer	1	155 200	1993
• Binary LC Pump	Perkin Elmer	1	250	1993
• Diode Array Detector	Perkin Elmer	1	235C	1993
Water Purification System	Barnsteadt	1	Nanopure II	1989

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MAJOR LABORATORY EQUIPMENT

ORGANIC ANALYSIS (GC)	MANUFACTURER	NO.	MODEL	YEAR
Gas Chromatographs	Perkin Elmer	1	8500	1988
	Perkin Elmer	3	9000	1991,92,93
	Hewlett Packard	2	5890A	1987,1989
	Hewlett Pakcard	2	6890	1998,2000
GC with Autosampler	Perkin Elmer	1	Autosystem XL	1996
Electrolytic Conductivity Detectors	Perkin Elmer	2	1000	1988,1993
Flame Ionization Detectors	Perkin Elmer	1	N611	1993
PID Photo Ionization Detectors	HNU	2		1988,1993
Electron Capture Detectors	Hewlett Packard	4		1987,89,98,00
	Perkin Elmer	4		1993,1996
Micro Electron Capture Detectors	Hewlett Packard	4		1998, 2000
Nitrogen Phosphorus Detectors	Perkin Elmer	1		1992
Computing Integrators/Data Systems	Hewlett Packard	2	3392A 2-Channel	1987,1989
	Perkin Elmer/Nelson	3	Turbochrom 4,6	1989,92,95,00
Autoinjector	Hewlett Packard	2	7673A	1987,1989
	Hewlett Packard	2	7683	1998,2000
	Perkin Elmer	2	AutoSys. 9000	1991,1992
Q.C. Software	Chemsoft	1	Clip Wizard	1994
Purging Apparatus	Tekmar	1	LSC-2000	1988
	Tekmar	1	LSC-3000	1994
Automatic Liquid Samplers	Tekmar	1	ALS2050	1990
	Dynatech	1	PTA-30	1994
SPECIAL PROCESS/SAMPLE PREP	**MANUFACTURER**	**NO.**	**MODEL**	**YEAR**
Automated GPC System	Zymark	1	Benchmate	1996
GPC Pump	Zymark	1	300	1996
GPC Apparatus	In-House	4		1987,1990
Fraction Collector	Zymark	1	200	1996
Data System	Omega	1		1995
TCLP Tumbler	Environ. Express	1	10-position	1990
	Analytical Testing	1	4-position	1987
Zero Headspace Extractor	Environ. Express	8		1990,1993
	Analytical Testing	4	C-102	1987,1989
UV Detector	Rainin	1	Dynamax	1991
Continuous Liquid/Liquid Extractor	Organomation	3	Rot-X-Tracth	1991,93, 97
Agitator	Analytical Testing	2	DC-18	1987
Sonic Disruptor	Tekmar	1	TSDB-500	1986
	Tekmar	1	TSD-602	1994
ICC Clinical Centrifuge	Int'l Equipment Co.		ICC Clinical	1985
Sartorius Balance	Brinkmann Instru.	2	1002	1987
Pensky-Martens Flash Point Tester	Precision Scientific	1		1992
Corrosivity Tester	In-House	2		1987
Blue M Oven	General Signal	1		1986
Water Bath	Precision Scientific	1	Thelco84	1984
	Lab Line	1		1990
Concentrator	Zymark	1	Turbo-Vap	1996
Turbo-Vap Evaporation Workstation	Zymark	1	200	1989
		1	640	1991
Evaporators	Organomation	1	PN-Evap,12-pos.	1992
	Organomation	2	S-Evap 8-position	1992,1995
Kiln	Cress	1	Firemate FE27	1989
Dishwasher	Kenmore	1	Ultrawash 665	2000

Prepared: 4/90/ Revised: 4/02

MAJOR LABORATORY EQUIPMENT

INORGANIC ANALYSIS	MANUFACTURER	NO.	MODEL	YEAR
Balance	Ohaus	1	C305-S	1989
	Sartorius	1	1612	1971
	Ohaus	1	SC4012	1997
	Ohaus	1	GT4100	1999
Autoanalyzer with 586 PC w/Printer, AACE Software, Linear Autosampler	Bran & Luebbe	1	TRAACS 800 *2-Channel*	1996
Block Digestor	Technicon	1	BD40	1977
	Tecator	1	1015	1989
Halide Analyzer (TOX):				
• Purgeable Organic Halide(POX)	Dohrmann Xertex	1	DX-20	1984
• Adsorption Module		1	AD-2	1984
• Microcoulometrix Analyzer Module		1	MC-1	1984
Refrigerator-Walk-in (16' x 8')		1		1998
Refrigerator-Locking (no spark interior)	Kelvinator	4		1984
	Fisher Scientific	1		1989
Envirotech Organic Analyzer (TOC):	Dohrmann w/autosmplr	1	DC190	1993
• Boat Sampling Module		1	183	1991
TOC Analyzer w/Pentium III PC, TOC Talk software and autosampler	Teckmar-Dohrman	1	Apollo 9000	2000
Dissolved Oxygen Meter	Yellow	2	51-A	1975
	Springs Instruments	2	57	1984
COD Apparatus	Hach	1	Micro Block	1988
Centrifuge	Fisher Scientific	2		1957,1984
Drying Oven	Fisher Scientific	1	CL ISOTEMP500	1980
	Precision Scientific	1	STG80	1992
Dessicator	VWR	1		1997
Muffle Furnace	Thermoline	1	62700	2000
pH Meters	Orion	1	310	
	Orion	1	420A	2000
	Fisher Scientific	1	Accument 10	1993
Spectrophotometer	Sequoia-Turner	1	340	1989
	Milton Roy	1	Genesys 5	1995
IR Spectrophotometer	Buck	1	HC404	1990
Analytical Nephelometer	Hach	1	2424	1977
Specific Ion Electrodes	Cole Palmer	2	2750231	2000
Midi Cyanide Distillation	Andrews Glass	1	795310-12	1994
Distillation Systems (Phenol & Flouride)	Westco	1	East Dist	1996
Autoclave	Market Forge	2	STM-E Type C	1984, 1989
Microscope	Nikon	1	Labobot 104	1983
Coliform Incubator Bath	Precision Scientific	1	66850	1980
Automatic Pipetting Machine	Scientific Equip. Prod.	1	40	1983,1984
Incubators	Fisher Scientific	2	307	1988
Water Purification System	Millipore	1	Alpha Q	1997
Auto Titrator	Visco	1	Titroline Alpha	1998
METAL ANALYSIS	MANUFACTURER	NO.	MODEL	YEAR
Atomic Absorption Spectrophotometer	Varian	1	AA400	1992
Graphite Furnace	Perkin Elmer	1	HGA5100/Zeeman	1988
	Varian	1	AA400/Zeeman	1992
Auto Sampler for Graphite Furnace	Perkin Elmer	1	AS-60	1989
	Varian	1	AA1400	1992
Automated Mercury System	Leeman	1	PS200	1992
Inductively Coupled Plasma (ICP)	ThermoJarrell Ash-61E Trace Simultaneous	1		1994
Inductively Coupled Plasma (ICP)	ThermoJarrell Ash-61E Trace Simultaneous	1	(dual view)	1996
EDL Lamp & Supply	Perkin Elmer	1	System 2	1992
	Photron	2	Super Lamp AS/SE	1992
Ultrasonic Nebulizer	Cetac Technologies	1	U5000AT	1999
CLP Reporting Software	Ward	2	Edrwin	1998
Water Bath	Science/Electronics	1	W38	1991

Prepared: 4/90/ Revised: 4/02

SECTION 4.0

4.0 DOCUMENT CONTROL

4.1 Laboratory Notebook Policy

All lab logbooks are prepared in the QA/QC department. Files of the templates of the pre-printed logbook forms are stored the QC department. An inventory of the logbooks is also maintained. Each logbook generated is assigned a document identification number, which is recorded in the master logbook when it is removed for use. All logbooks are signed out of a master logbook and signed back upon completion. Records must be retained for five years except for potable water, which must be kept for ten years.

The analyst logbooks are bound with all pages numbered consecutively. Analysts are required to sign (in full signature) and date next to all analyses performed. For GC and GC/MS, the instrument program is to be listed as well as sample ID, amount of sample injected and reason, if any, for re-analysis (under "remarks").

For wet chemistry tests, all raw data used in calculations is to be recorded in the logbook. For sample preparation, all weights to the closest 0.1 gram and/or exact volume of milliliter of sample extracted is to be listed as well as type of cleanup performed and date extracted. Examples of logbook pages are included in Figure 4.1 to 4.7.

The Document Control Officer in the QC Department maintains instrument logbooks and data packages. The books are logged into a master logbook and placed in a secure facility with no access by outside persons. Retrieval of these records are possible since the box number for storage is listed in the master log book and written on the outside of the box. The boxes are labeled with the date that they may be disposed. The storage facility is locked and is free of vermin , is environmentally stable in regard to temperature and humidity and is kept safe from loss.

Daily backups of the system maintain all electronically stored data. The LIMS is maintained in a fireproof room as well as a copy of the operating system off-site.

In case of transfer of ownership or if the lab goes out of business, all records are to be transferred to the new owner or retained by the current Lab Director for the required time period.

4.2 Sample Tracking and Custody Procedures

4.2.1 External Chain of Custody

H2M has a standard operating procedure for documenting the collection, receipt, tracking and compilation of sample data. Sample tracking is accomplished through the use of chains of custody. A sample is considered to be in custody if it is:

- In an individual's actual possession;
- In view, after being in physical possession;
- Locked so that no one can tamper with it, after having been in physical custody;
- In a secured area, restricted to authorized personnel only.

The chain of custody (COC) procedure begins with either sample collection or bottle preparation depending on client's needs. Every sample shall be assigned a unique identification number that is entered on the COC. The COC includes: container type; preservative type; number of containers for each sample location (including MS/MSD, trip blank and field blank); any distinctive notification; signature of sampler; receiver's signature; and date/time of relinquishment. Upon receipt of the samples by a H2M representative, the first "relinquished by/received by" blocks shall be completed on the COC.

The date and time of receipt in the lab is entered on the external COC form (figure 4.8). The shipment is checked for completeness and samples are examined for damage. All sample bottles are checked to verify that they are sealed properly. Any shortages and damage is noted on the external COC. A copy of the external COC is returned to the project manager. The sample custodian places the original in the H2M Labs client file.

A non-conformance form is prepared in the sample-receiving department to account for any breakage or discrepancy in sample documentation, as compared to the sample shipment. The H2M project manager will notify the client of non-conformances. (See Figure 4.18.)

4.2.2 Internal Chain-of-Custody

The sample custodian assigns laboratory identification numbers to the samples and then transfers the samples to department custodians. An internal COC form is completed with the project number, date of receipt and listing of samples by number and H2M laboratory identification numbers. The sample custodian and department custodian sign for transfer with date and time indicated. The department custodian places samples in secured areas for storage.

The department custodian relinquishes samples to the technicians for sample preparation and/or analysis. The analysts sign for the samples and extracts/digestates each time the samples exchange hands. Upon completion of analysis, samples are returned to the appropriate sample custodian.

Separate logbooks are on file in the laboratory departments for

recording all aspects of sample preparation and analysis, along with signatures of the analysts and dates steps were performed. Copies of sample request forms, external COC forms and internal custody are included in the data package. Copies of work sheets and applicable analyst's logbook pages are also included in the data package. Figure 4.9 is an example of an internal chain of custody form.

4.2.3 Internal Verification of COC Procedures

The sample custodian gives a copy of the external and internal COC to the project manager as well as any information received with the sample to the document control section of the QA/QC department. All paperwork is reviewed and checked for any transcription errors. If there are any transcription errors, the sample custodian and any affected departments are contacted. Verification that corrections were made properly is the responsibility of the laboratory's document control section or QA/QC department. The samples are then entered into a sample-tracking logbook and the sample delivery group folder is prepared including all pertinent information (i.e., sample request form and external COC). The folder is labeled with the SDG number, date received, due date, number and type of samples and types of analysis.

The external and internal COCs are labeled with a group number, usually in the form of an abbreviation of client and the number of packages alpha-numerically (e.g.. H2M001). The sample tracking form contains the following information: header information, client test ID, laboratory numbers, and samples.

Holding time are monitored on a daily basis as a check on the different departments. The department supervisors are notified at least two days in advance that holding times are approaching. The QA/QC department audits the COC procedure. The Production Manager meets with the supervisors to update the status of the samples.

A status report is also available to all managerial and supervisory personnel on the network at S:\LABSHARE\CLPSTAT. Figure 4.10 is an example of a status report. Upon completion of analysis of a sample delivery group, the QA/QC section coordinates collation of the data package and reviews that all required forms are included and that the package is submitted within the required time frame.

A flow chart summarizing the steps involved with the sample progress is presented in Figure 4.11. The diagram includes the tracking of sample progress as well as analysis and reporting.

4.3 Logbook Maintenance, Archiving Procedures and Data Package Archiving

Upon completion of a logbook, the book and associated raw data (e.g.,

chromatograms) are archived by the QA/QC department. The bookbinder is labeled with the test, start and completion, and run number. These data are stored by the QA/QC department for one year or less depending on the volume of sample data packages. After one year, these data are placed in labeled boxes and put into long-term storage. The boxes are labeled with pertinent information as to the test and date, and this information is also listed in a logbook. The data packages are stored and archived in a similar manner. Data packages are maintained on shelves in the QA/QC area organized by client. The binder is labeled with the client name, internal client group number, test grouping (e.g., BNA, pesticides), the month and year, and the volume number. The packages are maintained on the shelves until validation is complete. They are then boxed and shipped for storage at a secure off-site facility, located on Central Avenue in Farmingdale, N.Y. A logbook of the box number, contents and location is maintained in the QA/QC department.

4.4 Case File Organization

The document control coordinator of the QA/QC department organizes the case file by monitoring and accumulating information from sample receipt to data package submittal. The complete data package is collated in this department. Each department receives the necessary information in the internal COC to analyze the samples in a sample delivery group. Each department prepares and submits a complete package for their particular test panel. Software is available and the reports are computer generated. The data package for each individual fraction (VOA, BNA,PEST, METALS), is reviewed by assigned staff designated by the QA/QC department. The reviewer is a technically qualified individual such as the QA/QC manager, technical manager or the package will be sent to the department for revision. Each fraction of the data package is compiled in the QA/QC department with summary forms and external COC included. A copy of the data package is maintained on file in the QA/QC department with summary forms and external COC included. A copy of the data package is maintained on file in the QA/QC department.

4.5 Preparation, Review, Distribution and Revision of Procedure Manuals

The laboratory Standard Operating Procedures Manual's (SOP) are prepared by the QA/QC manager, technical manager or other key lab staff. The methods and/or procedures are written and then reviewed by the department for correctness. Revisions are monitored by a revision date on the title page of the manual and in the footer. Final review and approval is completed by the preparer of the SOP Manual, laboratory director and QA/QC manager. When new analytical methods or modifications to existing protocols or methods are authorized, the SOP Manual is updated.

4.6 Process for Revision of Documentation

When errors or omissions are discovered for the data packages or in raw data in log books, the following procedures are utilized:

The data is inserted or corrected on the appropriate raw data or forms. The

incorrect data is crossed out with a single line, the correction made, and then dated and initialed.

A new copy of the data package maybe generated. However, if minor corrections are required, the appropriate forms are then prepared and added as an addendum to the data package. If major corrections are required, a new case narrative is prepared listing the errors and corrections and resubmitted. The data is submitted to the client with a letter explaining the changes. If the errors were observed during data validation, a copy of the validation reports along with the laboratory response and corrected pages are provided. The revised information is kept with the data package and stored together for ease of retrieval.

4.7 Sample Preservation and Receiving

4.7.1 Sample Containers

Sample containers are usually provided by H2M, except where specified otherwise by the client. A sample request form (see figure 4-15) or a Project Information Sheet (see (figure 4-23) is generated to document the specific requirements of the project. For potable water clients, the sample request form is completed by the sampler and returned to the lab with the samples. A pricing authorization form (see figure 4-25) is generated and sent to the client for non-contract work to document the prices for the lab analyses. A project or quote is set up in the LIMS which can be copied into a workorder when samples are received. The wide scope of analyses performed in the laboratory necessarily mandates that several types of sampling containers may be used. Materials must be selected that would not result in interference with the analysis. Each sample container must have a durable waterproof label, which contains all the information necessary to identify the sample. See figures 4.19 to 4.21 for bottle types used per sample requested. New consultants are also given a summary of bottle type/sample with the bottles to ensure that the correct bottle is used for the tests requested.(see figure 4-24).

The amount of information on the label may vary depending on the source and other factors, but, in general should include: number of bottles per analysis · collector's name · sample location · date and time of collection · water temperature · depth of sample · tide stage · atmospheric conditions.

For CLP projects, bottles will be supplied by Scientific Specialties of Maryland or an equivalent supplier. These will be prepared using CLP-approved cleaning protocols, quality control analyzed and certified by the vendor (see figures 4.12 to 4.14 for sample of certification). The bottles used are verified as non-contaminated by monthly checking of bottles and filling with distilled water and analyzing for the parameters that would be analyzed from that bottle. This record is kept on file in

the QC department. Any positive readings for any analytes are flagged and the supervisor and QA Manager is notified. No bottles from the effected lot are used until the source of contamination is determined and remedied.

4.7.2 Sample Preservation and Shipment

Sample preservation is dependent upon which analyses are to be performed. A summary of sample container types and preservation methods is presented in Table 4.1. The majority of samples will need to be packed in ice and shipped to the laboratory within 24 to 48 hours of collection. Water samples requiring only trace metals analyses would be the only exception. Table 4.2 CLP Bottle Chart references the sample container code with a figure of the bottle type to be used.

4.7.3 Sample Receiving

Upon arrival at H2M, samples are inspected for integrity, such as breakage, leakage, air bubbles (for purgeables) and proper labeling. If any problems occur, the Project Manager will be notified and laboratory receiving personnel will await instructions before proceeding with sample accessioning. Personnel are in the laboratory: Monday to Friday 7:00 a.m. to 11:00 p.m., Saturday and Sunday 9:00 a.m. to 3:00 p.m. If deliveries must be made later than 6:00 p.m. on weekdays, or anytime on weekends, the laboratory must be contacted in advance so that arrangements can be made with our staff to ensure proper receipt of samples.

The temperature of the cooler is checked for samples that require storage at 4°C. Samples that require storage at 4°C and which are hand delivered to the laboratory, immediately after collection must be transported on ice in order to demonstrate that the chilling process has begun. Samples with a temperature of just above freezing to 6°C are acceptable. Samples that have not had time to cool are acceptable if they are on ice.

Samples that have not been properly stored during transport to the lab will be either rejected and a resample collected or it will be noted on a non-conformance report (see figure 4.18) and on the lab report.

The addition of the preservative is verified upon receipt and entered into the LIMS. For any damaged sample, cooler temperature variance or preservative disparity, a non-conformance form is completed and the client notified. Corrective action may include resampling, documenting problem on lab report or the addition of the preservative in the lab. All exceptions to the sample receipt protocol are fully documented. (See Figure 4.18.)

The sample information is entered into the LIMS system and a unique lab number is generated in a consecutive manner. All bottles are

identified with the lab ID number and a suffix of A, B, C, D, etc. is used when samples are fractionated. There is also a listing of how many of each type of bottle is present. If the sample is not fractionated, the bottles are all listed as A; however, the total quantity of bottles is differentiated by the number of bottles as indicated by the designation "1 of 3, 2 of 3 etc." on each bottle. Labels with all pertinent information such as date/time collected sample ID number, H2M Lab number are printed through the LIMS and placed on the sample bottle. The date and time of receipt in the laboratory is updated automatically through the LIMS system, as is the identification of the person logging in the sample information.

Samples are handled under conditions, which avoid contamination, deterioration or damage to the samples.

Volatile organic samples are stored in refrigerators in either the GC or GC/MS lab (depending on analysis requested) at 4°C (± 2°C) and are protected from light upon receipt until analysis.

Semi-volatile organic bottles are stored in the Special Process Lab under refrigeration or in the walk in refrigerator. Sample extracts are stored separately under refrigeration.

Metals water samples are stored in cabinets in the metals lab and soil samples are stored in a locked refrigerator in the wet chem lab and maintained at 4°C.

Wet chemistry samples are stored refrigerated in the walk-in refrigerator or the upright refrigerators if required by the type of test requested. Samples that do not require refrigeration are stored on shelves in the wet chem lab.

Bacteria samples are usually planted as soon as possible, but if storage is required the samples are refrigerated in the bacteria lab.

4.7.4 Laboratory Water Supply

The water used for reagents and blanks (trip, field, method, holding) and general laboratory procedures is derived from three sources: ultra pure still (Nanopure water filtration system) Millipore Alpha Q and the Belco glass still.

Nanopure Water Filtration System: This system is used for all organic work and all blanks sent to clients (field, trip). The GC and GC/MS laboratories use this water as the source for the method blanks daily from extractions to volatile organics. The water is checked on a daily basis and determined free of organic contaminates (below the IDL). The resistivity is checked on a daily basis and logged into a logbook. The resistivity is compared to another meter on a monthly basis and the values recorded in a logbook. The cartridges are replaced when the resistivity is no longer within the allowable range (0.5 to 2.0 megohms-

cm). No volatile organics or semi-volatile organics greater than one ug/L can be detected in this water.

Millpore Alpha Q: The all glass still is used for all microbiology work in the laboratory. The conductivity is checked daily and must be within the limits of 0.5 to 2.0 megohms m. This value is recorded daily in a logbook.

Field and Trip Blank Sample Preparation

Laboratory distilled water, certified as pure, is used for all field and trip blanks. This water is verified as pure by analysis prior to filling the trip and field blank bottles. These samples are analyzed for volatile organics, base-neutral-acid extractables and pesticide/PCBs. A record is kept on file in the QC department. No organic analytes can be detected in these samples above the reporting limit. Preservatives are added to the sample containers prior to shipment.

4.7.5 Progression, COC, Sample Storage

H2M has a standard operating procedure for documenting the receipt, tracking and compilation of sample data. The chain of custody (COC) procedure begins with the preparation of the bottles.

The cooler is sealed with custody tape and COC form is completed with the number of bottles prepared and the name of the preparer. The bottles are then sent to, or picked up by the client. After return receipt of the samples at the laboratory, they are routed through a sequence of steps from preparation to analysis until the final report is issued to the client. A flow chart summarizing all steps involved with the sample progress is presented in Figure 4.11. The diagram includes the tracking of sample progress as well as analysis and reporting.

If samples collected require special security and documentation of custody a specific procedure of sample tracking is described below.

Preparation of Sample Bottles and Coolers

Coolers: Cooler(s) used for transport of sample containers are scrubbed clean with a non-contaminating detergent. Cooler(s) are then flushed with organic-free distilled water and dried.

Glass and Plastic Sampling Containers: All containers are new. They are purchased specially cleaned and certified from Scientific Specialties or a similar vendor. These containers are used only once for the particular job intended. In addition, all cases of containers are supplied with lot numbers for easy tracking. Containers are assembled in conjunction with the number of sample locations, including: MS/MSD, trip blank(s) and field blank(s) and the proper preservative, if any, for the particular analysis required, such as 50 percent nitric acid for Metals; 100 percent sulfuric acid for Phenol, TKN, Nitrogen Series,

Oil/Grease etc.; and Sodium Hydroxide for Cyanide. Each container is affixed with an official label which includes a lot number. The label is then earmarked accordingly: HNO_3, H_2SO_4, or NaOH. A cautionary label is placed on each bottle with a preservative.

Packaging of Glass and Plastic Sampling Containers: All glass containers are individually fitted with resealable bubble-pack bags. Both glass and plastic containers are placed upright into coolers. Bottles are separated into individual location kits at the clients' request. Vials (40 mL) are always packaged in bubble-pack bags, placed into small cardboard boxes and placed within the cooler or, because of their light weight and small size, laid on top of the larger sample containers. Minimum breakage is achieved following this technique.

External COC and Custody Seals: External COC, with H2M logo, address and phone number, are prepared. Sample preservative will be listed. Custody seals for return trip are also included in plastic bag. One seal per cooler is affixed. Custody seals are signed, dated and affixed to each cooler (signature on custody seal must be positioned directly over groove between the lid and basin parts of the cooler).

Delivery of Coolers

To client: Bottles are either sent to the client via Federal Express or picked up by the client. The client fills the bottles. All sample bottles must be sealed tightly in the field to prevent any leakage of samples or contamination. The client then completes the COC form, and completes the sample request form, fills coolers, seals cooler with custody tape and delivers or ships, cooler to the laboratory. (See Figures 4.8 and 4.15.)

To H2M: The sample custodian examines cooler. If any hazard is suspected, cooler is moved to special hood before opening. Hazard suspect would include any previous knowledge from client or broken glass detected.

DC-1 Form Completion

Upon receipt of sample coolers in the laboratory, the USEPA sample log-in form (Form DC-1) is completed (if applicable). This form is used to document the receipt and inspection of the samples and coolers. One original of form DC-1 is required per cooler. If the samples in a single sample cooler must be assigned to more than one SDG, the original DC-1 accompanies the deliverables for the SDG of the lowest Arabic number and a copy accompanies the other SDGs. The copies must be stamped copy and the location of the original noted on the copy. Complete the DC-1 form (see figure 4.16), be

⇒ Lab name

⇒ Log-in data

⇒ Print and signature of who in lab received samples

⇒ Case number

⇒ SDG number

⇒ SAS number

⇒ Condition of shipping coolers

⇒ Sign and date air bill

⇒ Record the presence/absence of custody seals and their condition in item 1 of form.

⇒ Record the custody seal numbers in item 2 of form

⇒ Record the presence/absence of COC records, traffic reports, packing lists, air bills or air bill stickers.

⇒ Add pH of cyanide and metals samples as verified upon receipt in the laboratory. Cyanide pH must be greater than 12.

In items 3-5 on the form specify if there is an air bill present or air bill sticker in item 5 on DC-1.

⇒ Record the air bill or sticker number in item 6

⇒ Remove samples from cooler and examine the samples and sample tags and record condition of sample bottles and presence or absence of sample tags in items 7 and 8 on form.

⇒ Review shipping documents and compare information on all documents and complete item 9 on form.

⇒ If there are no problems, sign and date (including time) on form DC-1, COC record and traffic report and write the sample numbers on form DC-1.

⇒ Record the sample tag I.D. numbers and assigned lab numbers.

⇒ Cross reference H2M Lab numbers with the SMO. Project coordinator will document communication in the CLP communication logbook. See

Figure 4.17 for an example of the communication logbook, after resolution, sign and date the form and list the resolution.

⇒ Record the fraction and area stored in the sample transfer space, and sign and date.

⇒ Opening of Coolers

External COC form is removed and time and date of arrival is entered. Shipment is checked for completeness. Samples are examined for damages. All sample bottles are checked that they are sealed properly. Shortages and damages are noted on the external COC. Sample request form is compared to the external COC form. A copy of the external COC is given to sampling personnel. The original is placed in the client file with the sample custodian. The client is notified immediately of any damage or shortage of samples. For USEPA work (RAS or SAS), the custody seals, air bills, sample tags are retained in a file and given to Document Control. The pH of all preserved samples are measured upon receipt in the laboratory. The following analyte pH's are verified in the receiving department by the use of a wide range pH paper. A small aliquot of sample is poured over the pH paper. Do Not dip the pH paper into the sample.

Analyte	pH
Ammonia	<2
COD	<2
Cyanide	>12
Hardness	<2
TKN	<2
Metals	<2
Nitrate/nitrite	<2
Oil and grease	<2
TPH	<2
TOC	<2
Total Phenolics	<2

Note the pH in the LIMS in the pH field. Also, for USEPA samples note the

pH on the DC-1 form. If any of the above samples do not comply with the pH listed above, notify the project coordinator immediately. The client is to be notified as soon as possible.

Continuing Chain-of-Custody

The custodian assigns laboratory identification numbers to the samples and then transfers samples to department custodians. An internal COC form is completed with client project number, date of receipt, and listing of samples by customer numbers and H2M laboratory identification numbers (see Figure 4.9). The sample custodian and department custodian places samples in secured areas for storage.

The department custodian relinquishes samples to the technicians for sample preparation and/or analysis. The analysts sign for the samples and extracts/digestates each time the samples exchange hands. Upon completion of analysis, samples are returned to the custodian.

Separate logbooks are on file in the laboratory departments for recording all aspects of sample preparation and analysis, along with signatures of the analysts and dates steps were performed. Copies of sample request forms, external COC forms and internal custody are included in report. Copies of any work sheets/analysis logbook pages are also submitted.

Confidentiality

Certain clients require data to be kept strictly confidential with limited access by laboratory personnel. A system for maintaining this confidentiality is designed and performed by the document control officer. If required, all sample information generated, as well as raw data, is kept in a locked area in the QC Department and access is limited to the laboratory manager, quality assurance manager and document control officer. Notification of the requirement for confidentiality must be received with the sample. For all samples, results are not released to any individual without written permission from the client.

Storage

All samples are stored in areas free from secondary contamination. Samples are stored separate from standards and high concentration samples and away from foodstuffs. All samples are held at the required storage conditions

CLP VOA: Samples are stored in the GC/MS laboratory in a locked refrigerator at 4°C (±2°C) and are protected from light from receipt until analysis.

CLP BNA Pesticide/PCB:

Samples are stored in the Special Process laboratory in a locked refrigerator or the walk-in refrigerator at 4°C(±2°C) and are protected from light upon receipt until extraction and analysis. After analysis, extracts and unused samples are protected from light and stored at 4°C (±2°C). The sample extracts are stored in the locked refrigerator between the GC/MS and Special Process laboratory.

CLP Metals: Water samples are stored in a locked cabinet in the Metals laboratory. Soil samples are stored in a locked refrigerator in the Wet Chem Laboratory and maintained at 4°C (±2°C).

CLP Cyanide: Samples are stored in a locked refrigerator at 4°C (±2°C) in the Wet Chemistry storage area.

Final Storage: The time that samples are held after completion of analysis is dependent on the client's requirements. Some samples are stored for 6 months. Most samples are stored for 60 days after report generation. If extended storage is required, the samples are boxed and moved to the off site storage facility.

Sample Tracking and Custody Procedures

Upon delivery to the H2M sample custodian, the samples are logged into the system. The sample custodian gives a copy of the external and internal COC for each department as well as any information received with the sample to the Project Manager. All paperwork is reviewed and checked for any transcription errors (e.g. comparing the sample request to the external COC, the computer printout as compared to the internal COC). If there is any transcription errors, the sample custodian and any affected departments are contacted. Verification that corrections were made properly is also the responsibility of the Project Manager. The samples are then entered into a pertinent information folder (sample request form and external COC). The folder is labeled with the SDG number, date received, due date, number and type of samples and types of analysis.

All external and internal COC are labeled with a group number. Usually an abbreviation of client and the number of packages alphanumerically (e.g. H2M001). The sample tracking book contains the following information: header information, client test ID, laboratory numbers, and samples.

On a daily basis, holding times are monitored as a check on the different departments and the supervisors notify if holding times are drawing near (at least two days in advance). The Package Production Supervisor meets with the supervisors weekly to update the status of the project. A status report is also available to all lab employees on the network at S:\LABSHARE\CLPSTAT. All analysts are to keep the status up to date to allow tracking of sample status as compared to the due date. Figure 4.10 is

an example of a status report. Upon completion of a project, the Package Production section coordinates collation of the data package and reviews that all required forms are included and that the package is mailed within the required time frame.

4.8 Sample Acceptance Policy

H2M maintains a policy for the receipt of samples. Complete sample information should be received with the samples, this includes; location of sampling site, sample ID number, date and time of sample collection, collector's name, preservation type, and sample type . The proper labeling of sample bottles is necessary. The bottle should include the sample ID number on a waterproof, durable label marked with permanent ink. The appropriate bottle should be used for the collection of samples. Sample holding times should be checked for compliance. The samples should be reviewed for adequate sample volume for the tests required. If a Chain of custody is required, the following should be checked; the receipt of a COC, COC not filled out correctly/completely, sample information on the bottle matches the COC. If these requirements are not met, a Sample Receipt Non-compliance Form (see figure4-26) is completed. This information is disseminated to the client and instructions of how to proceed are documented. Some corrective action can be made in the lab. However , if the problem can not be rectified and the client wants analysis to proceed, this information is stated on the form and the non-compliance is stated on the lab report under the remarks category.

FIGURE 4.1

CLP DIGESTION LOG

CLIENT:_____
SDG #:_____ ANALYST
SIGNATURE_____
MATRIX:_____
DATE:_____
METHOD:_____

Sample ID	Lab Number	Dig Type	Initial Volume	Final Volume	Spike/Notes	Appearance	
						Before	After

Comments:

* Description of colors: red, blue, yellow, green, orange, violet, white, colorless, brown, grey, black.
* Description of texture: find, medium, coarse.
* Description of clarity: clear, cloudy, opaque.
* Description of artifacts: yes or no and describe.

FIGURE 4.2

FURNACE LOG BOOK

ELEMENT _____

INSTRUMENT:	BACKGROUND:	ANALYST SIGNATURE:
STNDS PREPARED DATE:	SOURCE:	DATE::
TRAY#	TUBE # BURNS:	

CUP	LAB NO	RESULT	DIL .FACTOR	% REC	ABS.	SAMPLE ID/ NOTES	TIME
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							

FIGURE 4.3

ICP ANALYSIS LOG BOOK

ICP ID:	CLIENT:	DATE:
TASK:	RESULT FILE:	ANALYST:

#	SAMPLE	NOTES	#	SAMPLE	NOTES
1			26		
2			27		
3			28		
4			29		
5			30		
6			31		
7			32		
8			33		
9			34		
10			35		
11			36		
12			37		
13			38		
14			39		
15			40		
16			41		
17			42		
18			43		
19			44		
20			45		
21			46		
22			47		
23			48		
24			49		
25			50		

FIGURE 4.4

FLAME AA ANALYSIS LOG BOOK

Absorbance of_____Std.-_____ DATE_____

Standards: Known Value Reading ANALYST SIGNATURE_____

1)_____ ___
2)_____ ___ FLAME ID:_____
3)_____ ___
4)_____ ___ ELEMENT_____
5)_____ ___

Lab No. Duplicate %RPD Spike Spike Reading %Recovery

___ ___ ___ ___ _____ _____
___ ___ ___ ___ _____ _____

Lab No.	Sample ID	Dil. Factor	Instr. Reading	Time	mg/L	ug/L	mg/kg	%	Rec

FIGURE 4.5

HG DIGESTIONS

NAME:_____
DATE:_____

LAB NO	CLIENT ID	SAMPLE WEIGHT GRAMS	SAMPLE VOLUME MLS	FINAL VOLUME MLS	DILUTION FACTOR	SPIKE

FIGURE 4.6

MERCURY ANALYSIS LOG BOOK

ELEMENT _____ DATE _____

INSTRUMENT ID: _____ ANALYST SIGNATURE: _____

#	SPK	LAB NO	RESULT (UG/L)	DIL. FACTOR	RESULT (MG/KG)	ABS.	ANALYSIS TIME	SAMPLE ID/NOTES

FIGURE 4.7

CYANIDE DISTILLATION LOG

DATE: _____ ANALYST: _____

VESSSEL NO.	LAB ID	CLIENT ID	VOLUME OF SAMPLE	SAMPLE PH	KI TEST PAPER +/- (*)	Pb ACETATE TEST PAPER +/- (**)	COMMENTS
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							

* Amount of ascorbic acid used ** Amount of Cd CO_3 used

STANDARDS PREPARED FOR THIS RUN:

CONC.	I.D.	QUANTITY	DISTILLED	YES	NO	LOT # AND SOURCE

Figure 4.8

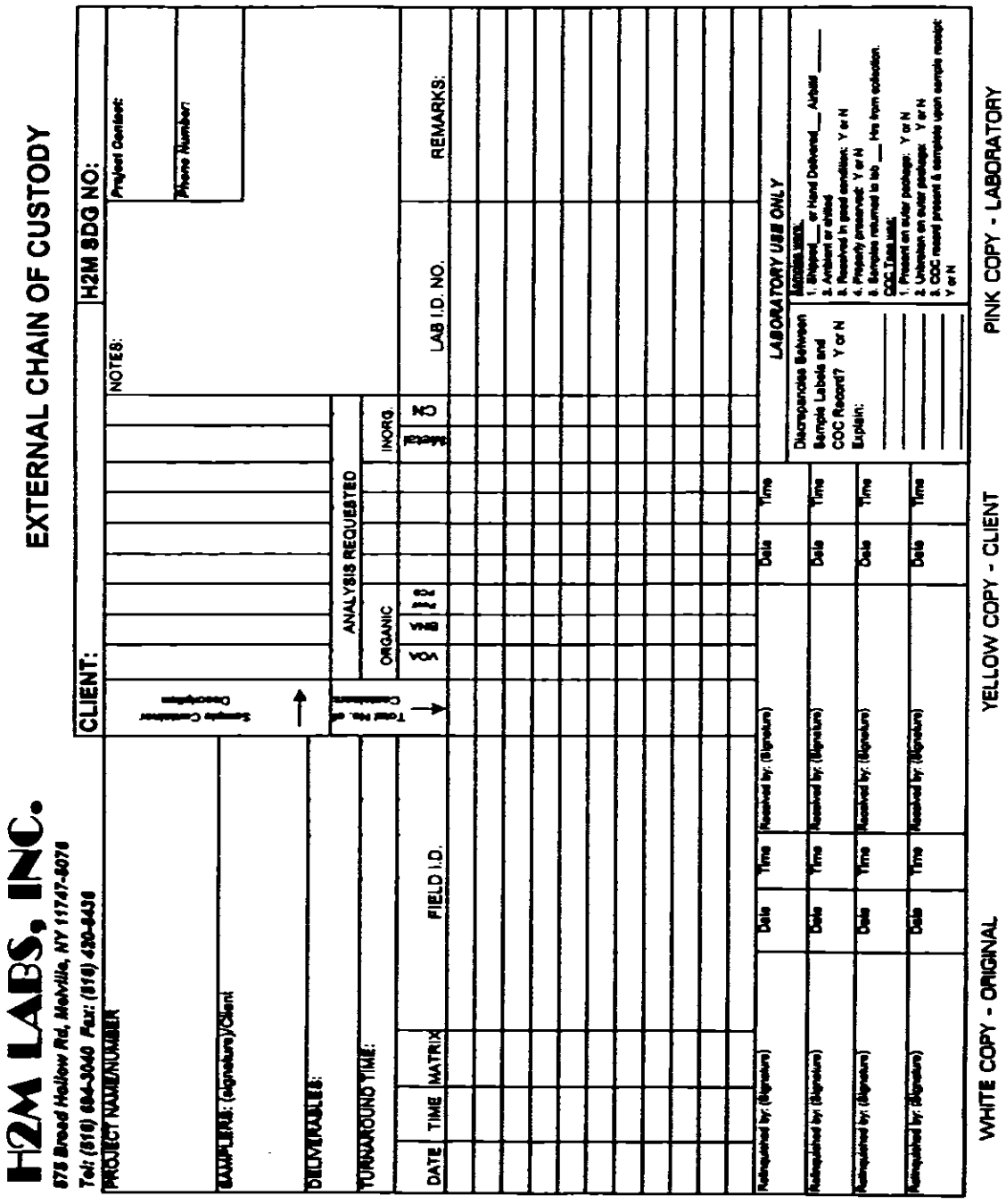

EXTERNAL CHAIN OF CUSTODY
H2M LABS, INC.
878 Broad Hollow Rd, Melville, NY 11747-4078
Tel: (516) 694-3040 Fax: (516) 420-8436
PROJECT NAME/NUMBER
SAMPLERS: (Signature)/Client
DELIVERABLES:
TURNAROUND TIME:
CLIENT:
H2M SDG NO:
NOTES:
Project Contact:
Phone Number:
ANALYSIS REQUESTED
ORGANIC
INORG.
LAB I.D. NO.
REMARKS:
DATE
TIME
MATRIX
FIELD I.D.
Relinquished by: (Signature)
Received by: (Signature)
Date
Time
LABORATORY USE ONLY
Discrepancies Between Sample Labels and COC Record? Y or N
Explain:
Condition upon receipt:
1. Shipped___ or Hand Delivered___ Ambient___ Iced___
2. Ambient or chilled
3. Received in good condition: Y or N
4. Properly preserved: Y or N
5. Samples received within holding time: Y or N
6. Sample bottles returned to lab___ Hrs from collection.
COC Tape was:
1. Present on outer package: Y or N
2. Unbroken on outer package: Y or N
3. COC record present & samples upon sample receipt: Y or N
WHITE COPY - ORIGINAL
YELLOW COPY - CLIENT
PINK COPY - LABORATORY

FIGURE 4.9

INTERNAL CHAIN OF CUSTODY

CLIENT: _____

SDG #: _____

SAMPLES RECEIVED BY _____DATE _____TIME _____

SIGNATURE _____

CLIENT I.D.	H2M LAB NO.	BOTTLE TYPE	NO. OF BOTTLES	TESTS REQUESTED

FIGURE 4.9 (cont'd)

INTERNAL CHAIN OF CUSTODY

CLIENT: ______________________________

SDG #: ______________________________

Date	Time	Sample Relinquished By	Sample Received By	Sample ID Number and Bottle Type	Purpose for Change of Custody	Inital
		Sign	Sign			
		Sign	Sign			
		Sign	Sign			
		Sign	Sign			
		Sign	Sign			
		Sign	Sign			
		Sign	Sign			
		Sign	Sign			
		Sign	Sign			
		Sign	Sign			
		Sign	Sign			
		Sign	Sign			
		Sign	Sign			
		Sign	Sign			
		Sign	Sign			
		Sign	Sign			
		Sign	Sign			
		Sign	Sign			
		Sign	Sign			
		Sign	Sign			
		Sign	Sign			
		Sign	Sign			
		Sign	Sign			

FIGURE 4.10

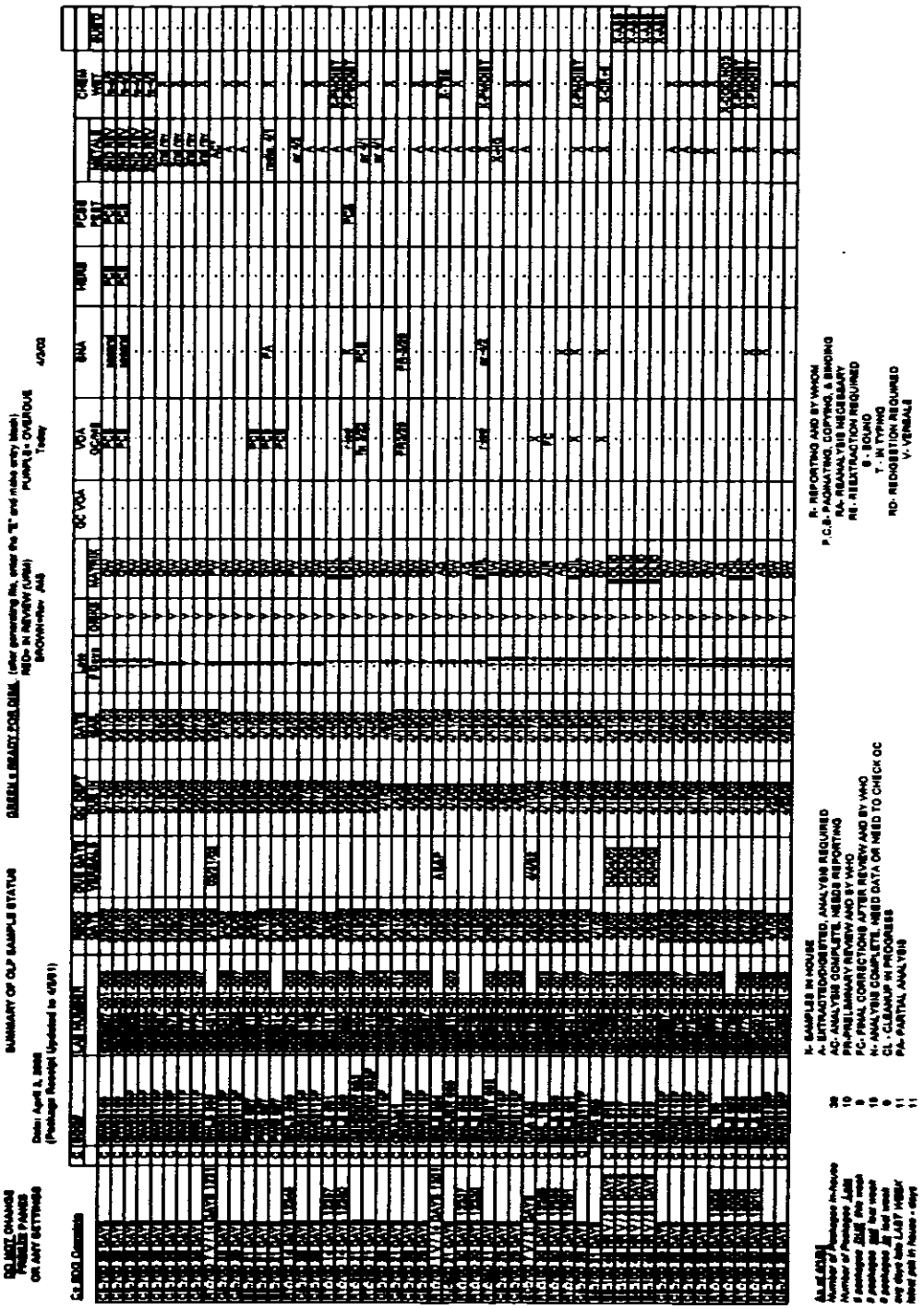


FIGURE 4.11

FIGURE 4.11
CHAIN OF CUSTODY FLOW CHART

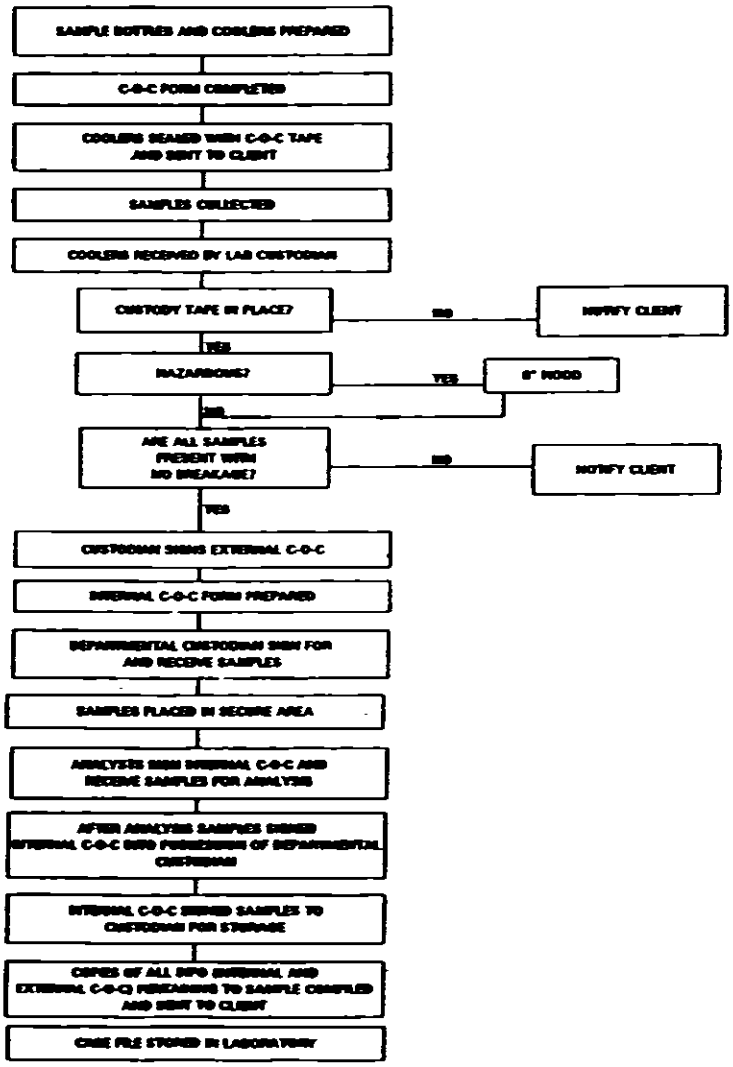


FIGURE 4.12

40 ML GLASS 8/5/97 (EXAMPLE ONLY)

Scientific Specialties Service INC

Certificate of Analysis

Analysis of Lot Nu
7 - 0 9 9 - 0 1 0

Product Number
3 7 6 8 4 0

The above lot number has been analyzed for the following Volatile Organic Chemicals which were either not found or were found in concentrations less than 5 µg/L.

Acetone*
Benzene
Bromochloromethane
Bromodichloromethane
Bromoform
Bromomethane
2-Butanone*
Carbon Disulfide
Carbon Tetrachloride
Chlorobenzene
Chloroethane
Chloroform
Chloromethane
Dibromochloromethane
1,2-Dibromoethane (EDB)
1,2-Dibromo-3-
Cholorpropane
1,2-Dichlorobenzene
1,3-Dicholorbenzene
1,4-Dichlorobenzene
1,1-Dichloroethane
1,2-Dichloroethane
1,1-Dichloroethene
cis-1,2-Dichloroethene
trans-1-3 Dichloropropene
1,2-Dichloropropane
trans-1-3 Dichloropropene
cis-1,3-Dichloropropene
Ethylbenzene
2-Hexanone*
4-Methyl-2-Pentanone*
Methylene Chloride
Styrene
1,1,2,2-Tetrachloroethane
Tetrachloroethene
Toluene
1,1,1-Trichloroethane
1,1,2-Trichloroethane
Trichloroethene
Vinyl Chloride
Oxylene
m & p xylenes

* *Reported to 5 ug/l*
Analytical Method: EPA Method 524.2

Please keep this certificate for your records.

Marc Grebow, VP

FIGURE 4.13

FOR ONE LITER GLASS 7/30/97 (EXAMPLE ONLY)

Scientific Specialties Service INC

Certificate of Analysis

Analysis of Lot Nu
6 - 2 9 0 - 0 1 5

Product Number
3 7 3 6 3 2

The above lot number has been analyzed by GC/MS for the following organic compounds which were either not found or were found in concentrations less than 5 µg/L unless noted.

Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene
Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(ghi)perylene
Benzoic Acid	Benzyl alcohol	4-Bromophenyl-phenylether	Butylbenzylphthalate
Di-n-butylphthalate	4-Chloroaniline	4-Chloro-3-methylphenol	bis-(2-Chloroethoxy)methane
bis-(2-Chloroethyl)ether	2,2-oxybis-(1-Chloropropane)	2-Chloronapthalene	2-Chlorophenol
4-Chlorophenyl-phenylether	Chrysene	Dibenz(a.h)anthracene	Dibenzofuran
1,4-Dichlorobenzene	1,2-Dichlorobenzene	1,3-Dichlorobenzene	3,3-Dichlorobenzidine
2,4-Dichlorophenol	Diethylphthalate	2,4-Dimethylphenol	Dimethylphthalate
*4,6-Dinitro-2-methylphenol	*2,4-Dinitrophenol	2,4-Dinitrotoluene	2,6-Dinitrotoluene
bis-(2Ethylhexyl)phthalate	Fluoranthene	Fluorene	Hexachlorobenzene
Hexachlorobutadiene	Hexachlorocyclopentadiene	Hexachloroethane	Indeno(1,2,3-cd)pyrene
Isophorone	2-Methylnaphthalene	2-Methylphenol	4-Methylphenol
Napthalene	*2-Nitroaniline	*3-Nitroaniline	*4-Nitroaniline
Nitrobenzene	2-Nitrophenol	*4-Nitrophenol	N-Nitrosodiphenylamine
N-Nitroso-di-n-propylamine	Di-n-octylphthalate	*Pentachlorophenol	Phenanthrene
Phenol	Pyrene	1,2,4-Trichlorobenzene	*2,4,5-Trichlorophenol
2,4,6-Trichlorophenol			

**less than 20 µg/L*

The above lot number has also been analyzed by GC/ECD for the following pesticide compounds which were either not found or were found in concentrations less than the quantation limits listed below [µg/L]:

Alpha BHC 0.01	Beta BHC 0.01	Delta BHC 0.01	Aldrin 0.01
Gamma Chlordane 0.01	Alpha Chlordane 0.01	4,4'-DDE 0.02	Endrin 0.02
4,4'-DDD 0.02	Endosulfan Sulfate 0.02	Gamma BHC[Lindane] 0.01	Heptachlor 0.01
Heptachlor Epoxide 0.01	Endosulfan I 0.01	Dieldrin 0.02	Endosulfan II 0.02
4,4'-DDT 0.02	Endrin Aldehyde 0.02	Toxaphene 1.0	Methoxychlor 0.10
Endrin Ketone 0.02	Aroclor 1016 0.20	Aroclor 1221 0.20	Aroclor 1232 0.40
Aroclor 1242 0.20	Aroclor 1248 0.20	Aroclor 1254 0.20	Aroclor 1260 0.20

Please keep this certificate for your records.

Marc Grebow, VP

FIGURE 4.14

LITER PLASTIC 7/30/97(EXAMPLE ONLY)

Scientific Specialties Service INC

Certificate of Analysis

Analysis of Lot Number
7 - 1 7 5 - 0 1 1

Product Number
3 6 3 0 3 2

The above lot number has also been analyzed by Furnace Atomic Absorption, Flame Atomic Absorption, Cold-Vapor Atomic Absorption, or ICP/MS and the elements below were either not found or found in concentrations less than those listed below:

Element	Concentration (µgL)
Aluminum	100
Antimony	5
Arsenic	2
Barium	20
Beryllium	1
Cadmium	1
Calcium	500
Chromium	10
Cobalt	10
Copper	10
Iron	500
Lead	2
Magnesium	500
Manganese	10
Mercury	0.2
Nickel	20
Potassium	750
Selenium	3
Silver	10
Sodium (Plastic)	500
Sodium (Glass)	5000
Thallium	10
Vanadium	10
Zinc	20

Please keep this certificate for your records.

Marc Grebow, VP

FIGURE 4.15

SAMPLE REQUEST FORM

Client Info

Name or Code: _____
Address: _____
_____
Phone #: _____
Attn: _____
Proj. # or (Name): _____
Bill To: _____
P.O.#(Method of Payment): _____
Copies To: _____
Sample Group Into: _____
To your knowledge is this
Hazardous waste? Yes or No

Authorization: Signature X_____
Date_____

(Remark)_____
_____
_____
_____

Sample Types

PW	-	Potable Water
GW	-	Groundwater
SW	-	Surface Water
ML	-	Misc.Liquids
S	-	Soil
SL	-	Sludge
SE	-	Sewage
SD	-	Sediment
L	-	Leachate
O	-	Oil
MS	-	Misc.Solid
*	-	Other
A	-	Air

Deliverables

( )	-	Report Only
( )	-	Summary/pkg.
( )	-	NJPDES
( )	-	Tier I
( )	-	Tier II
( )	-	Routine DEC
( )	-	NYSDEC CLP
( )	-	NJDEPE CLP
( )	-	EPA CLP
( )	-	C.O.C.

Sampling Method

C - Composite
__ Hrs.
G - Grab

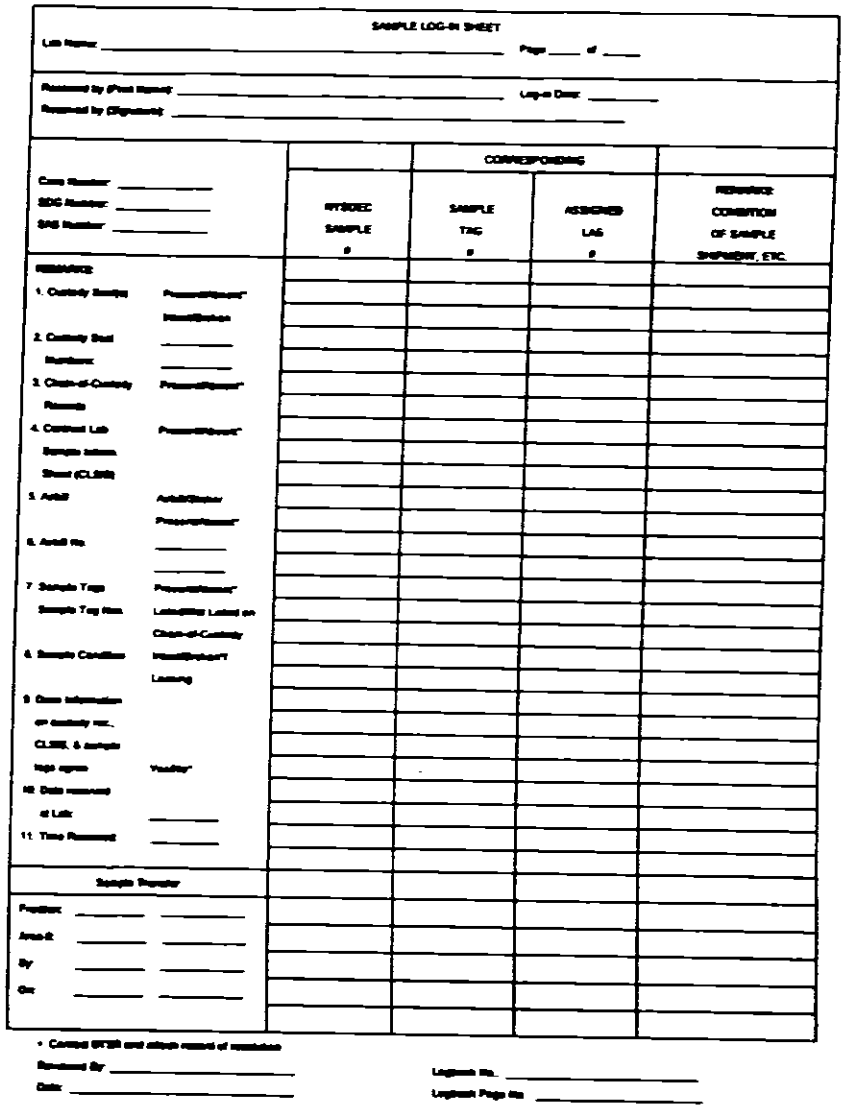
Origin			Purpose		
D	-	Distribution	RO	-	Routine
RW	-	Raw Well	RE	-	Resample
TW	-	Treated Well	V	-	Vicinity
T	-	Tank	S	-	Special
MW	-	Monitoring Well			

Sample Info.

Collected By:_____ Accepted By:_____

Date/Time Collected:	Sample Type	Location	Origin	Purpose	Analysis

Figure 4.16



FORM DC-1

FIGURE 4.17

Contract Laboratory Program

In Reference to Case No(s):

REGIONAL/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

Date of Call: _____
Laboratory Name: _____
Lab Contact: _____
Region: _____
Regional Contact: _____
Call Initiated By: _____ Laboratory _____ Region

In reference to data for the following sample number(s):

_____
_____
_____

Summary of Questions/Issues Discussed:

_____
_____
_____
_____
_____
_____
_____

Summary of Resolution:

_____
_____
_____
_____
_____

_____ _____
Signature Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

FIGURE 4.18

SAMPLE RECEIPT NON-COMPLIANCE REPORT
H2M LABS, INC.

Client:_____ SDG #:_____
Date of Sample Receipt:_____ Received By:_____

Problems with Samples:

_____ 1. Insufficient quantity received for proper analysis.
_____ 2. Sample received broken or leaking.
_____ 3. Sample received improperly preserved.
_____ 4. Sample received in improper container.
_____ 5. Holding time exceeded at receipt.
_____ 6. Sample I.D.
_____ 7. Multi-layer sample
_____ 8. No MS/MSD designated.
_____ 9. Sample received out of temp. specs (4°C +/-2°). Recorded temperature _____°C
_____10. Other _____

Problems with Chain of Custody (COC):

_____ 1. Sample received without COC form.
_____ 2. Custody tape broken.
_____ 3. COC form not relinquished by client.
_____ 4. COC form not properly signed by client.
_____ 5. Sample information on container does not match sample information on COC form.
_____ 6. Other_____

Notes:_____

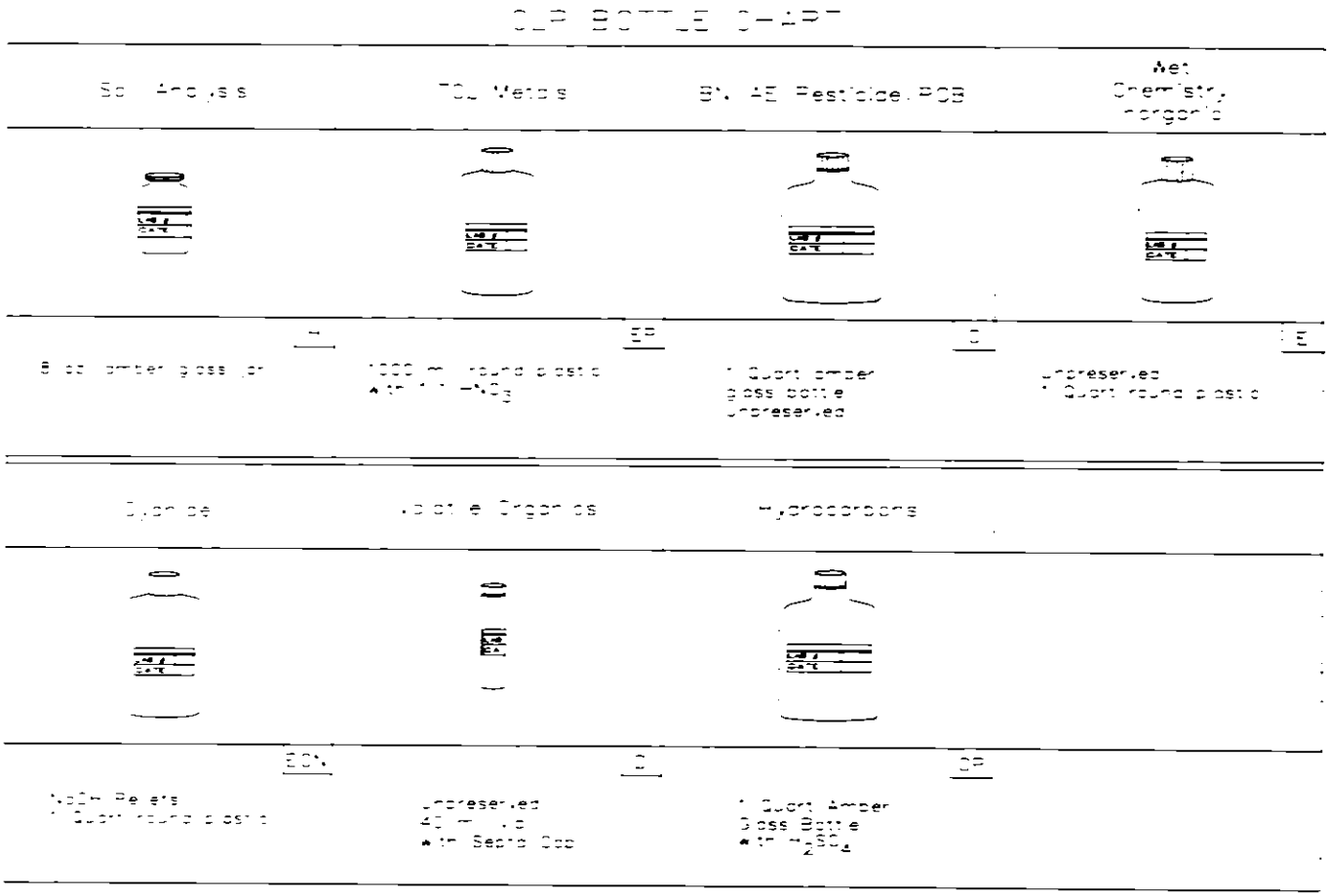
Contact:_____

Notification procedure: ___ phone ___ fax ___writing ___ e-mail ___other

Notified By:_____ **Date/Time:**_____

Corrective Action:_____

FIGURE 4.19



BOTTLE TYPES

A .....Two Ounce Jar
B.....Four Ounce Jar
C .....Eight Ounce Jar
D .....40 ml Vial
DH .....40 ml Vial with Hydrochloric Acid
E.....1000 ml Plastic
E_N .....1000 ml Plastic with Nitric Acid
Es.....1000 ml Plastic with Sullfuric Acid
Ezs .....1000 ml Plastic with Zinc Acetate and Solium Hudroxide
F.....250 ml Plastic
Fs .....250 ml Plastic with Sodium Hydroxide
F_N .....250 ml Plastic with Nitric Acid
G.....One Liter Glass
Gs.....One Liter Glass with Sulfuric Acid
Gzs.....One Liter Glass with Zinc Acetate and Sodium Hydroxide
H.....250 ml Glass
Hs.....250 ml Glass with Sulfuric Acid
I .....125 ml Autoclaved Plastic
J .....500 ml Plastic
J_N.....500 ml Plastic with Nitric Acid

***NOTE**: Identification of bottle types are not required for Non-CLP work*

FIGURE 4.20

WATER BOTTLE CHART

BAC	Metals	Heavy Metals	EPA Semi-volatile Herbicide & Pesticide
			
8oz. round plastic preserved	8oz. round plastic with HNO_3	Large, round plastic with HNO_3	1 Quart glass bottle unpreserved
Bottle code ST	Bottle code SP	Bottle Code SP	Bottle Code O

Wet Chemistry Reagent	Cyanide	Volatile Organics	Volatile Organics	THM
				
Unpreserved 1 Quart round plastic	Sodium Peters 1 Quart round plastic	Blue - 40 mg. Ascorbic Acid Bottle code & blue preservatives	Unpreserved Noted weight on label	Unpreserved
Bottle code E	Bottle code E_{CN}	Bottle code D	Bottle code D	Bottle code D

BOTTLE TYPES

A..... Two Ounce Jar
B..... Four Ounce Jar
C..... Eight Ounce Jar
D..... 40 ml Vial
DH ..... 40 ml Vial with Hydrochloric Acid
E..... 1000 ml Plastic
E_N..... 1000 ml Plastic with Nitric Acid
Es..... 1000 ml Plastic with Sulfuric Acid
Ezs..... 1000 ml Plastic with Zinc Acetate and Solium Hudroxide
F..... 250 ml Plastic
Fs ..... 250 ml Plastic with Sodium Hydroxide
F_N ..... 250 ml Plastic with Nitric Acid
G..... One Liter Glass
Gs..... One Liter Glass with Sulfuric Acid
Gzs..... One Liter Glass with Zinc Acetate and Sodium Hydroxide
H..... 250 ml Glass
Hs..... 250 ml Glass with Sulfuric Acid
I ..... 125 ml Autoclaved Plastic
J ..... 500 ml Plastic
J_N..... 500 ml Plastic with Nitric Acid

***NOTE**: Identification of bottle types are not required for Non-CLP work*

FIGURE 4.21

NUMBER AND TYPE OF WATER BOTTLES FOR A CLP PROJECT

Analysis	No. of Bottles	Type of Bottle	Preservation
CLP VOA	2	40 ml glass vials w/Teflon lined septa	Cool 4°C
CLP BNA CLP Pest/PCB	3	1 liter glass w/Teflon lined septa	Cool 4°C
CLP Metals	1	1 liter plastic	HNO_3 added to pH <2
CLP Cyanide	2	1 liter glass w/Teflon lined cap	0.6g Ascorbic Acid NaOH to Ph >12

NUMBER AND TYPE OF WATER BOTTLES FOR SAMPLE DESIGNATED AS MS/MSD

Analysis	No. of Bottles	Type of Bottle	Preservation
CLP VOA	4	40 ml glass vials w/Teflon lined septa	Cool 4°C
CLP BNA CLP Pest/PCB	7	1 liter glass w/Teflon lined cap	Cool 4°C
CLP Metals	2	1 liter plastic	HNO_3 added to pH <2
CLP Cyanide	4	1 liter glass w/Teflon lined cap	0.6g Ascorbic Acid NaOH to pH >12

NUMBER AND TYPE OF SOIL BOTTLES PER SAMPLE FOR CLP PROJECT

Analysis	No. of Bottles	Type of Bottle	Preservation
CLP VOA CLP BNA CLP Pest/PCB CLP Metals CLP Cyanide	4	8 oz. amber glass jar w/Teflon lined cap	Cool 4°C

For sample designated as the MS/MSD no additional sample is necessary for soil.

TABLE 4.1

SAMPLE PRESERVATION AND HOLDING TIMES

PARAMETER NAME	CONTAINER (1)	PRESERVATION (FROM DATE COLLECTION) (2)(3)	MAXIMUM HOLDING TIME
CLP Purgeable Organics	40 ml vial G. Teflon lined septum	Cool 4°C.	10 days
CLP Pesticides/PCBs	1 liter G.Teflon lined cap	Cool 4°C. pH 5-9(15)	7 days until extraction, analysis 40 days after extraction
CLP Base-Neutral Acid Extractables	1 liter G. Teflon lined	Store at 4°C.	7 days for extraction, analysis 40 days after extraction
Specific conductance	P,G	Store at 4°C.	28 days
Sulfate	P,G	Store at 4°C.	28 days
Sulfide	P,G	Store at 4°C., zinc acetate plus sodium hydroxide to pH>12	7 days
Temperature	P,G	None required	Analyze immediately (field test)
Turbidity	P,G	Store at 4°C.	48 hours
CLP Metals	P	HNO_3 to pH <2	6 months
CLP Mercury	P	HNO_3 to pH <2	28 days
CLP Cyanide	P	NaOH to pH >12	14 days
Herbicides	1 liter G	Cool 4°C	7 days analysis 40 days after extraction
Organophosphorus Pesticides	1 liter G	Cool 4°C	7 days analysis 40 days after extraction
TOC	250 ml glass	H_2SO_4	28 days
Total Alkalinity	Liter (p)	Cool 4°C	14 days
BOD_5	Liter (p)	Cool 4°C	48 hours
Bromide	Liter (p)	Cool 4°C	28 days
Chloride	Liter (p)	Cool 4°C	28 days
Color	Liter (p)	Cool 4°C	48 hours
Nitrate/Nitrite	Liter (p)	H_2SO_4	28 days
pH	Liter (p)	Cool 4°C	24 hours (field test)
Total Solids	Liter (p)	Cool 4°C	7 days
Hex.Chrom	Liter (p)	--	24 hours
Hardness	250 ml (p)	HNO_3, Cool 4°C	6 months
COD	Liter glass	H_2SO_4	28 days
Total Phenolics	Liter glass	H_2SO_4	28 days
TKN	Liter glass	H_2SO_4, Cool 4°C	28 days
Ammonia	Liter glass	H_2SO_4	28 days
Pet.Hydrocarbons	Liter glass	H_2SO_4	28 days

TABLE 4-2

SAMPLE CONTAINER CODES

CODE	BOTTLE TYPE	ANALYSIS
A	2 oz Amber Glass	Soil
B	4 oz Amber Glass	Soil
C	8 oz Amber Glass	Soil
D	40 ml Glass Vials with Teflon Lined Septa	Volatile Organics
E	1 Liter Plastic (unpreserved)	Alkalinity, BOD_5, bromide, chloride, color, solids, sulfate, turbidity, hex. Chromium
E_N	1 Liter Plastic HNO_3	TAL Metals
E_{ZS}	1 Liter Plastic NaOH Zn Acetate	Sulfide
F_S	250 ml Plastic NaOH	Cyanide
F_N	250 ml Plastic HNO_3	WC Hardness
G	1 Liter Glass with Teflon Lined Caps	Pesticides/PCB, herbicides, BNA, organo-phosporus pesticides
H_S	250 ml Glass H_2SO_4	COD, phenols, TKN, ammonia, NO_3, petroleum hydrocarbons, TOC

FIGURE 4.23

H2M LABS, INC. Date: _____

JMS, KEK, VIS, URM, SWM, LSD, LTD, GKB, ECT, KEM, VPK,NTS, JSA, RJM, PD

Project Information Sheet

CLIENT INFORMATION PIS # _____

CLIENT NAME: _____
CONTACT NAME: _____
CLIENT ADDRESS: _____
_____
_____
PHONE: _____ FAX: _____
PROJECT: _____ OMEGA PROJ NAME: _____

SHIPPING INFORMATION

CLIENT: _____

ADDRESS: _____
(if different) _____
ATTN TO: _____ PROJECT NO : _____
PHONE NO: _____

# OF SAMPLES	MATRIX	ANALYSIS	CODE

DELIVERABLES: _____ CODE: _____ TURN AROUND: _____
DISKETTES: Yes No if Yes Format: _____
QA/QC SAMPLES: see attached
DELIVERY DATE OF BOTTLES: _____ AM or PM
RETURN DATE OF SAMPLES: _____ # COPIES: 2
COMMENTS: _____
_____
_____

Who Priced Job: KEK Price Auth Number: _____
QA/QC Samples billable: Yes _____

FIGURE 4.24

Client:
Client Contact:

Re: (Site name)
RFI-C/A Pond A & Monitoring Wells

H2M has provided glassware to collect 9 sludge samples (5 samples plus one MS/MSD, 1 field duplicate, 1 rinse blank and 1 extra set-up) for TCL VOC, SVOC TAL metals, TCLP Metals, cyanide, pH, TOC, TOX and TPH, and 11 water samples (6 samples plus 1 MS/MSD, 1 field duplicate, 1 rinse blank, and 1 extra set-up) for TCL VOC, SVOC, TAL Metals, cyanide, TDS, TOC, TOX and TPH. Two trip blanks and DI water for the rinse blanks are also included.

Please fill the containers according to the tables below:

Sludge Samples:

Bottle Type	Analysis
1-2 oz. jar	TCL VOC's
1-2 oz. jar	TAL Metals
1-8 oz. jar	TCLP Metals, TCL SVOC's
1-8 oz jar	Cyanide, pH, TOC, TOX, TPH, TS

Sludge – Rinse Blank:

2-40 ml vials w/hydrochloric acid	TCL VOC's (fill with zero headspace)
1-40 ml vial w/sulfuric acid	TOC (fill with zero headspace)
2-1 liter amber glass	TCL SVOC's
1-1 liter plastic w/nitric acid	TAL Metals
1-1 liter plastic (unpreserved)	TCLP Metals, pH
1-250 ml plastic w/sodium hydroxide	Cyanide
2-1 liter glass w/sulfuric acid	TPH
1-250 ml glass w/sulfuric acid	TOX

Water - Samples and Rinse Blank:

2-40 ml vials w/hydrochloric acid	TCL VOC's (fill with zero headspace)
1-40 ml vial w/sulfuric acid	TOC (fill with zero headspace)
2-1 liter amber glass	TCL SVOC's
1-1 liter plastic w/nitric acid	TAL Metals
1-1 250 plastic (unpreserved)	TDS
1-250 ml plastic w/sodium hydroxide	Cyanide
2-1 liter glass w/sulfuric acid	TPH
1-250 ml glass w/sulfuric acid	TOX

**The glassware needed for the sample including the MS/MSD does not need to be tripled. Please refer to the external COC for total volume required.

If you have any questions, please don't hesitate to call.
Please return any unused glassware to the laboratory at the completion of the project. Thank you for your cooperation.

H2M Labs, Inc.

FIGURE 4.25

H2M LABS, INC.
575 Broad Hollow Road
Melville, NY 11747-5076
TEL: *(631) 694-3040*
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03-Apr-02

QUOTATION for ANALYTICAL SERVICES

Company: [redacted]
Contact: [redacted]
Address: [redacted]
Phone: [redacted] Fax: [redacted]

Submitted By:
Jennifer Aracri

Quote ID: 82
Project: STATEN ISLAND SITE
TAT: 10 working days
QC Level: B5-70

Expires: 31-Jan-02

TEST ID	Matrix	Test Name	Test	Remarks	# Samp	Unit Price	Test Total
PICKUP		SAMPLE PICK- UP	Per Client	PER PICK UP	10	$100.00	$1,000.00
6010_S_PKG	Soil	ICP METALS in SOIL	SW6010A		80	$125.00	$10,000.00
8021A_SSTAR	Soil	STARS VOA BY GC METHOD 8021A	SW8021		80	$175.00	$14,000.00
8270_SSTARS	Soil	STARS BASE/NEUTRALS IN SOIL	SW8270B		80	$275.00	$22,000.00

Misc Comments: 80-100 SAMPLES - PICK UP CHARGE IS $100 PER DAY - NUMBER OF DAYS USED IS ONLY AN ESTIMATE.

Sub total:	$47,000.00
Misc:	$0.00
Discount:	0.00%
Surcharge:	0.00%
TOTAL:	$47,000.00

Comments: QUALITY CONTROL SAMPLES (MS/MSD, FIELD AND RINSE BLANKS) ARE BILLABLE AS PER NYASP CAT B DELIVERABLES. DATA DELIVERABLES WILL BE NYSDEC CATEGORY B DATA PACKAGE, WITH EQUIS EDD FORMAT. THERE WILL BE A 75% SURCHARGE ADDED IF 1 WEEK PRELIMINARY RESULTS ARE REQUIRED.

1 of 1

FIGURE 4.26

H2M LABS, INC.

SAMPLE RECEIPT NON-COMPLIANCE REPORT
H2M LABS, INC.

Client:_____ SDG #:_____
Date of Sample Receipt:_____ Received By:_____

Problems with Samples:

_____ 1. Insufficient quantity received for proper analysis.
_____ 2. Sample received broken or leaking.
_____ 3. Sample received improperly preserved.
_____ 4. Sample received in improper container.
_____ 5. Holding time exceeded at receipt.
_____ 6. Sample I.D.
_____ 7. Multi-layer sample
_____ 8. No MS/MSD designated.
_____ 9. Sample received out of temp. specs (4°C +/-2°). Recorded temperature _____°C
_____10. Other _____

Problems with Chain of Custody (COC):

_____ 1. Sample received without COC form.
_____ 2. Custody tape broken.
_____ 3. COC form not relinquished by client.
_____ 4. COC form not properly signed by client.
_____ 5. Sample information on container does not match sample information on COC form.
_____ 6. Other_____

Notes:_____

Contact:_____

Notification procedure: ___ phone ___ fax ___writing ___ e-mail ___other

Notified By:_____ Date/Time:_____

Corrective Action:_____

SECTION 5.0

5.0 ANALYTICAL METHODOLOGY-ORGANIC

5.1 Listing of Standard Operating Procedures.

Table 5.1 is a listing of both organic and inorganic SOP's used in the lab.

5.2 Calibration Procedures, Frequency, Sample Preparation/Extraction and Analysis

Calibration and/or verification procedures are designed to insure that the data will be of known quality and the results are appropriate for a given regulation or decision.

- Raw data is retained to reconstruct the calibration used to calculate the sample result.
- All calibrations are verified with a second source standard which, when available is traceable to NIST.
- The low level standard may be analyzed at a concentration level at or below the regulatory/decision level but above the detection limit.
- Reported results must be within the calibration range or the result reported as an estimated value.
- No data associated with a calibration that is out of control is reported without notification of the client or documentation on the lab report or in the case narrative.
- Method Detection Limit – For all analytes where spiking solutions are available, a method detection limit (MDL) is documented. The MDL is determined by 40 CFR Part 136 Appendix B. All steps in the preparatory and analytical phase are performed for the determination of the MDL.

  Seven portions of a spiked reagent (at an estimated concentration between MDL and 5 x MDL) water sample are analyzed and the mean recovery and standard deviation are calculated. The student t factor for 7 replicate analysis of 3.14 is multiplied by the standard deviation and the result is the MDL. The MDL should be about one fifth the practical and routinely achievable detection level that can be reported with relatively good certainty that any reported value is reliable.
- Initial Demonstration of Capability. - An initial demonstration of method performance must be made prior to using any method and at any time there is a significant change in instrument type, personnel or methods.

  The initial demonstration of performance consists of spiking four

aliquots or clean matrix (e.g. reagent water) with a concentration of analytes of interest. The source of this solution could be a QC sample purchased from an outside supplier or a QC check solution. The solution must be independent from the calibration solution. The concentration spiked should be approximately ten times the method detection limit.

The four aliquots are prepared and analyzed according to the method either concurrently or over a period of days.

The four results should be calculated and a percent recovery determined. Using the four results, calculate the average recovery $\overline{X}$ in the appropriate reporting units and the standard deviation (S) in the same units for each parameter of interest.

For each parameter, compare S and $\overline{X}$ to the corresponding acceptance criteria for precision and accuracy in the method (if applicable) or in "in-house" limits if not stated in the method. If S and $\overline{X}$ for all parameters meet the acceptance criteria, the analysis of sample are permitted. If any one of the parameters exceed the acceptance range, the performance is not acceptable for that parameter.

When one or more of the tested parameters fail at least one of the acceptance criteria the analyst must:

- Locate and correct the problem and repeat the test for the parameters that were out.

A certification statement shall be used to document the completion of each initial demonstration of capability. A copy of the certification statement shall be retained in the personnel records of each affected employee.

5.2.1 Volatile Organics:

The requirements for volatile organic analytes are summarized in Tables 5.2.1A through 5.2.1I.

5.2.2 Base/Neutral Organics:

The requirements for base/neutral organic analytes are summarized in Tables 5.2.2A through 5.2.2I.

5.2.3 Pesticide/PCB Analyses:

The requirements for pesticide/PCB analyses are summarized in Tables 5.2.3A through 5.2.3E.

5.2.4 Organophosphorous Pesticides:

TABLE 5.1

STANDARD OPERATING PROCEDURES

SOP TITLE	SOP NUMBER	REVISION NUMBER AND DATE
Sample Preparation and Analysis of Volatile Organics by GC/MS: Method 95-1	ASP 95-1	4 – 4/17/02
Sample Preparation and Analysis of Semi-Volatile Organics by GC/MS: Method 95-2 Modified	ASP 95-2	4 – 4/19/02
Sample Preparation and Analysis of Chlorinated Pesticides and PCBs: Method 95-3	ASP 95-3	6 – 4/19/02
Sample Preparation and Analysis of Organo phosphorous Pesticides: EPA Method 8141A Landfill	8141A	1 – 1/11/00
Sample Preparation and Analysis of Chlorinated Herbicides: EPA Method 8151A Modified	8151A	3 – 4/18/02
Mercury Analysis in Water by Manual Cold Vapor Technique: Method 245.1 CLP-M	HG-245-1	1 – 1/10/98
Mercury Analysis in Sediment by Manual Cold Vapor Technique: Method 245.5 CLP-M	HG-245-5	1 – 1/10/98
Total Cyanide Analysis is in Water and Soils by Manual Spectrophotometric Technique with Midi-Distillation: Method 335.2 CLP-M	CYANIDE	1 - 1/13/98
Sample Preparation and Analysis of Color: Method 110.2	COLOR	2 - 1/14/98
Sample Preparation and Analysis of Total Suspended Solids: Method 160.2	TSS	1 - 1/98
Sample Preparation and Analysis of Total Dissolved Solids: Method 160.1	TDS	2 - 1/14/98
Sample Preparation and Analysis of Turbidity: Method 180.1	TURB	3 - 1/23/98
Total Alkalinity by Titrimetric Technique: Method 310.1	TALK	1 – 1/15/98
Bromide Analysis by Titrimetric Technique: Method 320.1	BROMIDE	2 - 1/13/98
Ammonia Analysis by Automated Phenate Technique: Method 350.1	AMMONIA	2- 1/23/98
Total Kjeldahl Nitrogen Analysis by Semi-Automated Colorimetric Technique: Method 351.2	TKN	2 - 1/23/98
Nitrate and Nitrate Analysis by Automated Cadmium Reduction Technique: Method 353.2	NITRATE	3 - 1/23/98

SOP TITLE	SOP NUMBER	REVISION NUMBER AND DATE
Sample Preparation and Analysis of Sulfate (Colorimetric, Automated, Methylthymol Blue, AAII): Method 375.2	SO4TRAC	0 - 1/19/98
Sample Preparation and Analysis of Sulfate (Turbidimetric): Method 375.4	SULFATE	1 - 1/14/98
Sample Preparation and Analysis of Sulfide: Method 376.1	SULFIDE	1 - 1/14/98
Sample Preparation and Analysis of Biochemical Oxygen Demand: Method 405.1	BOD	1 - 1/14/98
Chemical Oxygen Demand Analysis by Manual Colorimetric Technique: Method 410.4	COD	3/1/23/98
Sample Preparation and Analysis of Total Organic Carbon (Dohrmann DC-190): Method 415.1	TOC DC 190	0 - 5/7/97
Sample Preparation and Analysis of Total Organic Carbon (Dohrmann DC-180): Method 415.1	TOC DC 180	1 - 8/6/97
Total Recoverable Petroleum Hydrocarbon Analysis in Soils by Method 418.1 Modified	PETH SOIL	1 - 1/15/98
Total Recoverable Phenol Analysis by Manual Colorimetric Technique with Mini-Distillation: Method 420.1	PHENMINI	1- 1/13/98
Sample Preparation and Analysis of Hardness, Total (by Calculation): Method 2340C	HARDMET	2 - 1/15/98
Hexavalent Chromium Analysis by Colorimetric Technique: Method 3500 CR-D (water)	HEX CHROM	2 - 1/13/98
Hexavalent Chromium Analysis by Colorimetric Technique: Method 7196A (soil)	7196_CR6	0 - 1/98
Total Solids Analysis by Gravimetric Technique: Method D-V215 NYSDEC ASP 10/95	TS-SOIL	1 - 1/13/98
Total Organic Carbon in Soils in Combustion Infrared: Method Lloyd Kahn (Dohrmann)	TOC-KAHN	1 - 1/14/98
Soil Extraction Preparation For General Chemistries	SOIL EXT. PREP	0 - 1/26/98
Total Recoverable Oil & Grease analysis in waters by Gravimetric Technique: Method 413.1	O&G	0 - 11/11/98
Sample Preparation and Analysis of Formaldehyde – Method 8315	8315A	1 – 1/27/00
Total Recoverable Oil & Grease Analysis in Waters By Gravimetric Technique – Method 9070	9070	0 -11/1/98
Sample Preparation and Analysis ofm Volatile Orgnics by GS/MS – EPA CLP	CLP – VOA	0 – 5/1/97

SOP TITLE	SOP NO.	REVISION NO.
Trace Element Determination by Stabilized Temperature Platform Graphite Furnace – Method 200.9	200-9 (Furnace)	1 - 8/8/97
Total Hardness Analysis in Waters by Manual Titrimetric (EDTA) Technique - Method 130.2	HARDNESS	2 - 1/21/98
Sample Preparation and Analysis of Mercury Analysis in Soil/Sediment by Manual Cold Vapor Technique – Method 245.1	HG-245-1 (Potable)	1 - 12/3/98
Sample Preparation and Analysis of Mercury Analysis in Soil/Sediment by Manual Cold Vapor Technique – Method 245.5-CLP-M	HG-245.5	1 - 1/10/98
Sample Preparation and Analysis of Nitrogen, Nitrate-Nitrite (Colorimetric, Automated, Cadmium Reduction) Method 353.2	NITROGEN	0 – 6/18/99
Sample Preparation and Analysis of Chlorinated Pesticides and PCBS – Method OLM03.2	OLMO3.2 PEST/PCB	1 - 4/21/97
Total Recoverable Petroleum Hydrocarbon Analysis in Waters – Method 418.1	PETHH20l - 418.1	1 - 1/16/98
Sample Preparation and Analysis of Sulfide (Titrimetric, Iodine) – Method 376.1	SOIL/SULFIDE	0 - 5/18/98
Sample Preparation and Analysis of the Determination of Trace Metals by Inductively Coupled Plasma Atomic Emission Spectroscopy – Method 200.7 – CLP-M	TRACE2	3 – 1/20/99
Total Organic Halogen (TOX) Adsorption-Pyrolysis-Titrimetric Method – Method 5320B	TOX5320B	0 - 12/7/98
Method 9060 Modified for Soil (Lloyd Kahn)	TOC-9060M FOR SOILS	0 - 1/14/98
Total Organic Carbon Analysis in Water by Combustion Infrared Technique –Method 9060	TOC 9060-2 (DC-190	0 – 3/11/99
Sample Preparation and Analysis to Total Organic Carbon, TOC, (Combustion or Oxidation, Dohrmann DC-180) Method 9060	TOC9060-1 (DC-180)	2 – 3/11/99
Pensky-Martens Closed-Cup method for Determining Ignitability – Method 1010	1010	1 - 3/1/99
Extraction Procedure (EP) Toxicity Test Method and Structural Integrity Test – Method 1310A	1310A	1 - 3/4/99
Method OLM04.2 Pesticides/Aroclors	OLM04.2 PEST	1 – 4/19/02
Method OLM04.2 Semivolatiles	OLM01.2 SEMI	1 – 4/19/02
Method OLM04.2 Volatiles Organics	OLM04.2 VOL	0 – 3/24/00

SOP Title	SOP Code	Rev. No. / Date
Toxicity Characteristic Leaching Procedure - Method 1311	1311	1 - 3/8/99
Sample Preparation and Analysis of the Determination of Trace Metals by Inductively Coupled Plasma Atomic Emission Spectroscopy – Method 6010B and Prep. Methods 3005A, 3010A and 3050B	6010B	2 - 1/10/99
Sample Preparation and Analysis of pH Electrometric Measurement – Method 9040B	9040B	0 -2/17/99
pH Paper Method – Method 9041A	9041A	0 - 2/18/99
Soil and Waste pH – Method 9045C	9045C	0 - 2/19/99
Sample Preparation and analysis of Total Organic Carbon, TOC – Method 5301B	5310B	3 - 12/4/98
Ultraviolet Absorption Method – EPA Method 5910	5910	0 - 12/6/98
Sample preparation and Analysis of Chloride – Method 325.2	CHLORIDE	4 - 7/4/98
Determination of Chlorination Disinfection by Products	ICR-551.1	1 - 12/5/98
Determination of Haloacetic Acids in Drinking Water Method 522.2 by Liquid/Liquid Extraction	*ICR-552.2*	1 - 12/5/98
Total and Amenable Cyanide Distillation – Method 9010B	9010B	1 - 1/13/98
Sample Preparation and Analysis of Polychlorinated Biphenyls as Decachlorobiphenyl- EPA Method 508A	508A	2 – 4/18/02
Sample Preparation and Analysis of Chlorinated Herbicides – EPA Method 515.1	515.1	4 – 4/16/02
Sample Preparation and Analysis of Chlorinated Pesticides – Method 8081A	8081A	7 – 4/16/02
Sample Preparation and Analysis of Organophosphorous Pesticides – EPA Method 8141A	8141A	2 - 1/7/98
Analysis of Volatile Organics in Water by Purge and Trap Capillary Column GC with PID/ECD IN Series - EPA Method 502.2	502-2	3 – 4/16/02
SM18.2510B – Conductivity	SM COND	1 – 1/26/00
EPA 120.1 – Conductivity	EPA COND	1 – 1/26/00
EPA 150.1– Method 150.1 – pH	pH 150.1	0 – 1/26/00
Total Cyanide Analysis in Water and Soils by Manual Spectrophotometric Technique – Method 9014	CYANIDE	1 – 1/13/98
Multiple Tube Fermentation Technique for Members of the Coliform Group – Method 9221 B, C and E	MPN	1 – 2/1/00

SOP TITLE	SOP NUMBER	REVISION NUMBER AND DATE
Total Solids Analysis in water by Gravimetric Technique – Method 160.3	TS 160	0 – 1/27/00
Total Cyanide in Water by Manual Spectrophotometric Technique – Method 450 CN-E	CN 4500E	1 – 2/2/00
Sample Preparation and Analysis of Mercury in Soil/Sediment – Method 7471A	7471A	1 – 1/10/98
Sample Preparation and Analysis of Mercury in Water – Method 7470A	7470A	1 – 1/10/98
Sample Preparation and Analysis of Sulfide – Method 9030	SIDE 9030	1 – 2/2/00
Heterotropic Plate Count – Method 9215D	SPC	0 - 1/31/00
Sample Preparation and Analysis of Sulfide in Soil – Method 9030A Modified	SOIL – SULFIDE	0 – 5/18/98
Sample Preparation and Analysis of Semivolatile Organics by GC/MS – Method 8270C	8270C	4 – 4/18/02
Sample Preparation and Analysis of Polychlorinated Biphenyls – Method 8082	8082	3 – 4/16/02
Analysis of Volatile Aromatic by GC/PID in Wastewater – Method 602	602	0 – 5/21/98
Analysis of Total Petroleum Hydrocarbons by GC with FID or by GC/MS -EPA Method 8015M	8015M	3 – 1/27/00
Analysis of Volatile Organics by GC with PID/Hall Detectors – EPA Method 8021B	8021B	2 – 1/27/00
Sample Preparation and Analysis of Volatile Organics by GC/MS – Method 8260B	8260B	6 – 4/17/02
Sample Preparation and Analysis of the Determination of Trace Metals by Inductively Coupled Plasma Atomic Emission Spectroscopy – Method 200.7	200.7	0 – 12/8/98
Analysis of Volatile Organics by GC /Hall Detector in Wastewater – Method 601	601	1 – 1/27/00
Colilert Coliform and E. Coli Water Analysis – Method 9221D	9221D	0 – 1/25/00
Total Cyanide in Water by manual Spectrophotometric Technique with Midi-Distillation Method 335.2	335.2	0 – 1/27/00
Acidity in Water – Method 305.2	ACIDITY	1 – 1/27/00
Colilert Coliform and E. Coli Water Analysis – 9223	COLILERT	0 – 1/25/00
Total Alkalinity Analysis in Water by Titrimetrictechnide – SM 18 - 2320B	ALK 2320b	1 – 2/2/00

SOP TITLE	SOP NUMBER	REVISION NUMBER AND DATE
Sample Preparation and Analysis of Color – SM 18 – 2120B	CIR 2020b	1 – 2/2/00
Fluoride Analysis in Water by Ion Selective Electrode – 4500F C	FLUORIDE	1 – 3/14/00
Ortho Phosphate in Waters by the Ascorbic Acid Method	TDS 2540C	1 – 2/2/00
EPA Method 524.2 - Analysis of Volatile Organic in Drinking Water by GC/MS	524.2	1 – 2/17/00
EPA Method 624 – Sample Preparation and Analysis of Purgeables inWastewater by GC/MS	624	2 – 4/17/02
EPA Method 504.1 - EDB and DBCD in Water by Microextraction and EDC G/C	504.1	1 – 4/16/02
EPA Method 525.2 - Determination of Organic Compounds in Drinking Water by Liquid-Solid Extraction and GC/MS Analysis	525.2	2 – 4/18/02
EPA Method 505.5 - Sample Preparation and Analysis of Organohalide Pesticides and PCB's in Water by Microextraction and GC	505	0 – 3/13/00
EPA Method 360.2 - Sample Preparation and Analysis of Dissolved Oxygen	DO	1 – 2/7/00
EPA Method 160.3 - Total Solids by Gravimetric Technique	TS 160	0 – 1/27/00
EPA Method – 120.1 – Conductivity	COND 120	1 – 1/26/00
Method 425.1 – MBAS	MBAS	1 – 3/14/00
Method 625 – Sample Preparation and Analysis of Base/Neutral Acid Extractable in Water	625	1 – 2/10/00
Method 608 – Sample Preparation and Analysis of Chlorinated Pesticides in Wastewater	608	1 – 2/4/00
Method 9030 – Sample preparation and Analysis of Sulfide	SIDE 9030	1 – 2/2/00
TO1/TO2	VOST METHOD DOC	0 – NO DATE
Glyphosate	547	2 – 4/4/02
Analysis of Diquat in Drinking Water by HPLC	549.2	2 – 3/4/02
Carbamates	531.1	2 – 4/14/02
Temperature	TEMP	0 – 3/15/00
VOA	601	1 – 1/27/00
Grain Size Distribution in Soils – ASTM D422-63	GRAIN_SZ	1 – 3/5/02
Particle Size Distribution in Sediments – ASTM D422-63/EPA EMAP	SIEVEEMAP	1 – 3/5/02
Definitions and References	DEFI_REF	0 – 2/15/00
Preparation of Standards and Reagents, Cleaning of Containers	MATERIR0	0 – 3/21/00
Training: Orientation, Job Training and Ethics Policy	TRAINGR0	1 – 4/15/00
Manual Integration	INTEGRATION	1 – 9/10/01
Presecne/Absence of Total Coliform and E. Coli	PA	1 – 4/17/02

TABLE 5.2.1A
PRACTICAL QUANTIFICATION LIMITS FOR TARGETED VOLATILE ORGANICS

ANALYTE	CAS NO.	PQL (ug/L)	PQL (ug/kg)
Dichlorodifluoromethane	75-71-8	5	5
Chloromethane	74-87-2	5	5
Vinyl chloride	75-01-4	5	5
Bromomethane	74-83-9	5	5
Chloroethane	75-00-3	5	5
Acetone	67-64-1	10	10
Acetonitrile	75-05-8	200	200
Allyl chloride	107-05-1	5	5
Acrolein	107-02-8	50	50
Acrylonitrile	107-13-1	50	50
Iodomethane	74-88-4	5	5
Vinyl acetate	108-05-4	10	10
Chloroprene	126-99-8	10	10
2-butanone	78-93-3	10	10
Carbon disulfide	75-15-0	5	5
Trichlorofluoromethane	75-69-4	5	5
1,1-dichloroethene	75-35-4	5	5
Methylene chloride	75-09-2	5	5
Trans-1,2-dichloroethene	156-60-5	5	5
1,1-dichloroethane	75-34-3	5	5
Propionitrile	107-12-0	40	40
Isobutyl alcohol	78-83-1	400	400
Methacrylonitrile	126-98-7	5	5
Cis-1,2-dichloroethene	156-59-2	5	5
Bromochloromethane	74-97-5	5	5
2,2-dichloropropane	594-20-7	5	5
Chloroform	67-66-3	5	5
1,2-dichloroethane	107-06-2	5	5
1,1,1-trichloroethane	71-55-6	5	5
1,1-dichloropropene	563-58-6	5	5
Carbon tetrachloride	56-23-5	5	5
Benzene	71-43-2	5	5
Methyl methacrylate	80-62-6	5	5
Trichloroethene	79-01-6	5	5
1,2-dichloropropane	78-87-5	5	5
Dibromomethane	74-95-3	5	5
Bromodichloromethane	75-27-4	5	5
Cis-1,3-dichloropropene	10061-01-5	5	5
Toluene	108-88-3	5	5
Trans-1,3-dichloropropene	10061-02-6	5	5
1,1,2-trichloroethane	79-00-5	5	5
1,2-dibromomethane	106-93-4	5	5
4-methyl-2-pentanone	108-10-1	10	10
Chlorobenzene	108-90-7	5	5
1,3-dichloropropane	142-28-9	5	5
Tetrachloroethene	127-18-4	5	5
Dibromochloromethane	124-48-1	5	5
2-hexanone	591-78-6	10	10
1,1,1,2-tetrachloroethane	630-20-6	5	5
Ethylbenzene	100-41-4	5	5
Xylenes(total)	1330-20-7	5	5
Styrene	100-42-5	5	5
Bromoform	75-25-2	5	5
Trans-1,4-dichloro-2-butene	110-57-6	5	5
1,1,2,2-tetrachloroethane	79-34-5	5	5
1,2,3-trichloropropane	96-18-4	5	5
1,2-dibromo-3-chloropropane	96-12-8	5	5
Ethylmethacrylate	97-63-2	5	5

TABLE 5.2.1B
CHARACTERISTIC IONS FOR TARGETED COMPOUNDS

Parameter	Primary Ion*	Secondary Ions
Dichlorodifluoromethane	85	87
Chloromethane	50	52
vinyl chloride	62	64
Bromomethane	94	96
Chloroethane	64	66
Acetone	43	58
Aceonitrile	41	39
allyl chloride	41	39, 76
Acrolein	56	55
Acrylonitrile	53	51, 52
Iodomethane	142	127
vinyl acetate	43	86
Chloroprene	53	88, 90
2-butanone	43***	72
carbon disulfide	76	78
Trichlorofluoromethane	101	103
1,1-dichloroethene	96	61, 63
Methylene chloride	84	49, 86
trans-1,2-dichloroethene	96	61, 98
1,1-dichloroethane	63	65, 83
Propionitrile	54	55
isobutyl alcohol	43	42
Methacrylonitrile	41	67***
cis-1,2-dichloroethene	96	61, 98
Bromochloromethane	128	49, 130
2,2-dichloropropane	77	79, 97
Chloroform	83	85, 47
1,2-dichloroethane	62	98, 64
1,1,1-trichloroethane	97	61, 99
1,2-dichloroethane-d4	65	102
1,1-dichloropropene	75	110, 39
carbon tetrachloride	117	119
Benzene	78	77
methyl methacrylate	69	41, 100
Trichloroethene	95	130, 132
1,2-dichloropropane	63	112, 41
Dibromoethane	93	95, 174
Bromodichloromethane	83	85, 127
cis-1,3-dichloropropene	75	77, 110
Toluene	91	92***
Ethyl methacrylate	69	41, 99
Trans-1,3-dichloropropene	75	77, 110
1,1,2-trichloroethane	83	85, 97
1,2-dibromoethane	107	109, 188
4-methyl-2-pentanone	43	57, 58
toluene-d8	98	100
4-bromofluorobenzene	95	176
Chlorobenzene	112	77, 114
1,3-dichloropropane	76	41, 78
Tetrachloroethene	164	129, 166
Dibromochloromethane	129	127, 131
2-hexanone	43	58, 57
1,1,1,2-tetrachloroethane	131	119, 133
Ethylbenzene	106	91, 105
Xylenes (ortho)	106	91, 105
Styrene	104	78, 103
Bromoform	173	175, 254
trans-1,4-dichloro-2-butene	53	75, 89
1,1,2,2-tetrachloroethane	83	85, 131
1,2,3-trichloropropane	112***	75
1,2-dibromo-3-chloropropane	75	155, 157
m\p-xylenes	106	91, 105

**The primary ion should be ulsed unless interferences are present, in which case, a second ion may be used.*

*** m/z 43 is used for quantification of 2-Butanone, but m/z 72 must be present for positive identification.*

**** Quantitation ion differs from primary ion.*

TABLE 5.2.1C

CHARACTERISTIC IONS

System Monitoring Compounds

Compound	Primary Ion	Secondary Ion(s)	CAS No.
4-Bromofluorobenzene	95	174, 176	460-00-4
1,2-Dichloroethane-d_4	65	102	17060-07-0
Toluene-d_8	98	70, 100	2037-26-5

Internal Standards

Compound	Primary Ion	Secondary Ion(s)	CAS No.
Pentafluorobenzene	99	168***	363-72-4
1,4-Difluorobenzene	114	63, 88	540-36-3
Chlorobenzene-d_5	117	82***, 119	3114-55-4
1,4-Dichlorobenzene-d_4	152	150, 115	03855-82-1

*** Ion used for quantitation

TABLE 5.2.1D

INTERNAL STANDARDS ASSIGNED FOR QUANITITATION OF TARGETED COMPOUNDS AND SYSTEM MONITORING COMPOUNDS

Pentafluorobenzene (IS_1)	1,4-difluorobenzene (IS_2)	Chlorobenzene-d5 (IS_3)	1,4-dichlorobenzene-d4 (IS_4)
Dichlorodifluoromethane	1,2-dichloroethane-d4 (surrogate)	Chlorobenzene	trans-1,4-dichloro-2-butene
Chloromethane	1,1-dichloropropene	1,3-dichloropropane	1,1,2,2-tetrachloroethane
Vinyl chloride	Carbon tetrachloride	Tetrachloroethene	1,2,3-trichloropropane
Bromomethane	Benzene	Dibromochloromethane	1,2-dibromo-3-chloropropane
Chloroethane	methyl methacrylate	2-hexanone	
Acetone	Trichloroethene	1,1,1,2-tetrachloroethane	
Acetonitrile	1,2-dichloropropane	Ethylbenzene	
Allyl chloride	Dibromoethane	Xylenes(total)	
Acrolein	Bromodichloromethane	Styrene	
Acrylonitrile	Cis-1,3-dichloropropene	Bromoform	
Iodomethane	Toluene		
Vinyl acetate	Ethyl methacrylate		
Chloroprene	Trans-1,3-dichloropropene		
2-butanone	1,1,2-trichloroethane		
Carbon disulfide	1.2-dibromoethane		
Trichlorofluoromethane	4-methyl-2-pentanone		
1,1-dichloroethene	Toluene-d8 (surrogate)		
Methylene chloride	Bromofluorobenzene (surrogate)		
Trans-1,2-dichloroethene			
1,1-dichloroethane			
Propionitrile			
Isobutyl alcohol			
Methacrylonitrile			
cis-1,2-dichloroethene			
Bromochloromethane			
2,2-dichloropropane			
Chloroform			
1,2-dichloroethane			
1,1,1-trichloroethane			

TABLE 5.2.1E

BFB KEY IONS AND ION ABUNDANCE CRITERIA

Mass	Ion Abundance Criteria
50	15 - 40 percent of mass 95
75	30 - 60 percent of mass 95
95	Base peak, 100 percent relative abundance
96	5.0 - 9.0 percent of mass 95
173	Less than 2.0 percent of mass 174
174	50 - 120 percent of mass 95
175	5.0 - 9.0 percent of 174
176	95 - 101 percent of 174
177	5.0 - 9.0 percent of 176

NOTE: All ion abundances must be normalized to m/z 95, the nominal base peak, even though the ion abundance of m/z 174 may be up to 120 percent that of m/z 95.

TABLE 5.2.1F
RELATIVE RESPONSE FACTOR CRITERIA FOR INITIAL & CONTINUING CALIBRATION

Volatile Compound	Minimum RRF	Maximum % RSD	Maximum % Diff
Dichlorodifluoromethane	0.010	100	±100
Chloromethane	0.010	100	±100
vinyl chloride	0.100	20.5	±25.0
Bromomethane	0.100	20.5	±25.0
Chloroethane	0.010	100	±100
Acetone	0.010	100	±100
Acetonitrile	0.010	100	±100
allyl chloride	0.010	100	±100
Acrolein	0.010	100	±100
Acrylonitrile	0.010	100	±100
Iodomethane	0.010	100	±100
vinyl acetate	0.010	100	±100
Chloroprene	0.010	100	±100
2-butanone	0.010	100	±100
carbon disulfide	0.010	100	±100
Trichlorofluoromethane	0.010	100	±100
1,1-dichloroethene	0.100	20.5	±25.0
methylene chloride	0.010	100	±100
total-1,2-dichloroethene	0.010	100	±100
1,1-dichloroethane	0.200	20.5	±25.0
Propionitrile	0.010	100	±100
isobutyl alcohol	0.010	100	±100
Methacrylonitrile	0.010	100	±100
Bromochloromethane	0.010	100	±100
Bromochloromethane	0.010	±100	±100
2,2-dichloropropane	0.010	100	±100
Chloroform	0.200	20.5	±25.0
1,2-dichloroethane	0.100	20.5	±25.0
1,1,1-trichloroethane	0.100	20.5	±25.0
1,2-dichloroethane-d4	0.010	100	±100
1,1-dichloropropene	0.010	100	±100
carbon tetrachloride	0.100	20.5	±25.0
Benzene	0.500	20.5	±25.0
methyl methacrylate	0.010	100	±100
Trichloroethene	0.300	20.5	±25.0
1,2-dichloropropane	0.010	100	±100
Dibromomethane	0.010	100	±100
Bromodichloromethane	0.200	20.5	±25.0
cis-1,3-dichloropropene	0.200	20.5	±25.0
Toluene	0.400	20.5	±25.0
ethyl methacrylate	0.010	100	±100
trans-1,3-dichloropropene	0.100	20.5	±25.0
1,1,2-trichloroethane	0.100	20.5	±25.0
1,2-dibromoethane	0.010	100	±100
4-methyl-2-pentanone	0.010	100	±100
toluene-d8	0.010	100	±100
Bromofluorobenzene	0.200	20.5	±25.0
Chlorobenzene	0.500	20.5	±25.0
1,3-dichloropropane	0.010	100	±100
Tetrachloroethene	0.200	20.5	±25.0
Dibromochloromethane	0.100	20.5	±25.0
2-hexanone	0.010	100	±100
1,1,1,2-tetrachloroethane	0.010	100	±100
Ethylbenzene	0.100	20.5	±25.0
xylenes(total)	0.300	20.5	±25.0
Styrene	0.300	20.5	±25.0
Bromoform	0.100	20.5	±25.0
trans-1,4-dichloro-2-butene	0.010	100	±100
1,1,2,2-tetrachloroethane	0.300	20.5	±25.0
1,2,3-trichloropropane	0.010	100	±100
1,2-dibromo-3-chloropropane	0.010	100	±100

TABLE 5.2.1F (Continued)

SYSTEM MONITORING COMPOUNDS

Volatile Compound	Minimum RRF	Maximum % RSD	Maximum % Diff
Bromofluorobenzene	0.200	20.5	±25.0
Toluene-d8	0.010	100.	±100.
1,2-Dichloroethane-d4	0.010	100.	±100.

TABLE 5.2.1G

SYSTEM MONITORING COMPOUND RECOVERY LIMITS

Compound	% Recovery Water	% Recovery Soil
Toluene-d_8	88 –110	84 - 138
Bromofluorobenzene	86 – 115	59 - 113
1,2-Dichloroethane-d_4	76 - 114	70 - 121

TABLE 5.2.1H

QC LIMITS FOR MATRIX SPIKE SAMPLE DUPLICATES AND MATRIX SPIKE BLANK

Compound	% Recovery Water	RPD Water	% Recovery Soil	RPD Soil
1,1-Dichloroethene	61 - 145	14	59 - 172	22
Trichloroethene	71 -120	14	62 - 137	24
Benzene	76 - 127	11	66 - 142	21
Toluene	76 - 125	13	59 - 139	21
Chlorobenzene	75 - 130	13	60 - 133	21

TABLE 5.2.1I
QC SUMMARY

METHOD: 8260B
PARAMETERS: PURGEABLE ORGANICS

	Tune Performance	System Evaluation	Calibration Check	Instrument Blank	Matrix Spike Sample/ Matrix Spike Duplicate	Matrix Spike Blank	System Monitoring Compound Recoveries	Internal STD Area and RT
Measure Taken	BFB Injection	Initial calibration standards 5 levels	Continuing calibration standard run	Analyze Nanopure water	Run sample spiked with select standard mix	Run reagent water spiked with select standard mix	Add system monitoring compounds	Compare I.S. area and RT of 12 hour Std to samples
Frequency	Every 12 hours	Good until cont. calibration not met or change in system	Every 12 hours	Every 12 hours	One per 20 samples or SDG or matrix or 7 days sampling	One per 20 samples or SDG or matrix or 7 days sampling	All standards, blanks, samples, MS/MSD, MSB	every sample
Acceptance Criteria	Ion abundance must meet ASP criteria in Table 5.2.1E	Maximum %RSD and minimum RRF in Table 5.2.1F	Maximum %D and minimum RRF in Table 5.2.1F	Common solvents <5 x CRQL Others <CRQL	Advisory see Table 5.2.1H	see Table 5.2.1H	Achieve recoveries See Table 5.2.1G	RT: ± 30 seconds from Std, I.S. area -50% to +100% from Std
Corrective Action	Tune with FC 43 or PFTBA	1. New standard 2. Leak check 3. Colum n 4. Trap	Recalibrate Using the 5 levels	1. Check spikes for contam-ination 2. Bake instrume nt 3. Re-analyze samples assoc.	Not required	1. Re-analyze MSB/MS/ MSD 2. Check solution 3. Check system	1. Check for calc erros 2. Check inst. 3. Re-analyze	1. Inspect MS system 2. Re-analyze samples

TABLE 5.2.2A
PRACTICAL QUANTIFICATION LIMITS
FOR TARGETED SEMI-VOLATILE ORGANICS

ANALYTE	CAS NUMBER	PQL(ug/L)	PQL (ug/Kg)
N-Nitrosodimethylamine	62-75-9	10	330
N-Nitrosomethylethylamine	10595-95-6	10	330
Methylmethanesulfonate	66-27-3	10	330
N-Nitrosodiethylamine	55-18-5	10	330
Ethylmethanesulfonate	62-50-0	10	330
Phenol	108-95-2	10	330
bis(2-Chloroethyl)ether	111-44-4	10	330
2-Chlorophenol	95-57-8	10	330
1,3-Dichlorobenzene	541-73-1	10	330
Benzyl Alcohol	100-51-6	10	330
1,4-Dichlorobenzene	106-46-7	10	330
1,2-Dichlorobenzene	95-50-1	10	330
2-Methylphenol	95-48-7	10	330
2,2'-oxybis(1-Chloropropane)*	108-60-1	10	330
Acetophenone	98-86-2	10	330
N-Nitrosopyrrolidine	930-55-2	10	330
o-Toluidine	95-53-4	10	330
3-Methylphenol/4-Methylphenol**	12-03-3	20	660
N-Nitroso-di-n-propylamine	621-64-7	10	330
Hexachloroethane	67-72-1	10	330
Nitrobenzene	98-95-3	10	330
N-Nitrosopiperidine	100-75-4	10	330
Isophorone	78-59-1	10	330
2-Nitrophenol	88-75-5	10	330
2,4-Dimethylphenol	105-67-9	10	330
bis(2-Chloroethoxy)methane	111-91-1	10	330
O,O,O-Triethylphosphorothioate	126-68-1	20	660
2,4-Dichlorophenol	120-83-2	10	330
1,2,4-Trichlorobenzene	120-82-1	10	330
Naphthalene	91-20-3	10	330
4-Chloroaniline	106-47-8	10	330
Hexachloropropene	1888-71-7	10	330
Hexachlorobutadiene	87-68-3	10	330
N-Nitroso-di-n-butylamine	924-16-3	10	330
p-Phenylenediamine	106-50-3	20	660
4-Chloro-3-methylphenol	59-50-7	10	330
Safrole	94-59-7	10	330

TABLE 5.2.2A (cont'd)
PRACTICAL QUANTIFICATION LIMITS
FOR TARGETED SEMI-VOLATILE ORGANICS

ANALYTE	CAS NUMBER	PQL(ug/L)	PQL (ug/Kg)
2-Methylnaphthalene	91-57-6	10	330
1,2,4,5-Tetrachlorobenzene	95-94-3	10	330
Hexachlorocyclopentadiene	77-47-4	10	330
2,4,6-Trichlorophenol	88-06-2	10	330
2,4,5-Trichlorophenol	95-95-4	25	800
Isosafrole	120-58-1	10	330
2-Chloronaphthalene	91-58-7	10	330
2,6-Dichlorophenol	87-65-0	10	330
2-Nitroaniline	88-74-4	25	800
1,4-Naphthoquinone	130-15-4	10	330
1,3-Dinitrobenzene	99-65-0	10	330
Dimethylphthalate	131-11-3	10	330
Acenaphthylene	208-96-8	10	330
2,6-Dinitrotoluene	606-20-2	10	330
3-Nitroaniline	99-09-2	25	800
Acenaphthene	83-32-9	10	330
2,4-Dinitrophenol	51-28-5	25	800
4-Nitrophenol	100-02-7	25	800
Dibenzofuran	132-64-9	10	330
Pentachlorobenzene	608-93-5	10	330
2,4-Dinitrotoluene	121-14-2	10	330
1-Naphthylamine	134-32-7	10	330
2-Naphthylamine	91-59-8	10	330
2,3,4,6-Tetrachlorophenol	58-90-2	10	330
Diethylphthalate	84-66-2	10	330
Fluorene	86-73-7	10	330
4-Chlorophenyl-phenylether	7005-72-3	10	330
Thionazin	297-97-2	10	330
5-Nitro-o-toluidine	99-55-8	10	330
4-Nitroaniline	100-01-6	25	800
4,6-Dinitro-2-methylphenol	534-52-1	25	800
N-Nitrosodiphenylamine/Diphenylamine***	86-30-6	10	330
Diallate	2303-16-4	10	330
Phorate	298-02-2	10	330
4-Bromophenyl-phenylether	101-55-3	10	330
1,3,5-Trinitrobenzene	99-35-4	10	330
Phenacetin	62-44-2	20	660
Hexachlorobenzene	118-74-1	10	330

TABLE 5.2.2A (cont'd)
PRACTICAL QUANTIFICATION LIMITS
FOR TARGETED SEMI-VOLATILE ORGANICS

ANALYTE	CAS NUMBER	PQL(ug/L)	PQL (ug/Kg)
Dimethoate	60-51-5	20	660
4-Aminobiphenyl	92-67-1	20	660
Pentachlorophenol	87-86-5	25	800
Pronamide	23950-58-5	10	330
Pentachloronitrobenzene	82-68-8	10	330
Phenanthrene	85-01-8	10	330
Anthracene	120-12-7	10	330
Disulfoton	298-04-4	10	330
Di-n-butylphthalate	84-74-2	10	330
Methapyrilene	91-80-5	10	330
Fluoranthene	206-44-0	10	330
Pyrene	129-00-0	10	330
p-(Dimethylamino)azobenzene	60-11-7	10	330
Chlorobenzilate	510-15-6	20	660
3,3'-Dimethylbenzidine	119-93-7	20	660
Butylbenzylphthalate	85-68-7	10	330
2-Acetylaminofluorene	53-96-3	20	660
Benzo[a]anthracene	56-55-3	10	330
3,3'-Dichlorobenzidine	91-94-1	20	660
Chrysene	218-01-9	10	330
bis(2-Ethylhexyl)phthalate	117-81-7	10	330
Di-n-octylphthalate	117-84-0	10	330
Benzo[b]fluoranthene	205-99-2	10	330
7,12-Dimethylbenz(a)anthracene	57-97-6	20	660
Benzo[k]fluoranthene	207-08-9	10	330
Benzo[a]pyrene	50-32-8	10	330
3-Methylcholanthrene	56-49-5	10	330
Indeno[1,2,3-cd]pyrene	193-39-5	10	330
Dibenz[a,h]anthracene	53-70-3	10	330
Benzo[g,h,i]perylene	191-24-2	10	330
Dinoseb	88-85-7	10	330

* = *2,2'-oxybis(1-Chloropropane) is also identified as: Bis-2-chloro(1-methylethyl)ether; 2,2-Dichlorodiisopropyl ether.*

** = *3-Methylphenol and 4-Methylphenol will be reported as an isomeric pair as they co-elute.*

*** = *N-nitrosodiphenylamine decomposes upon injection into Diphenylamine; these two analytes cannot be separated.*

TABLE 5.2.2B
CHARACTERISTIC IONS FOR TARGETED ANALYTES

ANALYTE	PRIMARY ION	SECONDARY ION	TERTIARY ION
N-Nitrosodimethylamine	74	42	44
N-Nitrosomethylethylamine	42	88	43
Methylmethanesulfonate	80	79	65
N-Nitrosodiethylamine	102	42	44
Ethylmethanesulfonate	79	109	97
Phenol	94	65	66
bis(2-Chloroethyl)ether	93	63	95
2-Chlorophenol	128	64	130
1,3-Dichlorobenzene	146	148	113
Benzyl Alcohol	108	79	77
1,4-Dichlorobenzene	146	148	113
1,2-Dichlorobenzene	146	148	113
2-Methylphenol	108	107	79
2,2'-oxybis(1-Chloropropane)*	45	77	79
Acetophenone	105	77	120
N-Nitrosopyrrolidine	100	41	42
o-Toluidine	106	107	77
3-Methylphenol**	108	107	79
4-Methylphenol**	108	107	79
N-Nitroso-di-n-propylamine	70	42	130
Hexachloroethane	117	201	199
Nitrobenzene	77	123	65
N-Nitrosopiperidine	42	114	55
Isophorone	82	138	
2-Nitrophenol	139	65	109
2,4-Dimethylphenol	107	121	122
bis(2-Chloroethoxy)methane	93	95	123
O,O,O-Triethylphosphorothioate	198	97	65
2,4-Dichlorophenol	162	164	98
1,2,4-Trichlorobenzene	180	182	145
Naphthalene	128	129	127
4-Chloroaniline	127	129	
Hexachloropropene	213	211	215
Hexachlorobutadiene	225	223	227
N-Nitroso-di-n-butylamine	84	57	41
p-Phenylenediamine	108	80	107
4-Chloro-3-methylphenol	107	144	142
Safrole	162	104	131
2-Methylnaphthalene	142	141	
1,2,4,5-Tetrachlorobenzene	216	214	218

TABLE 5.2.2B (cont'd)
CHARACTERISTIC IONS FOR TARGETED ANALYTES

ANALYTE	PRIMARY ION	SECONDARY ION	TERTIARY ION
Hexachlorocyclopentadiene	237	235	272
2,4,6-Trichlorophenol	196	198	200
2,4,5-Trichlorophenol	196	198	200
Isosafrole	162	131	104
2-Chloronaphthalene	162	164	127
2,6-Dichlorophenol	162	164	98
2-Nitroaniline	65	92	138
1,4-Naphthoquinone	158	102	76
1.3-Dinitrobenzene	168	75	92
Dimethylphthalate	163	194	164
Acenaphthylene	152	151	153
2,6-Dinitrotoluene	165	89	121
3-Nitroaniline	138	108	92
Acenaphthene	153	152	154
2,4-Dinitrophenol	184	63	154
4-Nitrophenol	109	139	65
Dibenzofuran	168	139	
Pentachlorobenzene	250	252	248
2,4-Dinitrotoluene	165	63	182
1-Naphthylamine	143	115	116
2-Naphthylamine	143	115	116
2,3,4,6-Tetrachlorophenol	232	230	131
Diethylphthalate	149	177	150
Fluorene	166	165	167
4-Chlorophenyl-phenylether	204	206	141
Thionazin	97	96	107
5-Nitro-o-toluidine	152	77	106
4-Nitroaniline	138	92	108
4,6-Dinitro-2-methylphenol	198	121	105
N-Nitrosodiphenylamine/ Diphenylamine	169	168	167
Diallate	86	43	234
Phorate *	75	121***	97
4-Bromophenyl-phenylether	248	250	141
1,3,5-T rinitrobenzene *	75	74***	213
Phenacetin	108	109	179
Hexachlorobenzene	284	142	249
Dimethoate	87	93	125
4-Aminobiphenyl	169	168	170
Pentachlorophenol	266	264	268
Pronamide	173	175	145
Pentachloronitrobenzene	237	142	295

TABLE 5.2.2B (cont'd)
CHARACTERISTIC IONS FOR TARGETED ANALYTES

ANALYTE	PRIMARY ION	SECONDARY ION	TERTIARY ION
Phenanthrene	178	179	176
Anthracene	178	179	176
Disulfoton	88	97	186
Di-n-butylphthalate	149	150	104
Methapyrilene	58	97	191
Fluoranthene	202	101	100
Pyrene	202	101	100
p-(Dimethylamino)azobenzene	120	77	225
Chlorobenzilate	139	251	111
3,3'-Dimethylbenzidine	212	213	196
Butylbenzylphthalate	149	91	206
2-Acetylaminofluorene	181	180	223
Benzo[a]anthracene	228	229	226
3,3'-Dichlorobenzidine	252	254	126
Chrysene	228	226	229
bis(2-Ethylhexyl)phthalate	149	167	279
Di-n-octylphthalate	149	150	
Benzo[b]fluoranthene	252	253	125
7,12-Dimethylbenz(a)anthracene	256	241	239
Benzo[k]fluoranthene	252	253	125
Benzo[a]pyrene	252	253	125
3-Methylcholanthrene	268	252	253
Indeno[1,2,3-cd]pyrene	276	138	
Dibenz[a,h]anthracene	278	139	279
Benzo[g,h,i]perylene	276	138	
Dinoseb	211	163	147

* = *2,2'-oxybis(1-Chloropropane) is also identified as: Bis-2-chloro(1-methylethyl)ether; 2,2-Dichlorodiisopropyl ether.*

** = *3-Methylphenol and 4-Methylphenol will be reported as an isomeric pair as they co-elute.*

*** = *Quantitation ion differs from primary ion.*

TABLE 5.2.2C

CHARACTERISTIC IONS FOR SYSTEM MONITORING COMPOUNDS AND INTERNAL STANDARDS

SYSTEM MONITORING COMPOUNDS:	PRIMARY ION	SECONDARY ION	TERTIARY ION
Phenol-d5	99	42	71
2-Fluorophenol	112	64	
2,4,6-Tribromophenol	330	332	141
Nitrobenzene-d5	82	128	54
2-Fluorobiphenyl	172	171	
Terphenyl-d14	244	122	212
ADVISORY SURROGATES:			
2-Chlorophenol-d4	132	68	134
1,2-Dichlorobenzene-d4	152	115	150
INTERNAL STANDARDS:			
1,4-Dichlorobenzene-d4	152	115	
Naphthalene-d8	136	68	
Acenaphthene-d10	164	162	160
Phenanthrene-d10	188	94	80
Chrysene-d12	240	120	236
Perylene-d12	264	260	265

TABLE 5.2.2D
INTERNAL STANDARDS ASSIGNED FOR QUANTITATION OF SEMI-VOLATILE ANALYTES

1,4-Dichlorobenzene-d4	[illegible]	
N-Nitrosodimethylamine	Nitrobenzene-d5	1,2,4,5-Tetrachlorobenzene
N-Nitrosomethylethylamine	Nitrobenzene	Hexachlorocyclopentadiene
Methylmethanesulfonate	N-Nitrosopiperidine	2,4,6-Trichlorophenol
2-Fluorophenol (surr)	Isophorone	2,4,5-Trichlorophenol
N-Nitrosodiethylamine	2-Nitrophenol	2-Fluorobiphenyl
Ethylmethanesulfonate	2,4-Dimethylphenol	Isosafrole
Phenol-d5 (surr)	Bis(2-Chloroethoxy)methane	2-Chloronaphthalene
Phenol	O,O,O-Triethylphosphorothioate	2-Nitroaniline
bis(2-Chloroethyl)ether	2,4-Dichlorophenol	1,4-Naphthoquinone
2-Chlorophenol-d4 (surr)	1,2,4-Trichlorobenzene	1,3-Dinitrobenzene
2-Chlorophenol	Naphthalene	Dimethylphthalate
1,3-Dichlorobenzene	4-Chloroaniline	Acenaphthylene
Benzyl Alcohol	Hexachloropropene	2,6-Dinitrotoluene
1,4-Dichlorobenzene	Hexachlorobutadiene	3-Nitroaniline
1,2-Dichlorobenzene-d4 (surr)	N-Nitroso-di-n-butylamine	Acenaphthene
1,2-Dichlorobenzene	p-Phenylenediamine	2,4-Dinitrophenol
2-Methylphenol	4-Chloro-3-methylphenol	4-Nitrophenol
2,2'-oxybis(1-Chloropropane)	Safrole	Dibenzofuran
Acetophenone	2-Methylnaphthalene	Pentachlorobenzene
N-Nitrosopyrrolidine	2,6-Dichlorophenol	2,4-Dinitrotoluene
o-Toluidine		1-Naphthylamine
3-Methylphenol		2-Naphthylamine
4-Methylphenol		2,3,4,6-Tetrachlorophenol
N-Nitroso-di-n-propylamine		Diethylphthalate
Hexachloroethane		Fluorene
		4-Chlorophenyl-phenylether
		Thionazin
		5-Nitro-o-toluidine
		4-Nitroaniline
		2,4,6-Tribromophenol
Phenanthrene-d10	Chrysene-d12	
4,6-Dinitro-2-methylphenol	Pyrene	Di-n-octylphthalate
N-Nitrosodiphenylamine/ [illegible]	Terphenyl-d14	Benzo[b]fluoranthene
Diallate	p-(Dimethylamino)azobenzene	7,12-Dimethylbenz(a)anthracene
Phorate	Chlorobenzilate	Benzo[k]fluoranthene
4-Bromophenyl-phenylether	3,3'-Dimethylbenzidine	Benzo[a]pyrene
1,2,3-Trinitrobenzene	Butylbenzylphthalate	3-Methylcholanthrene
Phenacetin	2-Acetylaminofluorene	Indeno[1,2,3-cd]pyrene
Hexachlorobenzene	Benzo[a]anthracene	Dibenz[a,h]anthracene
Dimethoate	3,3'-Dichlorobenzidine	Benzo[g,h,i]perylene
4-Aminobiphenyl	Chrysene	
Pentachlorophenol	bis(2-Ethylhexyl)phthalate	
Pronamide		
Pentachloronitrobenzene		
Phenanthrene		
Anthracene		
Disulfoton		
Di-n-butylphthalate		
Methapyrilene		
Fluoranthene		
Dinoseb		

TABLE 5.2.2E

DFTPP CHARACTERISTIC IONS FOR SYSTEM MONITORING COMPOUNDS AND INTERNAL STANDARDS

Mass	Ion Abundance Criteria
51	30.0 - 60.0 percent of mass 198
68	Less than 2.0 percent of mass 69
69	Present
70	Less than 2.0 percent of mass 69
127	40.0 - 60.0 percent of mass 198
197	Less than 1.0 percent of mass 198
198	Base peak, 100 percent relative abundance (see note)
199	5.0 - 9.0 percent of mass 198
275	10.0 - 30.0 percent of mass 198
365	Greater than 1.00 percent of mass 198
441	Present but less than mass 443
442	40.0 - 110.0 percent of mass 198
443	17.0 - 23.0 percent of mass 442

NOTE :All ion abundances MUST be normalized to m/z 198, the base peak, even though the ion abundance of m/z 442 may be upto 110.0 percent that of m/z 198.

DFTPP - decafluorotriphenylphosphine

TABLE 5.2.2F
RELATIVE RESPONSE FACTOR CRITERIA FOR INITIAL & CONTINUING CALIBRATION

Semivolatile Compound	Minimum RRF	Maximum % RSD	Maximum % Diff
N-Nitrosodimethylamine	0.010	100.0	100.0
N-Nitrosomethylethylamine	0.010	100.0	100.0
Methylmethanesulfonate	0.010	100.0	100.0
2-Fluorophenol	0.600	20.5	25.0
N-Nitrosodiethylamine	0.010	100.0	100.0
Ethylmethanesulfonate	0.010	100.0	100.0
Phenol-d5	0.800	20.5	25.0
Phenol	0.800	20.5	25.0
bis(2-Chloroethyl)ether	0.700	20.5	25.0
2-Chlorophenol-d4	0.800	20.5	25.0
2-Chlorophenol	0.800	20.5	25.0
1,3-Dichlorobenzene	0.600	20.5	25.0
Benzyl Alcohol	0.010	100.0	100.0
1,4-Dichlorobenzene	0.500	20.5	25.0
1,2-Dichlorobenzene-d4	0.400	20.5	25.0
1,2-Dichlorobenzene	0.400	20.5	25.0
2-Methylphenol	0.700	20.5	25.0
2,2'-oxybis(1-Chloropropane)	0.010	100.0	100.0
Acetophenone	0.010	100.0	100.0
N-Nitrosopyrrolidine	0.010	100.0	100.0
o-Toluidine	0.010	100.0	100.0
3-Methylphenol	0.600	20.5	25.0
4-Methylphenol	0.600	20.5	25.0
N-Nitroso-di-n-propylamine	0.500	20.5	25.0
Hexachloroethane	0.300	20.5	25.0
Nitrobenzene-d5	0.200	20.5	25.0
Nitrobenzene	0.200	20.5	25.0
N-Nitrosopiperidine	0.010	100.0	100.0
Isophorone	0.400	20.5	25.0
2-Nitrophenol	0.100	20.5	25.0
2,4-Dimethylphenol	0.200	20.5	25.0
bis(2-Chloroethoxy)methane	0.300	20.5	25.0
O,O,O-Triethylphosphorothioate	0.010	100.0	100.0
2,4-Dichlorophenol	0.200	20.5	25.0
1,2,4-Trichlorobenzene	0.200	20.5	25.0
Naphthalene	0.700	20.5	25.0
4-Chloroaniline	0.010	100.0	100.0
Hexachloropropene	0.010	100.0	100.0
Hexachlorobutadiene	0.010	100.0	100.0
N-Nitroso-di-n-butylamine	0.010	100.0	100.0
p-Phenylenediamine	0.010	100.0	100.0
4-Chloro-3-methylphenol	0.200	20.5	25.0

Minimum RRF – Minimum Relative Response Factor
Maximum % RSD – Maximum Percent Relative Standard Devation
Maximum % Difference – Maximum Percent Difference

TABLE 5.2.2F (cont'd)
RELATIVE RESPONSE FACTOR CRITERIA FOR INITIAL & CONTINUING CALIBRATION

Semivolatile Compound	Minimum RRF	Maximum % RSD	Maximum % Diff
Safrole	0.010	100.0	100.0
2-Methylnaphthalene	0.400	20.5	25.0
1,2,4,5-Tetrachlorobenzene	0.010	100.0	100.0
Hexachlorocyclopentadiene	0.010	100.0	100.0
2,4,6-Trichlorophenol	0.200	20.5	25.0
2,4,5-Trichlorophenol	0.200	20.5	25.0
2-Fluorobiphenyl	0.700	20.5	25.0
Isosafrole	0.010	100.0	100.0
2-Chloronaphthalene	0.800	20.5	25.0
2,6-Dichlorophenol	0.010	100.0	100.0
2-Nitroaniline	0.010	100.0	100.0
1,4-Naphthoquinone	0.010	100.0	100.0
1,3-Dinitrobenzene	0.010	100.0	100.0
Dimethylphthalate	0.010	100.0	100.0
Acenaphthylene	1.300	20.5	25.0
2,6-Dinitrotoluene	0.200	20.5	25.0
3-Nitroaniline	0.010	100.0	100.0
Acenaphthene	0.800	20.5	25.0
2,4-Dinitrophenol	0.010	100.0	100.0
4-Nitrophenol	0.010	100.0	100.0
Dibenzofuran	0.800	20.5	25.0
Pentachlorobenzene	0.010	100.0	100.0
2,4-Dinitrotoluene	0.200	20.5	25.0
1-Naphthylamine	0.010	100.0	100.0
2-Naphthylamine	0.010	100.0	100.0
2,3,4,6-Tetrachlorophenol	0.010	100.0	100.0
Diethylphthalate	0.010	100.0	100.0
Fluorene	0.900	20.5	25.0
4-Chlorophenyl-phenylether	0.400	20.5	25.0
Thionazin	0.010	100.0	100.0
5-Nitro-o-toluidine	0.010	100.0	100.0
4-Nitroaniline	0.010	100.0	100.0
2,4,6-Tribromophenol	0.010	100.0	100.0
4,6-Dinitro-2-methylphenol	0.010	100.0	100.0
N-Nitrosodiphenylamine/Diphenylamine	0.010	100.0	100.0
Diallate	0.010	100.0	100.0
Phorate	0.010	100.0	100.0
4-Bromophenyl-phenylether	0.100	20.5	25.0
1,3,5-Trinitrobenzene	0.010	100.0	100.0
Phenacetin	0.010	100.0	100.0
Hexachlorobenzene	0.100	20.5	25.0
Dimethoate	0.010	100.0	100.0
4-Aminobiphenyl	0.010	100.0	100.0

TABLE 5.2.2F (cont'd)
RELATIVE RESPONSE FACTOR CRITERIA FOR INITIAL & CONTINUING CALIBRATION

Semivolatile Compound	Minimum RRF	Maximum % RSD	Maximum % Diff
Pentachlorophenol	0.050	20.5	25.0
Pronamide	0.010	100.0	100.0
Pentachloronitrobenzene	0.010	100.0	100.0
Phenanthrene	0.700	20.5	25.0
Anthracene	0.700	20.5	25.0
Disulfoton	0.010	100.0	100.0
Di-n-butylphthalate	0.010	100.0	100.0
Methapyrilene	0.010	100.0	100.0
Fluoranthene	0.600	20.5	25.0
Pyrene	0.600	20.5	25.0
Terphenyl-d14	0.500	20.5	25.0
p-(Dimethylamino)azobenzene	0.010	100.0	100.0
Chlorobenzilate	0.010	100.0	100.0
3,3'-Dimethylbenzidine	0.010	100.0	100.0
Butylbenzylphthalate	0.010	100.0	100.0
2-Acetylaminofluorene	0.010	100.0	100.0
Benzo[a]anthracene	0.800	20.5	25.0
3,3'-Dichlorobenzidine	0.010	100.0	100.0
Chrysene	0.700	20.5	25.0
bis(2-Ethylhexyl)phthalate	0.010	100.0	100.0
Di-n-octylphthalate	0.010	100.0	100.0
Benzo[b]fluoranthene	0.700	20.5	25.0
7,12-Dimethylbenz(a)anthracene	0.010	100.0	100.0
Benzo[k]fluoranthene	0.700	20.5	25.0
Benzo[a]pyrene	0.700	20.5	25.0
3-Methylcholanthrene	0.010	100.0	100.0
Indeno[1,2,3-cd]pyrene	0.500	20.5	25.0
Dibenz[a,h]anthracene	0.400	20.5	25.0
Benzo[g,h,i]perylene	0.500	20.5	25.0
Dinoseb	0.010	100.0	100.0

Allowance is made for up to four of the analytes with minimum RRF requirements greater than 0.010 and RSD requirements of 20.5 percent. The four compounds must not exceed 40.0 percent RSD and must have a minimum RRF of 0.010

TABLE 5.2.2G

SYSTEM MONITORING COMPOUND RECOVERY LIMITS

SURROGATE	% REC. (WATER)		% REC. (SOIL)	
Nitrobenzene-d5	35 - 114		23 - 120	
2-Fluorobiphenyl	43 - 116		30 - 115	
Terphenyl-d14	33 - 141		18 - 137	
Phenol-d5	10 - 110		24 - 113	
2-Fluorophenol	21 - 110		25 - 121	
2,4,6-Tribromophenol	10 - 123		19 - 122	
2-Chlorophenol-d4	33 - 110	(advisory)	20 - 130	(advisory)
1,2-Dichlorobenzene-d4	16 - 110	(advisory)	20 - 130	(advisory)

TABLE 5.2.2H

QC LIMITS FOR MATRIX SPIKE/ MATRIX SPIKE DUPLICATE/MATRIX SPIKE BLANK

ANALYTE	WATER QC LIMITS			SOIL QC LIMITS			STANDARD MSB QC LIMITS *		IN-HOUSE MSB QC LIMITS	
	LCL	*UCL*	*RPD*	*LCL*	*UCL*	*RPD*	*LCL*	*UCL*	*LCL*	*UCL*
Phenol	12	110	42	26	90	35	12	110	25	131
2-Chlorophenol	27	110	42	25	102	50	27	123	48	116
1,4-Dichlorobenzene	36	97	28	28	104	27	36	97	25	123
N-Nitroso-di-n-propylamine	41	116	38	41	126	38	41	116	40	124
1,2,4-Trichlorobenzene	39	98	28	38	107	23	39	98	25	129
4-Chloro-3-methylphenol	23	97	42	26	103	33	23	97	45	135
Acenaphthene	46	118	31	31	137	19	46	118	51	133
4-Nitrophenol	10	80	50	11	114	50	10	80	44	151
2,4-Dinitrotoluene	24	96	38	28	89	47	24	96	48	134
Pentachlorophenol	9	103	50	17	109	47	9	103	12	124
Pyrene	26	127	31	35	142	36	26	127	58	136

* *Mandatory QC limits for water and soil MSBs. If MSB not within Standard limits, analyst will verify if it is within In-house QC limits. If outside both Standard and In-house MSB limits samples require re-extraction.*

TABLE 5.2.2I
QC SUMMARY

METHOD: CLP BNA
PARAMETERS: EXTRACTABLE ORGANICS BY GC/MS

	Tune Performance	System Evaluation	Calibration Check	Instrument Blank	Matrix Spike Sample/ Matrix Spike Duplicate	Matrix Spike Blank	System Monitoring Compound Recoveries	Internal STD Area and RT
Measure Taken	DFTPP Injection	Five calibration standard runs	Continuing calibration standard run	Analyze Nanopure filtered water	Run sample spiked with select standard in duplicate	Run reagent water with spiked select standard	Spike system monitoring compounds into samples. blank standards. MS, MSD, MSB	Monitor I.S. area and RT of samples and compare samples
Frequency	Every 12 hours	Good until cont. calibration not met or change in system	Every 12 hours	Per Extraction batch	One per 20 samples or SDG or matrix or 7 days collection	One per 20 samples or SDG or matrix or 7 days collection	All standards, blanks, samples. MS standards, MSD, MSB	Every 12 hours
Acceptance Criteria	Ion abundance must meet ASP criteria in Table 5.2.2E	Maximum %RSD and minimum RRF in Table 5.2.2F	Maximum %D and minimum RRF in Table 5.2.2F	Common phthalate esters <5 x CRQL all others <CRQL	See Table 5.2.2H	See Table 5.2.2H	See Table 5.2.2G	RT: 30 seconds from Std, I.S. area: within –50% to +100%
Corrective Action	Tune with FC 43 or PFTBA	1. New standard 2. Leak check 3. Colum n 4. Trap	1. Recalib rate 2. Re-do initial calibratio n	1. Alleviate phthalate source 2. Re-extract SDG	Advisory	1. Check spiking 2. Re-analyze MS/MSD	1. Check solution 2. Check system 3. Re-analyze	1. Check solutions 2. Check system 3. Re-analyze

TABLE 5.2.3A

PRACTICAL QUANTIFICATION LIMITS FOR PESTICIDE/PCBS

		Quantitation Limits (a)		
ANALYTE	CAS Number	Water ug/Ll	Soil ug/Kg (b)	On column (pg/ul)
alpha-BHC	319-84-6	0.05	1.7	5
beta-BHC	319-85-7	0.05	1.7	5
delta-BHC	319-86-8	0.05	1.7	5
gamma-BHC (Lindane)	58-89-9	0.05	1.7	5
Heptachlor	76-44-8	0.05	1.7	5
Aldrin	309-00-2	0.05	1.7	5
Heptachlor epoxide	1024-57-3	0.05	1.7	5
Isodrin	465-73-6	0.10	3.3	10
Endosulfan I	959-98-8	0.05	1.7	5
Dieldrin	60-57-1	0.10	3.3	10
4,4'-DDE	72-55-9	0.10	3.3	10
Endrin	72-20-8	0.10	3.3	10
Endosulfan II	33213-65-9	0.10	3.3	10
4,4'-DDD	72-54-8	0.10	3.3	10
Endosulfan sulfate	1031-07-8	0.10	3.3	10
4,4'-DDT	50-29-3	0.10	3.3	10
Methoxychlor	72-43-5	0.50	17.0	50
Endrin aldehyde	7421-93-4	0.10	3.3	10
alpha-Chlordane	5103-71-9	0.05	1.7	5
gamma-Chlordane	5103-74-2	0.05	1.7	5
Toxaphene	8001-35-2	5.0	170.0	500
AROCLOR-1016	12674-11-2	1.0	33.0	100
AROCLOR-1221	11104-28-2	2.0	67.0	200
AROCLOR-1232	11141-16-5	1.0	33.0	100
AROCLOR-1242	53469-21-9	1.0	33.0	100
AROCLOR-1248	12672-29-6	1.0	33.0	100
AROCLOR-1254	11097-69-1	1.0	33.0	100
AROCLOR-1260	11096-82-5	1.0	33.0	100

(a) *The quantification limits are matrix dependent. The PDLs listed are provided for guidance and may not always be achievable.*

(b) *Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, calculate on dry weight basis, as required by the Protocol, will be higher.*

TABLE 5.2.3B

RETENTION TIME WINDOW VARIANCES (a)

Column	Variances (Minutes)
alpha-BHC	0.05
beta-BHC	0.05
gamma-BHC	0.05
delta-BHC	0.05
Heptachlor	0.05
Aldrin	0.05
alpha-Chlordane	0.07
gamma-Chlordane	0.07
Heptachlor epoxide	0.07
Isodrin	0.07
Dieldrin	0.07
Endrin	0.07
Endrin aldehyde	0.07
4,4'-DDD	0.07
4,4'-DDE	0.07
4,4'-DDT	0.07
Endosulfan I	0.07
Endosulfan II	0.07
Endosulfan Sulfate	0.07
Methoxychlor	0.07
Aroclor	0.07
Toxaphene	0.07
TCMX	0.05
DCB	0.10

(a) *Calculate the retention time windows from the average retention time of the initial calibration +/- the variance.*

TABLE 5.2.3C

MAJOR IONS FOR GC/MS CONFIRMATION

Analyte	Primary Ion	Secondary Ion(s)
a-BHC	183	181, 109
b-BHC	181	183, 109
d-BHC	183	181, 109
g-BHC	183	181, 109
Heptachlor	100	272, 274
Aldrin	66	263, 220
Heptachlor Epoxide	353	355, 351
Isodrin	193	195, 263
Endosulfan I	195	339, 341
Dieldrin	79	263, 279
4,4'-DDE	246	248,176
Endrin	263	82, 81
Endrin Aldehyde	67	250, 345
Endosulfan II	337	339, 341
4,4'-DDD	235	237, 165
Endosulfan sulfate	272	387, 422
4,4'-DDT	235	237,165
Methoxychlor	227	228
a/g-Chlordane	373	375, 377
Toxaphene	159	231, 233
Aroclor 1016	222	260, 292
Aroclor 1221	190	222, 260
Aroclor 1232	190	256, 292
Aroclor 1242	222	362, 326
Aroclor 1248	292	362, 326
Aroclor 1254	292	362, 326
Aroclor 1260	360	362,394

TABLE 5.2.3D

QC LIMITS

Surrogate Recovery Limits (a)

Surrogate	Water - % Recovery	Soil - % Recovery
TCX	30 - 150	30 - 150
DCB	30 - 150	30 - 150

(a) *Limits are advisory only.*

MSB/MS/MSD Limits (a)

Analyte	Water % Recovery	RPD	Soil % Recovery	RPD
g-BHC	56 –123	15	46 – 127	50
Heptachlor	40-131	20	35 – 130	31
Aldrin	40-120	22	34 – 132	43
Dieldrin	52 – 126	18	31 – 134	38
Endrin	56 – 121	21	42 – 139	45
4,4'-DDT	38 – 127	27	23 – 134	50

(a) *Limits are advisory only for MS/MSD extracts.*

Limits are mandatory for MSB.

TABLE 5.2.3E

QC SUMMARY

METHOD: CLP-M
PARAMETERS: PESTICIDES/PCBs

	Initial and Continuing Calibration Column Resolution	Initial Calibration Linearity	Initial and Continuous Calibration Breakdown	Matrix Spike Blank	Method Blank
Measure Taken	Initial and continuing calibration and PEM and resolution check std (RESC)	Determine linearity by analyzing min 3 levels of Std for mixture standard single level for multi-component	Initial and continuing calibration and PEM analyzed and endrin and DDT breakdown calculated in the PEM	Reagent water spiked with select list of analytes and surrogates extracted	Reagent water Spiked with surrogate
Frequency	Initially or when continuing calibration not met or major change to system	Initially or when continuing calibration not met or major change to system	Initially or when continuing calibration not met or major change to system	Each SDG or 7 days or matrix or 20 samples	Each batch of Samples Extracted
Acceptance Criteria	PEM: all peaks must be 90% resolved on columns Ind. A&B: midpoint conc. Resolution must be ≥90% %D: ≤ 25% of true value, %RSD ≤ 20%, %RSD surrog. ≤ 30% except <25% □- and □-BHC Resc. 60% resolution Two may be out but must be ≤ 30%		Breakdown of DDT and endrin in the PEM ≤ 20%, combined breakdown ≤ 30%	See Table 5.2.3D	Less than CRQL
Corrective Action	1. Change the parameter (e.g. temp. prog or flow) 2. Re-analyze	Re-calibrate	1. Clip column 2. Clean injection port area	1. Check solution 2. Check instrument response 3. Re extract and reanalyze	1. Determine cause of contamination 2. Re-extract and re-analyses

TABLE 5.2.4A

PRACTICAL QUANTIFICATION LIMITS (PQL) FOR ORGANOPHOSPHOROUS PESTICIDES

		Quantification Limits	
Analyte	**CAS Registry No.**	**Water (ug/L)**	**Soil (ug/kg) (a)**
Famphur	52-85-7	1	33
Methyl parathion	298-00-01	1	33
Parathion	56-38-2	1	33

(a) Quantitation Limits listed for soil/sediment are based on wet weight. The quantitation limits calculated on dry weight basis, as required, will be higher.

TABLE 5.2.4B

QC LIMITS

Water % Recovery

Analyte

Matrix Spike Compounds	LFB (a)	MS/MSD (a)	RPD (a)
Famphur	40 – 150	40 – 150	40
Methyl parathion	40 – 150	40 – 150	40
Parathion	40 – 150	40 – 150	40

Surrogate Compounds	
Triphenyl phosphate	40 – 150 (a)

Soil % Recovery

Analyte

Matrix Spike Compounds	LFB(a)	MS/MSD (a)	RPD (a)
Famphur	30 – 150	30 – 150	40
Methyl parathion	30 – 150	30 – 150	40
Parathion	30 – 150	30 – 150	40

Surrogate Compounds	
Triphenyl phosphate	30 – 150 (a)

(a) Advisory limits due to insufficient number of data points.

TABLE 5.2.4C

QC SUMMARY

METHOD: 8141A
PARAMETERS: ORGANOPHOSPHOROUS PESTICIDES

	INITIAL CALIBRATION LINEARITY	CONTINUING CALIBRATION	SURROGATE STANDARD RECOVERY	MS/MSD	LAB FORTIFIED BLANK	METHOD BLANK
Measure Taken	Six calibration stand	Analyze continuing Calibration Standar	Run sample spiked With select standard In duplicate	Run sample spiked W/ select standard In duplicate	Run reagent Water spiked W/ select standard	Analyze Nanopore water
Frequency	Good until calibrati Met or change in sy	Initially and after Every 10 samples	All standards, blank Samples, MS/MSD,	One per 20 samples Or SDG, or matrix Or 7 days collection	One per 20 samples Or SDG, or matrix Or 7 days collection	One per Extraction batch
Acceptance Criteria	%RSD < 20%	%D < 15% on quantitation column	Achieve recoveries (See table 5.2.4B)	See table 5.2.4B	See table 5.2.4B	< CRQL
Corrective Action	Linear regression fu used Or second order fun Or quadratic curve	1. reinject 2. new solution 3. instrument corrective action 4. analyze new initial calibration	Check solution Check system Re-analyze	Advisory	Check solution Check system Re-analyze MSB/ MS/MSD	Identify source Of contamination Re-analyze

TABLE 5.2.5A

PRACTICAL QUANTIFICATION LIMITS (PQL) FOR HERBICIDES

		Quantification Limits (a)	
Analyte	CAS Registry No.	Water (ug/L)	Soil (ug/kg) (b)
2,4-D	94-75-7	0.5	10
2,4,5-TP	93-72-1	0.25	5
2,4,5-T	93-76-5	0.25	5

(a) Specific quantification limits are highly matrix dependent. The quantification limits listed are provided for guidance and may not always be achievable.

(b) Quantitation Limits listed for soil/sediment are based on wet weight. The quantitation limits calculated on dry weight basis, as required, will be higher.

TABLE 5.2.5B

CONVERSION FACTORS (CF) FOR CHLORINATED HERBICIDES

Compound	Molecular Weight of Acid	Molecular Weight of Methyl Ester	Conversion Factor
2,4-D	221.0	235.0	0.94
2,4,5-T	255.5	269.5	0.95
2,4,5-TP (Silvex)	269.5	283.5	0.95
DCAA	205.0	219.1	0.94

TABLE 5.2.5C

QC LIMITS

Water % Recovery

Analyte

Matrix Spike Compounds	LFB	MS/MSD	RPD (a)
2,4-D	40 – 131	18 – 138	56
2,4,5-TP	21 – 142	11 – 136	30
2,4,5-T	44 - 136	8 - 145	58

Surrogate Compound	
DCAA	40 – 148

Soil % Recovery

Analyte

Matrix Spike Compounds	LFB (a)	MS/MSD (a)	RPD
2,4-D	25 – 157	25 – 157	40
2,4,5-TP	12 – 146	12 – 146	40
2,4,5-T	16 - 136	16 - 136	40

Surrogate Compound	
DCAA	29 – 136

(a) Advisory limits due to insufficient number of data points.

TABLE 5.2.5D

QC SUMMARY

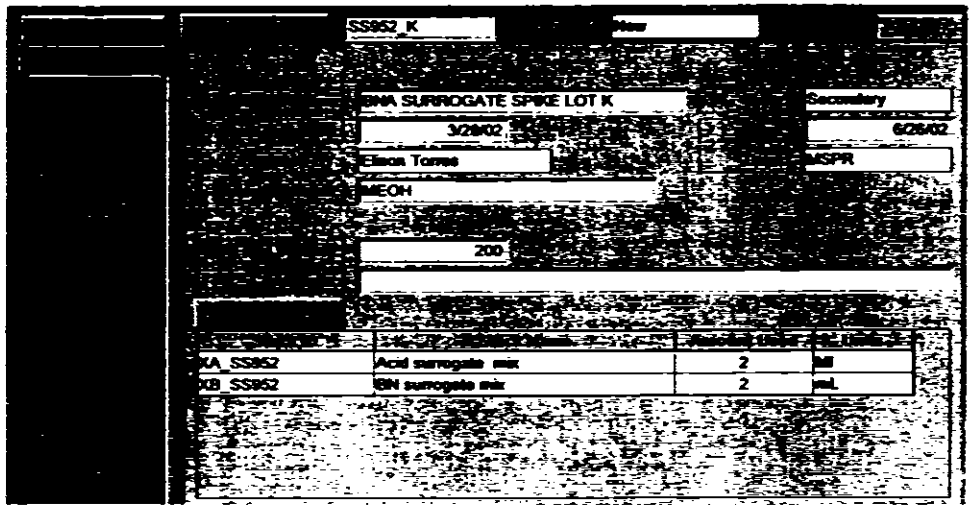
METHOD: 8150B
PARAMETERS: CHLORINATED HERBICIDES

	INITIAL CALIBRAT LINEARITY	CONTINUING CALIBRATION	SURROGATE STANDARD RECOVERY	MS/MSD	LAB FORTIFIED BLANK	METHOD BLANK
Measure Tak	Six calibration standard runs	Analyze continuing Calibration Standa	Run sample spiked With select standard In duplicate	Run sample spike W/ select standar In duplicate	Run reagent Water spiked W/ select standard	Analyze Nanopore water
Frequency	Good until calibration Met or change in syste	Initially and after Every 10 samples	All standards, blanks Samples, MS/MSD, LFB	One per 20 sampl Or SDG, or matri Or 7 days collecti	One per 20 samples Or SDG, or matrix Or 7 days collection	One per Extraction batc
Acceptance Criteria	%RSD < 20%	%D < 15% on quantitation colum	Achieve recoveries (See table 5.2.5C)	See table 5.2.5C	See table 5.2.5C	< CRQL
Corrective Action	Linear regression func Or second order functi Or quadratic curve	1. Reinject 2. new solution 3. instrument corrective action 4. analyze new initial calibration	Check solution Check system Re-analyze	Advisory	Check solution Check system Re-analyze MSB/ MS/MSD	Identify source Of contaminati Re-analyze

TABLE 5.3

ELEMENT	SOURCE	LOT #	EXP. DATE	CONC.

TABLE 5.3A


SS952_K
New
BNA SURROGATE SPIKE LOT K
Secondary
3/28/02
6/26/02
Elson Torres
MSPR
MEOH
200
XA_SS952
Acid surrogate mix
2
ml
XB_SS952
BN surrogate mix
2
mL

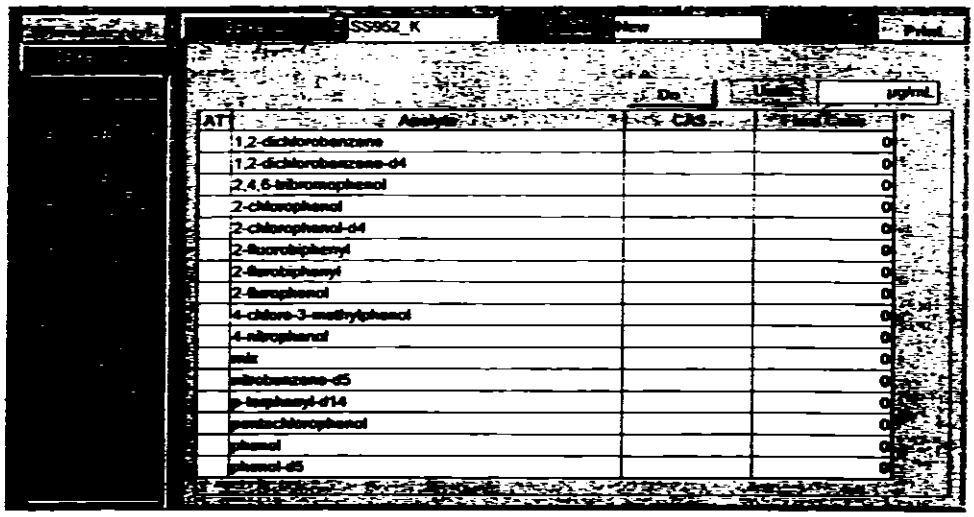

SS952_K
New
Print
ug/mL
AT
Analyte
CAS
1,2-dichlorobenzene
1,2-dichlorobenzene-d4
2,4,6-tribromophenol
2-chlorophenol
2-chlorophenol-d4
2-fluorobiphenyl
2-fluorophenol
4-chloro-3-methylphenol
4-nitrophenol
phenol
phenol-d5

TABLE 5.4

DEMONSTRATION OF CAPABILITY

CERTIFICATION STATEMENT

Date: _____ Page ___ of ___

Laboratory Name: _____

Laboratory Address: _____

Analyst(s)
Name(s)_____
_____
_____
_____

Matrix: (examples: laboratory pure water, soil, air, waste solid, leachate, sludge, other)
_____
_____
_____
_____Method Number
and Analyte or Class of Analytes or Measured Parameters (examples: barium by 200.7, trace metals by 6010, benzene by 8021, etc.)
_____
_____
_____
_____

We, the undersigned, CERTIFY that:

1. The analysts identified above, using the cited test method, which is in use at this facility for the analyses of samples under the National Environmental laboratory

2. The test method was performed by the analysts(s) identified on this certification.

3. A copy of the test method and the laboratory specific SOPs are available for all personnel on-site.

4. The data associated with the demonstration capability are true, accurate, complete and self-explanatory (1).

5. All raw data (including a copy of this certification form) necessary to reconstruct and validate these analyses have been retained at the facility, and that the associated information is well organized and available for review by authorized assessors.

Technical Director's Name and Title	Signature	Date
Quality Assurance Officer's Name	Signature	Date

This certification form must be completed each time a demonstration of capability is completed.

(1) Definitions

True:	Consistent with supporting data.
Accurate:	Based on good laboratory practices consistent with sound scientific principles/practices.
Complete:	Inclused the results of all supporting performance testing.
Self-explanatory:	Data properly labeled and stored so that the results are clear and require no additional explanation.

SECTION 6.0

6.0 ANALYTICAL METHODOLOGY-INORGANIC

6.1 List of SOP's

Table 6.1 is a listing of all Organic and Inorganic SOP's used in the laboratory.

6.2 Calibration Procedures, Frequency, Preparation/Extraction and Sample Analysis

Calibration and/or verification procedures are designed to insure that the data will be of known quality and the results are appropriate for a given regulation or decision.

- Raw data is retained to reconstruct the calibration used to calculate the sample result.
- All calibrations are verified with a second source standard which, when available is traceable to NIST.
- The low level standard may be analyzed at a concentration level at or below the regulatory/decision level but above he detection limit.
- Reported results must be within the calibration range or the result reported as an estimated value.
- No data associated with a calibration that is out of control is reported without client notification and documentation in the case narrative or on the lab report.
- Method Detection Limit – For all analytes where spiking solutions are available, a method detection limit (MDL) is documented. The MDL is determined by 40 CFR Part 136 Appendix B. All steps in the preparatory and analytical phase are performed for the determination of the MDL.
- Seven portions of a spiked reagent (at and estimated concentration between MDL and 5 x MDL) water sample are analyzed and the mean recovery and standard deviation are calculated. The student t factor of 7 replicate analyses of 3.14 is multiplied by the standard deviation and the result is the MDL. The MDL should be above one fifth the practical and routinely achievable detection level that can be reported with relatively good certainty that any reported value is reliable.
- Initial Demonstration of Capability. - An initial demonstration of method performance must be made prior to using any method and at any time there is a significant change in instrument type, personnel or methods.
  The initial demonstration of performance consists of spiking four aliquots or clean matrix (e.g. reagent water) with a concentration of analytes of interest. The source of this solution could be a QC sample purchased from an outside supplier or a QC check solution. The solution must be independent from the calibration solution. The concentration spiked should be approximately ten times the method detection limit.

  The four aliquots are prepared and analyzed according to the method either concurrently or over a period of days.

  The four results should be calculated and a percent recovery determined.

Using the four results, calculate the average recovery $\overline{X}$ in the appropriate reporting units and the standard deviation (S in the same units for each parameter of interest.

For each parameter, compare S and $\overline{X}$ to the corresponding acceptance criteria for precision and accuracy in the method (if applicable) or in "in-house" limits. If S and $\overline{X}$ for all parameters meet the acceptance criteria, the analysis of sample are permitted. If any one of the parameters exceed the acceptance range, the performance is not acceptable for that parameter.

When one or more of the tested parameters fail at least one of the acceptance criteria the analyst must:

- Locate and correct the problem and repeat the test for the parameters that were out.

A certification statement shall be used to document the completion of each initial demonstration of capability. A copy of the certification statement shall be retained in the personnel records of each employee.

Quality Assurance Records are maintained by the laboratory and include the following documentation:

Analytical balances - are serviced by Brinkman Instruments Co. annually. On a daily basis the balance is checked in two ranges with class S weights.

pH meter - are calibrated daily using a standard buffer of pH 7. The slope is verified with 2 standard buffers of pH 4 and 10. These values must be within ±0.2 pH units to proceed with the analysis.

Conductivity meter and cell - the cell constant is determined annually using a 0.01 m potassium chloride solution. The conductivity meter and cell are calibrated with a 0.001 m potassium chloride solution on a daily basis. This value must be ± 20% of the value to proceed with analysis.

Dissolved Oxygen Meter - Daily calibration of the meter and probe are performed by calibration against the Winkler Method.

Spectrophotometers - Annually the spectrophotometers are checked with a check standard and compared to a standard curve. This curve is updated semi-annually or more frequently depending on the method requirements.

Thermometers - The NIST certified thermometer is sent to be verified annually and checked at the ice-point and the correction factor adjusted. All working thermometers are checked against the NIST thermometer.

Turbidimeters - are checked when used by analyzing standards prepared by AMCO-A EPA-1 in the range of usage (0 to 10 NTU).

Refrigerators - Temperatures must be within 1° to 5°C. The temperatures are checked each day.

BOD incubators - Temperatures of the incubators must be 20° ±1°C. These temperatures are checked twice daily.

Incubators - Bacteriology. Daily: Lab Incubators temperatures are monitored daily, on each shelf, and must maintain a temperature of 35°±0.5°C. Water bath Incubators must maintain a temperature of 44.5° ±0.2°C.

Ovens - temperatures are checked at the beginning and the end of each cycle.

Autoclaves - Temperature during the sterilization cycle must be maintained and completed with 45 minutes using a 10-12 minute sterilization period.

Reagent Grade (Laboratory pure) Water

Parameter	Frequency	Acceptance Criteria
Conductivity (at 25°C	Daily	<2 micromhos/cm at 25°C
Free residual chlorine	Monthly	<0.1 mg/L
Standard plate count	Monthly	<500 colonies/mL
Suitability test	Yearly	Ratio between 0.8 to 3.0
Heavy metals	Yearly	< 50ug/L for each metal collectively <100 ug/L
Use test	Yearly	Student t = 2.78
PH	Each use	5.5 – 7.5
TOC	Monthly	<1.0 mg/L
Ammonia/organic nitrogen	Monthly	<0.1mg/L

6.2.1 Metals/Cyanide:

The requirements for the metals/cyanide are summarized in Tables 6.2.1A through 6.2.1D.

6.2.2 Wet Chemistry:

The requirements for the wet chemistry parameters are summarized in Table 6.2.2B.

6.3 Standards Preparation Procedures.

6.3.1 Reference Materials

All stock standards used in the laboratory are purchased from chemical supply companies. Documentation is maintained to verify the integrity of the standard solution. This is purchased or supplied through the

supplier of the standard and maintained in the laboratory.

Standard solutions are also purchased from commercial vendors such as Plasma Pure and ERA. Certified reference materials are used as laboratory control standards. If available, National Institute of Standards and Technology (NIST) Standard Reference Materials are used. Internal reference standards are prepared independently form the standards used for calibration.

Standards used for metals analysis are prepared in water with a matrix similar to the samples. Standards are used that bracket the concentration range of interest. Working standards are prepared daily from stock standards. The stock standards are purchased from commercial sources such as Plasma Pure and Fischer Scientific. Expiration dates are monitored, and standards are disposed of prior to that date.

Figures 6.1 is an are examples of standard logbook pages used in the laboratory. They include but not limited to the assigned solution number, date prepared, analytes, purity, concentration, how prepared.

6.4 Decision Processes, Procedures, and Responsibility for Initiation of Corrective Action.

The quality control requirements of the analytical methods are stated in the individual method standard operating procedures. In-house limits such as accuracy and precision limits are established annually. "Real time" checking of the data by the analyst is performed. (when possible e.g. overnight run) The analyst is responsible for reviewing the initial calibration, blank and QC check criteria for adherence to the method requirements prior to initiating sample analysis.

On going QC is checked by the analyst either in real time or the following morning for an overnight run. The analyst is responsible for reviewing the data in comparison with the QC of the method. Analysis proceeds if all QC is met and is halted if not met. The noncompliance is reviewed by the analyst and corrective measures are taken to correct the situation. These may include but are not limited to: checking calculation, verification of standard, recalibrating instrument, baking out instrument etc.

The analysis then proceeds. If the QC criteria are met, the samples are analyzed. If the nonconformance remains, the department supervisor is notified and is involved in the decision making process of corrective action.

If due to holding time constraints, analysis must proceed, another instrument will be used if available. If no other instrument is available, the QA manager is notified and the QC requirement that is not met is reviewed. If the QC requirement does not effect the sample results, the sample analysis may be

approved and the discrepancy noted on the report or in the case narrative. The QA manager or Technical manager may override the QC requirement. This is documented in the run log by the initials, date and a short statement of the noncompliance and that it was approved. No approval is granted without the documentation in the run log by the QA Manager or Technical Manager only.

TABLE 6.1

STANDARD OPERATING PROCEDURES

SOP TITLE	SOP NUMBER	REVISION NUMBER AND DATE
Sample Preparation and Analysis of Volatile Organics by GC/MS: Method 95-1	ASP 95-1	4 – 4/17/02
Sample Preparation and Analysis of Semi-Volatile Organics by GC/MS: Method 95-2 Modified	ASP 95-2	4 – 4/19/02
Sample Preparation and Analysis of Chlorinated Pesticides and PCBs: Method 95-3	ASP 95-3	6 – 4/19/02
Sample Preparation and Analysis of Organo phosphorous Pesticides: EPA Method 8141A Landfill	8141A	1 – 1/11/00
Sample Preparation and Analysis of Chlorinated Herbicides: EPA Method 8151A Modified	8151A	3 – 4/18/02
Mercury Analysis in Water by Manual Cold Vapor Technique: Method 245.1 CLP-M	HG-245-1	1 – 1/10/98
Mercury Analysis in Sediment by Manual Cold Vapor Technique: Method 245.5 CLP-M	HG-245-5	1 – 1/10/98
Total Cyanide Analysis is in Water and Soils by Manual Spectrophotometric Technique with Midi-Distillation: Method 335.2 CLP-M	CYANIDE	1 - 1/13/98
Sample Preparation and Analysis of Color: Method 110.2	COLOR	2 - 1/14/98
Sample Preparation and Analysis of Total Suspended Solids: Method 160.2	TSS	1 - 1/98
Sample Preparation and Analysis of Total Dissolved Solids: Method 160.1	TDS	2 - 1/14/98
Sample Preparation and Analysis of Turbidity: Method 180.1	TURB	3 - 1/23/98
Total Alkalinity by Titrimetric Technique: Method 310.1	TALK	1 – 1/15/98
Bromide Analysis by Titrimetric Technique: Method 320.1	BROMIDE	2 - 1/13/98
Ammonia Analysis by Automated Phenate Technique: Method 350.1	AMMONIA	2- 1/23/98
Total Kjeldahl Nitrogen Analysis by Semi-Automated Colorimetric Technique: Method 351.2	TKN	2 - 1/23/98
Nitrate and Nitrate Analysis by Automated Cadmium Reduction Technique: Method 353.2	NITRATE	3 - 1/23/98

SOP TITLE	SOP NUMBER	REVISION NUMBER AND DATE
Sample Preparation and Analysis of Sulfate (Colorimetric, Automated, Methylthymol Blue, AAII): Method 375.2	SO4TRAC	0 - 1/19/98
Sample Preparation and Analysis of Sulfate (Turbidimetric): Method 375.4	SULFATE	1 - 1/14/98
Sample Preparation and Analysis of Sulfide: Method 376.1	SULFIDE	1 - 1/14/98
Sample Preparation and Analysis of Biochemical Oxygen Demand: Method 405.1	BOD	1 - 1/14/98
Chemical Oxygen Demand Analysis by Manual Colorimetric Technique: Method 410.4	COD	3/1/23/98
Sample Preparation and Analysis of Total Organic Carbon (Dohrmann DC-190): Method 415.1	TOC DC 190	0 - 5/7/97
Sample Preparation and Analysis of Total Organic Carbon (Dohrmann DC-180): Method 415.1	TOC DC 180	1 - 8/6/97
Total Recoverable Petroleum Hydrocarbon Analysis in Soils by Method 418.1 Modified	PETH SOIL	1 - 1/15/98
Total Recoverable Phenol Analysis by Manual Colorimetric Technique with Mini-Distillation: Method 420.1	PHENMINI	1- 1/13/98
Sample Preparation and Analysis of Hardness, Total (by Calculation): Method 2340C	HARDMET	2 - 1/15/98
Hexavalent Chromium Analysis by Colorimetric Technique: Method 3500 CR-D (water)	HEX CHROM	2 - 1/13/98
Hexavalent Chromium Analysis by Colorimetric Technique: Method 7196A (soil)	7196_CR6	0 - 1/98
Total Solids Analysis by Gravimetric Technique: Method D-V215 NYSDEC ASP 10/95	TS-SOIL	1 - 1/13/98
Total Organic Carbon in Soils in Combustion Infrared: Method Lloyd Kahn (Dohrmann)	TOC-KAHN	1 - 1/14/98
Soil Extraction Preparation For General Chemistries	SOIL EXT. PREP	0 - 1/26/98
Total Recoverable Oil & Grease analysis in waters by Gravimetric Technique: Method 413.1	O&G	0 - 11/11/98
Sample Preparation and Analysis of Formaldehyde – Method 8315	8315A	1 – 1/27/00
Total Recoverable Oil & Grease Analysis in Waters By Gravimetric Technique – Method 9070	9070	0 -11/1/98
Sample Preparation and Analysis ofm Volatile Orgnics by GS/MS – EPA CLP	CLP – VOA	0 – 5/1/97

SOP TITLE	SOP NUMBER	REVISION NUMBER AND DATE
Trace Element Determination by Stabilized Temperature Platform Graphite Furnace – Method 200.9	200-9 (Furnace)	1 - 8/8/97
Total Hardness Analysis in Waters by Manual Titrimetric (EDTA) Technique - Method 130.2	HARDNESS	2 - 1/21/98
Sample Preparation and Analysis of Mercury Analysis in Soil/Sediment by Manual Cold Vapor Technique – Method 245.1	HG-245-1 (Potable)	1 - 12/3/98
Sample Preparation and Analysis of Mercury Analysis in Soil/Sediment by Manual Cold Vapor Technique – Method 245.5-CLP-M	HG-245.5	1 - 1/10/98
Sample Preparation and Analysis of Nitrogen, Nitrate-Nitrite (Colorimetric, Automated, Cadmium Reduction) Method 353.2	NITROGEN	0 – 6/18/99
Sample Preparation and Analysis of Chlorinated Pesticides and PCBS – Method OLM03.2	OLMO3.2 PEST/PCB	1 - 4/21/97
Total Recoverable Petroleum Hydrocarbon Analysis in Waters – Method 418.1	PETHH20l - 418.1	1 - 1/16/98
Sample Preparation and Analysis of Sulfide (Titrimetric, Iodine) – Method 376.1	SOIL/SULFIDE	0 - 5/18/98
Sample Preparation and Analysis of the Determination of Trace Metals by Inductively Coupled Plasma Atomic Emission Spectroscopy – Method 200.7 – CLP-M	TRACE2	3 – 1/20/99
Total Organic Halogen (TOX) Adsorption-Pyrolysis-Titrimetric Method – Method 5320B	TOX5320B	0 - 12/7/98
Method 9060 Modified for Soil (Lloyd Kahn)	TOC-9060M FOR SOILS	0 - 1/14/98
Total Organic Carbon Analysis in Water by Combustion Infrared Technique –Method 9060	TOC 9060-2 (DC-190	0 – 3/11/99
Sample Preparation and Analysis to Total Organic Carbon, TOC, (Combustion or Oxidation, Dohrmann DC-180) Method 9060	TOC9060-1 (DC-180)	2 – 3/11/99
Pensky-Martens Closed-Cup method for Determining Ignitability – Method 1010	1010	1 - 3/1/99
Extraction Procedure (EP) Toxicity Test Method and Structural Integrity Test – Method 1310A	1310A	1 - 3/4/99
Method OLM04.2 Pesticides/Aroclors	OLM04.2 PEST	1 – 4/19/02
Method OLM04.2 Semivolatiles	OLM01.2 SEMI	1 – 4/19/02
Method OLM04.2 Volatiles Organics	OLM04.2 VOL	0 – 3/24/00

SOP TITLE	SOP NUMBER	REVISION NUMBER AND DATE
Toxicity Characteristic Leaching Procedure - Method 1311	1311	1 - 3/8/99
Sample Preparation and Analysis of the Determination of Trace Metals by Inductively Coupled Plasma Atomic Emission Spectroscopy – Method 6010B and Prep. Methods 3005A, 3010A and 3050B	6010B	2 - 1/10/99
Sample Preparation and Analysis of pH Electrometric Measurement – Method 9040B	9040B	0 -2/17/99
pH Paper Method – Method 9041A	9041A	0 - 2/18/99
Soil and Waste pH – Method 9045C	9045C	0 - 2/19/99
Sample Preparation and analysis of Total Organic Carbon, TOC – Method 5301B	5310B	3 - 12/4/98
Ultraviolet Absorption Method – EPA Method 5910	5910	0 - 12/6/98
Sample preparation and Analysis of Chloride – Method 325.2	CHLORIDE	4 - 7/4/98
Determination of Chlorination Disinfection by Products	ICR-551.1	1 - 12/5/98
Determination of Haloacetic Acids in Drinking Water Method 522.2 by Liquid/Liquid Extraction	ICR-552.2	1 - 12/5/98
Total and Amenable Cyanide Distillation – Method 9010B	9010B	1 - 1/13/98
Sample Preparation and Analysis of Polychlorinated Biphenyls as Decachlorobiphenyl- EPA Method 508A	508A	2 – 4/18/02
Sample Preparation and Analysis of Chlorinated Herbicides – EPA Method 515.1	515.1	4 – 4/16/02
Sample Preparation and Analysis of Chlorinated Pesticides – Method 8081A	8081A	7 – 4/16/02
Sample Preparation and Analysis of Organophosphorous Pesticides – EPA Method 8141A	8141A	2 - 1/7/98
Analysis of Volatile Organics in Water by Purge and Trap Capillary Column GC with PID/ECD IN Series - EPA Method 502.2	502-2	3 – 4/16/02
SM18.2510B – Conductivity	SM COND	1 – 1/26/00
EPA 120.1 – Conductivity	EPA COND	1 – 1/26/00
EPA 150.1– Method 150.1 – pH	pH 150.1	0 – 1/26/00
Total Cyanide Analysis in Water and Soils by Manual Spectrophotometric Technique – Method 9014	CYANIDE	1 – 1/13/98
Multiple Tube Fermentation Technique for Members of the Coliform Group – Method 9221 B, C and E	MPN	1 – 2/1/00

SOP TITLE	SOP NUMBER	REVISION NUMBER AND DATE
Total Solids Analysis in water by Gravimetric Technique – Method 160.3	TS 160	0 – 1/27/00
Total Cyanide in Water by Manual Spectrophotometric Technique – Method 450 CN-E	CN 4500E	1 – 2/2/00
Sample Preparation and Analysis of Mercury in Soil/Sediment – Method 7471A	7471A	1 – 1/10/98
Sample Preparation and Analysis of Mercury in Water – Method 7470A	7470A	1 – 1/10/98
Sample Preparation and Analysis of Sulfide – Method 9030	SIDE 9030	1 – 2/2/00
Heterotropic Plate Count – Method 9215D	SPC	0 - 1/31/00
Sample Preparation and Analysis of Sulfide in Soil – Method 9030A Modified	SOIL – SULFIDE	0 – 5/18/98
Sample Preparation and Analysis of Semivolatile Organics by GC/MS – Method 8270C	8270C	4 – 4/18/02
Sample Preparation and Analysis of Polychlorinated Biphenyls – Method 8082	8082	3 – 4/16/02
Analysis of Volatile Aromatic by GC/PID in Wastewater – Method 602	602	0 – 5/21/98
Analysis of Total Petroleum Hydrocarbons by GC with FID or by GC/MS -EPA Method 8015M	8015M	3 – 1/27/00
Analysis of Volatile Organics by GC with PID/Hall Detectors – EPA Method 8021B	8021B	2 – 1/27/00
Sample Preparation and Analysis of Volatile Organics by GC/MS – Method 8260B	8260B	6 – 4/17/02
Sample Preparation and Analysis of the Determination of Trace Metals by Inductively Coupled Plasma Atomic Emission Spectroscopy – Method 200.7	200.7	0 – 12/8/98
Analysis of Volatile Organics by GC /Hall Detector in Wastewater – Method 601	601	1 – 1/27/00
Colilert Coliform and E. Coli Water Analysis – Method 9221D	9221D	0 – 1/25/00
Total Cyanide in Water by manual Spectrophotometric Technique with Midi-Distillation Method 335.2	335.2	0 – 1/27/00
Acidity in Water – Method 305.2	ACIDITY	1 – 1/27/00
Colilert Coliform and E. Coli Water Analysis – 9223	COLILERT	0 – 1/25/00
Total Alkalinity Analysis in Water by Titrimetrictechnide – SM 18 - 2320B	ALK 2320b	1 – 2/2/00

SOP TITLE	SOP NUMBER	REVISION NUMBER AND DATE
Sample Preparation and Analysis of Color – SM 18 – 2120B	CIR 2020b	1 – 2/2/00
Fluoride Analysis in Water by Ion Selective Electrode – 4500F C	FLUORIDE	1 – 3/14/00
Ortho Phosphate in Waters by the Ascorbic Acid Method	TDS 2540C	1 – 2/2/00
EPA Method 524.2 - Analysis of Volatile Organic in Drinking Water by GC/MS	524.2	1 – 2/17/00
EPA Method 624 – Sample Preparation and Analysis of Purgeables inWastewater by GC/MS	624	2 – 4/17/02
EPA Method 504.1 - EDB and DBCD in Water by Microextraction and EDC G/C	504.1	1 – 4/16/02
EPA Method 525.2 - Determination of Organic Compounds in Drinking Water by Liquid-Solid Extraction and GC/MS Analysis	525.2	2 – 4/18/02
EPA Method 505.5 - Sample Preparation and Analysis of Organohalide Pesticides and PCB's in Water by Microextraction and GC	505	0 – 3/13/00
EPA Method 360.2 - Sample Preparation and Analysis of Dissolved Oxygen	DO	1 – 2/7/00
EPA Method 160.3 - Total Solids by Gravimetric Technique	TS 160	0 – 1/27/00
EPA Method – 120.1 – Conductivity	COND 120	1 – 1/26/00
Method 425.1 – MBAS	MBAS	1 – 3/14/00
Method 625 – Sample Preparation and Analysis of Base/Neutral Acid Extractable in Water	625	1 – 2/10/00
Method 608 – Sample Preparation and Analysis of Chlorinated Pesticides in Wastewater	608	1 – 2/4/00
Method 9030 – Sample preparation and Analysis of Sulfide	SIDE 9030	1 – 2/2/00
TO1/TO2	VOST METHOD DOC	0 – NO DATE
Glyphosate	547	2 – 4/4/02
Analysis of Diquat in Drinking Water by HPLC	549.2	2 – 3/4/02
Carbamates	531.1	2 – 4/14/02
Temperature	TEMP	0 – 3/15/00
VOA	601	1 – 1/27/00
Grain Size Distribution in Soils – ASTM D422-63	GRAIN_SZ	1 – 3/5/02
Particle Size Distribution in Sediments – ASTM D422-63/EPA EMAP	SIEVEEMAP	1 – 3/5/02
Definitions and References	DEFI_REF	0 – 2/15/00
Preparation of Standards and Reagents, Cleaning of Containers	MATERIR0	0 – 3/21/00
Training: Orientation, Job Training and Ethics Policy	TRAINGR0	1 – 4/15/00
Manual Integration	INTEGRATION	1 – 9/10/01
Presecne/Absence of Total Coliform and E. Coli	PA	1 – 4/17/02

TABLE 6.2.1A
TARGET ANALYTE LIST
AND PRACTICAL QUANTITATION LIMITS
FOR METALS

PARAMETERS	PQL (UG/L)	PQL (MG/KG)
Aluminum	200	40
Antimony	60	12
Arsenic	10	2
Barium	200	40
Beryllium	5	1
Boron	500	100
Cadmium	5	1
Calcium	5000	1000
Chromium	10	2
Cobalt	50	10
Copper	25	5
Cyanide	5	2.5
Iron	100	20
Lead	3	0.6
Magnesium	5000	1000
Manganese	15	3
Mercury	0.2	0.1
Nickel	40	8
Potassium	5000	1000
Selenium	5	1
Silver	10	2
Sodium	5000	1000
Thallium	10	2
Tin	250	50
Vanadium	50	10
Zinc	10	4

TABLE 6.2.1B

INITIAL AND CONTINUING CALIBRATION VERIFICATION

		% OF TRUE VALUE (EPA SET)	
ANALYTICAL METHOD	**INORGANIC SPECIAL**	**LOW LIMIT**	**HIGH LIMIT**
ICP/AA	Metals	90	110
Cold Vapor AA	Mercury	80	120
Other	Cyanide	85	115

TABLE 6.2.1C

SUMMARY OF SPIKING CONCENTRATIONS, STANDARD CONCENTRATIONS, CRDL

ANALYTE	ICSA	ICSB	SPIKING SOLUTION		LCS	CRI	CDRL
			WATER (µg/L)	SOIL (mg/kg			
Al	500000	500000	2000	NR	50000	NR	200
Sb			500	100	1000	120	60
As		1000	2000	400	500	20	10
Ba		500	2000	400	2500	NR	200
Be		500	50	10	2500	10	5
Cd		1000	50	10	2500	10	5
Ca	500000	500000	NR	NR	50000	NR	5000
Cr		500	200	40	2500	20	10
Co		500	500	100	2500	100	50
Cu		500	250	50	2500	50	25
Fe*	200000	200000	1000	NR	50000	NR	100
Pb		1000	500	100	500	6	3
Mg	500000	500000	NR	NR	50000	NR	5000
Mn		500	500	100	2500	30	15
Hg			1	0.50	6	NR	0.2
Ni		1000	500	100	2500	80	40
K			NR	NR	80000	NR	5000
Se		1000	2000	400	500	10	5
Ag		1000	50	10	1000	20	10
Na*			NR	NR	80000	NR	5000
Tl		1000	2000	400	500	20	10
V		500	500	100	2500	100	50
Zn		1000	500	100	5000	40	20
CN			100	25	50		5
B		1000	1000	200	2500	1000	500
Sn		1000	2000	400	2500	500	250

* *Two wavelengths run for better sensitivity for low level.*
The values are as follows: Fe – IC/CCV = 2500 ug/l, Na – ICV/CCV = 2500 ug/l

** *All units are µg/L except soil spiking soluton, which is in mg/kg.*

TABLE 6.2.1D
QC SUMMARY

METHOD: CLP M
PARAMETERS: TAL METALS

	Verification Of Linearity at CRQL	System Evaluation Calibration	Calibration Check ICV and CCV	Instrument Blank	Spiked Sample	Duplicate	Preparation Blank	ICP Interference Check Sample	Laboratory Control Sample (CS)	ICP Serial Dilution
Measure Taken	Analyze at CRA and the CRDL samples	Analyze a blank standard independence for calibration levels	Analyze standard independent from calibration	Analyze ICB and CCBs	Sample spiked with analytes	Analyze a sample twice	A prep blank carried through prep and analysis	Analyze ICS, ICS A and ICS B	Carry through prep. & analyze aqueous and solid LCS	Analyze a 5 fold dilution of sample that is 50x IDL
Frequency	After the ICV in each analysis	Each 24 hours of use	10% or every 2 hrs during analysis whichever is more frequent	10% or every 2 hrs during analysis whichever is more frequent	One per matrix and conc. or SDG whichever is more frequent	One per matrix and conc. or SDG which-ever is more frequent	One per SDG or with each batch of samples digested whichever is more frequent	At beginning and end of analysis run of minimum of 2x per 8-hr. whichever is more frequent	One LCS per batch digested per matrix or per SDG whichever is more frequent except Hg and Cn	If analyte conc. is at minimum of factor of 50 above IDL on each group of samples of a similar matrix or for each SDG
Acceptance Criteria	Advisory	± 5% of true value except at CRDL	See Table 7.5B	Absolute value must be less than or equal to the CRDL	Spike recov. Should be between 75-125% except if sample conc. 4x > spike conc.	> 5x CRQL RPD 20%, < 5x CRQL or one above and one below RPD ± CRQL	The absolute value must be less than or equal to CRQL	ICS AB must be within ± 20% of true value	80–120% except Ag & Sb, soil/sed's limits provided 10/LCS	Dilution must be within 10% of the original determination
Corrective Action	None	Re-calculate	1. Stop analysis 2. Correct problem 3. Re-calibrate 4. Re-analyze	1. Stop analysis 2. Correct problem 3. Re-calculate 4. Re-analyze	Flag with "N" and for non-furnace & Hg elements also perform a post-spike	Flag with "*"	If above CRDL, the lowest conc. in the samples must be 10x blank conc. or re-digested and re-analyzed	1. Stop analysis 2. Correct problem 3. Re-calibrate 4. Re-analyze	1. Terminate 2. Correct 3. Re-digest/ re-analyze	Flag with "E"

TABLE 6.2.2A
QC SUMMARY

Parameter	Method	ICV/ CCV/ Freq	ICV/ CCV Limits	Matrix Spike Freq	Matrix Spike Limits *	ICB/ CCB Freq	ICB/ CCB Limits	DUP Freq	RPD Limits
Alkalinity	310.1	1 per 10	± 25%	1 per 20	± 25%	1 per 10	± CRQL	1 per 20	± 20
BOD	405.1	1 per 10	± 25%	NA	NA%	1 per 10	± CRQL	1 per 20	± 20%
Bromide	320.1	1 per 10	± 20%	1 per 20	± 25%	1 per 10	± CRQL	1 per 20	± 20% or CRDL
Chloride	325.2	1 per 10	± 20%	1 per 20	± 25%	1 per 10	± CRQL	1 per 20	± 20% or CRQL
Nitrate	353.2	1 per 10	± 20%	1 per 20	± 25%	1 per 10	± CRQL	1 per 20	± 20% or CRQL
Sulfate	375.4	1 per 5	± 20%	1 per 20	± 25%	1 per 10	± CRQL	1 per 20	± 20% or CRQL
TDS	160.1	1 per 10	±20%	1 per 20	±25%	1 per 10	± CRQL	1 per 20	± 20% or CRQL
TSS	160.2	1 at start of run	±20%	NA	NA	1 per 10	± CRQL	1 per 20	± 20% or CRQL
Color	110.2	1 per 10	± 20%	NA	NA	1 per 20	± CRQL	1 per 20	± 20% or CRQL
Turbidity	180.2	1 per 10	± 10%	NA	NA	1 per 10	± CRQL	1 per 20	± 20%
Hex. Chrom	SM3500 CRD	1 per 10	± 20%	1 per 20	± 25%	1 per 10	± CRQL	1 per 20	± 20%
TPH	418.1	1 per 10	± 20%	1 per 20	± 25%	1 per 10	± CRQL	1 per 20	± 20%
TOC	415.1	1 per 10	± 20%	1 per 20	± 25%	1 per 10	± CRQL	1 per 20	± 20%
TOC	Kahn	1 per 10	± 20%	1 per 20	± 25%	1 per 10	± CRQL	Quad 1 per 20	± 3 SD
Total Phenols	420.1	1 per 10	± 10%	1 per 20	± 25%	1 per 10	± CRQL	1 per 20	± 20% or CRQL
Ammonia	350.1	1 per 10	± 20%	1 per 20	± 25%	1 per 10	± CRQL	1 per 20	± 20% or CRQL
COD	410.4	1 per 10	± 20%	1 per 20	± 25%	1 per 10	± CRQL	1 per 20	± 20% or CRQL
TKN	351.2	1 per 10	± 20%	1 per 20	± 25%	1 per 10	± CRQL	1 per 20	± 20% or CRQL
Hardness	130.2	1 per 10	± 10%	1 per 20	± 25%	1 per 10	± CRQL	1 per 20	± 20% or CRQL
Oil & Grease	415.1	1 per 20	± 20 &	1 per 20	± 25%	1 per 20	+ CRQL	1 per 20	± 20% or CRQL
Sulfide	376.1	1 per 10	± 20%	1 per 20	± 25%	1 per 10	± CRQL	1 per 20	± 20% or CRQL

* = If outside limits, repeat matrix spike analysis once.
NA = Not Applicable

TABLE 6.2.2B
TARGET COMPOUND LIST
AND PRACTICAL QUANTITATION LIMITS
FOR WET CHEMISTRY

PARAMETERS	PQL (UG/L)	PQL (MG/KG)
Alkalinity	1000	5
BOD	2000	N/A
Chloride	1000	5
Nitrate	200	1
Sulfate	5000	25
TDS	10000	N/A
TSS	10000	N/A
Color *(color units)	5	N/A
Turbidity*(units NTU)	1	N/A
Hexavalent Chromium	20	0.4
TOC	1000	500
Total Phenols	5	0.025
Total Ammonia	100	0.5
COD	10000	250
TKN	100	0.5
Hardness	6000	30
Sulfide	1000	5
Bromide	2000	10
Petroleum Hydrocarbons	N/A	35
Oil & Grease	10000	NA

TABLE 6.3

ELEMENT	SOURCE	LOT #	EXP. DATE	CONC.

SECTION 7.0

7.0 DATA GENERATION

7.1 Data Collection Procedure

Data is acquired in one of two ways; either automatically generated from the instrument through generation of the raw data by computer or manually by entry into consecutively pre-paginated bound logbooks. The information is documented with all pertinent information for the test. The name and date of the person analyzing the samples is also documented.

7.2 Data Reduction Procedure

Laboratory validation of the data begins with the processing of data and continues through data review and reporting of analytical results. Data processing can be performed by the analyst who obtained the data or by another analyst. Data review starts with an analyst independent of the data acquisition and processing, reviewing (validating) that the data processing was performed correctly and continues through verifying that the reported analytical results correspond to the data acquired and processed.

The first step in validation is data processing. In general, data will be processed by an analyst in one of the following manners: manual computation of results directly on the data sheet or on calculation pages that are attached to the data sheet; input of raw data for computer processing; direct acquisition and processing of raw data by computer.

If data is manually processed by an analyst, all steps in the computation shall be provided, including equations used and the source of input parameters such as response factors (RF), dilution factors, calibration constants. If calculations are not performed directly on the data sheet, calculations shall be attached to the data sheets.

For data that is entered by an analyst and computer processed, a copy of the input is kept and uniquely identified with the project number and other information as needed. The samples analyzed shall be evident and the input signed and dated by the analyst. If data is directly acquired from instrumentation and processed, the analyst shall verify that the following are correct: project and sample numbers; calibration constants and RF; and output parameters such as units and numerical values used for reporting limits (if a value reported is less than the reporting limit). The analyst shall sign and date the resulting output.

The GC/MS analyses are processed in the Omega LIMS. The pesticide data are acquired using a Nelson Turbochrom or Omega LIMS. The metals data are reported using Ward Scientific software or the Omega

LIMS. Figure 7.1 is an example of a form used to document the individual that reported the data package.

7.3 Data Validation Procedures

7.3.1 Review of Data Processing

At least 20 percent of all data is reviewed in the following manner. If errors are determined during this portion of the review process, a complete review shall be performed for the data set. The data must be reviewed either by a senior analyst or the department supervisor. The analyst provides the reviewer with a complete data package. The package shall include, as appropriate: raw data, data sheets, strip charts, computer input/output, calculation, and sources for input parameters (i.e., RFs).

The review of the data covers: appropriateness of equations used; correctness of numerical input; numerical correctness of all calculations (accomplished by re-performing numerical computations); and correct.

The review process must be thorough enough to verify the results. If the reviewer disagrees with any part of the computations, the reviewer marks through the number with a single line and places the revised number above it. Any changes made by the reviewer shall be reviewed by the originator of the data. If the originator agrees with the change, no action is necessary. If the originator disagrees, then both the originator and reviewer must resolve the difference so that they agree with the result presented. See Figure 7.2 for Lab Report Review Procedure.

7.3.2 Internal Laboratory Data Verification

The data package is reviewed for correctness and completeness by either the organic/inorganic laboratory supervisors, the Technical Manager, the Laboratory Manager or the QA/QC Manager. Their review includes validation of method used and compliance with the requirements of the SOP. Following their approval, the data package goes to word processing for typing of the case narrative.

7.4 Data Reporting and Authorization Procedures

Completed data packages are generated in the organic departments. The inorganic traditional data is submitted to the QA/QC department and reviewed prior to acceptance.

The metals raw data is submitted to the QA/QC department, which computes and generates the data package using Ward Scientific software.

All data packages are reviewed by either the department supervisor, Technical Manager, Laboratory Manager or QA/QC Manager. Any deviations or noncompliances are documented in the "case narrative" written by the reviewer. Any omissions or errors are listed and the data package is rejected and returned to the department for correction. After corrections have been made, the reviewer verifies the corrections, the case narrative is revised as necessary, and the case narrative is signed by the reviewer.

7.4.1 Authorized Personnel to Review Packages

Metals and Inorganic:	Metals Supervisor	Randy Mercurio
	Wet Chem Supervisor	Heidi Bogner
	Vice President	Vincent Stancampiano
	QA Manager	Lynn Daniello
	Technical Manager	Ursula Middel
	Laboratory Manager	Joann Slavin
Pesticides:	Technical Manager	Ursula Middel
	QA Manager	Lynn Daniello
	GC Supervisor	Peter Daphnis
	Laboratory Manager	Joann Slavin
GC/MS:	GC/MS Supervisor	Glen Bochicchio
	Technical Manger	Ursula Middel
	QA Manager	Lynn Daniello
	Laboratory Manager	Joann Slavin

7.4.2 Data Package NYSDEC ASP CLP (3/00)

The following is a summary of the information and order that the data packages will be submitted:

SUMMARY PACKAGE

- Case Narrative
- By fraction (VOA, BNA, pesticides, Herbicides, organo phosphorus

pesticides, inorganics, CONV) and by sample within each fraction, tabulated target compound results (Form I-ORG or Form I-IN) and tentatively identified compounds (TIC) (Form I-ORG, TIC) (VOA and BNA only.

- By fraction (VOA, BNA, Pesticides, Herbicides, organo-phosphorus pesticides)- surrogate spike analysis results (Form II-ORG) by matrix (water and/or soil) and for soil, by concentration (low or medium)

- By fraction (VOA, BNA, Pesticides, Herbicides, organo-phosphorus pesticides)-matrix spike/matrix duplicate/matrix spike blank results (Form III-ORG), as required by method.

- By fraction (VOA, BNA, Pesticides, Herbicides, organo-phosphorus pesticides)-QC check sample/standard recovery summary, if required by method.

- By fraction (INORG and CONV only)-duplicate sample results (Form VI-IN).

- By fraction (INORG and CONV only)-spike sample results (Form VI-IN).

- By fraction (VOA, BNA, Pesticides, Herbicides, organo-phosphorus pesticides, inorganics, CONV)-blank data (Form IV-ORG and Form III-IN) and tabulated results (Form I-ORG and Form I-IN) including TIC (Form I-ORG, TIC) (VOA and BNA only).

- By fraction (VOA and BNA only)-internal standard area data (Form VIII-ORG).

The sample data package is divided into the eight major units described in the following sections. The last six units are each specific to an analytical fraction (volatiles, semi-volatiles, pesticides/PCBs, GC organics, inorganics, conventional wet-chemistry). The sample data package shall include data for analyses of all samples in one SDG, including field samples, re-analyses, blanks, duplicates, spikes, matrix spikes and matrix spike duplicates.

7.4.2A Case Narrative

This document shall be clearly labeled "Case Narrative" and shall contain the following: laboratory name; case number; SDG number; sample numbers in the SDG, differentiating between initial analyses and re-analyses; contract number; and detailed documentation of any quality control, sample, shipment and/or analytical problems encountered in processing the samples reported in the data package.

The laboratory must also include documentation of any internal quality control processes used, summary of corrective actions taken, and resolutions. The Case Narrative shall contain the following statement, verbatim:

"I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the laboratory manager or designee, as verified by the following signature."

This statement shall be directly followed by signature of the laboratory manager or designee with a typed line below it containing the signer's name, title, and date of signature. Additionally, the Case Narrative itself must be signed in original signature by the laboratory manager or his designee and dated.

7.4.2B CLP Volatiles Data

7.4.2B.1 QC Summary

System Monitoring Compound Summary (Form II-CLP-VOA); Matrix Spike/Matrix Spike Duplicate Summary (Form III-CLP-VOA); Method Blank Summary (Form IV-CLP-VOA), if more than a single form is necessary, forms must be arranged in chronological order by date of analysis of the blank; GC/MS Instrument Performance Check (Form V-CLP-VOA), BFB in chronological order, by instrument; Internal Standard Area and RT Summary (Form VIII-CLP-VOA); Instrument Detection Limits.

7.4.2B.2 Sample Data

Sample data shall be arranged in packets with the Organic Analysis Data Sheet (Form I-CLP_VOA, including Form I-CLP-VOA-TIC), followed by the raw data for volatile samples. These sample packets will be placed in alphanumeric order.

Target Compound Results- Organic Analysis Data Sheet (Form I-CLP-VOA): Tabulated results (identification and quantitation) of the specified targeted compounds. The validation and release of these results is authorized by a specific, signed statement in the Case Narrative.

In the event that the laboratory manager cannot validate all data reported for each sample, the laboratory manager shall provide a detailed description of the problems associated with the sample in the Case Narrative. On Form I-CLP-VOA, the appropriate concentration units shall be entered (e.g., ug/L for water samples or ug/kg for soil/sediment). No other units are acceptable. Report analytical results to one significant figure if the value is less than 10 to two significant figures above 10.

Tentatively Identified Compounds (Form I-CLP-VOA-TIC): This form must be included even if no compounds are found. If so, indicate this on the form by entering "0" in the field for 'number found." Form I-CLP-VOA-TIC is the tabulated list of the highest probable match for up to 10 of the non-surrogate organic compounds not targeted for the appropriate program under which samples were submitted, including the Chemical Abstracts Services Registry (CAS) number, tentative identification and estimated concentrations. For estimating concentration, assume a response factor of one, and estimate the concentration by comparison of the compound total area count to the total area count of the nearest internal standards free of interferences on the reconstructed ion chromatogram. The laboratory must be consistent.

Reconstructed total ion chromatograms (RIC) for each sample or sample extract: RIC must be normalized to the largest non-solvent component and contain the following header information: sample number; date and time of analysis; GC/MS instrument I/d: laboratory file ID. Internal standard and system monitoring compounds are to be labeled and identified with their chemical names, either directly out from the peak or on a printout of retention times if retention times are printed over the peak.

The complete data system report must be included in all sample data packages in addition to the RIC. The complete data system report shall include all of the information listed below: sample number; date and time of analysis; RT or scan number of identified targeted compounds; ion used for quantitation with measured area; copy of area table from data system; GC/MS instrument ID; laboratory file ID.

For each sample, by each compound identified, copies of raw spectra and copies of background-subtracted mass spectra of target compounds that are identified in the sample and corresponding background-subtracted TCL standard mass spectra shall be included in the data package. Spectra must be labeled with the sample number, laboratory file ID, date and time of analysis, and GC/MS instrument ID; compound names must be clearly marked on all spectra; copies of mass spectra of non-surrogate organic compounds not listed in the targeted compound list (TCL) with associated best match spectra (three best matches), labeled as above.

7.4.2B.3 Standards Data

Initial Calibration Data (Form IV-CLP-VOA) in order by instrument, if more than one instrument used. VOA standard, RIC, and quantitation reports for the initial five-point calibration, labeled as above. Spectra not required. All initial calibration data must be included, regardless of when it was performed and for which case. When more than one initial calibration is performed, the data must be put in chronological order, by instrument.

Continuing Calibration (Form VII-CLP-VOA) in order by instrument, if more than one instrument is used. VOA standards, RIC, and quantitation reports for all continuing 12-hour calibrations, labeled as above. Spectra not required. When more than one continuing calibration is performed, forms must be in chronological order, within fraction and instrument.

7.4.2B.4 Raw QC Data

BFB for each 12-hour period for each GC/MS system utilized; bar graph spectrum and mass listing.

Blank Data in chronological order. Tabulated results (Form I-CLP-VOA). TIC (Form I-CLP-VOA-TIC) even if none found; RIC and quantitation reports (GC/MS), labeled as above; TCL spectra with lab generated standard, labeled as above. Data systems which are incapable of dual display shall provide spectra in the following order: raw TCL compound spectra; enhanced or background subtracted spectra; laboratory generated TCL standard spectra; GC/MS library search spectra for TIC concentrations.

Matrix Spike Blank Data: Tabulated results (Form I-CLP-VOA) of all TCL compounds; Form I-CLP-VOA-TIC is not required; RIC and quantitation reports or legible facsimile (GC/MS), labeled as above; spectra not required.

Matrix Spike Data: Tabulated results (Form I-CLP-VOA) of all TCL compounds; Form I-CLP-VOA-TIC is not required; RIC and quantitation reports or legible facsimile (GC/MS), labeled as above; spectra not required

Matrix Spike Duplicate Data: Tabulated results (Form I-CLP-VOA) of all TCL compounds; Form I-CLP-VOA-TIC is not required; RIC and quantitation reports or legible facsimile (GC/MS), labeled as above; spectra not required.

Copy of Calculations: The laboratory must provide a copy of the calculations work sheet showing how final results are obtained form values printed on the quantitation report. If manipulations are performed by a software package, a copy of the formula used must be supplied as well as values for all terms in the formula. Copy of preparation/analytical logbook pages.

7.4.2.C CLP Semi-Volatiles Data

7.4.2C.1 QC Summary

System Monitoring Compound Recovery Summary (Form II-CLP-SV); Matrix Spike/Matrix Spike Duplicate Summary (Form III-CLP-SV); Method Blank Summary (Form IV-CLP-SV), if more than a single form is necessary, forms must be arranged in chronological order by date of analysis of the blank; GC/MS Instrument Performance Check (Form V-CLP-SV), DFTPP in chronological order, by instrument; Internal Standard Area and RT Summary (Form V-CLP-SV); Instrument Detection Limits.

7.4.2.C2 Sample Data

Sample data shall be arranged in packets with the Organic Analysis Data Sheet (Form I-CLP-SV, including Form I-SV-TIC), followed by the raw data for semi-volatile samples. These sample packets should then be placed in alphanumeric order.

Target Compounds Results - Organic Analysis Data Sheet (Form I-CLP-SV-1, SV-2): Tabulated results (identification and quantitation) of the specified targeted compounds (Exhibit C). The validation and release of these results is authorized by a specific, signed statement in the Case Narrative (reference above). In the event that the laboratory manager cannot validate all data reported for each sample, the laboratory manager shall provide a detailed description of the problems associated with the sample in the Case Narrative. On Form I-CLP-SV, the appropriate concentration units shall be entered (e.g. ug/L for water samples or

ug/kg for soil/sediment). No other units are acceptable. Report analytical results to one significant figure if the value is less than 10 to two significant figures above 10.

Tentatively Identified Compounds (Form I-CLP-SV-TIC): This form must be included even if no compounds are found. If so, indicate this on the form by entering "0" in the field for "number found." Form I CLP-SV-TIC is the tabulated list of the highest probable match for up to 20 of the non-surrogate organic compounds not listed in the TCL, including CAS number, tentative identification and estimated concentration.

For estimating TIC concentration, assume a response factor of one, and estimate the concentration by comparison of the compound total area count to the total area count of the nearest internal standard free of interferences on the RIC. Alkanes are listed in the case narrative. They are not counted as TICs.

Reconstructed total ion chromatograms (RIC) for each sample, sample extract, standard, blank, and spiked sample. RIC must be normalized to the largest non-solvent component, and must contain the following header information: sample number; date and time of analysis; GC/MS instrument ID; laboratory file ID.

Internal standard and surrogate spiking compounds are to be labeled and identified with their chemical names, either directly out from the peak or on a printout of retention times, if retention times are printed over the peak. The complete data system report must be included in all sample data packages in addition to the RIC. The complete data system report shall include all of the information listed below: sample number; date and time of analysis; RT or scan number of identified TCL compounds; ion used for quantitation with measured area; copy of area table from data system; GC/MS instrument ID; laboratory file ID.

For each sample, by each compound-identified copies of raw spectra and copies of background-subtracted mass spectra of target compounds listed that are identified in the sample and corresponding background-subtracted TCL standard mass spectra shall be included in the data package. Spectra must be labeled with sample number, laboratory file ID, date and time of analysis, and GC/MS instrument ID; compound names must be clearly marked on all spectra. Copies of mass spectra of non-surrogate organic compounds not listed in the TCL list with associated best-matched spectra (three best matches), GPC chromatograms (if GPC performed).

7.4.2C.3 Standards Data

Initial Calibration Data (Form IV-CLP-SV-1, SV-2) in order by instrument if more than one instrument used. BNA standards, RIC, and quantitation reports (or legible facsimile) for the initial five-point calibration, labeled as above. Spectra not required. All initial calibration data must be included, regardless of when it was performed and for which case. When more than one initial calibration is performed, the data must be put in chronological order by instrument.

Continuing Calibration (Form VII-CLP-SV-1, SV-2) in order by instrument if more than one instrument is used. VOA standards, RIC, and quantitation reports (or legible facsimile) for all continuing 12-hour calibrations, labeled as above. Spectra not required. When more than one continuing calibration is performed, forms must be in chronological order, within fraction and instrument.

7.4.2C.4 Raw QC Data

BFB for each 12-hour period, for each GC/MS system utilized; bar graph spectrum; mass listing.

Blank Data in chronological order. This order is different form that used for samples. Tabulated results (Form I-CLP-SV-1, SV-2); TIC (Form I-CLP-SV-TIC) even if none found; RIC and quantitation reports or legible facsimile (GC/MS), labeled as above; TCL spectra with lab generated standard, labeled as above. Data systems which are incapable of dual display shall provide spectra in the following order: raw TCL compound spectra; enhanced or background subtracted spectra; laboratory generated TCL standard spectra; GC/MS library search spectra for TIC, labeled as above; quantitation calculation of TIC concentrations.

Matrix Spike Blank Data: Tabulated results (Form I-CLP-SV-1, SV-2) of all TCL compounds; Form I-CLP-SV-TIC is not required; RIC and quantitation reports, or legible facsimile (GC/MS), labeled as above; spectra not required.

Matrix Spike Data: Tabulated results (Form I-CLP-SV-1, SV-2) of all TCL compounds; Form I-CLP-SV-TIC is not required; RIC and quantitation reports or legible facsimile (GC/MS), labeled as above; spectra not required.

Matrix Spike Duplicate Data: Tabulated results (Form I-CLP-SV-1,

SV-2) of all TCL compounds; Form I-CLP-SV-TIC is not required; RIC and quantitation reports or legible facsimile (GC/MS), labeled as above; spectra not required.

Copy of calculations and copy of extraction and analytical logbook pages.

7.4.2D CLP Pesticide/PCB Data

7.4.2D.1 QC Summary

Surrogate Percent Recovery Summary (Form II-CLP-Pest); Matrix Spike/Matrix Spike Duplicate Summary (Form II-CLP-PEST); Method Blank Summary (Form IV-CLP-PEST); (if more than a single form is necessary, forms must be arranged in chronological order by date of analysis of the blank); Instrument Detection Limits.

7.4.2D.2 Sample Data

Sample data shall be arranged in packets with the Organic Analysis Data Sheet (Form I-CLP-Pest), followed by the raw data for pesticide samples. The sample packets should be placed in increasing alphanumeric order by sample number order.

TCL Results-Organic Analysis Data Sheet (Form I-CLP-PEST): Tabulated results (identification and quantitation) of the specified target compounds (Exhibit C). The validation and release of these results is authorized by a specific, signed statement in the Case Narrative (referenced above). In the event that the laboratory manager cannot validate all data reported for each sample, the laboratory manager shall provide a detailed description of the problems associated with the sample in the Case Narrative. On Form I-CLP-PEST, the appropriate concentration units shall be entered (e.g., ug/L for water samples or ug/kg for soil/sediment). No other units are acceptable. Report analytical results to two significant figures for all pesticide/PCB samples.

Copies of pesticide chromatograms: All chromatograms must be labeled with the following information: sample number; volume injected (uL); date and time of injection; GC column identification (by stationary phase); GC instrument identification. Positively identified compounds must be labeled with the names of compounds, either directly out from the peak, or on a printout of retention times if retention times are printed over the peak. Copies of pesticide chromatograms from second GC column confirmation, Chromatograms to be labeled as above.

GC integration report or data system printout and calibration plots (area vs. concentration) for 4-4'-DDD, 4,4'DDE or toxaphene (where appropriate). Manual work sheets. UV traces from GPC (if GPC performed).

If pesticide/PCB are confirmed by GC/MS, the laboratory shall submit copies of raw spectra and copies of background-subtracted mass spectra of target compounds listed in Exhibit C that are identified in the sample and corresponding background-subtracted standard mass spectra. Compound names must be clearly marked on all spectra. For multi-component pesticides/PCBs confirmed by GC/MS, the laboratory shall submit mass spectra of three major peaks of multi-component compounds from samples and standards.

7.4.2D.3 Standards Data

Initial calibration of single component analytes (Form VI PEST-1 and PEST-2) - all GC columns and all instruments, in chronological order by GC column and instrument; initial calibration of multi-component analytes (Form VI PEST-3) - all GC columns and all instruments, in chronological order by GC column and instrument.

Analyte resolution summary (Form VI Pest-4)- all GC columns and instruments, in chronological order by GC column and instrument.

Calibration verification summary (Form VII PEST-1) - for all Performance Evaluation Mixtures and instrument blanks, on all GC columns and instruments, in chronological order by GC column and instrument. Calibration verification summary (Form VII PEST-2) - for all mid-point concentrations of Individual Standard Mixtures A and B and Instrument blanks used for calibration verification, on all GC columns and instruments, in chronological order by GC column and instrument.

Analytical sequence (Form VIII PEST)- all GC columns and instruments, in chronological order by GC column and instrument; florisil cartridge check (Form IX PEST-1) - for all lots of cartridges used to process samples in the SDG; pesticide GPC calibration (Form IX PEST-2)- all GPC columns, in chronological order by calibration date.

Pesticide identification summary for single component analytes (Form X PEST-1)-for all samples with positively identified single component analytes, in alphanumeric order. Pesticide identification summary for Multicomponent Analytes (Form X PEST-2)- for all samples with positively identified multicomponent

analytes, in alphanumeric order.

Chromatograms and data system printouts are required for all standards including the following: resolution check mixture; all Performance Evaluation Mixtures; Individual Standard Mixture A at three concentrations, each initial calibration; individual Standard Mixture B at three concentrations, each initial calibration; All multicomponent analytes (toxaphene and aroclors), each initial calibration; all mid-point concentrations of Individual Standard Mixtures A and B used for calibration verification; florisil cartridge check solution, all lots; pesticide GPC calibration check solution, all calibrations relating to samples in the SDG; all multicomponent analyte standards analyzed for confirmation.

A printout of retention times and corresponding peak areas or peak heights must accompany each chromatogram. In addition, all chromatograms are required to be labeled with the following: sample number for the standard (i.e., INDA1, INDA2): label all standard peaks for all individual compounds either directly out from the peak or on the printout of retention times if retention times are printed over the peak; total nanograms injected for each standard; date and time of injection; GC column identification (by stationary phase and internal diameter); GC instrument identification.

Pesticide GPC Calibration Data: UV detector traces showing Peaks that correspond to the compounds in the pesticide GPC calibration mixture. Traces must be labeled with GCP column identifier, date of calibration, and with compound names labeled either directly out form the peak, or on a printout of retention times, if retention times are printed over the peak.

7.4.2D.3 Raw QC Data

Blank Data in chronological order, by type of blank (method, instrument, sulfur clean up). This order is different form that used for samples. Tabulated results (Form I PEST); chromatograms and data system printouts GC for each GC column and instrument used for analysis, labeled as above.

Matrix Spike Data: Tabulated results (Form I-CLP-PEST) of all targeted compounds; chromatograms and data system printouts (GC), labeled as above.

Matrix Spike Duplicate Data and Matrix Spike Blank Data: Tabulated results (Form I-CLP-PEST) of all targeted compounds;

chromatograms and data system printouts (GC), labeled as above.

Copy of Calculations, copy of extraction and analytical logbook pages.

7.4.2E GC Organic Data (Herbicide/Organo-Phosphorus Pesticides)

7.4.2E.1 QC Summary

Surrogate Percent Recovery Summary (Form II-GC); Matrix Spike/Matrix Spike Duplicate/Matrix Spike Blank Summary (Form III-GC), if more than a single form is necessary, forms must be arranged in chronological order by date of analysis of the blank; Instrument Detection Limits.

7.4.2E.2 Sample Data

Sample Data shall be arranged in packets with the Organic Analysis Data Sheet (Form I-GC), followed by the raw data for the samples. These sample packets should then be placed in the alphanumeric order.

7.4.2E.3 Standards Data

Initial calibration of analytes (Form VI) - all GC columns and all instruments, in chronological order by GC column and instrument.

Calibration verification summary (Form VII) - for all mid-point concentrations of standard mixtures and instrument blanks used for calibration verification, on all GC columns and instruments, in chronological order by GC column and instrument.

Analytical sequence (Form VIII)- all GC columns and instruments, in chronological order by GC column and instrument.

Identification summary for analytes (Form X)-for all samples with positively identified analytes, in alphanumeric order.

Chromatograms and data system printouts are required for all standards.

A printout of retention times and corresponding peak areas or peak heights must accompany each chromatogram. In addition, all chromatograms are required to be labeled with the following: sample number for the standard: label all standard peaks for all compounds either directly out from the peak or on the printout of retention times if retention times are printed over the peak; total

nanograms injected for each standard; date and time of injection; GC column identification (by stationary phase and internal diameter); GC instrument identification.

7.4.2E.4 Raw QC Data

Blank Data in chronological order. This order is different from that used for samples. Tabulated results (Form I-CLP-PEST); chromatograms and data system printouts (GC) for each GC column and instrument used for analysis.

Matrix Spike Data: Tabulated results (Form I-CLP-PEST) of all targeted compounds; chromatograms and data system printouts (GC), labeled as above.

Matrix Spike Duplicate Data and Matrix Spike Blank Data: Tabulated results (Form I-CLP-PEST) of all targeted compounds; chromatograms and data system printouts (GC), labeled as above.

7.4.2F Inorganic Data

Sample data shall be submitted with the Inorganic Analysis Data Reporting Forms for all samples in the SDG, arranged in alpha-numeric order, followed by the QC analyses data, Quarterly Verification of Instrument Parameters forms, raw data, and copies of the digestion and distillation logs.

7.4.2F.1 Results

Inorganic Analysis Data Sheet (Form I-CLP-IN): Tabulated analytical results (identification and quantitation) of the specified analytes.) The validation and release of these results is authorized by a specific, signed statement on the Cover Page. Appropriate concentration units must be specified and entered on Form I-CLP-IN. the quantitative values shall be reported in units of micrograms per liter (ug/L) for aqueous samples and milligrams per kilogram (mg/kg) for solid samples. No other units are acceptable. Results for solid sample must be reported on a dry weight basis. Analytical results must be reported to two significant figures if the value is less than 10 to three significant figures if the value is greater than or equal to 10. Results for percent solids must be reported to one decimal place.

7.4.2F.2 QC Data

Initial and continuing calibration verification, Form II-CLP-IN (Part 1); CRDL standard for AA and ICP, Form II-CLP-IN (Part 2);

blanks Form III-CLP-IN; ICP interference check sample, Form IV-CLP-IN; Spike Sample Recovery , Form V-CLP-IN (Part 1); Post Digest Spike Sample Recovery, Form V-CLP-IN (Part 2); Duplicates, Form VI-CLP-IN; laboratory control sample, Form VII-CLP-IN; standard addition results, Form VIII-CLP-IN; ICP serial dilutions, Form IX-CLP-IN.

7.4.2F.3 Verification of Instrument Parameters

Instrument Detection Limits (quarterly), Form X CLP-IN; ICP interelement correction factors (annually), Form XI-CLP-IN (Part 1); ICP interelement correction factors (annually), Form XI-CLP-IN (Part 2); ICP linear ranges (quarterly), Form XIII-CLP-IN. Copies of verification of instrument parameters forms for the current quarter must be submitted with each data package.

7.4.2F.4 Raw Data

For each reported value, the laboratory shall include in the data package all raw data form the instrument used to obtain that value. This applies to all required QA/QC measurements, instrument standardization, as well as sample results. This statement does not apply to the Verification of Instrument Parameters submitted as part of each data package. Raw data must contain all instrument readouts used for the sample results, including those readouts that may fall below the IDL. All AA and ICP instruments must provide a legible hard copy of the direct real-time instrument readout (i.e. strip charts, printer tapes). A photocopy of the direct sequential instrument readout must be included. A hardcopy of the instrument's direct instrument readout for cyanide must be included if the instrumentation has the capability.

The order of raw data in the data package shall be ICP, Flame AA, Furnace AA, Mercury, and Cyanide. All raw data shall include intensities (ICP) and absorbances with concentration units for flame AA, furnace AA, Mercury and Cyanide. All flame and furnace AA data shall be grouped by element. Raw data must labeled with sample number and appropriate codes to unequivocally identify:

- Calibration standards, including source and prep date. Initial and continuing calibration blanks and preparation blanks.
- Initial and continuing calibration verification standards, interference check samples, ICP serial dilution samples, CRDL

Standard for ICP and AA, Laboratory Control Sample and Post Digestion Spike.

- Diluted and undiluted samples (by sample number) and all weight, dilutions and volumes used to obtain the reported values. If the volumes, weights and dilutions are consistent for all samples in a given SDG, a general statement outlining these parameters is sufficient.

- Duplicates.

- Spikes (indicating standard solutions used, final spike concentrations, volumes involved). If spike information (source, concentration, column) is consistent for a given SDG, a general statement outlining these parameters is sufficient.

- Instrument used, any instrument adjustments, data corrections or other apparent anomalies on the measurement record, including all data voided or data not used to obtain reported values and a brief written explanation.

- All information for furnace analysis clearly and sequentially identified on the raw data, including client sample number, sample and analytical spike data, percent recovery, coefficient or variation, full MSA data, MSA correlation coefficient, slope and intercept of linear fit, final sample concentration (standard addition concentration), and type of background correction used: BS for Smith-Heifthe, BD for deuterium Arc, or BZ for Zeeman.

- Time and date of each analysis. Instrument run logs can be submitted if they contain this information. If the instrument does not automatically provide times of analysis, these must be manually entered on all raw data for initial and continuing calibration verification and blanks, as well as interference check samples and linear range analysis.

- Integration times for AA analyses.

7.4.2F.5 Digestion Logs

Logs shall be submitted in the following order: digestion logs for ICP flame AA, furnace AA and mercury preparations, followed by a copy of the distillation log for cyanide. These logs must include date; sample weights and distillation log for cyanide. These logs must include date; sample weights and volumes; sufficient information to unequivocally identify which QC samples(i.e.,

laboratory control sample, preparation blank) correspond to each batch digested; comments describing any significant sample changes or reactions which occur during preparation; and indication of pH less than two or more than 12, as applicable.

7.5 Computer and electronic data

7.5.1.LIMS

H2M uses Omega by Khemia Laboratory Information Management System(LIMS). The system is an Access based system. The system was designed to ensure the integrity and security of the sample information. The system operates on a separate network server. The software was demonstrated adequate for use in the laboratory during a parallel comparison with the old LIMS system. All aspects of the system were reviewed and verified. The integrity of the data is ensured throughout input, storage, transmission, and processing. The labs IT Group is responsible for the documentation and verification of all software used throughout the lab. The IT Group maintains a logbook documenting changes to the system and the date implemented to insure version control of the software. The IT Group is also responsible for purchasing and maintaining the equipment used.

The IT group has customized the LIMS system to maintain the integrity and the security of the data. The system has limited access. An individual login name is used to log on to the system and an individual password is required for entry. This information is confidential and a master listing is maintained in the IT Department or the IT department may have the authority to override the individual's password.

An audit trail is built into the LIMS system to document each individual user of the system and to document any modifications made to the system. A tracking changes feature is part of the LIMS. This allows for computer documentation of any changes made in the system. This includes the change made, person that made the change and the reason for the change. A logging record (see figure 7-3) is printed for each client grouping of samples received that day and verified by either the Receiving Department Supervisor, the Production Manager or the Project Manager to verify tests selected, pricing and sample information.

The finalized data from the analyses are input into the LIMS system. The instrument's files are converted to a format compatible for import into the Omega LIMS system. Some tests without the capability of electronic output, such as many of the traditional wet chemistry parameters, require manual entry into the system. A series of EXCEL spreadsheets have been setup to aid in the entry of the data. These spreadsheets are then imported directly into the LIMS.

Once the data has been imported, the data is calculated for preparation factors, dilution factors and percent moisture. The analyst importing the files, checks the data for errors. The Quality Assurance Manager, department supervisor, or an authorized

analyst then verifies ("QA Sequence") the data.

Once the data is verified a final report is generated. This data can also be accessed by the Omega CLP reporting modules to provide a full data package.

7.5.2 Electronic Data Deliverables

Some clients as well as some State Agencies require the submission of the data via hardcopy and electronically. Since there is no set format that all clients require, the deliverables are customized to the clients needs. At this time, EDDs are produced in the QC department. Since all instruments are directly interfaced with the LIMS, all data is directly imported. This allows for generation of the disks from the Omega LIMS. This minimizes the amount of manual entry required. Some tests, such as wet chemistry and other non-automated tests do however require manual input of data into an EXCEL format which is than imported into the LIMS to generate the disks. This input is verified by checking for transcription errors prior to releasing the disk. These EDDs are either sent to the client via e-mail or are transferred onto a disk and mailed with the data Package.

7.6 LIMS Generated Reports

Lab reports are generated by the LIMS system (see figures 7-4 to 7-12) and contain the following information:

- Lab name and address
- Unique lab numbers
- Client name and address
- Client ID number
- If relevant condition of sample
- Date/time collection collected by and date /time receipt
- Tests and dates of analysis
- Time of analysis
- Test method
- Any deviations or qualifiers applicable
- Results, units, dry or wet weight
- Electronically produced signature and title of person authorized to release report and date of issue

Figure 7-1

DATA PACKAGE SIGNATURE FORM

SDG #_____

SCAN _____

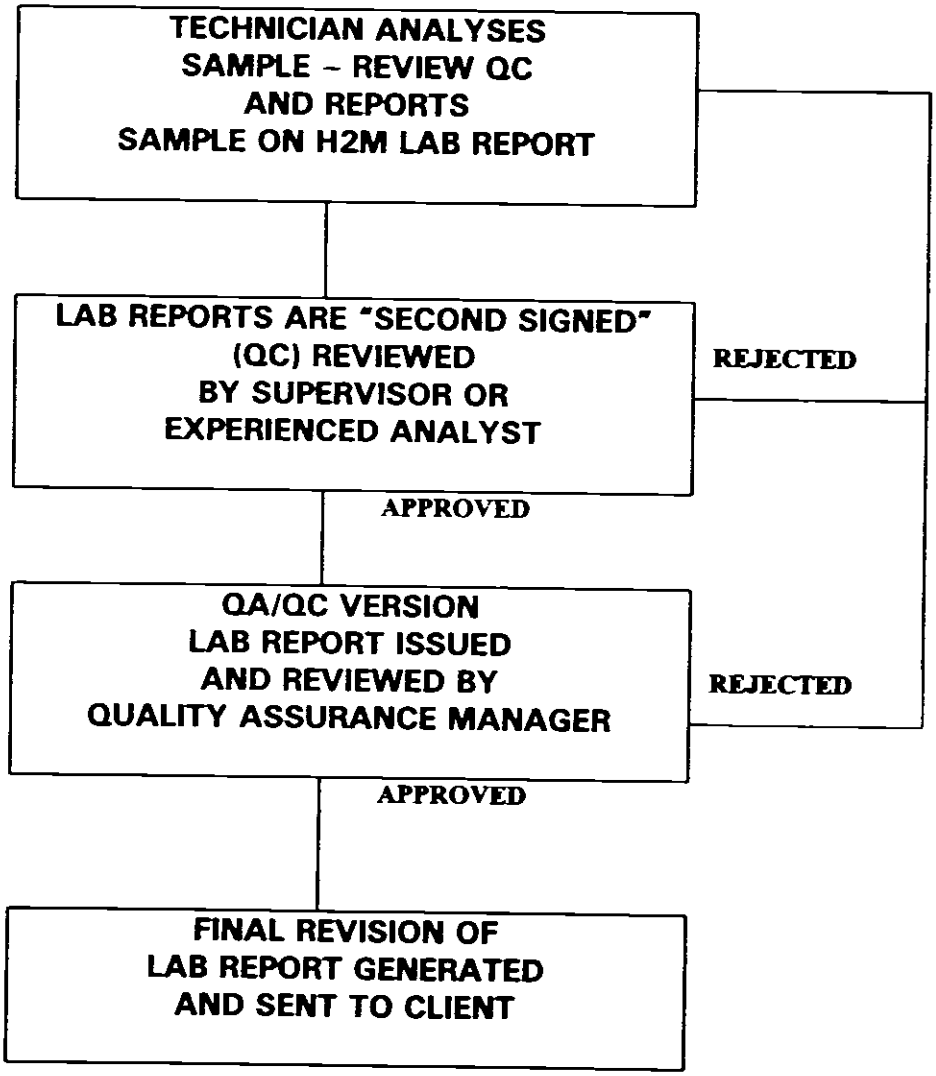
This data package was reported by the undersigned. This reporting includes data calculations, manual edits if necessary and compilation of raw data. The information presented is true and correct to the best of my knowledge.

Signature: _____

Date: _____

FIGURE 7-2

LAB REPORT REVIEW PROCEDURE



H2M LABS, INC.

WORK ORDER Summary

17-Apr-02

Work Order 0203086

Client ID: [redacted]
Project: [redacted]
Comments: [redacted]

QC Level: RT-10

Sample ID	Client Sample ID	Collection Date	Date Received	Date Due	Matrix	Test Code	Storage
0203086-001A	BASIN L - 114	3/5/2002 8:09:00 AM	3/5/2002	3/13/2002	Aqueous	OG_W	
				3/13/2002		TSS_WW	
0203086-002A	BASIN K - 113	3/5/2002 8:29:00 AM		3/13/2002		OG_W	
				3/13/2002		TSS_WW	
0203086-003A	BASIN H - 106	3/5/2002 8:51:00 AM		3/13/2002		OG_W	
				3/13/2002		TSS_WW	
0203086-004A	BASIN P - 107	3/5/2002 9:04:00 AM		3/13/2002		OG_W	
				3/13/2002		TSS_WW	
0203086-005A	BASIN R - 111	3/5/2002 9:34:00 AM		3/13/2002		OG_W	
				3/13/2002		TSS_WW	
0203086-006A	BASIN B - 109	3/5/2002 9:49:00 AM		3/13/2002		OG_W	
				3/13/2002		TSS_WW	
0203086-007A	BASIN E - 104	3/5/2002 10:08:00 AM		3/13/2002		OG_W	
				3/13/2002		TSS_WW	
0203086-008A	BASIN F - 103	3/5/2002 10:37:00 AM		3/13/2002		OG_W	
				3/13/2002		TSS_WW	
0203086-009A	BASIN Q - 102	3/5/2002 10:48:00 AM		3/13/2002		OG_W	
				3/13/2002		TSS_WW	
0203086-010A	BASIN C - 112	3/5/2002 11:00:00 AM		3/13/2002		OG_W	
				3/13/2002		TSS_WW	
0203086-011A	BASIN N - 116	3/5/2002 11:23:00 AM		3/13/2002		OG_W	
				3/13/2002		TSS_WW	

H2M LABS, INC.

FIGURE 7-3

QAM No.	SEC 7
Revision No.:	2
Revision Date	3/5/02
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H2M LABS, INC.

575 Broad Hollow Road, Melville NY 11747
(631) 694-3040, FAX: (631) 420-8436 NYSDOH ID # 10478

LABORATORY RESULTS

[redacted]

Received : 03/08/02 3:07 PM
Collected By : CLIENT
Sample Type : Sewage

Copies To [redacted]

Date Reported : 3/14/02

Lab Number	Location	Collected		Total Coliform	Fecal Coliform
			Units	MPN	MPN
			Method	M9221 BC	M9221 BC
			Limits	N/A	N/A
0203113-001A	PLANT	03/08/02 11:15 AM			
Routine			Analysis Time	> 16000 3/8/02 3:30:00 PM	11 3/8/02 3:30:00 PM
Effluent					
0203113-002A	OUTFALL	03/08/02 11:15 AM			
Routine			Analysis Time	170 3/8/02 3:36:00 PM	4 3/8/02 3:36:00 PM
Effluent					

Joann M. Slavin
Laboratory Manager

QAM No.	SEC 7
Revision No.:	2
Revision Date	3/5/02
Page	23 of 31

H2M LABS, INC.

FIGURE 7-4

FIGURE 7-5

H2M LABS, INC.

575 Broadhollow Road, Melville NY 11747
(631)694-3040 FAX (631)420-8436 NYSDOH ID# 10478

LABORATORY RESULTS

[redacted]

Lab No. : 0202109-001A

Sample Information
Type : Sewage

Attn To : [redacted]

Origin: Effluent

Client ID. : PLANT

Collected 2/5/02 11:00:00 AM
Received 2/5/02 3:08:00 PM
Collected By : CLIENT
Copies To : GWD

Parameter(s)	Results	Units	Method Number	Analyzed
Total Coliform	2400	MPN	M9221 BC	2/5/02 3:40:00 PM
Fecal Coliform	< 2	MPN	M9221 BC	2/5/02 3:40:00 PM

Qualifiers: E - Value above quantitation range
B - Results for Dilution

Date Reported : 2/12/02

Joann M. Slavin
Laboratory Manager

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FIGURE 7-6

H2M LABS, INC.
575 Broadhollow Road, Melville NY 11747
(631)694-3040 FAX (631)420-8436 NYSDOHID# 10478

LABORATORY RESULTS

[redacted]

Lab No. : 0202109-002A

Sample Information...
Type : Sewage

Attn To : [redacted]

Origin: Effluent

Client ID. : OUTFALL

Collected 2/5/02 11:10:00 AM
Received 2/5/02 3:08:00 PM
Collected By : CLIENT
Copies To : GWD

Parameter(s)	Results	Units	Method Number	Analyzed
Total Coliform	98	MPN	M9221 BC	2/5/02 3:45:00 PM
Fecal Coliform	< 2	MPN	M9221 BC	2/5/02 3:45:00 PM

Qualifiers: E - Value above quantitation range
D - Results for Dilution

Date Reported : 2/12/02

Joann M. Slavin
Laboratory Manager

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H2M LABS, INC.

FIGURE 7-7

H2M LABS, INC.

575 Broadhollow Road, Melville NY 11747
(631)694-3040 FAX (631)420-8436 NYSDOH ID # 10478

LABORATORY RESULTS

[redacted]

Lab No. : 0201425-001A

Sample Information
Type : Potable Water
Origin : Dist.
Routine

Attn To : [redacted]

Federal ID [redacted]

Collected : 1/17/02 10:40:00 AM
Received : 1/17/02 11:51:00 AM
Collected By : DF/SI
Copies To : NCHD

Client ID. : N-378858
Point No : N-370050
Location : FIRE HEADQUARTERS
NORTHERN BLVD.

Parameter(s)	Results	Units	Limit	Method Number	Analyzed
Dichlorodifluoromethane	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
Chloromethane	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
Vinyl chloride	< 0.5	µg/L	2	E502.2	1/22/02 2:04:44 AM
Bromomethane	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
Chloroethane	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
Trichlorofluoromethane	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
1,1-Dichloroethene	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
Methylene chloride	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
trans-1,2-Dichloroethene	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
1,1-Dichloroethane	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
cis-1,2-Dichloroethene	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
2,2-Dichloropropane	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
Bromochloromethane	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
Chloroform	< 0.5	µg/L	50	E502.2	1/22/02 2:04:44 AM
1,1,1-Trichloroethane	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
Carbon tetrachloride	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
1,1-Dichloropropene	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
1,2-Dichloroethane	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
Trichloroethene	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
1,2-Dichloropropane	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
Dibromomethane	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
Bromodichloromethane	< 0.5	µg/L	50	E502.2	1/22/02 2:04:44 AM
trans-1,3-Dichloropropene	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
cis-1,3-Dichloropropene	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
1,1,2-Trichloroethane	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
Tetrachloroethene	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
1,3-Dichloropropane	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
Dibromochloromethane	< 0.5	µg/L	50	E502.2	1/22/02 2:04:44 AM
Chlorobenzene	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
1,1,1,2-Tetrachloroethane	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
Bromoform	< 0.5	µg/L	50	E502.2	1/22/02 2:04:44 AM
Bromobenzene	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
1,1,2,2-Tetrachloroethane	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
1,2,3-Trichloropropane	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
2-Chlorotoluene	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
4-Chlorotoluene	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
1,2-Dichlorobenzene	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
1,3-Dichlorobenzene	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
1,4-Dichlorobenzene	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM

Results reported exceed(s) Regulatory Limit(s).
Result(s) flagged with * Exceed Regulatory Limit(s). Limit noted.

Date Reported : 2/20/02

Joann M. Marino
Laboratory Manager

FIGURE 7-8

H2M LABS, INC.
575 Broadhollow Road, Melville NY 11747
(631)694-3040 FAX (631)420-8436 NYSDOHID# 10478

[redacted]

LABORATORY RESULTS

Lab No. : 0201425-091A

Sample Information...
Type : Potable Water
Origin : Dist.
Routine

Federal ID 2902851
Collected : 1/17/02 10:40:00 AM
Received : 1/17/02 11:51:00 AM
Collected By : DF98
Copies To : NCHD

Client ID. : N-370050
Point No : N-370050
Location : FIRE HEADQUARTERS
NORTHERN BLVD.

Parameter(s)	Results	Units	Limit	Method Number	Analyzed
1,2,4-Trichlorobenzene	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
Hexachlorobutadiene	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
1,2,3-Trichlorobenzene	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
Benzene	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
Toluene	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
Ethylbenzene	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
m,p-Xylene	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
o-Xylene	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
Styrene	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
Isopropylbenzene	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
n-Propylbenzene	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
1,3,5-Trimethylbenzene	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
Methyl tert-butyl ether	< 0.5	µg/L	50	E502.2	1/22/02 2:04:44 AM
tert-Butylbenzene	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
1,2,4-Trimethylbenzene	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
4-Isopropyltoluene	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
sec-Butylbenzene	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
n-Butylbenzene	< 0.5	µg/L	5	E502.2	1/22/02 2:04:44 AM
Chloroform	< 0.5	µg/L	50	E510.1	1/22/02 2:04:44 AM
Bromodichloromethane	< 0.5	µg/L	50	E510.1	1/22/02 2:04:44 AM
Dibromochloromethane	< 0.5	µg/L	50	E510.1	1/22/02 2:04:44 AM
Bromoform	< 0.5	µg/L	50	E510.1	1/22/02 2:04:44 AM
Total Trihalomethanes	< 0.5	µg/L	100	E510.1	1/22/02 2:04:44 AM
Barium	< 0.20	mg/L	2	E200.7	1/29/02 10:17:00 AM
Beryllium	< 3.00	µg/L	4	E200.7	1/29/02 10:17:00 AM
Cadmium	< 5.00	µg/L	5	E200.7	1/29/02 10:17:00 AM
Calcium	3.96	mg/L		E200.7	1/29/02 10:17:00 AM
Chromium	< 0.01	mg/L	0.1	E200.7	1/29/02 10:17:00 AM
Copper	< 0.02	mg/L	1.3	E200.7	1/29/02 10:17:00 AM
Iron	< 0.02	mg/L	0.3	E200.7	1/29/02 10:17:00 AM
Magnesium	1.79	mg/L		E200.7	1/29/02 10:17:00 AM
Manganese	< 0.01	mg/L	0.3	E200.7	1/29/02 10:17:00 AM
Nickel	< 0.04	mg/L	0.1	E200.7	1/29/02 10:17:00 AM
Silver	< 0.01	mg/L	0.1	E200.7	1/29/02 10:17:00 AM
Sodium	15.3	mg/L		E200.7	1/29/02 10:17:00 AM
Zinc	< 0.02	mg/L	5	E200.7	1/29/02 10:17:00 AM
Arsenic	< 3.0	µg/L	50	E200.9	1/23/02 5:35:00 PM
Lead	< 1.0	µg/L	15	E200.9	1/21/02 5:40:00 PM
Antimony	< 5.0	µg/L	6	E200.9	1/21/02 1:45:00 PM

Result(s) reported meet(s) Regulatory Limit(s).
Result(s) flagged with * Exceed Regulatory Limit(s). Limit noted.

Date Reported : 2/20/02

Joann M. Slavin
Laboratory Manager

FIGURE 7-9

H2M LABS, INC.

575 Broadhollow Road, Melville NY 11747
(631)694-3040 FAX (631)420-8436 NYSDOHID# 10478

[redacted]

Attn To : [redacted]

Federal ID 2902851
Collected : 1/17/02 10:40:00 AM
Received : 1/17/02 11:51:00 AM
Collected By : DF98
Copies To : NCHD

LABORATORY RESULTS

Lab No. : 0201425-001A

Sample Information
Type : Potable Water
Origin : Dist.
Routine

Client ID. : N-370050
Point No : N-370050
Location : FIRE HEADQUARTERS
NORTHERN BLVD.

Parameter(s)	Results	Units	Limit	Method Number	Analyzed
Selenium	< 5.0	µg/L	50	E200.9	1/29/02 10:05:00 AM
Thallium	< 1.9	µg/L	2	E200.9	1/31/02 8:40:00 AM
Hardness, Calcium (As CaCO3)	9.9	mg/L		M2340 B	1/29/02 10:17:00 AM
Total Hardness (As CaCO3)	17.2	mg/L		M2340 B	1/29/02 10:17:00 AM
Mercury	< 0.20	µg/L	2	E245.1	1/23/02 10:43:01 AM
Gross Alpha (See Attached)	0.3(+-1.3)	pCi/l(T)	15	E900.0	2/12/02 3:53:00 PM
Gross Beta (See Attached)	1.8(+-2.4)	pCi/l(T)	15	E900.0	2/12/02 3:53:00 PM
Alkalinity, Total (As CaCO3)	35.9	mg/L		M2320 B	1/22/02 9:42:00 AM
Chloride	4.0	mg/L	250	E325.2	1/28/02 4:34:25 PM
Free Cyanide	< 10	µg/L	200	E335.2	1/21/02 3:36:00 PM
Color	< 5	units	15	E110.2	1/18/02 9:06:00 AM
Fluoride	< 0.10	mg/L	2.2	M4500F C	1/23/02 12:08:00 PM
LSI	-3.67	SI		24B LANGELIER	1/30/02
MBAS	< 0.08	mg/L		E425.1	1/18/02 7:46:00 AM
Nitrogen, Ammonia (As N)	< 0.10	mg/L		E350.1	1/25/02 2:42:47 PM
Nitrite as N	< 0.10	mg/L	1	E353.2	1/18/02 5:41:35 PM
Nitrate as N	2.11	mg/L	10	E353.2	1/24/02 3:34:46 PM
Odor	0	units	3	E140.1	1/18/02 9:05:00 AM
pH	7.1	pH Units		E150.1	1/17/02 5:04:00 PM
Sulfate	< 5.0	mg/L	250	E375.4	1/21/02 9:34:00 AM
Total Dissolved Solids	50	mg/L		E160.1	1/18/02 3:57:00 PM
Turbidity	< 1.0	NTU	5	E180.1	1/18/02 9:37:00 AM

Result(s) reported exceed(s) Regulatory Limit(s).
Result(s) flagged with * Exceed Regulatory Limit(s). Limit noted.

Date Reported : 2/20/02

Joann M. Marino
Laboratory Manager

FIGURE 7-10

H2M LABS, INC.
575 Broadhollow Road, Melville NY 11747
(631)694-3040 FAX (631)-420-8436 NYSDOHID# 10478

[redacted]

Attn To : [redacted]

LABORATORY RESULTS

Lab No. : 0201425-002A

Sample Information...
Type : Potable Water
Origin : Dist.
Routine

Federal ID 2902851
Collected : 1/17/02 11:05:00 AM
Received : 1/17/02 11:51:00 AM
Collected By : DF59
Copies To : NCHD

Client ID. : M-370080
Point No : N-370080
Location : FIRE STATION #2
MINEOLA AVE.

Parameter(s)	Results	Units	Limit	Method Number	Analyzed
Dichlorodifluoromethane	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
Chloromethane	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
Vinyl chloride	< 0.5	µg/L	2	E502.2	1/22/02 3:00:41 AM
Bromomethane	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
Chloroethane	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
Trichlorofluoromethane	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
1,1-Dichloroethene	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
Methylene chloride	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
trans-1,2-Dichloroethene	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
1,1-Dichloroethane	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
cis-1,2-Dichloroethene	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
2,2-Dichloropropane	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
Bromochloromethane	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
Chloroform	< 0.5	µg/L	50	E502.2	1/22/02 3:00:41 AM
1,1,1-Trichloroethane	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
Carbon tetrachloride	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
1,1-Dichloropropene	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
1,2-Dichloroethane	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
Trichloroethene	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
1,2-Dichloropropane	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
Dibromomethane	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
Bromodichloromethane	< 0.5	µg/L	50	E502.2	1/22/02 3:00:41 AM
trans-1,3-Dichloropropene	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
cis-1,3-Dichloropropene	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
1,1,2-Trichloroethane	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
Tetrachloroethene	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
1,3-Dichloropropane	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
Dibromochloromethane	< 0.5	µg/L	50	E502.2	1/22/02 3:00:41 AM
Chlorobenzene	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
1,1,1,2-Tetrachloroethane	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
Bromoform	< 0.5	µg/L	50	E502.2	1/22/02 3:00:41 AM
Bromobenzene	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
1,1,2,2-Tetrachloroethane	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
1,2,3-Trichloropropane	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
2-Chlorotoluene	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
4-Chlorotoluene	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
1,2-Dichlorobenzene	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
1,3-Dichlorobenzene	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
1,4-Dichlorobenzene	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM

Result(s) reported exceed(s) Regulatory Limit(s).
Result(s) flagged with * Exceed Regulatory Limit(s). Limit noted.

Date Reported : 2/20/02

Joann M. Slevin
Laboratory Manager

FIGURE 7-11

H2M LABS, INC.
575 Broadhollow Road, Melville NY 11747
(631)694-3040 FAX (631)420-8436 NYSDOH ID# 10078

LABORATORY RESULTS

[redacted]

Attn To : [redacted]

Lab No. : 6201425-002A

Sample Information
Type : Potable Water
Origin : Dist.
Residue

Federal ID 2902851
Collected : 1/17/02 11:05:00 AM
Received : 1/17/02 11:51:00 AM
Collected By : DF99
Copies To : NCHD

Client ID. : N-370080

Point No : N-370080
Location : FIRE STATION #2
MINEOLA AVE.

Parameter(s)	Results	Units	Limit	Method Number	Analyzed
1,2,4-Trichlorobenzene	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
Hexachlorobutadiene	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
1,2,3-Trichlorobenzene	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
Benzene	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
Toluene	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
Ethylbenzene	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
m,p-Xylene	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
o-Xylene	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
Styrene	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
Isopropylbenzene	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
n-Propylbenzene	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
1,3,5-Trimethylbenzene	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
Methyl tert-butyl ether	< 0.5	µg/L	50	E502.2	1/22/02 3:00:41 AM
tert-Butylbenzene	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
1,2,4-Trimethylbenzene	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
4-Isopropyltoluene	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
sec-Butylbenzene	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM
n-Butylbenzene	< 0.5	µg/L	5	E502.2	1/22/02 3:00:41 AM

Result(s) reported exceed(s) Regulatory Limit(s).
Result(s) flagged with * Exceed Regulatory Limit(s). Limit noted.

Date Reported : 2/20/02

Laboratory Manager

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H2M LABS, INC.
575 Broad Hollow Road, Melville NY 11747
(631) 694-3040, FAX (631) 420-8436 NYSDOH ID# 10478

LABORATORY RESULTS

[redacted]

Received : 03/28/02 1:54 PM
Collected By : SHW03
Sample Type : Potable Water

Federal ID [redacted]
Copies To : NCHD, JRH

Date Reported : 4/1/02

Lab Number	Location	Collected		Total Coliform	E Coliform	Total Residual Chlorine	pH
			Units			mg/L	pH Units
			Method	M9223	M9223	M4500-Cl G	E160 1
			Limits	Negative	Absent	N/A	N/A
0303653-001A	9	03/28/02 12 02 PM	Analysis	Negative	Absent	0.5	7.0
Routine	KAR-N-TRUK		Time	3/30/03 11:30:00 AM	3/30/03 11:30:00 AM	3/28/03	3/28/03 5:05:00 PM
Dist.	2089 JERICHO TPKE,NEW HYDE PARK						
0303653-002A	10	03/28/02 11 11 AM	Analysis	Negative	Absent	0.1	6.9
Routine	NHP VILLAGE GARAGE		Time	3/30/03 11:30:00 AM	3/30/03 11:30:00 AM	3/28/03	3/28/03 5:07:00 PM
Dist.	400 STEWART AVE., NEW HYDE PARK						
0303653-003A	42	03/28/02 12 34 PM	Analysis	Negative	Absent	0.7	7.1
Routine	TNH DEPT OF PARKS & REC.		Time	3/30/03 11:30:00 AM	3/30/03 11:30:00 AM	3/28/03	3/28/03 5:09:00 PM
Dist	1001 EVERGREEN, NEW HYDE PARK						
0303653-004A	62	03/28/02 11 34 AM	Analysis	Negative	Absent	0.3	7.1
Routine	STEWART MANOR RR STATION		Time	3/30/03 11:30:00 AM	3/30/03 11:30:00 AM	3/28/03	3/28/03 5:09:00 PM
Dist	NEW HYDE PARK & MANOR RD.						
0303653-005A	77	03/28/03 11 47 AM	Analysis	Negative	Absent	0.3	7.2
Routine	N H P VILLAGE HALL		Time	3/30/03 11:30:00 AM	3/30/03 11:30:00 AM	3/28/03	3/28/03 5:10:00 PM
Dist.	1430 JERICHO TPKE., NEW HYDE PARK						

Result(s) reported meet(s) Regulatory Limit(s).
Result(s) flagged with * Exceed Regulatory Limit(s). Limit noted.

Joann M. Slavin
Laboratory Manager

QAM No.	SEC 7
Revision No.:	2
Revision Date	3/5/02
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H2M LABS, INC.

FIGURE 7-12

SECTION 8.0

8.0 QUALITY CONTROL

8.1 Responsibility Designation

The authority and responsibility for QA is delegated to the QA/QC Manager, Lynn T. Daniello. Ms. Daniello reports directly to John J. Molloy, President of H2M labs, Inc. Mr. Molloy is informed of any deficiencies or non-conformances in the system and the corrective action measures implemented to ensure compliance in the future. Ms. Daniello reviews the results generated in the laboratory and enforces the QA requirements. She is also responsible for educating the supervisors and analysts of the QA requirements for their department. An annual quality systems review is performed with the Laboratory Director.

The individual analyst is responsible for the day-to-day quality control requirements of the particular method and documentation. The supervisor's function is to check the conformance of the documentation and ensure its compliance. The QA/QC manager performs spot checks of the logbooks and discusses deficiencies with the supervisor.

The basic responsibility of the analyst performing a method is the quality of the product produced. The inherent requirements of an analytical method as well as the quality control mandated must be addressed in a real-time situation.

Since quality control is "the technical operations which are designed to ensure that the data generated in the laboratory are produced with known limits of accuracy and precision". The method utilized, as well as the means of use are critical.

The supervisors' responsibilities include the verification that the appropriate method and usage of the method are performed and that the in-house established quality control limits are met.

8.2 Method Requirement

The QC procedures in place in the laboratory are derived from Good Laboratory Practices and Analytical Quality Control Procedures. The QC requirements as stated in the method are adhered. The QC stipulated in the NYS DOH ELAP Manual must also be followed. Method QC is documented in the in-house SOP's.

8.3 Internal Quality Control

The data acquired from QC procedures are used to estimate the quality of the data to determine the need for corrective action, and to interpret results following corrective actions are implemented. Details of each method stipulated QC is stated in the method standard operating procedure (SOP). When no method limits exist, QC limits are generated in-house. QC limits

for laboratory control samples (LCS) and matrix spikes (MS) are based on 20 data points, calculating the mean recovery plus or minus three standard deviation units. Duplicate limits for precision range from zero to 3.27 times the mean of the historical differences or relative percent differences

If less than 20 data points are available, interim QC limits are used. These are 70-130% recovery for accuracy and 20% relative percent difference for precision.

All quality control measures are assessed and evaluated on an on-going basis.

Results of LCS and duplicate results are tabulated. Analytical data that are generated with QC samples that fall within the acceptance limits indicate the method is in control. Data generated with QC samples that fall outside QC limits indicate the test method was out of control. These data are considered suspect and the associated samples are re-analyzed or reported with qualifiers if re-analysis is not possible. This evaluation is performed by the analyst running the samples. The analysts responsibilities include evaluating the results compared to the required QC limits and initiating corrective action if needed. If minor corrective action is needed and reanalysis corrects the problem no non-conformance report is needed. However if the non-conformance requires a resampling or re-extraction , the analyst completes a form and distributes it to the QA Manager and the QC Department. If there is a specific project manager, they also would receive a copy. The QA/QC department then reviews the non-compliance and takes action by either contacting the client to inform them and asking for feedback or initiating an investigation by a technical nature to determine the root cause of the problem. If data must be reported even though all QC requirements were not met, the affected sample results must be qualified in the case narrative (if applicable) or by qualifying the data on the report form.

8.3.1 Calibration Procedures, Frequency, and Essential Quality Control

The following is an overview of the required QC for analysis. More specific QC with limits for some methods can be found in the following tables.

- Positive and negative controls: such as blanks, spikes reference standards and zero blanks
- Precision data: such as duplicates or matrix/matrix spike duplicates
- Accuracy data: such as check standards, lab fortified blanks, calibration materials, proficiency samples, blind samples
- Evaluation of test performance: such as MDL's, linearity

- Selection of appropriate formulae: such as internal standards, linear regression
- Selection of proper quality of standards and reagents
- Measures to assure the selectivity of the test for its intended purpose
- Measures to assure constant and consistent test conditions (both instrumental and environmental) such as temperature, humidity, light

SUMMARY OF ESSENTIAL QC FOR CHEMICAL ANALYSIS

REFERENCE	TYPE OF CONTROL	FREQUENCY	CRITERIA
Negative control	Method blank	1 per batch/matrix type/sample extraction or prep method	Must be less than1/10 of regulatory level or 1/10 any positive result
Positive control	Matrix spikes	1 per 20 samples/matrix type/prep method	Advisory only
Positive control	Lab fortified blank	1 per batch/prep proc	Method dependent
Positive control	Laboratory control Sample	1 per batch/prep proc.	Method dependent
Precision	Matrix spike/matrix spike duplicate or duplicates	1per20/ matrix /prep proc	Advisory
Method evaluation	Demonstration of capability	Initial verification per analyst	Method dependent
Method evaluation	Calibration	Initially with daily verification	Method dependent

SUMMARY OF ESSENTIAL QC FOR CHEMICAL ANALYSIS (CONTINUED)

REFERENCE	TYPE OF CONTROL	FREQUENCY	CRITERIA
Method evaluation	Proficiency results	Nelac freq	NELAC spec
Sensitivity	Method detection limit	Yearly	Method dependent
Data reduction	Documentation	Not specified	Protocol dependent
Quality of standards and reagents	Reagent quality checks	Reagent grade	Per label
Quality of standards and reagents	Water quality checks	Bottle checks monthly	Less than reporting limit
Selectivity	Absolute retention time and relative retention time	Method dependent	Instrument dependent
Constant and consistent test conditions	Instrument stability	None specified	Method dependent
Constant and consistent test conditions	Glassware cleaning	Method dependent	Protocol dependent

ESSENTIAL QUALITY CONTROL REQUIREMENTS FOR MICROBIOLOGY

REQUIREMENTS	TYPE OF CONTROL	FREQUENCY	CRITERIA
Negative control	Sterility checks and Blanks	Method specified	Method specified
Negative control	Uninoculated control	Method specified	None specified
Positive control	Positive	Monthly	None specified
Precision	Duplicates	5% of suspected positives	None specified
Precision	Proficiency tests	NELAC	None specified
Method Evaluation	Proficiency tests	NELAC	To be specified
Method Evaluation	Method validation	Method dependent	None specified
Test Performance	Media appropriateness	Check prior to use	None specified
Data Reduction	Analyst counting	Verify ability to count monthly	None specified
Quality of Standards, Reagents and Media	Shelf life for reagents and media	Manufacturer specified	Manufacturer specified
Quality of Standards, Reagents and Media	Water quality	Free from bacterial and inhibitory substances	Method specified

ESSENTIAL QUALITY CONTROL REQUIREMENTS FOR MICROBIOLOGY (CONTINUED)

REQUIREMENTS	TYPE OF CONTROL	FREQUENCY	CRITERIA
Selectivity	Traceability/selectivity	Reference cultures	Not specified
Selectivity	Confirmation/verification	Method specified	Method specified
Quality of Standards, Reagents and Media	Detergent inhibition	Check detergent lot(initially verify)	Not specified
Constant and Consistent Test Conditions	Contaminant monitoring	Trend analysis	Not specified
Constant and Consistent Test Conditions	Autoclave performance	Within temperature tolerances	Method specified
Constant and Consistent Test Conditions	Performance of volumetric equipment	Manufacturer specified	Manufacturer specified
Constant and Consistent Test Conditions	Measurement instruments	Manufacturer specified	Manufacturer specified

8.4 Testing Discrepancies

Specific corrective action protocols for handling out-of-control QC are stated in each SOP. General procedures are followed to determine when departures from quality controlled have occurred.

Due to sampling schedule and time frame of analysis, it is not always possible to repeat the analysis if the quality control measures are not acceptable. If a quality control measure is found to be out-of-control and the data is to be reported, all samples associated with the failed quality control measure are reported with the data qualified. This may occur by the addition of the qualifier to the result, e.g. B – analyte detected in method blank, E – concentration level over calibration; J – estimated result or but documenting the discrepancy in the case narrative (if it is a full data package) or by indicating the non-conformance in the remarks section in the lab report.

A non-conformance report is completed documenting the out-of-control QC event and stating corrective measures to prevent re-occurrence.

8.5 Corrective action and Determination of QC Limits

The quality control requirements of the analytical methods are stated in the individual method standard operating procedures. In-house limits such as accuracy and precision limits are established annually. "Real time" checking of the data by the analyst is performed. (when possible, e.g. overnight run.) The analyst is responsible for reviewing the initial calibration, blank and QC check criteria for adherence to the method requirements prior to initiating sample analysis.

On going QC is checked by the analyst either in real time or the following morning for an overnight run. The analyst is responsible for reviewing the data in comparison with the QC of the method. Analysis proceeds if all QC is met and is halted if not met. The noncompliance is reviewed by the analyst and corrective measures are taken to correct the situation. These may include but are not limited to: checking calculation, verification of standard, recalibrating instrument, baking out instrument etc.

The analysis then proceeds. If the QC criteria are met, the samples are analyzed. If the nonconformance remains, the department supervisor is notified and is involved in the decision making process of corrective action.

If due to holding time constraints, analysis must proceed, another instrument will be used if available. If no other instrument is available, the QA manager is notified and if the QC requirement does not effect the sample results, the sample analysis may be approved and the discrepancy noted on the report or in the case narrative. The QA manager or Technical manager may override the QC requirement. This is documented in the run log by the initials, date and a short statement of the noncompliance and that it was approved. No approval is granted without the documentation in the run log by either the QA Manager or Technical Manager only.

The corrective actions of the method included instrument maintenance, solution checking, re-calculation, re-analysis, re-extraction, etc. These actions are needed to produce data of an acceptable quality for reporting.

The tables at the end of the section (Tables 8.5A through 8.5G) outline corrective action measures needed for the particular methods to ensure that the quality control criteria stated is met.

Statistical techniques are used to monitor and evaluate data quality. Calculations of the mean, standard deviation, confidence limits, correlation co-efficient, relative percent difference and percent error are needed for validation of test methods. Tables summarizing quality control data are also necessary for monitoring the system to determine a trend analysis.

8.6 Exceptionally Permitted Departures From Documented Policies and Procedures from Standard Specifications

All policies and procedures in place in the laboratory must be adhered. Departures from documented policies and procedures may be permitted if approved by the QA Manager or Technical Manager. This departure must be fully documented and include the reason for departure and signed and dated by either the Technical or QA Manager. No departures are permitted unless this procedure is followed. The client is made aware of the departure and permission may be granted for the departure. In all cases, the clients are informed either via telephone, fax, a non-conformance or the case narrative.

8.7 Solvents, Reagents, and Adsorbent Check Analysis

All solvents and reagents are routinely demonstrated to be free from contamination under the conditions of the analysis by analyzing laboratory reagent blank.

All solvents and reagents are monitored and lot numbers, date of opening and expiration date are maintained in a log book. For organic sample preparation, the solvents and reagents are checked before usage. Each lot of sodium sulfate is extracted with hexane and analyzed by GC/EC prior to use. Every lot of solvent is analyzed to determine that is free of interferences before use. The various adsorbent materials are also checked.

8.7.1 Calibration Check of GPC Column

Once a week the matrix spike solution and an Aroclor solution are loaded on one of the GPC columns for a recovery check.

- Concentrate two ml of the matrix spike solution to one ml and dilute to 10 ml with MC. Charge the GPC system with five ml of this dilution.
- Perform GPC cleanup using the same "dump" and "collect" cycles as for samples.
- Concentrate Fraction II and solvent exchange to 10 ml hexane.
- Omit Florisil cleanup.
- Repeat procedure with five ml MC solution containing 0.2 ug/ml each of AR1016 and AR1260. Analyze both concentrates by GC.
- Determine recoveries for the matrix spike solution. Recoveries must be 80 to 110 percent. (The final extract will be approximately 1/10 of the original matrix spike solution concentration.)
- Examine Aroclor pattern for AR1660 injection. Ratio of peaks should not be changed from standard pattern.

8.7.2 Maintenance of GPC Column

To prevent contaminations of samples introduced by a dirty GPC system, the following maintenance schedule has to be strictly adhered. GPC Blanks and maintenance steps have to be recorded in the GPC Calibration/Maintenance Log Book for all columns.

- Flush column for 10 minutes in a "wash" cycle and discard this fraction (Fraction III).
- Rinse the sampling loop and injection valve (Hamilton Valve) with at least 10 ml of solvent before loading next sample
- Either a disposable filter is used for each sample or the filter holder for the pre-filtering of sample extracts has to be cleaned vigorously between samples.
- After a maximum of 10 samples per column, a GPC blank has to be run through the system. This consists of 0.5 ml pesticide surrogate solution, used for NYSDEC CLP, and 4.5 ml MC. This GPC blank has to be concentrated, solvent exchanged and checked for contaminations by GC/ECD. No interferences larger than minimum detection limits (MDL) of pesticides and no other large peaks should be found in the chromatograms. Only identification on one column should determine the MDL pesticides criterion. Secondary column confirmation need not be performed. A GPC blank check should be performed after particularly dirty samples, even if 10 samples have not yet been cleaned. NO SAMPLE CAN BE CLEANED UP ON THE SYSTEM UNTIL A CLEAN GPC BLANK CAN BE OBTAINED. Any or all of the following cleaning steps can be performed in order to achieve clean GPC blanks.
- To clean system, pump MC through the system for one to two hours.
- Pre-columns, consisting of SPE cartridges packed with Bio Beads SX-3, have to be replaced frequently. Recommended frequency is 20 samples, if appearance indicates contamination or blank shows contaminations.
- Column frits have to be replaced at intervals of 100 samples throughput.
- Discoloration of column may not necessarily yield dirty sample extracts. Usually, however, it coincides with contamination being leached out and the column should be repacked.
- Other reasons for re-packing a column are: required flowrate cannot be maintained due to column backpressure. (Column must be isolated to determine that no other clogs exist in the system.); column shows large gaps; resolution between chromatographic peaks on the UV trace cannot be achieved.
- If a sufficiently clean blank cannot be obtained, or after a sample throughput of 50 samples, flush several volumes of five ml each of methylene chloride through system.
- Flowrate of five ml per minute must be maintained. Clogs can be isolated by different valve settings or eliminating sections of the

system. Backflushing or dismantling and then sonicating components can be used to unclog the system.

8.7.3 Florisil Cleanup

This cleanup procedure elutes all pesticides/PCBs into one fraction with a moderately polar solvent mix that leaves more polar contaminations adsorbed on the cartridge packing.

The compound trichlorophenol (TCP) is used as a representative polar contaminant during the Florisil cartridge performance check. Prepackaged cartridges with Teflon or SS-frits can be used or Kontes Disposaflex glass columns with pesticide-grade rinsed glasswool are packed with 0.5 gram or one gram of Florisil.

Each batch or lot of cartridges packed in-house or purchased also has to be tested with the performance test mixture to assure adequate pesticide recovery.

8.7.4 Florisil Cartridge Performance Check

- To prepare FCPC solution, mix 0.5 ml acetone solution, containing 0.1 ug/ml of TCP and 0.5 ml of standard mix A (medium level), with four ml hexane and concentrate to 0.5 ml. Mix 0.5 ml ICP hexane solution with 0.5 ml mix A standard.
- Mount cartridge to be tested on Supelco manifold. Keep individual cartridge valves closed until mounting solvent.
- At about one psi or less, rinse cartridges with at least five ml of 90:10 hexane/acetone mix. Open valves enough to adjust flowrate not to exceed approximately three ml per minute. Note optimal valve position.
- Close valves. Place labeled collection tubes under cartridges.
- Load one ml FCPC mix onto cartridges.
- Open valve, rotating to previous flow position.
- Without letting cartridges go to dryness, elute with nine ml 90:10 hexane/acetone.
- Rinse cartridges with additional two ml hexane and collect in same collection tubes.
- Concentrate elutes to one ml.
- Analyze by GC. Recovery for the targeted compounds must be 80 to 115 percent. Concentration will be approximately half of the INDA concentration and TCP recovery must be under five percent.

8.8 Reference Material Analysis

8.8.1 Standards:

All stock standards used in the laboratory are purchased from chemical supply companies. Documentation is maintained to verify the integrity of the standard solution. This is purchased or supplied through the supplier of the standard and maintained in the laboratory.

Standard solutions are also purchased from commercial vendors such as Ultra Scientific and Accustandard. Certified reference materials are used as laboratory control standards. If available, National Institute of Standards and Technology (NIST) Standard Reference Materials are used. Internal reference standards are prepared independently from the standards used for calibration.

Volatile Organic standards are prepared from commercially available mixes such as Restek and Supelco. The standards are replaced every month or sooner if necessary. Gases are replaced on a weekly basis.

The semi-volatile and pesticide standards are prepared from neats (pure compounds), and commercial mixes. Stock standard are replaced every six months or sooner if necessary.

Standards used for metals analysis are prepared in water with a matrix similar to the samples. Standards are used that bracket the concentration range of interest. Working standards are prepared daily from stock standards. The stock standards are purchased from commercial sources such as Plasma Pure and Fischer Scientific. Expiration dates are monitored, and standards are disposed of prior to that date.

8.9 Corrective Action and Determination of QC Limits

The quality control requirements of the analytical methods are stated in the individual method standard operating procedures. In-house limits such as accuracy and precision limits are established annually. "Real time" checking of the data by the analyst is performed (when possible, e.g. overnight run.) The analyst is responsible for reviewing the initial calibration, blank and Q.C. check criteria for adherence to the method requirements prior to initiating sample analysis.

On going Q.C. is checked by the analyst either in real time or the following morning for an overnight run. The analyst is responsible for reviewing the data in comparison with the Q.C. of the method. Analysis proceeds if all Q.C. is met and is halted if not met. The noncompliance is reviewed by the analyst and corrective measures are taken to correct the situation. These may include but are not limited to: Checking calculation, verification of standard, recalibrating instrument, baking out instrument etc.

The analysis then proceeds. If the Q.C. criteria are met, the samples are analyzed. If the nonconformance remains, the department supervisor is notified and is involved in the decision making process of corrective action.

If due to holding time constraints, analysis must proceed, another instrument will be used if available. If no other instrument is available, the QA manager is notified and if the Q.C. requirement does not effect the sample results, the

sample analysis may be approved and the discrepancy noted on the report or in the case narrative. The Q.A. manager or Technical manager may override the Q.C. requirement. This is documented in the run log by the initials, date and a short statement of the noncompliance and that it was approved. No approval is granted without the documentation in the run log by either the Q.A. Manager or Technical Manager only.

The corrective actions of the method included instrument maintenance, solution checking, re-calculation, re-analysis, re-extraction, etc. These actions are needed to produce data of an acceptable quality for reporting.

The tables cited in Section 8.5 list the corrective action measures needed for the particular methods to ensure that the quality control criteria stated is met.

Statistical techniques are used to monitor and evaluate data quality. Calculations of the mean, standard deviation, confidence limits, correlation co-efficient, relative percent difference and percent error are needed for validation of test methods. Tables summarizing quality control data are also necessary for monitoring the system to determine a trend analysis.

TABLE 8.5A
QC SUMMARY

METHOD: 8260B

PARAMETERS: PURGEABLE ORGANICS

	Tune Performance	System Evaluation	Calibration Check	Instrument Blank	Matrix Spike Sample/ Matrix Spike Duplicate	Matrix Spike Blank	System Monitoring Compound Recoveries	Internal STD Area and RT
Measure Taken	BFB Injection	Initial calibration standards 5 levels	Continuing calibration standard run	Analyze Nanopure water	Run sample spiked with select standard mix	Run reagent water spiked with select standard mix	Add system monitoring compounds	Compare I.S. area and RT of 12 hour Std to samples
Frequency	Every 12 hours	Good until cont. calibration not met or change in system	Every 12 hours	Every 12 hours	One per 20 samples or SDG or matrix or 7 days sampling	One per 20 samples or SDG or matrix or 7 days sampling	All standards, blanks, samples, MS/MSD, MSB	every sample
Acceptance Criteria	Ion abundance must meet ASP criteria in Table 5.2.1E	Maximum %RSD and minimum RRF in Table 5.2.1F	Maximum %D and minimum RRF in Table 5.2.1F	Common solvents <5 x CRQL Others <CRQL	Advisory see Table 5.2.1H	See Table 5.2.1H	Achieve recoveries See Table 5.2.1G	RT: ± 30 seconds from Std, I.S. area -50% to +100% from Std
Corrective Action	Tune with FC 43 or PFTBA	1. New standard 2. Leak check 3. Column 4. Trap	Recalibrate Using the 5 levels	1. Check spikes for contam-ination 2. Bake instrument 3. Re-analyze samples assoc.	Not required	1. Re-analyze MSB/MS/ MSD 2. Check solution 3. Check system	1. Check for calc erros 2. Check inst. 3. Re-analyze	1. Inspect MS system 2. Re-analyze samples

TABLE 8.5B
QC SUMMARY

METHOD: CLP BNA

PARAMETERS: EXTRACTABLE ORGANICS BY GC/MS

	Tune Performance	System Evaluation	Calibration Check	Instrument Blank	Matrix Spike Sample/ Matrix Spike Duplicate	Matrix Spike Blank	System Monitoring Compound Recoveries	Internal STD Area and RT
Measure Taken	DFTPP Injection	Five calibration standard runs	Continuing calibration standard run	Analyze Nanopure filtered water	Run sample spiked with select standard in duplicate	Run reagent water with spiked select standard	Spike system monitoring compounds into samples, blank standards, MS, MSD, MSB	Monitor I.S. area and RT of samples and compare samples
Frequency	Every 12 hours	Good until cont. calibration not met or change in system	Every 12 hours	Per Extraction batch	One per 20 samples or SDG or matrix or 7 days collection	One per 20All samples or SDG or matrix or 7 days collection	standards, blanks, samples, MS standards, MSD, MSB	Every 12 hours
Acceptance Criteria	Ion abundance must meet ASP criteria in Table 5.2.2E	Maximum %RSD and minimum RRF in Table 5.2.2F	Maximum %D and minimum RRF in Table 5.2.2F	Common phthalate esters <5 x CRQL all others <CRQL	See Table 5.2.2H	See Table 5.2.2H	See Table 5.2.2G	RT: 30 seconds from Std, I.S. area: within –50% to +100%
Corrective Action	Tune with FC 43 or PFTBA	1. New standard 2. Leak check 3. Column 4. Trap	1. Recalibrate 2. Re-do initial calibration	1. Alleviate phthalate source 2. Re-extract SDG	Advisory	1. Check spiking 2. Re-analyze MS/MSD	1. Check solution 2. Check system 3. Re-analyze	1. Check solutions 2. Check system 3. Re-analyze

TABLE 8.5C
QC SUMMARY

METHOD: CLP-M

PARAMETERS: PESTICIDES/PCBS

	Initial and Continuing Calibration Column Resolution	Initial Calibration Linearity	Initial and Continuous Calibration Breakdown	Matrix Spike Blank	Method Blank
Measure Taken	Initial and continuing calibration and PEM and resolution check std (RESC)	Determine linearity by analyzing min 3 levels of Std for mixture standard single level for multi-component	Initial and continuing calibration and PEM analyzed and endrin and DDT breakdown calculated in the PEM	Reagent water spiked with select list of analytes and surrogates extracted	Reagent water Spiked with surrogate
Frequency	Initially or when continuing calibration not met or major change to system	Initially or when continuing calibration not met or major change to system	Initially or when continuing calibration not met or major change to system	Each SDG or 7 days or matrix or 20 samples	Each batch of Samples Extracted
Acceptance Criteria	PEM: all peaks must be 90% resolved on columns Ind. A&B: midpoint conc. Resolution must be ≥90% %D: ≤ 25% of true value, %RSD ≤ 20%, %RSD surrog. ≤ 30% except <25% □- and □-BHC Resc. 60% resolution Two may be out but must be ≤ 30%		Breakdown of DDT and endrin in the PEM ≤ 20%, combined breakdown ≤ 30%	See Table 5.2.3D	Less than CRQL
Corrective Action	1. Change the parameter (e.g. temp. prog or flow) 2. Re-analyze	Re-calibrate	1. Clip column 2. Clean injection port area	1. Check solution 2. Check instrument response 3. Re extract and reanalyze	1. Determine cause of contamination 2. Re-extract and re-analyses

TABLE 8.5D
QC SUMMARY

METHOD: 8141A

PARAMETERS: ORGANOPHOSPHOROUS PESTICIDES

	INITIAL CALIBRATION LINEARITY	CONTINUING CALIBRATION	SURROGATE STANDARD RECOVERY	MS/MSD	LAB FORTIFIED BLANK	METHOD BLANK
Measure Taken	Six calibration standard runs	Analyze continuing Calibration Standard	Run sample spiked With select standard In duplicate	Run sample spiked W/ select standard In duplicate	Run reagent Water spiked W/ select standard	Analyze Nanopore water
Frequency	Good until calibration not Met or change in s	Initially and after Every 10 samples	All standards, bla Samples, MS/MSD, LFB	One per 20 samples Or SDG, or matrix Or 7 days collection	One per 20 samples Or SDG, or matrix Or 7 days collection	One per Extraction batch
Acceptance Criteria	%RSD < 20%	%D < 15% on quantitation column	Achieve recoveries (See table 5.2.4B)	See table 5.2.4B	See table 5.2.4B	< CRQL
Corrective Action	Linear regression function used Or second order function Or quadratic curve	1. reinject 2. new solution 3. instrument corrective action 4. analyze new initial calibration	Check solution Check system Re-analyze	Advisory	Check solution Check system Re-analyze MSB/ MS/MSD	Identify source Of contamination Re-analyze

TABLE 8.5E
QC SUMMARY

METHOD: 8150B

PARAMETERS: CHLORINATED HERBICIDES

	INITIAL CALIBRATION LINEARITY	CONTINUING CALIBRATION	SURROGATE STANDARD RECOVERY	MS/MSD	LAB FORTIFIED BLANK	METHOD BLANK
Measure Taken	Six calibration standard runs	Analyze continuin Calibration Standard	Run sample spiked With select standard In duplicate	Run sample spiked W/ select standard In duplicate	Run reagent Water spiked W/ select standard	Analyze Nanopore water
Frequency	Good until calibration not Met or change in system	Initially and after Every 10 samples	All standards, blank Samples, MS/MSD, LFB	One per 20 samples Or SDG, or matrix Or 7 days collection	One per 20 samples Or SDG, or matrix Or 7 days collection	One per Extraction batch
Acceptance Criteria	%RSD < 20%	%D < 15% on quantitation colu	Achieve recoveries (See table 5.2.5C)	See table 5.2.5C	See table 5.2.5C	< CRQL
Corrective Action	Linear regression function used Or second order function Or quadratic curve	1. Reinject 2. new solution 3. instrument corrective action 4. analyze new initial calibration	Check solution Check system Re-analyze	Advisory	Check solution Check system Re-analyze MSB/ MS/MSD	Identify source Of contaminatic Re-analyze

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TABLE 8.5F
QC SUMMARY

METHOD: CLP M

PARAMETERS: TAL METALS

	Verification of Linearity at CRQL	System Evaluation Calibration	Calibration Check ICV and CCV	Instrument Blank	Spiked Sample	Duplicate	Preparation Blank	ICP Interference check sample	Laboratory Control Sample (LCS)	ICP Serial Dilution
Measure Taken	Analyze at CRA, and the CRDL samples	Analyze a blank standard independence for calibration levels	Analyze standard independent from calibration	Analyze ICB and CCBs	Sample spiked with analytes	Analyze a sample twice	A prep blank carried through prep and analysis	Analyze ICS, ICS A and ICS B	Carry through prep. & analyze aqueous and solid LCS	Analyze a 5 fold dilution of sample that is 50x IDL
Frequency	After the ICV in each Analysis	Each 24 hours of use	10% or every 2 hrs during analysis whichever is more frequent	10% or every 2 hrs during analysis whichever is more frequent	One per matrix and conc. or SDG whichever is more frequent	One per matrix and conc. or SDG which-ever is more frequent	One per SDG or with each batch of samples digested whichever is more frequent	At beginning and end of analysis run of minimum of 2x per 8-hr.whichever is more frequent	One LCS Per batch digested per matrix or per SDG whichever is more frequent except Hg and Cn	If analyte conc. Is at minimum of factor of 50 above IDL on each group of samples of a similar matrix or for each SDG
Acceptance Criteria	Advisory	± 5% of true value except at CRDL	See Table 7.5B	Absolute value must be less than or equal to the CRDL	Spike recov. Should be between 75-125% except if sample conc. 4x > spike conc.	> 5x CRQL RPD 20%, < 5x CRQL or one above and one below RPD ± CRQL	The absolute value must be less than or equal to CRQL	ICS AB must be within ± 20% of true value	80–120% except Ag & Sb, soil/sed's limits provided 10/LCS	Dilution must be within 10% of the original determination
Corrective Action	None	Re-calculate	1. Stop analysis 2. Correct problem 3. Re-calibrate 4. Re-analyze	1. Stop analysis 2. Correct problem 3. Re-calculate 4. Re-analyze	Flag with "N" and for non-furnace & Hg elements also perform a post-spike	Flag with "*"	If above CRDL, the lowest conc. in the smpls must be 10x blank conc. or re-digested and re-analyzed	1. Stop analysis 2. Correct problem 3. Re-calibrate 4. Re-analyze	1. Terminate 2. Correct 3. Re-digest/ re-analyze	Flag with "E"

TABLE 8.5G
QC SUMMARY

Parameter	Method	ICV/ CCV/ Freq	ICV/ CCV Limits	Matrix Spike Freq	Matrix Spike Limits *	ICB/ CCB Freq	ICB/ CCB Limits	DUP Freq	RPD Limits
Alkalinity	310.1	1 per 10	± 25%	1 per 20	± 25%	1 per 10	± CRQL	1 per 20	± 20
BOD	405.1	1 per 10	± 25%	NA	NA%	1 per 10	± CRQL	1 per 20	± 20%
Bromide	320.1	1 per 10	± 20%	1 per 20	± 25%	1 per 10	± CRQL	1 per 20	± 20% or CRDL
Chloride	325.2	1 per 10	± 20%	1 per 20	± 25%	1 per 10	± CRQL	1 per 20	± 20% or CRQL
Nitrate	353.2	1 per 10	± 20%	1 per 20	± 25%	1 per 10	± CRQL	1 per 20	± 20% or CRQL
Sulfate	375.4	1 per 5	± 20%	1 per 20	± 25%	1 per 10	± CRQL	1 per 20	± 20% or CRQL
TDS	160.1	1 per 10	±20%	1 per 20	±25%	1 per 10	± CRQL	1 per 20	± 20% or CRQL
TSS	160.2	1 at start of run	±20%	NA	NA	1 per 10	± CRQL	1 per 20	± 20% or CRQL
Color	110.2	1 per 10	± 20%	NA	NA	1 per 20	± CRQL	1 per 20	± 20% or CRQL
Turbidity	180.2	1 per 10	± 10%	NA	NA	1 per 10	± CRQL	1 per 20	± 20%
Hex. Chrom	SM3500 CRD	1 per 10	± 20%	1 per 20	± 25%	1 per 10	± CRQL	1 per 20	± 20%
TPH	418.1	1 per 10	± 20%	1 per 20	± 25%	1 per 10	± CRQL	1 per 20	± 20%
TOC	415.1	1 per 10	± 20%	1 per 20	± 25%	1 per 10	± CRQL	1 per 20	± 20%
TOC	Kahn	1 per 10	± 20%	1 per 20	± 25%	1 per 10	± CRQL	Quad 1 per 20	± 3 SD
Total Phenols	420.1	1 per 10	± 10%	1 per 20	± 25%	1 per 10	± CRQL	1 per 20	± 20% or CRQL
Ammonia	350.1	1 per 10	± 20%	1 per 20	± 25%	1 per 10	± CRQL	1 per 20	± 20% or CRQL
COD	410.4	1 per 10	± 20%	1 per 20	± 25%	1 per 10	± CRQL	1 per 20	± 20% or CRQL
TKN	351.2	1 per 10	± 20%	1 per 20	± 25%	1 per 10	± CRQL	1 per 20	± 20% or CRQL
Hardness	130.2	1 per 10	± 10%	1 per 20	± 25%	1 per 10	± CRQL	1 per 20	± 20% or CRQL
Oil & Grease	415.1	1 per 20	± 20 &	1 per 20	± 25%	1 per 20	+ CRQL	1 per 20	± 20% or CRQL
Sulfide	376.1	1 per 10	± 20%	1 per 20	± 25%	1 per 10	± CRQL	1 per 20	± 20% or CRQL

* = If outside limits, repeat matrix spike analysis once.
NA = Not Applicable

SECTION 9.0

9.0 PREVENTIVE MAINTENANCE

9.1 Preventive Maintenance procedures

The preventive maintenance procedures in the lab allows for the consistent production of a quality product. The proper calibration and verification of equipment is critical. Preventive maintenance is important in preventing probable down time and instrument problems by instituting a proactive program to ensure that the routine maintenance procedures are performed to prevent failure of the equipment during use. The ongoing external and internal program assure that the instrument manufacturers guidelines are followed. The calibration and maintenance on all the instruments are documented in the calibration log books and the individual instrument maintenance logbooks.

9.1.1 Service Contracts

All major laboratory equipment is covered under service contracts from either the instrument manufacturer or an outside service organization (Compco Analytical). The service agreements in general include the cost of travel and parts and labor. The time frame for arrival to the site is anywhere from 48 hours to 4 days depending on the agreement.

9.1.2 Preventive Maintenance agreement

The service agreements include pre-planned service during the course of the contract to minimize down time.

This includes: Source cleaning, changing of the pump oil, cleaning of the source (in some agreements) and other routine maintenance. This is scheduled during the year.

Trained staff is on premises when the external maintenance is performed to observe and learn the procedure. All maintenance performed on the equipment is recorded in the individual logbooks that are kept with the instrument. All equipment in use in the laboratory is listed on the equipment list. The main goal of the preventive maintenance program is to increase the reliability of the equipment thereby decreasing downtime and increasing productivity.

9.1.3 Responsibility for maintenance

Responsibility for the preventive maintenance lies with the analyst and the supervisor of the department. The staff must make it a part of the routine daily procedure to routinely repair and replace parts to allow for consistent operating conditions. The staff must be trained to be observant of signs of potential problems and implement maintenance.

9.2 Back-up Equipment

A plan, which specifies what to do if an instrument, fails is in place. All major equipment has back-up instruments in place that can be used if an instrument goes down .All GC's, GC/MS's; ICP's have more than one instrument. Spare parts for small consumables and columns are kept on site. A contingency plan for failure is used if the instrument needs to be sent out for repair and no back up is available. Samples are sent out to a certified lab and the client is notified in advance that the samples are subbed out. Table 9 lists the preventive maintenance activities by instrument type and the recommended frequencies. Depending on workload and the types of samples analyzed, more or less frequent maintenance may be required.

TABLE 9

Preventive Maintenance Requirement

Instrument	Items checked/serviced	Frequency	Documentation
Analytical Balance	Internal weight train, gears, electronics	Annual	Service sticker
Analytical Balance	Clean pan and check with class S weights	Daily	Balance log
pH meter	Electronics checked	Daily	Logbook
Auto analyzer	Check for leaks	Daily	Visual
Auto analyzer	Clean auto sampler and check tubing for wear and discoloration	Monthly	Visual
TOC Analyzer	Change injection needle, clean injection port	Monthly	Logbook
TOC Analyzer	Change catalyst	Monthly	Logbook
TOC Analyzer	Inspect combustion tube	Semi-annual	Visual
Refrigerators, Incubators, Ovens	Clean interior	Monthly	Visual
Refrigerators, Incubators, Ovens	Check thermometer temperature against NIST certified thermometer	Annually	Logbook
Refrigerators, Incubators, Ovens	Verify temperature setting	Daily	Logbook
Autoclaves	Sterilization indicator tape	Daily	Logbook
Autoclaves	Clean interior	Monthly	Visual
Microscopes	Clean optics	Monthly	Visual
TOX	Clean inlet, cell and exit tube	Weekly	Visual
Turbidimeter	Clean cells	Daily	---------
Conductivity Meter	Check probe and cable	Daily	Visual
DO Meter	Check solution and membrane	Daily	Visual
Thermometers	Check for cracks and gaps in mercury	Daily	Visual
Auto samplers	Check needles and lines	Daily	Visual

TABLE 9 (continued)

Preventive Maintenance Requirement

Instrument	Items checked/serviced	Frequency	Documentation
Atomic absorption Spectrophotometer Flame	Clean window	As Needed	Logbook
	O Rings checked	As Needed	Logbook
Atomic absorption Spectrophotometer Furnace	Graphite ring changing	As needed	Logbook
	Sample capillary system	As needed	Logbook
	Check Graphite tubes	Daily, replace as needed	Logbook
ICP Spectrophotometer	Sample capillary nebulizer	As needed	Logbook
	Pump winding	Weekly	Logbook
	Lens cleaning	Quarterly	Logbook
	Clean and realign torch	Monthly	Logbook
	Check interelement interference	Annually	Logbook
GC	Change column	As needed	Logbook
	PID lamp cleanup	Monthly	Logbook
	Furnace tube replacement	Quarterly	Logbook
	Septa change	Monthly	Logbook
	Change inj. port insert	Monthly	Logbook
	Clip column	Monthly	
Electron Capture Detector	Wipe test	Annually	Logbook
	Return to factory to refoil	18 month	Logbook
GC/MS	Clean source	As needed	Logbook
	Change insert	Daily	Logbook
	Replace septa	Daily	Logbook
	Clip column	As needed	Logbook
	Swab inj. port	As needed	Logbook
	Change vacuum pump oil	Annually	Logbook
	Check Mass calibration	Daily	Run Log

SECTION 10.0

10.0 QUALITY ASSURANCE

10.1 Data Quality Assurance

Quality Assurance (QA) implies the ability to prove that systems used to generate data are under control. In order for the QA system to be useful it must demonstrate that the stipulated departmental and method quality control procedures are being met. The key measures by which the above criteria are met are clear and concise documentation of all aspects of the sample.

10.2 Systems/Internal Audits

The laboratory has a program of audits to ensure the effective operation of the quality system. Several different types of audit procedures are used in the laboratory. These include the following:

(a) Non-conformance Summary Reports
(b) LIMS Holding Time Worksheet
(c) Intradepartmental QC Review
(d) Data Package Review
(e) Internal Audit of Chain-of-Custody
(f) Internal Audit of QC Measures and Records
(g) Audit Data Package
(h) Methods Audit
(i) Quality Systems Audit

(a) Non-conformance Summary Reports: Figure 10.1 is an example of a non-conformance summary report used in the laboratory. The form is utilized intra as well as interdepartmental to note any deficiencies, systematic or human errors for specific samples. The non-conformance report is prepared by the analyst and distributed to the technical manager. The technical manager meets with the supervisors and analyst or whole department if necessary to discuss and resolve the non-conformance issues. The QA/QC manager is consulted if procedural changes need to be implemented.

(b) LIMS Holding Time Worksheet: The ACCESS-based LIMS system was developed in-house and has the capability to monitor samples and required analyses by holding time (see Figure 10.4). A daily printout lists the sample and the date by which it must be prepared/analyzed. This is reviewed daily by the Production Manager and laboratory supervisors to ensure that holding times are met.

(c) Intradepartmental QC Review: All departments have a review procedure by the analyst to make sure that all samples as well as all associated QC is performed.

(d) Data Package Review: All data packages are reviewed by either the technical QA manager, department supervisors or QA/QC manager.

(e) Internal Audit of Chain-of-Custody (COC): The QA/QC manager (or designated representative) conducts random audits of the internal COC records. A sample is tracked throughout the internal custody of the department to ensure consistency. Since all COC documentation is submitted in the data packages, the COC is also reviewed at that time.

(f) Internal Audit of QC Measures and Records: The QA/QC manager (or designated representative) conducts random inspections of the various lab departments. This may be formal (use of checklist) or informal. These inspections include logbook review, QC records, standard preparation logs and instrument maintenance records. This may include retesting of samples, intralaboratory comparison of results, and interlaboratory comparisons.

(g) Data Package Audit: On a weekly basis, an update of the status of deliverable requirements is prepared in the QA/QC department and given to all managers and supervisors to monitor the progress of the data packages. Corrective measures are taken if the department or reporting of the various components of the package is not on schedule.

(h) Methods Audit: An analyst review of the in-house SOP may be performed to ensure compliance with the method. The analyst will review the most recent version of the SOP and make edits if necessary to comply with the method. A new revision may be required.

(i) Quality Systems Audit: An Annual Quality Systems Audits of all technical activities is performed. These audits are designed to verify that all activities are conducted in accordance with the requirements of the laboratory quality system. The annual internal audit is performed by the QA Manager or a staff member of the QC department trained in the area audited. The audit may also be performed by the Technical Manager if so authorized by the QA Manager. In

cases where the audit identifies circumstances in which the correctness or validity of test results is questioned, the laboratory must take corrective action immediately and notify all clients whose work may have been affected.

10.3 Performance/External Audits

Several procedures are in place for monitoring the performance of the product produced by laboratory. These include:

(a) Data Validation
(b) Inter-Laboratory Comparison Testing Programs
(c) State/Federal Laboratory Audit
(d) Consultant/Customer Laboratory Audits
(e) Proficiency Sample Programs
(f) Double Blind Samples

(a) Data Validation: A minimum of 20% of the data packages produced by the laboratory undergo data validation by an outside service. A report is then generated listing the comments noted by the validator. The QA manager responds to the comments, and, if necessary, corrective action measures are introduced in the department.

(b) Inter-Laboratory Comparison Testing Programs: Testing in regards to blind samples or comparison of data inter-laboratory is performed periodically.

(c) State/Federal Laboratory Audits: The laboratory is certified in several states. The lab is audited for all methods in use on an ongoing basis.

(d) Consultant/Customer Laboratory Audits: The client may chose to audit the laboratory to be assured of their specific project requirements.

(e) Proficiency Sample Program: The laboratory participates in the NYS DOH Proficiency Program.

(f) Double Blind Samples: An outside supplier (ERA) is utilized to evaluate the capability of the laboratory through the use of double blind samples.

10.4 Corrective Action Procedures

There are several procedures in place in the laboratory by which quality problems are detected and documented. These encompass the findings of the QA systems and QA performance monitoring procedures discussed in

Sections 10.3 and 10.4 above. As mentioned in Section 10.3, the non-conformance reports are a means of reporting non-compliance to management. The cause of the non-compliance is investigated and corrective measures taken. Problems in quality can be detected throughout the system. Measures are instituted to detect and inform as early in the process as possible.

Several checks are established to detect and correct any errors. These checks include the use of holding time worksheets, and other systems in place in the departments. The analyst is responsible for monitoring the method and implementing corrective actions as needed such as instrument maintenance, column replacement, new solutions, checking calculations, re-analyses, etc. The supervisors have checks in place to ensure that the analysts are meeting the QC corrective actions taken by the supervisors, include scheduling changes, and implementing the corrective action procedures based on technical or QA/QC manager, determine corrective action procedures based on responses to comments, validation findings, audit findings, non-conformance reports, and proficiency data.

10.5 Quality Systems Report to Management

On an Annual Basis a review of the Quality System is performed to ensure the suitability of the program. The review is conducted by management and any improvements or changes indicated by the results of the review are incorporated into the quality system upon completion of the review. This review of the system includes reviews of proficiency results, internal and external audits, summary of complaint issues, results of interlaboratory comparisons and an overview.

Responsibility Designation

The authority and responsibility for QA is delegated to the QA/QC Manager, Lynn T. Daniello. Ms. Daniello reports directly to John J. Molloy, President of H2M labs, Inc. Mr. Molloy is informed of any deficiencies or non-conformances in the system and the corrective action measures implemented to ensure compliance in the future. Ms. Daniello reviews the results generated in the laboratory and enforces the QA requirements. She is also responsible for educating the supervisors and analysts of the QA requirements for their department. An annual quality systems review is performed with the laboratory Director.

The individual analyst is responsible for the day-to-day quality control requirements of the particular method and documentation. The supervisor's function is to check the conformance of the documentation and ensure its compliance. The QA/QC manager performs spot checks of the logbooks and discusses deficiencies with the supervisor.

10.6 Procedure for Dealing with Complaints

Clients may call to ask for a result to be verified. There are several categories of complaints that will be discussed. These include:

- Customer Service
- Timeliness of Results
- Quality of Product
- Invoice Issues

Customer Service/Timeliness of Results/Invoice Issues

Complaints that deal with non-responsiveness to the client are handled by the service department. If a client complains that they have not received resolution to a complaint, the call may be forwarded to the Service Manager, QA Manager or Laboratory Manager for resolution. These issues are documented in the department phone log.

Quality of Product

All complaints received regarding the quality of the data produced are handled by the QC department. The date and the name of the person receiving the complaint, source of complaint, resolution and any written material associated with the complaint are documented and kept on file.

The complaint is investigated by the QA officer or designee and a technical review of the suspected test is undertaken. The results of the investigation are documented on a customer complaint form (see figure 10.3).

This information is to be used by all laboratory personnel that have contact with clients. These forms need to be filled out each time there is a customer complaint (for example- late results, client left message and was not called back, etc). These files are located in S:\LABSHARE\NELACLOGS\. The customer complaint file is S:LABSHARE\NELACLOGS\COMPLAINT LOG.DOC.

FIGURE 10.1

NON-CONFORMANCE SUMMARY FORM

Sample Number: _____

Problem: _____

_____

_____

Supervisor: _____ Date: _____

Cause: _____

_____

_____

Analyst Responsible: _____

Corrective Action: _____

_____

_____

Action to Prevent Reoccurrence: _____

_____

_____

Signed: _____ Date: _____

FIGURE 10.2

DATA PACKAGE SIGNATURE FORM

SDG # _____

SCAN _____

This data package was reported by the undersigned. This reporting includes data calculations, manual edits if necessary and compilation of raw data. The information presented is true and correct to the best of my knowledge.

Signature: _____

Date: _____

FIGURE 10.3

Complaints Log – H2M Labs

Please add any client / customer complaints to the TOP of this list (cut & paste in template to top). Please make sure that the resolution to the complaint is included in the information. Please see KEK or JMS if you have questions or need assistance.

Template:

Date:
H2M Contact:
Client Name:
Contact Name:
Complaint:
Resolution:

Date:
H2M Contact:
Client Name:
Contact Name:
Complaint:
Resolution:

Date:
H2M Contact:
Client Name:
Contact Name:
Complaint:
Resolution:

Date:
H2M Contact:
Client Name:
Contact Name:
Complaint:
Resolution:

FIGURE 10.4

HOLDING TIME REPORT — **GC Volatiles** — **DATE: 04-Apr-02**

Sample ID	Client ID	Test Code	Matrix	Collection Date	EPA Holding Time	Holding Time Expires	Days Left
0204024-001A	HGO	502_W	Potable Water	4/1/02	14	4/15/02 9:00:00 AM	11
0204032-001A	HGO	502_W	Potable Water	4/1/02	14	4/15/02 9:25:00 AM	11
0204032-002A	HGO	502_W	Potable Water	4/1/02	14	4/15/02 10:35:00 AM	11
0204010-001A	Z-REIF	502_W	Potable Water	4/1/02	14	4/15/02 10:40:00 AM	11
0204034-001A	HGO	502_W	Potable Water	4/1/02	14	4/15/02 11:45:00 AM	11
0204080-001A	HGO	502_W	Potable Water	4/2/02	14	4/16/02 8:05:00 AM	12
0204080-002A	HGO	502_W	Potable Water	4/2/02	14	4/16/02 8:30:00 AM	12
0204053-001A	CPW	502_W	Potable Water	4/2/02	14	4/16/02 9:30:00 AM	12
0204063-001A	HGO	502_W	Potable Water	4/2/02	14	4/16/02 9:30:00 AM	12
0204077-001A	Z-CALABR	502_W	Potable Water	4/2/02	14	4/16/02 9:45:00 AM	12
0204080-003A	HGO	502_W	Potable Water	4/2/02	14	4/16/02 11:10:00 AM	12
0204072-001A	DIX	502_W	Potable Water	4/2/02	14	4/16/02 1:30:00 PM	12
0204071-002A	DIX	502_W	Potable Water	4/2/02	14	4/16/02 2:15:00 PM	12
0204123-001A	GCV	502_W	Potable Water	4/3/02	14	4/17/02 9:15:00 AM	13
0204123-002A	GCV	502_W	Potable Water	4/3/02	14	4/17/02 9:15:00 AM	13
0204128-001A	WAWN	502_W	Potable Water	4/3/02	14	4/17/02 10:10:00 AM	13
0204128-002A	WAWN	502_W	Potable Water	4/3/02	14	4/17/02 10:17:00 AM	13
0204128-010A	WAWN	502_W	Potable Water	4/3/02	14	4/17/02 10:49:00 AM	13
0204128-009A	WAWN	502_W	Potable Water	4/3/02	14	4/17/02 10:58:00 AM	13
0204118-001A	HGO	502_W	Potable Water	4/3/02	14	4/17/02 11:05:00 AM	13
0204128-006A	WAWN	502_W	Potable Water	4/3/02	14	4/17/02 11:18:00 AM	13
0204128-005A	WAWN	502_W	Potable Water	4/3/02	14	4/17/02 11:29:00 AM	13
0204128-007A	WAWN	502_W	Potable Water	4/3/02	14	4/17/02 12:07:00 PM	13
0204128-008A	WAWN	502_W	Potable Water	4/3/02	14	4/17/02 12:07:00 PM	13
0204130-002A	WAWN	502_W	Potable Water	4/3/02	14	4/17/02 12:31:00 PM	13
0204130-001A	WAWN	502_W	Potable Water	4/3/02	14	4/17/02 12:36:00 PM	13
0204130-004A	WAWN	502_W	Potable Water	4/3/02	14	4/17/02 1:03:00 PM	13
0204130-003A	WAWN	502_W	Potable Water	4/3/02	14	4/17/02 1:15:00 PM	13
0204156-001A	PWD	502_W	Groundwater	4/4/02	14	4/18/02 10:05:00 AM	14
0204156-002A	PWD	502_W	Groundwater	4/4/02	14	4/18/02 11:00:00 AM	14
0204035-001A	GCV	502_WVH	Potable Water	4/1/02	14	4/15/02 10:00:00 AM	11
0204035-002A	GCV	502_WVH	Potable Water	4/1/02	14	4/15/02 10:00:00 AM	11
0204079-001A	GCV	502_WVH	Potable Water	4/2/02	14	4/16/02 10:40:00 AM	12
0204072-001A	DIX	510_W	Potable Water	4/2/02	7	4/9/02 1:30:00 PM	5
0204092-001B	GSHMEM	602_W	Aqueous	4/3/02	7	4/10/02 9:15:00 AM	6
0204092-004C	GSHMEM	602_W	Trip Blank	4/3/02	7	4/10/02 9:15:00 AM	6
0204117-004A	KEY	602_W	Aqueous	4/1/02	14	4/15/02 9:15:00 AM	11
0204117-002A	KEY	602_W	Aqueous	4/1/02	14	4/15/02 9:30:00 AM	11
0204089-002A	KEY	602_W	Aqueous	4/2/02	14	4/16/02 9:30:00 AM	12
0204089-004A	KEY	602_W	Aqueous	4/2/02	14	4/16/02 10:00:00 AM	12
0204089-005A	KEY	602_W	Aqueous	4/2/02	14	4/16/02 10:30:00 AM	12
0204114-004A	KEY	602_W	Aqueous	4/2/02	14	4/16/02 12:00:00 PM	12
0204114-002A	KEY	602_W	Aqueous	4/2/02	14	4/16/02 12:30:00 PM	12
0204132-002A	HSD	602_W	Sewage	4/3/02	14	4/17/02 8:30:00 AM	13
0204092-002A	GSHMEM	8021_W	Aqueous	4/3/02	5	4/8/02 9:15:00 AM	4
0204092-003A	GSHMEM	8021_W	Aqueous	4/3/02	5	4/8/02 9:15:00 AM	4

SECTION 11.0

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