ENVIRONMENT CANADA

LABORATORY

ENVIRONMENTAL AUDIT PROTOCOL

ALTECH ENVIRONMENTAL
CONSULTING LTD.
225 SHEPPARD AVENUE WEST
WILLOWDALE, ONTARIO
M2N 1N2

SEPTEMBER 20, 1990

ENVIRONMENTAL AUDIT PROTOCOL

TABLE OF CONTENTS

ENVIRONMENTAL AUDIT PROTOCOL

INTRODUCTION: UNDERSTANDING THE PROTOCOL INVESTIGATION

COMPLIANCE AND MANAGEMENT SYSTEMS

The vital working document for the environmental audit is the audit protocol. The protocol serves as a guide for auditors to plan and conduct environmental audits at laboratory facilities. Management systems and compliance information is gathered through a rigorous, comprehensive examination of environmental operations with the intent of assessing environmental management practices at the facility.

The protocol provides detailed instructions to assist knowledgeable environmental personnel in conducting a thorough audit investigation. On the surface, the environmental audit can be used to determine the compliance status of a facility at a specific point in time. To ensure compliance is maintained in the long-term, a responsible environmental management compliance program must be developed. The environmental audit and in turn the protocol, direct the analysis of management or compliance elements such as:

(a) the development and implementation of written policy statements endorsing compliance with laws;

(b) appointment of, and education of, environmental managers/co-ordinators with the duties and requirements of environmental legislation;

(c) on-going training of staff in effective performance of functions required by legislation, in particular with statutory requirements to notify environment ministries in respect of a spill and timely, adequate responses to environmental problems;

(d) ensuring the adequacy and accessibility of equipment and facilities to enable compliance;

(e) establishment and updating of operating manuals and procedures and emergency/contingency plans;

(f) implementation of environmental protection programs and regular and continuous monitoring and maintenance thereof;

(g) timely communication with employees, including information updates, notices and reminders;

(h) planned and orderly recordkeeping, documenting systems and events; and,

(i) studies and programs directed to air, water, waste, materials handling, spills,impact on land, and health and safety.

While environmental management/assurance programs cannot guarantee that present or future liabilities will be eliminated, the investigation directed by the protocol will enable the audit team to generate valuable recommendations for improvement of facility environmental performance.

HOW TO USE THE PROTOCOL

The protocol manual consists of this introductory section and five major parts. Each part will be explored in detail in the following paragraphs. Facility management should utilize Environment Canada's series of documents on Effective Environmental Auditing, particularly Volume 1, "Principles of Effective Environmental Auditing" to become familiar with the auditing process and to assist in determining the appropriate scope of treatment required for the facility in question. Several workshop exercises are provided in Volume 1 for this specific purpose.

It should be noted that this protocol may require additions, deletions, or other modifications in order to meet the needs of facility-specific audit objectives or other special circumstances. Facilities of any size can utilize this document by determining sections and questions that are applicable to the particular site. The protocol is provided as a guide for auditors to conduct a comprehensive investigation of the environmental systems operating at the laboratory, and should be tailored to specific audit scope and objectives which are prerequisites to performing the audit. However, the depth of investigation incorporated into the protocol questions is provided to ensure that the audit team considers environmental risks in a thorough manner.

Features of the protocol include:

- Pre-audit activities, including facility requests;
- Regulatory and guideline review for developing a facility-specific compliance standard;
- Opening meeting procedures and orientation tour objectives;
- The management systems review to guide the auditor through the detailed audit investigations; and,
- Preparation and procedures for the exit meeting with management.

Databases and inventory lists, as well as other applicable audit related information can be entered and stored for future reference using D-Base or Lotus 1-2-3 computer software.

PRE-AUDIT ACTIVITIES

Pre-audit activities centre upon the gathering of preliminary information regarding the specific laboratory in order to familiarize the audit team with the general operations before the on-site work begins. This preparation serves to maximize the efficiency of the time spent on-site. To this end, a list of required orientation information is listed in this section.

REGULATORY AND GUIDELINE REVIEW

Because the regulatory regime is different for every region of Canada, the audit team must collect and understand the appropriate regulations, by-laws, and government guidelines to be applied to the facility. The pre-audit information should be utilized for direction in this regard. The result of this investigation is the development of a facility-specific standard with which to measure environmental compliance. If management has formulated environmental policies, these too should be included in the facility standard. In order to further assist the audit team in sourcing the pertinent legislation, a table is included detailing the levels of government responsible for administration of directed environmental programs for each province in Canada.

OPENING MEETING AND ORIENTATION TOUR

The protocol provides guidance to the content of the opening meeting with management at the start of the on-site work. The Management Controls Questionnaire is also included for completion to enable the auditors to obtain an overview of on-site management and procedural activities. The audit team should use information acquired during the meeting and from the pre-audit activities, to maximize the visual understanding of the facility gained during the orientation tour.

MANAGEMENT SYSTEMS REVIEW

The Management Systems Review forms the major portion of the environmental audit. On-site investigations are performed with respect to:

- Facility control mechanisms, such as equipment, piping, physical processes and inventories;
- Permits and compliance issues and measurement to the audit standard compiled by the audit team; and,
- Management systems concerning roles, responsibilities, procedures, communication etc. for managing environmental activities.

Each of wastewater, air, waste, materials handling, spills and emergency procedures, and land use and site management, are included for the above treatment. For each area, the review process is directed by the protocol and is very rigorous, attempting to cover a full range of environmental risk possibilities, some obvious, some subtle. The order of the questions, and the detail of investigation within each question has been organized to be as logical and efficient as possible, to lead the auditor to investigate the issue to a reasonable conclusion depending on the facility. In the end, the audit team will gain valuable investigative knowledge by applying this review during the Audit.

It should be noted that smaller laboratories may not have in place many of the environmental control systems referred to in the protocol questions. If pollution control equipment is absent, this fact should be noted and the audit investigation used to determine whether equipment would be of benefit to the facility to reduce the possibility of a significant environmental impact. A similar argument can be made for documentation, recordkeeping and monitoring programs which will provide baseline information useful in determining risk potentials.

Within each subsection of air, waste, etc., are pages included for summarizing deviations from regulations, guidelines, and internal policies. These pages help the audit team to "tie-up loose ends" while on-site, with respect to compliance violations. Another vital process which must be performed by each auditor, is the development of formalized working papers, referred to as "W.P." in the protocol. The working papers clearly document the information gathered during the audit, and substantiate the audit findings. They provide the principal support required for the audit report.

An example of a working paper follows in Figure 1. The working papers should be prepared on-site during the audit, be handwritten and included photocopies of support documentation as required. Each paper should reference the specific protocol question, be dated, and be initialled by the auditor. In turn, the protocol will reference the working paper page number and the auditor's initials. Because the audit report will be written using the working papers as backup, they should be clear, concise and accurate. Speculation should be avoided, and uncertainties and unconfirmed information noted as such. All applicable protocol questions should be referenced by working papers. If several questions can be answered at one time through a logical development of audit information, then the working paper should detail this also.

Another important component of the Management Systems Review is the communications interview, which is performed on an on-going basis throughout the audit as required. With each person interviewed, the subject matter will be different depending on the person's job and information already gathered during the audit. The objectives of an interview are to:

- track the knowledge and awareness of procedures;
- question on problems or events the individual may be familiar with;
- track the understanding of management systems especially in terms of their role, responsibility, and reporting requirements;
- measure the level of effectiveness of training programs; and,
- verify information gained from other sources.

The internal interviews are generally 20-40 minutes, depending on the role of the individual. They are pre-scheduled and conducted in a private room for comfort and confidentiality. The skill and experience of the auditor will be critical to the quality of the information received. Verbal and anecdotal evidence must be verified, sometimes through blind questioning of other staff.

Ideally the selection of personnel to be interviewed should be random. A broad selection of managers, supervisors, technicians, maintenance and other staff may be chosen. The number of interviews can range from 5-20% of the number of staff at the facility but the selection must represent virtually every department. Where there are shift operations, a representative number of interviews must be staff on other shifts.

The personnel to be chosen include:

- facility control staff including those in operations and maintenance. Include individuals who have specific duties with pollution control equipment;

- individuals responsible for permits and compliance. Documentation is often requested; and,

- management and supervisors at various levels as well as technicians and other staff who use and are subject to existing management systems. The objective is to check the completeness, quality and understanding of communications.

FIGURE 1

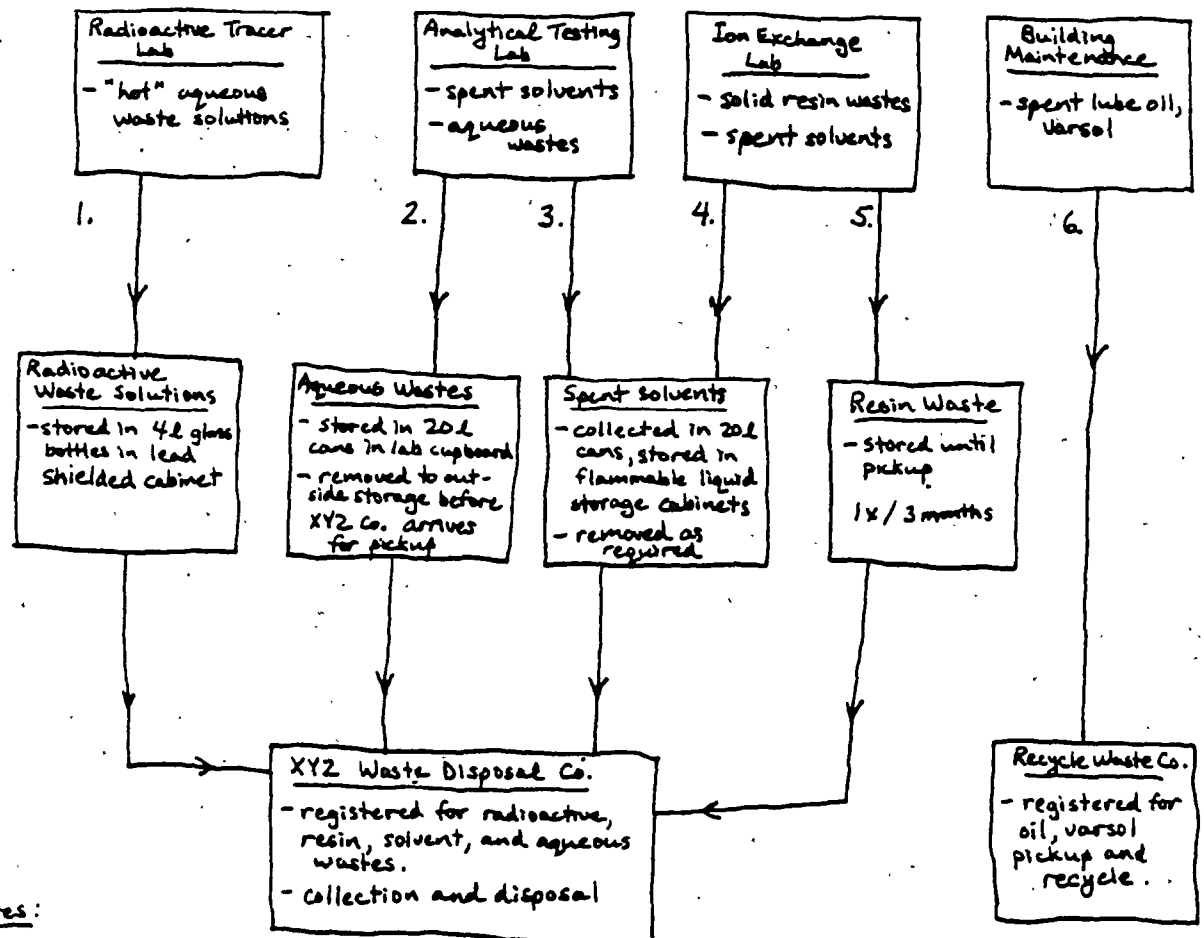
SAMPLE WORKING PAPER FOR

LABORATORY ENVIRONMENTAL AUDIT

Protocol Question 4 : Hazardous Waste Management

Facility Review of Hazardous Waste Movement

WM-4 / 1 of 5
RJS Oct 14/84



Notes:

1. Radioactive waste solutions all low level (not harmful for lab staff in these quantities). Stored in 4 litre glass bottles in lead shielded, signed cabinet. Bottles removed by XYZ when 6 bottles are accumulated. Labelling of containers good. No inventory of wastes in lab.

2. Aqueous wastes accumulated in 20 litre cans and taken manually to outside storage cupboard (sheltered from sun), before XYZ Co. comes for pickup. Some acidic materials included in waste, with possibility of corrosion of tops of containers due to filling practices. Cans not labelled.

3, 4. Spent solvents collected in 20 litre cans in each lab, stored in short term in flammable liquid cabinets. Cans then manually transfered to flammable liquids storage room and poured into 210 litre drum. Possibility of spills from filling procedure. Long walk from lab to solvent storage. All aspects of storage room explosion proof as required. Drum not labelled to exact contents or what shouldn't be added. Solvent wastes not always taken by XYZ when other wastes removed. Possibility of solvent wastes being stored longer than 3 months, without notification to regulatory department.

WM-4 / 1 of 5

Notes 5,6 not included in this Figure.

THE EXIT MEETING AND AUDIT REPORT WRITING

After the final questions are asked during the Management Systems Review, an organized summary must be made of the major audit findings. This summary must be prepared in a limited amount of time in order that the on-site time can be used effectively. The protocol provides guidance as to the areas which should be addressed during the exit meeting, and in the writing of the audit report.

CONDUCTING AN ORGANIZED AUDIT

The on-site work of the audit is usually performed within some type of time constraints, requiring an organized approach to the evidence gathering process and subsequent information review. Preparation is of utmost importance for efficient utilization of time. There are methods of organization which will assist the audit team to perform professionally, for example:

- Studying pre-audit information before the on-site visit;
- Becoming familiar with the applicable regulatory regime for the laboratory;
- Spending several hours at the end of each day on-site to summarize findings and create working papers;
- Making a "To Do" list with associated priorities, based on the day's summarized findings and areas not yet investigated;
- Holding brainstorming sessions to take advantage of team viewpoints on specific topics; and,
- Taking an environmental auditing training course.

The amount of information which is collected during the audit is frequently overwhelming and requires conscientious management for maximum education of the auditor. Additional information can be requested after the on-site work is completed, but this is usually used only for major omissions and additional clarifications. The entire audit must be performed professionally including proper time management.

The following source list gives an indication of the types of documents which may be necessary to review during the course of the audit. The audit team should stay alert to other sources which may apply to the particular facility.

RECORDS/INFORMATION TO REVIEW:

- Legislation, regulations, guidelines, codes of practice for controlling environmental activities at the site;
- Internal facility policies;
- Permits and registration documentation for air, water, waste control and discharge;
- Facility organizational structure, reporting hierarchy, departments, number of employees, etc.;
- Blueprints, site plans, process flow diagrams, etc. relating to environmental control;

- Management plans, procedures, methods for laboratory operations, maintenance and training;
- Previous audit reports;
- Control orders or compliance violation documents;
- Intracompany correspondence with regulatory agencies;
- Incident summaries and follow-up action plans;
- Plans for future construction or process modifications;
- Monitoring, inspection, sampling, and analytical records for environmental control;
- Past environmental control processes and historical use of the site;
- Environmental impact assessments;
- Central files of facility relating to management systems and environmental control;
- Personal files of managers, supervisors (with consent);
- Verified verbal interviews; and,
- Any other sources which may assist in information collection and verification.

ENVIRONMENTAL AUDIT

DESIGNATED AUDITOR'S REPORT

FACILITY NAME: _____

DATE(S) OF AUDIT: _____

PERIOD UNDER REVIEW: _____

AUDIT TEAM MEMBERS:

(Team Leader) _____

_____

_____

_____

_____

PROTOCOL COMPLETED BY:

(Signed) _____

(Date) _____

PART 1

PRE-AUDIT ACTIVITIES

OBJECTIVE

This part of the protocol outlines the basic activities to be undertaken before the commencement of the on-site field work. It is intended to provide guidance to the team in reviewing facility background information, allocating team resources, and otherwise preparing for the audit.

ENVIRONMENTAL AUDIT PROTOCOL

PART 1: PRE-AUDIT ACTIVITIES

1. Pre-Audit Planning

   - Contact laboratory director and discuss objectives and scope of the audit.
   - Confirm dates of the on-site work and resources required.
   - Send confirmation letter and documentation required attachment.

2. Review Background Material

   - Obtain and review site layouts, blueprints and all relevant process flow diagrams from facility management. These maps can include surface drainage, sewer diagrams, tank, equipment, and building locations, process flow charts, etc.
   - Establish the presence of any major or unusual activities of the operation (ie. special waste management facilities such as incinerator) so that the audit team can prepare appropriately.

3. Review Regulations, Policy, Guidelines, and Internal Standards

Sample Audit confirmation letter with Pre-Audit requests.

LABORATORY ADDRESS

Dear Laboratory Director:

This is to confirm the arrangements for the upcoming environmental audit of the _____ laboratory during the week of _____, 1990. The audit team will be comprised of _____. As currently envisioned, we expect to conclude our audit during the afternoon of_____, and will conduct a management presentation at that time to appraise you of our preliminary results and findings.

We expect to arrive on _____ at 8:30 a.m. and would like to have a pre-audit meeting with you and other facility management at this time. The meeting will be to describe briefly the purpose of the audit, discuss the approach we would like to take, and answer any questions you may have. After this overview, we will begin the formal audit process.

To expedite the audit, we would appreciate the assembly of and shipment to our office, the documentation outlined in the attachment, at least one week before the on-site visit. To facilitate our work on-site, we would like an office or an area we can use as a base, as well as administrative support for photocopying.

Please do not hesitate to call if you have any concerns or questions regarding the audit. Thank you for your co-operation.

Yours very truly,

Attachment
To Confirmation
Letter.

PRE-AUDIT DOCUMENTATION

GENERAL:

- Blueprints of the facility, including a site plan, sewer plans, major equipment, tank, and building configurations, etc., if available.
- Description of facility operations (general: could be short presentation of activities during management meeting).
- Facility organization chart including staff names.
- Formalized comprehensive environmental management plans, such as emergency response, waste management, etc.
- Previous audit reports and their status.
- Copies of facility policies and procedures.

AIR POLLUTION CONTROL

- Permits and Registration

WATER POLLUTION CONTROL

- Water discharge permits and registration

SOLID AND HAZARDOUS WASTE MANAGEMENT

- Facility permits and registration

PART 2

REGULATORY AND GUIDELINE REVIEW

OBJECTIVE

This part of the protocol should be used by the audit team to collect and understand the regulatory and guideline requirements applicable to the particular laboratory. Based on the pre-audit information already reviewed, and the discussion in this section, a regulatory compliance standard should be assembled before further detailed audit investigations are undertaken. Guidance is given with respect to the levels of government which administer particular regulations in each province or territory, compliance issues which address long-term environmental risks, and legal implications of management in action with respect to environmental affairs.

ENVIRONMENTAL AUDIT PROTOCOL

PART 2: REGULATORY AND GUIDELINE REVIEW

DEVELOPING A COMPLIANCE STANDARD

Environment Canada is in the process of developing regulations for government facilities under the Canadian Environmental Protection Act (CEPA). In the absence of specific regulations under CEPA, the specific compliance standards of provincial and municipal regulations must be used to determine facility compliance status. It is this combination of regulations with which the laboratory must comply 100% of the time.

A protocol document similar to this one, has been developed recently by the U.S. Environmental Protection Agency for auditing federal government laboratory facilities in the United States. Inspection of the EPA protocol reveals a significant difference between the regulatory structures of Canada and the U.S. Canadian federal legislation contains more general regulations then comparable federal legislation in the States, resulting in a requirement for provincial and municipal governments in Canada to administer many more specific issues. In addition, best practices and guidelines are used extensively in Canada to assist Canadian facilities in achieving long-term compliance voluntarily. Regulatory compliance can even be based on these guidelines if an enforcement officer deems that implementing these practices would be necessary to achieve compliance with existing regulations.

The implication of the more general and continually evolving Canadian federal regulations, is that a comprehensive listing of environmental regulations cannot be included in this protocol development for general use during audits across Canada. It becomes a requirement of the audit team to assemble pertinent regulations and by-laws which apply to the facility being audited, specific to the particular region of the country. It is important that the team be familiar with the regulations and guidelines which will be used to measure compliance during the audit, before the in-depth investigations begin. To this end, the pre-audit documentation should be reviewed to identify environmental control which may apply to the laboratory, and Figure 2 should be used to direct the audit team to the appropriate level of government from which the applicable regulations and/or guidelines would be obtained.

Federal legislation which must be applied directly to all laboratories is as follows (list is not exhaustive):

- Canadian Environmental Protection Act (CEPA)
  - -General, and Part IV specifically for federal government facilities
  - -Storage of PCB Wastes Interim Order and Amendments
- Environmental Contaminants Act (RSO 1975)
- Fisheries Act
- Canada Labour Code

FIGURE 2
LEVELS OF GOVERNMENT RESPONSIBLE FOR ADMINISTRATION OF DIRECTED ENVIRONMENTAL PROGRAMS, BY PROVINCE [8]

PROVINCE OR TERRITORY		AIR QUALITY [2]	WASTEWATER CONTROL (SEWERS)	SOLID WASTE [6] CONTROL (GARBAGE)	HAZARDOUS WASTE CONTROL	HAZARDOUS MATERIALS CONTROL	SPILLS [7] CONTROL
BRITISH COLUMBIA	FEDERAL						X
	PROVINCIAL	X			X	X	
	REGIONAL (GVRD) [1]		X	X			
	MUNICIPAL		X	X			
ALBERTA	PROVINCIAL	X			X	X	X
	MUNICIPAL		X	X			
SASKATCHEWAN							
	PROVINCIAL	X			X	X	X
	MUNICIPAL		X	X			
MANITOBA	PROVINCIAL	X			X	X	X
	MUNICIPAL		X	X			
ONTARIO	PROVINCIAL	X			X	X	X
	MUNICIPAL		X	X			
QUEBEC	FEDERAL		X[7]				X[7]
	PROVINCIAL	X	X		X[7]	X	X
	REGIONAL (MUC) [3]	X		X			
	MUNICIPAL			X			
MARITIMES	FEDERAL		X[7]			X	X[7]
	PROVINCIAL	X		X	X		X
	MUNICIPAL						
YUKON [4] TERRITORY	FEDERAL	X	X		X	X	X
	TERRITORIAL			X			
	MUNICIPAL			X			
NORTHWEST [4,5] TERR.	FEDERAL	X	X	X	X	X	X
	TERRITORIAL						
	MUNICIPAL						

FIGURE 2 cont'd

NOTES:

1. GVRD - Greater Vancouver Regional District

2. Air quality for emissions of specific regulated substances is administered by Federal government.

3. MUC - Montreal Urban Community

4. Department of Indian Affairs and Northern Development (DIAND) (Federal) administers separate guidelines as applicable to northern and native lands, in conjunction with Environment Canada and Territorial government. DIAND has resource management responsibilities and acts as a quasi-territorial advisory department.

5. Jurisdiction of environmental affairs depends on land ownership, where environmental concern takes place.

6. Solid waste control is usually administered by municipalities, with landfill sites owned by provincial or private companies.

7. Federal Fisheries Act is applicable if no provincial program in place, or environmental impact is on major waterways or ocean.

8. All trans-boundary emissions or effects (interprovincial, to USA or other countries) are administered by the Federal government (Environment Canada).

These regulatory requirements provide a yardstick against which any facility's compliance status can be measured. However, this legislation and accompanying regulatory structure is fairly broad and does not provide enough guidance for the detailed day-to-day operation of facility environmental controls. Provincial and municipal regulations, and all guidelines and codes of practice, provide the required direction.

INVESTIGATING COMPLIANCE IN THE LONG-TERM

As a means of ensuring regulatory compliance and maintenance of a proactive environmental management program, Environment Canada recommends the adoption of best management practices. The application of BMP's results in most aspects of a facility's compliance requirements being covered as a matter of course. In the long-term, these practices result in a foundation of data which allows the facility to track on-going compliance to regulations as well as performance to environmental goals.

This protocol will assist the audit team in investigating the compliance issues at a particular laboratory, in terms of immediate compliance and by evaluating the effectiveness of best management practices in place to achieve compliance in the long-term. The auditors will utilize the inherent depth of questioning in the Management Systems Review (Part 4 of the protocol), which incorporates applicable BMP's. Therefore, guidelines and codes of practice should also be assembled for the on-site work to ensure that a comprehensive environmental control standard is used for the audit. An example of a federal guideline where best management practices are applied is the Code of Practice for Underground Storage Tank Systems, 1989. Again, the majority of specific guidelines are provincially generated and should be well-represented in the audit compliance standard.

By using BMP's to identify and act upon environmental liabilities, "due diligence" is displayed, resulting in a measure of protection from potential prosecution. Section 125 of CEPA specifically codifies the defence of due diligence as a means of reducing liability from an environmental discharge. It is in the context of the ability to rely on a defence of due diligence that a "compliance program" becomes important.

The environmental audit now being performed is a tool that can be used to ensure that all existing or potential non-compliance with environmental laws and regulations and environmental concerns are identified and acted upon. In this context, it is important for the audit team to develop and understand the appropriate compliance standard for the particular facility. Deviations from the standard should be summarized on the two pages at the end of each subsection of the Management Systems Review, quoting the specific non-compliance issue and a reference to the exact section of the legislation. Space is provided for each of federal, provincial, and municipal regulatory deviations, as well as those from environmental guidelines, and internal facility policies. The pre-audit review of facility policies will give the audit team the required information with which to assess internal deviations.

ENVIRONMENTAL AUDIT PROTOCOL

PART 3: THE OPENING MEETING

AND ORIENTATION TOUR

Working Paper Reference

Meet with Facility management to:

1. Provide an overview of the audit program including its purpose, scope, approach, and reporting process.

2. Obtain an overview of on-site activities from the facility manager. Use the Management Controls Questionnaire (following pages) and the points below to gain a preliminary understanding of the operations of the laboratory. Document your understanding of the following:

   - Individual(s) responsible for overall management of the laboratory;
   - Individual(s) responsible for environmental activities throughout the laboratory;
   - Management organization, responsibilities, and accountabilities;
   - Description of activities conducted at the laboratory;
   - Size of the facility;
   - Number of personnel employed by the laboratory (ie. technicians, maintenance, clerical, etc.);
   - General environmental management activities (ie. number of air sources, types of wastes generated, hazardous materials stored, etc.);
   - Any unique or particular facility environmental concerns; and,
   - Any off-site locations or field operations under the control of the facility director.

Working Paper Reference

3. Educate and prepare the audit team regarding safety procedures for visitors to the laboratory, so that auditor safety is ensured while on site.

4. Conduct Orientation Tour

MANAGEMENT CONTROLS QUESTIONNAIRE

OBJECTIVE

To quickly gain information from facility management regarding responsibilities and procedures for environmental affairs at the laboratory. The information gathered requires further investigation and follow-up during the Management Systems Review portion of the audit.

1. Who at the facility is responsible for the development and implementation of programs for compliance with applicable governmental and agency requirements for each of the following functional areas:

   - Air pollution control?

   - Water pollution control?

   - Hazardous waste management?

   - Non-hazardous solid waste management?

   - PCB management?

   - Pesticide management?

   - The Environmental Assessment Process?

   - Health and Safety?

   - Radioactive Waste Management?

MANAGEMENT CONTROLS QUESTIONNAIRE

		YES	NO
2.	Are people identified in (1) above responsible for keeping up to date with regulations and guidelines in these areas?	____	____
3.	Does the laboratory have any specific policies or procedures pertaining to the following?		
	• Record retention?	____	____
	• Use of contractor services?	____	____
	• Waste minimization?	____	____
	• Compliance with established rules and regulations, and policies and procedures?	____	____
	• Submission of routine regulatory reports?	____	____
	• Reporting environmental accidents, such as spills, upsets, releases, etc.?	____	____
	• Inspecting and testing of pollution control equipment?	____	____
	• Inspecting hazardous waste accumulation areas?	____	____
	• Monitoring emissions (ie. air, water)?	____	____
	• For samples received at the facility, or generated by the facility:		
	-collecting, preserving and analyzing environmental samples?	____	____
	-maintaining a chain-of-custody for those samples received?	____	____
	-acceptable methods for storage, handling, and disposal of biological, chemical, or radioactive waste materials?	____	____
	• Acceptable uses and methods for disposal of cleaning agents (ie. chromic and nitric acid mixtures)?	____	____
	• Storage, handling or disposal of other chemicals (ie. bottled gases, solvents, toxics, etc.)?	____	____
	• Storage, handling or disposal of carcasses or other biological/pathological materials (including contaminated clothing)?	____	____

MANAGEMENT CONTROLS QUESTIONNAIRE

		YES	NO
•	Limiting materials discharged "down-the-sewers" from the facility?	____	____
•	Limiting materials used under ventilation hoods within the laboratory?	____	____
•	Responding to citizen complaints (ie. odours, etc.)?	____	____
•	Waste characterization?	____	____
•	Selection of hazardous waste treatment storage and transporter vendors?	____	____
•	Off-site waste disposal?	____	____
•	Other? _____	____	____
4.	Does the facility conduct any periodic environmental monitoring?	____	____
•	Air emissions?	____	____
•	Water discharges?	____	____
5.	Does the facility have an emergency response plan?	____	____
6.	Does the staff responsible for environmental compliance routinely meet to discuss current issues (or, if one individual, does the individual responsible for environmental compliance routinely meet with laboratory management to discuss current concerns)?	____	____
7.	Does the facility maintain files for documents relating to environmental pollution?	____	____
•	Permit applications?	____	____
•	Permits?	____	____
•	Correspondence?	____	____
•	Spill plans?	____	____
•	Emergency plans?	____	____
•	Waste analysis?	____	____
•	Waste manifests?	____	____
•	Annual reports?	____	____
•	Monitoring results?	____	____
•	Environmental inspections and audits?	____	____
•	Compliance waivers or variances?	____	____
•	Incident reports?	____	____
•	Public complaints?	____	____
•	Emission inventories?	____	____
•	Consent agreements or notices of violation?	____	____

MANAGEMENT CONTROLS QUESTIONNAIRE

		YES	NO
8.	Is the facility currently under a consent order, compliance schedule, etc., to comply with regulatory program requirements?	____	____
	If yes, who is responsible for ensuring compliance schedule, etc., is adhered to?		
9.	Is any training other than on-the-job training provided to facility personnel in the following categories:		
	• Spill response and control?	____	____
	• Hazardous waste management?	____	____
	• Emergency response?	____	____
	• Wastewater treatment operations?	____	____
	• Releases of hazardous substances?	____	____
	• Use and acceptable storage, handling and disposal of hazardous materials, including biological, toxic, radioactive, etc.	____	____
10.	Are these training sessions documented?	____	____
11.	How frequently is training provided in:		
	• Spill response and control?		
	_____		
	• Hazardous waste management?		
	_____		
	• Emergency response?		
	_____		
	• Wastewater treatment plant operation?		
	_____		
	• Releases of hazardous substances?		
	_____		
	• Uses, storage, and disposal of materials?		
	_____		
12.	Who receives this training?		
	• Spill response?		
	_____		

MANAGEMENT CONTROLS QUESTIONNAIRE

		YES	NO
	• Hazardous waste?		
	• Emergency response?		
	• Wastewater treatment?		
	• Releases of hazardous substances?		
	• Uses, storage, handling and disposal of materials?		
13.	Are there any other off-site locations that are the responsibility of the facility director?	____	____
14.	Are there any field operations which are the responsibility of the facility director?	____	____
15.	Describe the facility's past disposal practices.		

PART 4

THE MANAGEMENT SYSTEMS REVIEW

This part of the protocol forms the majority of the evidence gathering process for the audit, treating facility control, permits and compliance, and management systems associated with wastewater control, air pollution control, waste management practices, materials handling, spills and emergency procedures, and land use and site management. Treated within the land use and site management section are specifics such as underground storage tanks, PCB management, and the like. The auditor should include in this section an analysis of the general systems in place to handle additional hazardous materials which are used at the site, using the rigour of the PCB treatment as a sample for the required investigations. It is not intended that the audit team investigate the systems to handle each individual chemical used in the lab.

The questions contained in the Management Systems Review guide the audit team through a formalized procedure for gathering and verifying audit evidence. The audit team is asked to consider each question carefully to determine its applicability to the laboratory being audited. The inventories, documentation collection, evaluation, analysis and personal interviews required, lead to the auditor development of formalized working papers, referred to as "W.P." in the protocol. The working papers clearly document the information gathered during the audit, which protocol questions were not applicable, and substantiate the audit findings. They provide the principal support required for the audit report. More information on working papers, including an example, is found in the introductory section of this manual.

Finally, in each subsection (air, water, waste, etc.) are included sheets which should be used to summarize all noted deviations from federal, provincial, and municipal legislation and regulations found during the auditing procedure. Reference should be made to the specific section of the act or regulation. Space is also provided to detail risks of non-compliance and deviations from best practices, guidelines, and management imposed standards. These pages can be copied if more space is required.

WASTEWATER MANAGEMENT

THE MANAGEMENT SYSTEM REVIEW

W.P. Ref.

FACILITY CONTROL

1. Using data supplied by the laboratory, review the following as applicable to the facility:

   (a) Facility layout including sewer diagrams/blueprints, wastewater treatment flow diagrams, holding tanks, grease traps, catch basins etc. as available;

   (b) Potential water usage especially in terms of large scale uses such as pilot or bench scale activities. Obtain process flow diagrams and descriptions where appropriate; and,

   (c) Significant wastewater control facilities such as septic beds, end-of-pipe treatment, deep well injection, on-site disposal (eg. percolating beds, biological treatment, irrigation). These facilities will require separate attention.

2. Tour the facility including individual labs, utility rooms, shipping and receiving, and storage areas.

   (a) Physically follow sewers and trace sewer blueprints to verify general layout. Identify sanitary sewer lateral junction points and define upstream operations they serve. Physically open and inspect all sumps, etc. Compare actual sewers, sumps, etc. to drawings and note deviations. If drawings do not exist, auditors to plot best understanding of sewer systems using sewer clean-outs, floor cuts, and limited sewer dye testing to estimate directions. Through observation and inquiry, obtain and document your understanding of equipment operation; and,

   (b) Track storm sewer laterals in the facility where possible including following in the ceiling or basement, etc. Based on inquiry, process flow diagrams and observation, identify any interconnections between the sanitary and storm sewers. Carefully scrutinize any use of the storm sewer inside the facility.

3. Tour the property external to the facility to:

   (a) Determine that process flow diagrams, sewer diagrams and facility layout are consistent with observed discharge locations;

W.P. REF.

(b) Identify and trace all storm and sanitary sewers, including storm laterals (ie. parking lot drainage, etc.), and ensure no interconnections; and,

(c) Based on inquiry and observation, review sewer and process flow diagrams, and carefully scrutinize storm sewers in vulnerable areas such as shipping/receiving bays, waste storage areas, chemical transfer areas, chemical and empty drum/pail storage. Evaluate potential for contaminated storm water run-off either through residues on the ground (possibly indicating housekeeping issues) or accidents or emergencies.

4. Investigate and inventory the uses of water and potential discharges, including lab sinks, floor drains, etc. looking for batch, continuous and non-routine/emergency/spills related events. Assess discharges down the sanitary and storm sewers separately.

(a) Identify and characterize contaminants that are or may possibly go down the sewers. Identify high strength vs low strength, toxicity, flammability, etc. Assess risks.

(b) Inventory engineering controls at from source to end-of-pipe inclusive. Evaluate engineering controls in terms of:

- suitability of technology to control expected contaminant and/or unexpected contaminant discharge (ie. spill); and,
- matching design capacity and sizing of equipment with expected flow and contaminant loading including daily and surge flows. Obtain design documentation from lab files, maintenance or supplier.

(c) Evaluate maintenance of system and equipment in terms of:

- regular, routine maintenance on system. Obtain records. If preventative maintenance program in effect, obtain schedule, what is checked, and documentation indicating adherence to the program; and,

W.P. REF.

(d) Assess all discharges, with control equipment and without, for risks of:

- uncontrolled releases;
- materials incompatible with the sewer and wastewater compliance where, either individually or in combination, they can cause a precipitate, a sludge, two phase liquid or mechanical problems such as clogging or other damage to the sewer (ie. corrosion); and,
- possible compatibility problems, either in terms of safety or compliance, at the junctions of sewer laterals where flow streams from different labs combine.

5. If significant wastewater control facilities have been identified, perform a separate detailed review and analysis. Through observation, inquiry and documentation, review the following:

(a) Review and verify process flow diagrams to ensure all system/equipment working as prescribed.

(b) Perform engineering assessment as outlined in 4 (b); and,

(c) Perform maintenance assessment as outlined in 4 (c).

PERMITS AND COMPLIANCE

6. Using the a permit and regulatory compliance standard already assembled:

(a) Evaluate the approval permits and/or the facility applications, for the following:

- examine for completeness of data and accuracy. Perform walk through inventory of equipment and emission points to verify;
- document that the permit application was signed by appropriate management representative;

W.P. REF.

- determine whether any modifications of the facility have resulted in increases in discharge rates and that these changes are properly reflected in applications for revisions or renewal of permits. Also, determine if any operational changes in the lab have resulted in changes of type of pollutants not covered in applications for permits or in existing permits; and,

- for those substances reported as present or absent in discharges at time of permit application, ascertain if the basis for that description is still valid.

(b) Ascertain status of compliance with all stipulations of permits and regulations. Document deviations:

- for the review period, record date of all known excursions, type of excursion, abatement or corrective actions, and communications to regulatory agencies, etc. Determine if compliance with all reporting procedures has been carried out; if not, list exceptions and mitigating circumstances; and,

- obtain and review intracompany correspondence relative to permit limitation issues or regulatory actions, noting all unresolved issues.

7. Develop a flow chart or other description showing process and responsibilities for water pollution control activities (ie. responsibility for operations, sampling, analysis, record maintenance, and regulatory reporting).

8. Determine whether operating procedures or installed systems are capable of providing information substantiating compliance with requirements. For example:

(a) Inventory all effluent monitoring equipment or procedures and assess sufficiency. Document findings and note possible improvements. Where effluents are not monitored, estimate risk of non-compliance;

(b) With facility personnel, observe the procedure for sample collection, analysis and data recording. Document and assess the maintenance and calibration programs for the following devices:

- composite sampling;
- effluent flow measuring;

W.P. REF.

- in-place monitoring and recording devices; and,
- control equipment.

(c) Note any provision for crosschecking or verification by independent analysis, as well as other quality control procedures; and,

(d) Verify that locations of sampling points result in representative samples, and sampling frequency agrees with permit.

9. Review monitoring records for inclusion of all required information: | |

(a) The date, exact place and time of sampling;

(b) The individuals performing the sampling and analysis; and,

(c) The analytical methods used and results of such analyses.

10. Review the analytical procedures used by the laboratory to sample and analyze wastewaters. Verify compliance with the guidelines and test procedures as outlined by regulation or as accepted practice. Determine whether proper sample containers, preservation techniques, holding times, and quality control procedures are used. Note any significant discrepancies between procedures used and those approved. | |

11. Review plans and programs for compliance with published regulatory requirements and confirm that dates of compliance are consistent with requirements. | |

MANAGEMENT SYSTEMS

12. Interview facility personnel and review available documents to gain an understanding of the water pollution control management systems established at the laboratory. Document in a flow chart or narrative form your understanding of programs, procedures and responsibilities for the following management system controlling wastewater compliance. | |

(a) Evaluate the management plan for compliance including yearly targets that have been set and capital budget programs in place. Ensure that the roles are defined and everyone understands their responsibilities for compliance including reporting requirements. Check with a selection of line management and staff. Evaluate whether past targets and performance measures have been achieved.

(b) Determine documentation and recordkeeping programs implemented by the lab for sample collection, analysis and data recording including analytical results for compliance, but also log notations, event/incident summaries, inspection records, etc. Inventory recording procedures developed and their location. Inspect documents for completeness and timely follow-up, noting deviations. Obtain copies of documentation.

- determine if the monitoring of telltale parameters and recordkeeping is complete to control the risk of non-compliance. Indicate possible improvements.

- investigate record retention policies and operating procedures to ensure appropriate documentation control. Ensure it meets regulated requirements if appropriate.

(c) In terms of recordkeeping, review the follow-up programs to monitor and evaluate the data. Use interviews and the paper trail to verify:

- investigate who monitors and reviews the data. Is the review frequent enough to catch deviations especially as they may impact on compliance; and,

- describe and flow chart the reporting process or strategy that the responsible parties follow to identify and report (include internal management reporting as well as external authorities):

  i) immediate excursions of compliance;

  ii) situations involving increasing incidents and/or effluent quality etc. that may present a risk of non-compliance in the near future; and,

W.P. REF.

iii) quarterly, bi-yearly, or yearly performance monitoring and evaluation to targets.

(d) Investigate established performance improvement programs, both capital and procedural changes, and assess adequacy and timeliness of implementation.

13. Based on the responses obtained in the Management Controls Questionnaire, identify, obtain and review all acceptable practices and policies, as they relate to waste and wastewater discharges down the sewer. Investigation may be through inquiry, observations and documentation review.

(a) Tour the laboratory to observe the application of these practices during the period of the audit, identifying deviations from best practice.

(b) Based on the inventory of sewer discharges in 4 (a), are there any substantial risks not covered by operating procedures that should be.

(c) Based on the objective review of these procedures, are there deficiencies in the procedure itself that must be corrected, modified or expanded.

(d) Identify who is responsible for developing, monitoring and updating the procedures for the facility. Physically identify where the procedures/manuals are located and who controls and/or uses them.

(e) Identify how adherence to the procedures is monitored and deviations or incidents recorded. How is the report made (ie. verbal, formal incident report) and who gets it. Assess follow-up program to deviations/incidents by tracking dates on memos, logs, etc. to determine responsiveness of actions. Flow chart understanding of the complete system.

14. Interview appropriate facility personnel and review available documents to gain an understanding of the operations and maintenance planning and programs for facility control as it relates to wastewater discharges.

(a) Evaluate management plan and yearly targets for training, operations performance improvements, operator performance, efficiencies and cost targets including related capital programs in place. Ensure roles and responsibilities are defined and understood. Check with a selection of line management, supervisors, lab staff,

W.P. REF.

and maintenance staff. Include a selection of personnel who are directly responsible for operating or maintaining wastewater equipment.

- evaluate training programs and procedures and their effectiveness.

(b) Determine the documentation and recordkeeping programs implemented by operations and maintenance for facility control. This may include work orders, memos, log notation, inspection records, etc. Inventory recording procedure and inspect documents for environmental notations noting deviations, timely follow-up etc.

(c) In terms of recordkeeping, review the follow-up programs to monitor and evaluate the data. Establish if and how the information is used to develop performance improvement programs for wastewater facilities. Review maintenance operations separate from regular lab operations.

(d) Investigate established performance improvement programs, both capital and procedural changes, and assess adequacy and timeliness of implementation.

INTERVIEWS

15. Based on information gained from the Management Controls Questionnaire, conduct communications interviews with appropriate staff on wastewater treatment issues. Obtain a broad, random selection of staff with specific duties regarding wastewater treatment (maintenance and operations) including general laboratory personnel and test their knowledge of procedures.

REGULATORY COMPLIANCE DEVIATIONS
WASTEWATER MANAGEMENT

NUMBER	FEDERAL LEGISLATION	COMPLIANCE REFERENCE
	PROVINCIAL LEGISLATION	
	MUNICIPAL LEGISLATION	

REGULATORY COMPLIANCE DEVIATIONS (CONTINUED)
WASTEWATER MANAGEMENT

NUMBER	RISKS OF NON-COMPLIANCE	COMPLIANCE REFERENCE

DEVIATIONS FROM STANDARDS AND GUIDELINES

WASTE MANAGEMENT

THE MANAGEMENT SYSTEMS REVIEW

W.P. Ref.

FACILITY CONTROL

1. Using data supplied by the laboratory, review the following as applicable to the facility:

   (a) Facility layout in terms of waste generation and storage including solid non-hazardous as well as hazardous wastes. Identify waste storage areas, waste processing equipment (ie. solvent still, autoclave, etc.), and waste shipping areas.

   (b) Division mandate and activities and potential wastes generated especially as activities relate to changing experiments/investigations and, therefore, potentially changing waste streams.

2. Tour the facility including lab operations, utility rooms, shipping and receiving, and storage areas. Inspect housekeeping procedures, visual discoloration, staining or other evidence of spills etc. Specifically:

   (a) inspect collection, handling and storage facilities;
   (b) inspect all treatment facilities;
   (c) inspect active disposal areas on the site;
   (d) inspect inactive disposal sites; and,
   (e) inspect area placarding and individual waste containment and labelling programs.

3. By following and tracing the procedures and operations of each laboratory department, conduct a comprehensive waste inventory noting points where solid and hazardous wastes are generated. Include utility and maintenance areas etc. Ensure that non-routine, yearly maintenance and emergency/spill clean-up are covered in the assessment.

   (a) Characterize waste streams in terms of relative strengths, hazard, and special handling and disposal requirements. Consider health effects, flammability, corrosive, compatibility and reactive concerns. Use Material Safety Data Sheets and other resource material to assess risks such as:

i)	Chemical	v)	Nuclear
ii)	Reactive	vi)	Infectious
iii)	Biological	vii)	Highly Toxic
iv)	Radioactive	viii)	Physical

(b) Carefully evaluate how regular department activities, can change, for example, emergency work, one time operations, changing experiments or lab requirements. Evaluate changing chemical/material needs and impact on waste stream profile (ie. changing wastes, volumes or strengths). Consider seasonal changes also. Review past changes in each department. Obtain documentation where appropriate.

4. Track the waste stream from the point of generation through the material handling and collection stage. Based on observation and inquiry, document understanding of material flow in text or flow chart form.

(a) Are adequate management policies directed toward minimizing wastes established.

(b) Are waste containment, handling, treatment and disposal requirements understood by staff for all wastes in their specific lab. Test knowledge.

(c) Are waste containment facilities located conveniently (and safely) within close proximity of the work station. Assess amount of handling and distance to travel (ie. walk) to containment.

(d) Assess containment system for ease of use, designed to prevent spills, release of vapours/odours etc. For example, ensure pails/drums have a funnel or wide neck opening, lidded and secure, located outside traffic patterns.

(e) Ensure labelling of all intermediate or work station containers and waste collection depots is accurately carried out and adequate information provided for safe handling and transport. Ensure label includes materials allowed in the container and any materials that are prohibited.

(f) Are adequate treatment procedures followed prior to release of a hazardous waste ie. neutralization, detoxification, etc.

(g) Track procedures or equipment that alerts to full containers and identify who has the responsibility to pick up and transfer to central storage and containment. Assess transportation mechanism, safety procedures taken and all logging or documentation that may take place for each transfer. Flow chart final disposition of each type of waste stream from each lab.

W.P. REF

(h) For waste streams not associated with lab operations, eg. oil changeouts from compressors, follow the same principles of 4(a) - 4(g) and flow chart final disposition.

(i) Compare all waste disposal procedures and streams with inventory performed in question 3 and report deviations.

5. Review on-site central waste storage facilities both inside and outside laboratory building(s). Specifically:

(a) Assess layout, housekeeping, containment, special conditions for safe storage (eg. explosion proof wiring) in terms of wastes stored and provincial and federal guidelines. Ensure containers are in good condition, secure and compatible with wastes in terms of size, materials of construction and method of operation.

(b) Review inventory control procedures. Document agreement between inventory records and wastes in storage by inspection. Inspect labels on a cross section of wastes in storage.

(c) Document the flow of records from the time of receipt of waste at storage site until removal. If stored greater than 90 days, ensure appropriate notification performed.

6. For wastes that are shipped off-site for disposal, conduct the following tests:

(a) Obtain and record names and addresses of all off-site disposal contractors and carriers;

(b) Review facility procedures for selecting and screening waste contractors;

(c) Document contractor's province issued transport disposal number;

(d) Document that a current disposal permit exists for each disposal site;

(e) Ascertain that disposal permits are approved for the particular type of waste;

(f) Document waste shipment by inspection of manifest forms. Ensure that all sections of the forms have been completed. Interview staff involved with manifests to

ensure proper handling procedures and clear understanding of system, making sure that the people signing the manifests are authorized to do so; and,

(g) Determine the facility's policy for visiting/inspecting off-site disposal locations.

7. In terms of non-hazardous solid waste management, interview laboratory personnel and review available documents to gain an understanding of the non-hazardous solid waste management systems established at the facility. Document in a flow chart or narrative form your understanding of programs, procedures and responsibilities for managing non-hazardous solid waste streams. Consider:

(a) Collection, transportation and disposition of non-hazardous solid wastes;

(b) Procedure for classifying wastes;

(c) Waste inventories, analyses, recycling or disposal records;

(d) Ensuring haulers have non-hazardous solid waste permits, registrations or licenses;

(e) Labelling, storage, sampling and analysis; and,

(f) Other action and recordkeeping activities.

8. Conduct a systematic risk assessment following wastes from initial containment through collection, storage and final disposition. Investigation includes inquiry, observation and documentation review. Assess potential risks including those for health and safety, fire and explosion, emergency release (lab/community), accidents and spills.

(a) Consider the potential for a dangerous release either in terms of environmental impact or public/worker safety (ie. fire and explosion risk). Investigate waste streams generated on a lab by lab basis looking for the possibility of incompatible combinations or other situations impacting on safe operation.

(b) Evaluate the possibility of external impacts or accidents. For example, look for storage in traffic areas, storage of flammables in direct sunlight, storage in area where another risk potential may impact (ie. possible flammable risk close to waste container etc.).

W.P. REF

(c) Consider human interactions causing a reaction or release, ie. mistakes/accidents, security, negligence, inappropriate material transfers, etc.

9. Evaluate the health and safety hazards and risks associated with the waste streams and inventory personal protective equipment close at hand. Assess whether equipment is appropriate and complete for the job. Visually inspect equipment and ensure it is available and maintained.

10. If significant waste control facilities have been identified, such as solvent stills, autoclaves, etc, perform a separate detailed review and analysis. Through observation, inquiry and documentation, review the following:

(a) Review and verify process flow diagrams to ensure all systems/equipment working as prescribed;

(b) Evaluate engineering controls in terms of:

- suitability of technology to treat expected wastes and assess expected and unexpected contaminant discharge (ie. spill); and,
- matching design capacity and sizing of equipment with expected processing volumes. Obtain design documentation from lab files, maintenance or supplier;

(c) Evaluate maintenance of system and equipment in terms of:

- regular, routine maintenance on system. Obtain records. If preventative maintenance program in effect, obtain schedule, what is checked, and documentation indicating adherence to the program; and,
- frequency of down time associated with specific equipment, and, if down, estimate time period for equipment to be up and running. Establish importance of system/equipment to compliance and/or facility efficiencies. Inquire and review records.

11. In terms of past disposal practices, interview facility personnel and review available documents to gain an understanding of the systems established at the facility to manage past disposal practices. Locate the potential areas. Consider soil and groundwater contamination from old waste processing areas, storage facilities, etc.

PERMITS AND COMPLIANCE

12. Using the permit and regulatory compliance standard already assembled:

    (a) Confirm whether the laboratory is a generator of hazardous waste. If so, complete the following:

    - locate and copy provincial waste registration applications and approval documents. Ensure they are current and compare registered wastes to inventory. Note deviations; and,
    - evaluate from the inventory whether further registration is required.

    (b) If the laboratory treats, stores or disposes of hazardous wastes on site:

    - ensure the facility has a provincial permit (where required). Assess permit for completeness and accuracy. Assess installation to verify that it is as approved. Document deviations; and,
    - does the facility accept wastes from other facilities for treatment of disposal. Establish compliance requirements.

    (c) Ascertain status of compliance with all stipulations of permits and regulations. Document deviations:

    - for the review period, record date of all known excursions to compliance, type of excursion, corrective actions and communications to regulatory agencies, etc. Determine if compliance with all reporting procedures has been carried out; if not, list exceptions and mitigating circumstances;
    - obtain and review intracompany correspondence relative to compliance issues or regulatory actions, noting all unresolved issues; and,
    - identify any outstanding court orders, variances, compliance orders, administrative orders, etc.

13. Develop flow chart or other description showing responsibilities for waste management activities.

W.P. REF

14. Determine whether operating procedures or installed systems are capable of providing information substantiating compliance. Note where changes in practice will reduce the risks of non-compliance.

MANAGEMENT SYSTEMS

15. Interview facility personnel and review available documents to gain an understanding of the waste management systems established at the laboratory. Document in a flow chart or narrative form your understanding of programs, procedures and responsibilities for the following management system controlling waste. Establish whether the facility has a written Waste Management Plan. Review.

(a) Evaluate the management plan for compliance including yearly targets and capital budget programs in place. Ensure that the roles are defined and everyone understands their responsibilities for compliance including reporting requirements. Check with a selection of line management staff. Evaluate whether past targets and performance measures (ie. cost controls) achieved.

b) Determine documentation and recordkeeping programs implemented by the lab for waste collection, storage, and disposal including waste analytical results and registrations for compliance, but also log notations, event/incident summaries, inspection records, etc. Inventory every recording procedure developed and location, and inspect documents for completeness, meeting deadlines, and timely follow-up on records noting deviations. Obtain copies of the documentation.

- determine if the program for monitoring of telltale parameters and recordkeeping is complete to control the risk of non-compliance. Indicate possible improvements.

- investigate record retention policies and operating procedures to ensure appropriate documentation control. Ensure it meets regulated requirements if appropriate.

(c) In terms of recordkeeping, review the follow-up programs to monitor and evaluate the waste characteristics, volumes and movements. Use interviews and the paper trail to verify.

- investigate who monitors and reviews the data. Is the review frequent enough to catch deviations especially as they may impact on compliance; and

- describe and flow chart the reporting process or strategy that the responsible parties follow to identify and report (include internal management reporting as well as external authorities):

  i) immediate excursions of compliance;

  ii) situations involving increasing incidents etc. that may present a risk of non-compliance in the near future;

  iii) quarterly, bi-yearly, or yearly performance monitoring and evaluation to targets.

(d) Establish performance improvement programs both capital and procedural changes, and assess adequacy and timeliness of implementation.

16. Based on the responses obtained in the Management Controls Questionnaire, identify, obtain and review acceptable practices, policies, and procedures as they relate to waste management. Investigation may be through inquiry, observations and documentation review.
Practices may include, but are not limited to:

- prohibited practices;
- acceptable or unacceptable practices for disposal; and,
- safe operating practices protecting against health or safety hazards.

(a) Tour the lab to observe the application of these practices during the period of the audit, identifying deviations from best practices.

(b) Based on the inventory of wastes in Question 3, are there any substantial risks not covered by procedures that should be.

(c) Based on the objective review of these procedures, are there deficiencies in the procedure itself that must be corrected, modified or expanded.

W.P. REF

(d) Identify who is responsible for developing, monitoring and updating the procedures for the facility. Physically identify where the procedures/manuals are located and who controls and/or uses them.

(e) Identify how adherence to the procedures is monitored and deviations or incidents recorded. How is the report made (ie. verbal, formal incident report) and who gets it. Assess follow-up program to deviations/incidents by tracking dates on memos, logs etc. to determine responsiveness of actions. Flow chart understanding of the complete system.

17. Interview appropriate facility personnel and review available documents to gain an understanding of the operations and maintenance aspects of facility control as it relates to waste management.

(a) Evaluate management plan and yearly targets for training, operations performance improvements, operator performance, efficiencies and cost targets including related capital programs in place. Ensure roles and responsibilities are defined and understood. Check with a selection of line management, supervisors, lab staff, and maintenance staff. Include a selection of staff who are directly responsible for operating or maintaining waste treatment equipment.

(b) Determine the documentation and recordkeeping programs implemented by operations and maintenance for facility control. This may include work orders, memos, log notations, inspection records, etc. Inventory recording procedure and inspect documents for environmental notations noting deviations, timely follow-up etc.

(c) In terms of recordkeeping, review the follow-up programs to monitor and evaluate the data. Establish if and how the information is used to develop performance improvement programs for waste facilities. Review maintenance operations separate from regular lab operations.

(d) Investigate established performance improvement programs, both capital and procedural changes, and assess adequacy and timeliness of implementation.

W.P. REF

18. Inventory all facility training programs that address the compliance aspects of waste management, operation of waste treatment facilities and/or training to specific programs/practices. View schedules and personnel trained. Assess retraining procedures. Establish person responsible for training program and review management system.

INTERVIEWS

19. Based on information gained from the Management Controls Questionnaire, conduct communications interviews with appropriate staff on waste management issues. Obtain a broad, random selection of staff with specific duties regarding waste treatment (maintenance and operations) including general lab personnel and their knowledge of waste management procedures. Include individuals with specific roles and responsibilities in monitoring and reporting compliance issues.

REGULATORY COMPLIANCE DEVIATIONS
WASTE MANAGEMENT

NUMBER	FEDERAL LEGISLATION	COMPLIANCE REFERENCE

PROVINCIAL LEGISLATION

MUNICIPAL LEGISLATION

REGULATORY COMPLIANCE DEVIATIONS (CONTINUED)
WASTE MANAGEMENT

NUMBER	RISKS OF NON-COMPLIANCE	COMPLIANCE REFERENCE

DEVIATIONS FROM STANDARDS AND GUIDELINES

AIR MANAGEMENT

THE MANAGEMENT SYSTEMS REVIEW

W.P. Ref.

FACILITY CONTROL

1. Using data supplied by the laboratory, review the following as applicable to the facility:

   (a) Facility layout including ventilation system blueprints/diagrams as applied to controlled and uncontrolled air pollution sources;

   (b) Divisional activities and potential air usage especially in terms of large scale uses. Include pilot plant/bench scale activities. Obtain process flow diagrams and descriptions where appropriate; and,

   (c) Significant air control facilities such as fume hoods, scrubbers, demisters, incinerators, etc.

2. Tour the facility, both inside buildings and on the external site. Include individual labs, utility rooms, shipping and receiving, and storage areas.

   (a) Follow and trace ventilation system diagrams to verify stack and equipment layout. Note deviations to drawings. If drawings do not exist, auditor to plot best understanding of ventilation layout. Smoke flow testing may be used to estimate directions.

   (b) Based on inquiry, diagrams and observation, note any building ventilation junctions with laboratory ventilation system for make-up air, etc.

   (c) Perform a roof tour. Follow and trace ventilation system diagrams to verify stack and equipment layout, matching layout to that determined in Part 2 (a). Note all air intakes and discharge points as well as any possible short circuiting. Note all odours, spills, discoloration, stack deterioration or condition, liquid carryover, etc. Draw map of roof top discharges.

   (d) Determine impact on neighbouring community buildings and personnel. Note odours, dusting, noise, etc. Note sensitive receptors and emission locations.

W.P. REF.

3. Investigate and inventory all points of potential air discharges including bench work, compressed gases, equipment releases and venting, boilers/utilities, etc. looking for batch, continuous and non-routine/emergency related events.

(a) Identify and characterize contaminants that are or may possibly go into the air. Identify concentrated vs dilute, odour, toxic, safety (ie. flammability) concerns. Assess risks.

(b) Inventory engineering controls at the point of discharge. Evaluate engineering controls in terms of:

- suitability of technology to control expected contaminant and/or unexpected contaminant discharge (ie. spill, accidental release)
- matching design capacity and sizing of equipment with expected flow and contaminant loading including daily and surge flows. Obtain design documentation from lab files, maintenance or supplier.

(c) Evaluate maintenance of system and equipment in terms of:

- regular, routine maintenance on system. Obtain records. If preventative maintenance program in effect, obtain schedule, what is checked, and documentation indicating adherence to the program; and,
- frequency of down time associated with specific equipment, and if down, estimate time period for equipment to be up and running. Establish importance of system/equipment to compliance and/or facilities efficiencies through inquiry and review of records.

(d) Assess all discharges, with control equipment and without, for risks of:

- uncontrolled releases; and,
- materials incompatible with ventilation systems in terms of damage which could be caused (corrosion, flammability), personnel safety, or compliance.

W.P. REF.

4. If significant air pollution control equipment has been identified, perform a separate and detailed review and analysis. Through observation, inquiry and documentation, review the following:

   (a) Review and verify process flow diagrams to ensure all systems/equipment working as prescribed;

   (b) Perform engineering assessment as outlined in 3 (b); and,

   (c) Perform maintenance assessment as outlined in 3 (c).

PERMITS AND COMPLIANCE

5. Using the permit and regulatory compliance standards already assembled:

   (a) Evaluate the approval permits and/or the facility applications for the following:

   - examine for completeness of data and accuracy. Perform walk through inventory of equipment and emission points to verify;
   - document that the permit application was signed by appropriate management representative;
   - determine whether any modifications of the facility have resulted in increases in emission rates and that these changes are properly reflected in applications for revisions or renewal of permits. Also, determine if any operational changes in the lab have resulted in changes of type of pollutants not covered in applications for permits or in existing permits; and,
   - for those substances reported as present or absent in discharges at time of permit application, ascertain if the basis for that description is still valid.

   (b) Ascertain status of compliance with all stipulations of permits and regulations. Document deviations;

   - for the review period, record date of all known excursions, type of excursion, abatement or corrective actions, and communications to regulatory agencies, etc. Determine if

W.P. REF.

compliance with all reporting procedures has been carried out; if not, list exceptions and mitigating circumstances; and,

- obtain and review intracompany correspondence relative to permit limitation issues or regulatory actions, noting all unresolved issues.

6. Develop a flow chart or other description showing process and responsibilities for regulatory air pollution control activities with respect to responsibility for operation, record maintenance, and reporting.

7. Determine whether operating procedures or installed systems are capable of providing information substantiating compliance with requirements. For example:

   (a) Inventory all emission monitoring equipment or procedures and assess sufficiency. Include monitoring of a periodic nature and for non-routine or emergency emissions. Document findings and note possible improvement. Where effluents are not monitored, estimate risk of non-compliance;

   (b) With facility personnel, observe the procedure for maintenance and calibration programs for emission control equipment. Document and assess for sufficiency.

   (c) Note any provision for crosschecking or verification by independent analysis, as well as other quality control procedures.

8. Review a cross-section of monitoring records for inclusion of required information:

   (a) The date, exact place and time of sampling;

   (b) The individuals performing the sampling and analysis; and,

   (c) The analytical methods used and results of such analyses.

9. Review the laboratory analytical procedures used by the facility to analyze air emissions and verify compliance with the guidelines and test procedures as outlined by regulation or as accepted practice. Determine whether proper sample containers, preservation techniques, holding times, and quality control procedures are used. Note any significant discrepancies between procedures used and those approved.

W.P. REF.

10. Review plans and programs for compliance with published regulatory requirements and guidelines and confirm that dates of compliance are consistent with requirements.

11. For documented non-compliance occurrences and public complaints, determine that sufficient reporting and follow-up has been undertaken. Include instances of outstanding control orders and complaints of odours, noise, dust fogging and public health problems. Verify that requirements of orders are being met.

12. Confirm that the sulfur content of fuel oil used for fuel-burning equipment is less than that prescribed in applicable regulations.

13. Check facility understanding of noise regulations that effect the laboratory. Review monitoring data where provided.

14. Determine whether procedures are in place to monitor employee exposure to regulated and hazardous air contaminants.

    (a) Perform compliance assessment as in 5 (b) as applicable. Note TLV's or other provincial requirements.

    (b) Develop flow chart as in 6 as applicable.

MANAGEMENT SYSTEMS

15. Interview facility personnel and review available documents to gain an understanding of the air pollution control management systems for regulatory compliance established at the laboratory. Document in a flow chart or narrative form your understanding of programs, procedures and responsibilities for the following management system controlling air emissions.

    (a) Evaluate the management plan for compliance including yearly targets that have been set and capital budget programs in place. Ensure that the roles are defined and everyone understands their responsibilities for compliance including reporting requirements. Check with a selection of line management and staff. Evaluate whether past targets and performance measures have been achieved.

(b) Determine documentation and recordkeeping programs implemented by the lab for sample collection, analysis and data recording including analytical results for compliance, but also log notations, event/incident summaries, inspection records, etc. Inventory recording procedures developed and their location, and inspect documents for completeness, and timely follow-up, noting deviations. Obtain copies of the documentation.

- determine if the program for monitoring of telltale parameters and recordkeeping is complete to control the risk of non-compliance. Indicate possible improvements.

- investigate record retention policies and operating procedures to ensure appropriate documentation control. Ensure it meets regulated requirements if appropriate.

(c) In terms of recordkeeping, review the follow-up programs to monitor and evaluate the data. Use interviews and the paper trail to verify:

- investigate who monitors and reviews the data. Is the review frequent enough to catch deviations especially as they may impact on compliance; and,

- describe and flow chart the reporting process or strategy that the responsible parties follow to identify and report (include internal management reporting as well as external authorities):

  i) immediate excursions of compliance;

  ii) situations involving increasing incidents and/or emission quality etc. that may present a risk of non-compliance in the near future; and,

  iii) quarterly, bi-yearly, or yearly performance—monitoring and evaluation to targets.

(d) Investigate established performance improvement programs both capital and procedural changes, and assess adequacy and timeliness of implementation.

W.P. REF.

16. Based on the responses obtained in the Management Controls Questionnaire, identify, obtain and review all acceptable practices and policies, and laboratory procedures as they relate to air emissions. Investigation may be through inquiry, observations and documentation review.

(a) Tour the laboratory to observe the application of these practices during the period of the audit, identifying deviations from best practice.

(b) Based on the inventory of air discharges in 3 (a), are there any substantial risks not covered by operating procedures that should be.

(c) Based on the objective review of these procedures, are there deficiencies in the procedure itself that must be corrected, modified or expanded.

(d) Identify who is responsible for developing, monitoring and updating the procedures for the facility. Physically identify where the procedures/manuals are located and who controls and/or uses them.

(e) Identify how adherence to the procedures is monitored and deviations or incidents recorded. How is the report made (ie. verbal, formal incident report) and who gets it. Assess follow-up program to deviations/incidents by tracking dates on memos, logs, etc. to determine responsiveness of actions. Flow chart understanding of the complete system.

17. Interview appropriate facility personnel and review available documents to gain an understanding of the operational and maintenance planning and programs for facility control as it relates to air emissions.

(a) Evaluate management plan and yearly targets for training, operations performance improvements, operator performance, efficiencies and cost targets including related capital programs in place. Ensure roles and responsibilities are defined and understood. Check with a selection of line management, supervisors, lab staff, and maintenance staff. Include a selection of staff who are directly responsible for operating or maintaining air emission equipment.

- evaluate training programs and procedures and their effectiveness.

W.P. REF.

(b) Determine the documentation and recordkeeping programs implemented by lab operations and maintenance personnel for facility control. This may include work orders, memos, log notations, inspection records, etc. Inventory recording procedures and inspect documents for environmental notations noting deviations, timely follow-up etc.

(c) In terms of recordkeeping, review the follow-up programs to monitor and evaluate the data. Establish if and how the information is used to develop performance improvement programs for air emissions. Review maintenance operations separate from regular lab operations.

(d) Investigate established performance improvement programs, both capital and procedural changes, and assess adequacy and timeliness of implementation.

INTERVIEWS

18. Based on information gained from the Management Controls Questionnaire, conduct communications interviews with appropriate staff on air emission issues. Obtain a broad, random selection of staff with specific duties regarding air emission treatment (maintenance and operations) and general laboratory staff and their knowledge of procedures.

REGULATORY COMPLIANCE DEVIATIONS
AIR MANAGEMENT

NUMBER	FEDERAL LEGISLATION	COMPLIANCE REFERENCE
	PROVINCIAL LEGISLATION	
	MUNICIPAL LEGISLATION	

REGULATORY COMPLIANCE DEVIATIONS (CONTINUED)
AIR MANAGEMENT

NUMBER	RISKS OF NON-COMPLIANCE	COMPLIANCE REFERENCE

DEVIATIONS FROM STANDARDS AND GUIDELINES

MATERIALS MANAGEMENT

THE MANAGEMENT SYSTEM REVIEW

W.P. Ref.

FACILITY CONTROL

1. By following and tracing the procedures and operations of each laboratory department, conduct a comprehensive materials inventory noting points where these materials are used. Include utility and maintenance areas etc. Ensure that non-routine, yearly maintenance and emergency/spill clean-up are covered in the assessment.

    - Characterize materials in terms of relative strengths, hazard, and special handling and disposal requirements. Consider health effects, flammability, corrosive, compatibility and reactive concerns. Use Material Safety Data Sheets and other resource material to assess risks such as:

i)	Chemical	v)	Nuclear
ii)	Reactive	vi)	Infectious
iii)	Biological	vii)	Highly Toxic
iv)	Radioactive	viii)	Physical

2. Review material shipping and receiving areas, specifically:

    (a) Assess layout, housekeeping and provisions for safely handling incoming and outgoing shipments, in terms of materials handled and provincial and federal guidelines. Include trolleys, lifts, temporary storage areas, etc.

    (b) Review inventory logging procedures. Ensure that system is set up to identify shipments, note their hazards and proper handling procedures, and notify particular departments or individuals that shipment has arrived.

    (c) Conduct a systematic risk assessment of the area considering the potential for a dangerous release either in terms of environmental impact or public/worker safety. Include possible impacts from human interactions, such as material transfer or mistakes.

3. Review on-site central materials storage facilities both inside and outside laboratory building(s). Specifically:

    (a) Assess layout, housekeeping, containment, special conditions for safe storage (eg. explosion proof wiring) in terms of materials stored and provincial and federal

W.P. REF.

guidelines. Ensure containers are in good condition,secure and compatible with materials inside in terms of size, materials of construction and method of operation.

(b) Review inventory control procedures. Document agreement between inventory records and materials in storage by inspection. Inspect labels on a cross-section of containers in storage.

(c) Conduct a systematic risk assessment of each facility, considering the potential for a dangerous release either in terms of environmental impact or public/worker safety. Evaluate the possibility of external impacts or accidents, and those from human interactions and handling.

4. Conduct a systematic risk assessment for transport of materials from receiving to storage and from storage to lab usage. Also include materials to be transported from labs or storage to shipping area. Investigation includes inquiry, observation and documentation review. Assess potential risks including those for health and safety, fire and explosion, emergency release (lab/community), accidents and spills.

(a) Consider the potential for a dangerous release either in terms of environmental impact or public/worker safety (ie. fire and explosion risk).

(b) Evaluate the possibility of external impacts or accidents, and those from human interactions and handling.

5. Evaluate the health and safety hazards based on the risks associated with material handling and inventory personal protective equipment close at hand. Assess whether equipment is appropriate and complete for the job. Visually inspect equipment and ensure it is available and maintained.

PERMITS AND COMPLIANCE

6. Review the regulatory compliance standard already assembled in the pre-audit activities to ensure that material handling, associated regulations and guidelines are included. Specific areas such as nuclear, radioactive, biological, etc. should be covered with applicable detailed legislation and guidelines.

- ascertain status of compliance with all stipulations of permits, regulations and guidelines. Document deviations;

W.P. REF.

- for the review period, record date of all known excursions to compliance, type of excursion, corrective actions and communications to regulatory agencies, etc. Determine if compliance with all reporting procedures has been carried out; if not, list exceptions and mitigating circumstances;

- obtain and review intracompany correspondence relative to compliance issues or regulatory actions, noting all unresolved issues; and,

- identify any outstanding court orders, variances, compliance orders, administrative orders, etc.

7. Develop flow chart or other description showing responsibilities for material handling activities.

8. Inventory any designated substances that may be in use at the facility and review the assessment and resulting Control Programs. Obtain documentation for each designated substance. Specifically:

   (a) Ensure the Control Program is comprehensive identifying all the parameters of the legislation.

   (b) Identify the roles and responsibilities to track operational changes that may change program. Track currency of program.

   (c) Document that schedules and timetables are met (ie. yearly medical surveillance etc.). Review records and document deviations.

9. Conduct a comprehensive review of the Controlled Products Act and the Workplace Hazardous Materials Information System at the laboratory. Use inquiry, documentation review and observation to substantiate compliance to all aspects of WHMIS.

   (a) Determine classification system and identify roles and responsibilities to ensure program is in compliance. Who is the overall co-ordinator.

   (b) Based on previous inspections of chemical inventory lists, review Material Safety Data Sheets for completeness and note deviations. Are data sheet formats current and in compliance. Are they available to staff at all times.

W.P. REF.

(c) In touring the laboratory, inspect labelling, including chemical materials received as well as samples. Where intermediate containers are used, identify labelling requirements and spot check adherence to compliance throughout the lab.

(d) Examine all documentation on the WHMIS training program. Determine who was trained and when. Include new hire training requirements. Spot check with facility staff whether they went through the training and test for understanding of the information.

10. Flow chart your understanding of the WHMIS management system to maintain compliance. Specifically, investigate:

(a) Procedures for identifying a new Controlled Product to be used in the lab and obtaining the MSDS;

(b) Procedures for accurately classifying new chemicals. Establish how labels are affixed. Determine procedures for replacing damaged or defaced labels; and,

(c) Procedures for identifying when retraining is required.

11. Conduct a comprehensive review of Transportation of Dangerous Goods (TDG) compliance at the laboratory. Use inquiry, documentation review, and observation to substantiate all aspects of TDG.

(a) Evaluate labelling packaging, and bill of lading completion procedures for accuracy, completeness, and type of hazard inherent to the materials handled. Note deviations;

(b) Ensure that all personnel associated with TDG handling have been trained through an approved course and are properly certified. Inspect TDG certification, documentation for currency. Test understanding of TDG requirements.

(c) Review freight and/or courier companies used by the laboratory to ensure they are qualified to ship dangerous goods.

MANAGEMENT SYSTEMS

12. Interview facility personnel and review available documents to gain an understanding of the materials management systems established at the laboratory. Document in a flow chart or

narrative form your understanding of programs, procedures and responsibilities for the following management system controlling shipping, transport, and storage of materials on-site. Establish whether the facility has a written Materials Management Plan. Review.

(a) Evaluate the management plan for compliance including yearly targets and capital budget programs in place. Ensure that the roles are defined and everyone understands their responsibilities for compliance including reporting requirements. Check with a selection of line management staff. Evaluate whether past targets and performance measures (ie. cost controls) achieved.

b) Determine documentation and recordkeeping programs implemented by the lab for shipping, transport, and storage including log notations, event/incident summaries, inspection records, etc. Inventory every recording procedure developed and location, and inspect documents for completeness, meeting deadlines, and timely follow-up on records noting deviations. Obtain copies of the documentation.

- determine if the program for monitoring of telltale parameters and recordkeeping is complete to control the risk of non-compliance. Indicate possible improvements.

- investigate record retention policies and operating procedures to ensure appropriate documentation control. Ensure it meets regulated requirements if appropriate.

(c) In terms of recordkeeping, review the follow-up programs to monitor and evaluate the materials characteristics, volumes and movements. Use interviews and the paper trail to verify.

- investigate who monitors and reviews the data. Is the review frequent enough to catch deviations especially as they may impact on compliance; and

- describe and flow chart the reporting process or strategy that the responsible parties follow to identify and report (include internal management reporting as well as external authorities):

  i) immediate excursions of compliance;

W.P. REF.

ii) situations involving increasing incidents that may present a risk of non-compliance in the near future;

iii) quarterly, bi-yearly, or yearly performance monitoring and evaluation to targets.

(d) Establish performance improvement programs both capital and procedural changes, and assess adequacy and timeliness of implementation.

13. Based on the responses obtained in the Management Controls Questionnaire, identify, obtain and review acceptable practices, policies, and procedures as they relate to materials handling. Investigation may be through inquiry, observations and documentation review.

Practices may include, but are not limited to:

- prohibited practices;
- acceptable or unacceptable practices; and,
- safe operating practices protecting against health or safety hazards.

(a) Tour the lab to observe the application of these practices during the period of the audit, identifying deviations from best practices.

(b) Based on the inventory of material in Question 1, are there any substantial risks not covered by procedures that should be.

(c) Based on the objective review of these procedures, are there deficiencies in the procedure itself that must be corrected, modified or expanded.

(d) Identify who is responsible for developing, monitoring and updating the procedures for the facility. Physically identify where the procedures/manuals are located and who controls and/or uses them.

(e) Identify how adherence to the procedures is monitored and deviations or incidents recorded. How is the report made (ie. verbal, formal incident report) and who gets it. Assess follow-up program to deviations/incidents by tracking dates on memos, logs etc. to determine responsiveness of actions. Flow chart understanding of the complete system.

W.P. REF.

14. In addition to those already investigated under WHMIS and TDG, inventory all facility training programs that address the compliance aspects of materials management, and/or training to specific programs/practices. View schedules and personnel trained. Assess retraining procedures. Establish person responsible for training program and review management system.

INTERVIEWS

15. Based on information gained from the Management Controls Questionnaire, conduct communication interviews with appropriate staff on materials management issues. Obtain a broad, random selection of staff with specific duties regarding materials handling (maintenance and operations) including general lab personnel and their knowledge of materials management procedures. Include individuals with specific roles and responsibilities in monitoring and reporting compliance issues.

REGULATORY COMPLIANCE DEVIATIONS
MATERIALS MANAGEMENT

NUMBER	FEDERAL LEGISLATION	COMPLIANCE REFERENCE

PROVINCIAL LEGISLATION

MUNICIPAL LEGISLATION

REGULATORY COMPLIANCE DEVIATIONS (CONTINUED)
MATERIALS MANAGEMENT

NUMBER	RISKS OF NON-COMPLIANCE	COMPLIANCE REFERENCE

DEVIATIONS FROM STANDARDS AND GUIDELINES

SPILL PREVENTION AND CONTROL
(includes Emergency Response)

THE MANAGEMENT SYSTEMS REVIEW

FACILITY CONTROL

W.P. Ref.

1. Based on the previous characteristics of water discharges, wastes, air emissions, and material handling, tour the facility and identify and inventory all potential risks of spills. Include emergency or accidental release of contaminants especially where a significant health or safety hazard may exist. The review should include, but is not limited to, drum storage areas, loading/unloading areas etc. Look for visual evidence of staining, pooling, etc. and investigative past incidents and "near misses".

2. In conjunction with the analysis done on wastewater, document your understanding of the drainage system on facility property, and for selected passive retention systems (dykes, berms, etc.), determine through inspection that the systems can operate as designed. In particular, determine the effectiveness of valves and operating procedures to retain spills (ie. confirm that provisions are adequate to prevent accumulated rain water from decreasing the design volume of dyked areas).

3. Identify and map means of egress to the occupational or natural environment, ie. drains in proximity of spill risk, vent to atmosphere, migration of material to adjacent lab areas. Significance of risk will be determined by evaluation of hazardous properties of chemicals (ie. flammable, reactive, toxic) previously performed.

   (a) For releases to the natural environment, evaluate potential impact especially as it may involve third parties on facility property or the neighbouring community. Use professional judgement substantiated with qualitative engineering modelling calculations based on expected emissions.

   (b) For releases to the occupational environment, evaluate potential impact in terms of personnel evacuation, etc. Consider positive or negative air pressures and the potential for emission migration. Smoke tube testing may be required.

   (c) Assess significance of releases and establish relative priorities.

W.P. REF.

4. Identify, inventory and physically inspect engineering controls to control spills/emergency releases.

   (a) Inspect high level alarms, dykes and berms, catchment basins, automatic shut-offs, toxic alarms, direct audible or code signal communications etc.

   (b) Based on observations made during facility tour, determine if all preventative systems are capable of preventing spills from entering surface waters. Identify where preventative systems are not installed, review the risk of a spill, and make recommendations.

5. Investigate engineering specifications and practices designed to minimize the risk of a spill or catastrophic failure that will result in an emergency.

   (a) From engineering and purchasing specifications, determine that materials and construction of tanks are compatible with materials stored and conditions of storage.

   (b) Ascertain that the area within dykes is sufficiently impervious to contain spills. Investigative based on best design practices, and use calculations to confirm.

   (c) For underground storage and piping installation, ascertain that appropriate corrosion protection has been installed (ie. cathodic protection and resistant coatings).

   (d) For loading and unloading facilities, determine adequacy of signs and procedures for warning vehicular traffic, ensuring that vehicles cannot depart before complete disconnect; ascertain that catchment basin serving the area is adequate to hold at least the maximum capacity of any single compartment of a tank truck or car. Look for storm sewers or drainage to any receiving waters.

6. Identify maintenance system for equipment identified in Question 4. Evaluate system in terms of:

   (a) Regular, routine maintenance on system. Obtain records. If preventative maintenance program in effect, obtain schedule, what is checked, and documentation indicating adherence to the program. Particularly, note when deficiencies are observed and assess through records that appropriate and responsive corrective action was taken.

W.P. REF.

(b) Document inspection and testing program. Include regular testing of alarms, calibrations etc. as well as integrity testing of above ground tanks. Review all inspection logs related to visual inspection of berms, evidence of small spills/housekeeping problems etc. Include rigorous review of spill locker equipment checks and maintenance of emergency personal protection equipment.

(c) Determine that drainage directly into water courses or into catchment basins is inspected and records maintained. Ascertain that catchment basins are not subject to pooling or periodic flooding.

7. Determine major spill/emergency risk locations, with respect to potential occurrence and/or severity of impact, and investigate accessibility of spill control and personal protection equipment. If a spill equipment locker exists, investigate. If a spill equipment locker may be required, recommend.

PERMITS AND COMPLIANCE

8. Develop flow chart showing emergency response capability and responsibilities for action and reporting for spills or emergencies:

(a) of hazardous chemicals;

(b) for laboratory emergencies;

(c) to land; and,

(d) to a water course.

Check for clear, well-distributed spill response plans showing action requirements and responsibilities.

9. Through facility records, document spill reporting procedures consistent with federal, provincial and municipal requirements, both immediate and follow-up. Note any outstanding orders and compliance issues.

10. Document spill incident review procedures and follow-up actions. Document incident reporting procedures for "near misses".

11. Including the review of the spill/emergency incident file or other documentation, compile list of all significant incidents or events for the period under review. Investigation should include employee interviews and verbal recollections, however, ensure

W.P. REF.

information is verified through documentation or other employees including dates, times, events, etc. Compare to compliance requirements and laboratory policy and guidelines and note deviations.

(a) Document response time to spill and regulatory reporting requirements.

(b) Review responsiveness to the event including alerting, reporting, containment, clean up and follow-up actions/program. Critically review each event to establish comprehensiveness of the approach and any recommendations or improvements that may have been noted.

MANAGEMENT SYSTEMS

12. Interview facility personnel and review available documents to gain an understanding of the Emergency and Spill Prevention and Control Program. Document in a flow chart or narrative form your understanding of programs, procedures and responsibilities for the following management system controlling emergency discharges. Specifically, check and verify the following:

(a) Does the facility have a spill response plan and/or emergency plan. If not formalized, assemble all relevant charts, lists, procedures for the review. If formalized, verify its content for the following information:

- notification and alerting procedures;
- duties and responsibilities of the on-site co-ordination;
- location of equipment and materials required for containment and clean-up;
- spill control and clean-up procedures;
- information on disposal of contaminants; and,
- methods of restoring the spill site to original state.

(b) Is there a readily available list of names, telephone numbers, and addresses of persons and alternates to receive notification of any discharges. Consider facility operations during off-peak hours when personnel are at a minimum or absent.

W.P. REF.

(c) Is there an established (published) procedure for reporting these discharges to appropriate regulatory agencies;

(d) Have prearrangements been made for requesting assistance in the event of a major spill;

(e) Have provisions been made to assure that the full resource capabilities are known and can be committed in the event of a discharge;

(f) If a large spill or serious (ie. toxic) emergency is a concern, have regional equipment, materials and supplies been prepared for coping with a spill; and,

(g) For the maximum credible discharge, has an estimate been made of equipment, materials and supplies required for containment and clean-up of a spill.

13. In terms of the prevention program, determine documentation and recordkeeping programs implemented by the facility to record incidents, near misses, inspection monitoring etc. Inventory each recording procedure developed and inspect documents. Obtain copies.

(a) Determine if the monitoring of telltale parameters and recordkeeping is complete to control the risk of non-compliance. Indicate possible improvements.

14. With regard to recordkeeping, review the follow-up programs to monitor and evaluate the data. Use interviews and the paper trail to verify:

(a) Investigate who monitors and reviews the data. Is the review frequent enough to catch deviations especially as they may impact on compliance; and,

(b) Describe and flow chart the reporting process or strategy that the responsible parties follow to identify and report (include internal management reporting as well as external authorities);

- immediate excursions of compliance;
- situations involving increasing incidents that may present a risk of non-compliance in the near future; and,
- quarterly, bi-yearly, or yearly performance monitoring and evaluation to targets.

W.P. REF.

15. In terms of the control program, which includes contingency planning and response, scrutinize carefully for comprehensiveness and level of understanding by all involved. Conduct spot checks and/or tests of the system from the first alert procedures through to the understanding of a random selection of staff.

(a) Review first alert and reporting procedure including employee, supervisor, co-ordinator and management roles. Test response phone numbers, accuracy of lists etc.

(b) Establish employee understanding of first response and how/when authorities are alerted. How/when is co-ordinator and management alerted.

(c) In the event of a large scale emergency, review procedures for establishing "on-site commander" and the response plans such as evacuation, extra resources, medical aid and/or hospital co-ordination, media, etc.

(d) Record frequency, attendees, and program of spill prevention training sessions. Determine if spill simulations and emergency exercises have been performed to test the training effectiveness.

(e) Through facility documents and employer interviews, investigate spill response training provided. Document understanding of roles, responsibilities and response actions of training team members.

REGULATORY COMPLIANCE DEVIATIONS
SPILLS MANAGEMENT

NUMBER	FEDERAL LEGISLATION	COMPLIANCE REFERENCE

PROVINCIAL LEGISLATION

MUNICIPAL LEGISLATION

REGULATORY COMPLIANCE DEVIATIONS (CONTINUED)

SPILLS MANAGEMENT

NUMBER	RISKS OF NON-COMPLIANCE	COMPLIANCE REFERENCE

DEVIATIONS FROM STANDARDS AND GUIDELINES

LAND IMPACT AND SITE MANAGEMENT

THE MANAGEMENT SYSTEMS REVIEW

This section of the Management Systems Review directs the investigation of specific environmental topics which have not been addressed in detail in previous sections of the protocol. The following questions are specific to PCB management, underground tanks, radioactive materials and past practices, but should be used as a guide for the audit investigation of other relevant topics such as asbestos, biohazards, pesticide use, and the like.

As described previously, the actual areas covered will depend on the operations of the laboratory, as well as the depth of the analysis predetermined in the pre-audit management discussions. The audit team should utilize the responses to the Management Controls Questionnaire for direction as to the topics which should be investigated for a comprehensive facility analysis. Regulatory standards and guidelines must be established for each chosen area before the particular investigation begins.

W.P. Ref.

PCB MANAGEMENT

1. Determine whether the facility has in use or in storage PCB's or PCB containing transformers, capacitors, electromagnets, hydraulic systems or lab samples. If analytical testing has been performed to confirm, obtain records. If not, understand rationale for PCB classification. Determine if anything has been missed in the evaluation. Document and inspect. ☐

2. I P ''s ex s at th s oca on, nterv ew fac ty personne an review available documents to gain an understanding of the PCB management systems established at the facility. Document in a flow chart or narrative form your understanding of programs, procedures and responsibilities for the following PCB activities: ☐

   (a) Review the action plan for identifying the PCB's and ensuring safe removal, storage and disposal to federal and provincial government regulations;

   (b) Review the recordkeeping and monitoring programs for PCB's and determine that the necessary records for reporting are maintained: and.

   (c) Review the handling procedures for PCB containing materials including environmental samples, lab extracts, lab standards and immersion oils. Observe waste sample containment procedures, etc.

3. If PCB filled or contaminated equipment is still in operation, identify management strategy including plans for decommissioning and removal. Review budgeting (for replacement equipment) and purchasing records where appropriate. ☐

W.P. REF.

(a) Identify inspection and monitoring program for the equipment including site personnel and electrical contractors;

(b) If available, review PCB Contingency Plan or substitute procedures for comprehensiveness. Perform spot checks on procedures and inspection records. Note deviations; and,

(c) Ensure appropriate safety and personal protective equipment is available and maintained.

4. Inspect PCB storage facilities. Ensure they comply with federal government guidelines in terms of security, containment, inspection, monitoring, placarding etc. Note deviations.

(a) Inspect log in the storage facility and assess entries. Note log comments or irregularities. Check actual inventory against log.

(b) Inspect condition of the berming, sealants, equipment packing, stacking, etc.; and,

(c) Assess external risks that may impact on the storage.

UNDERGROUND STORAGE TANKS

5. Inventory on-site tanks and establish contents, volume, age, etc. Establish where service of tank and contents can change. Review previous tanks that have been taken out of service.

(a) Check tank construction and corrosion control methods. Review to Environmental Code of Practice for Underground Storage Tanks. Check purchasing records to verify materials. If cathodic protection is used, inspect electrical installation.

(b) Inspect filling areas and overflow pipes and identify visual staining as a reflection of poor filling practices.

(c) Identify all empty, decommissioned, or removed tanks. If empty, determine compliance status. If decommissioned, review procedure and compliance status. If removed, obtain anecdotal evidence as to whether contamination was observed. For piping not in service, determine if the terminal connections are properly capped. Check procedures for blanking underground lines.

W.P. REF.

6. Interview facility personnel and review available documents to gain an understanding of the underground storage tank management systems established at the laboratory. Document in a flow chart or narrative form your understanding of programs, procedures and responsibilities for the following activities:

(a) Maintaining current inventory of existing tanks, including full descriptions as well as site sensitivity;

(b) Preventative inspection and maintenance program for tanks and piping. Review schedule and judge if frequency appropriate. Review records to verify adherence to timetables;

(c) Leak detection programs. For example, if inventory tracking is used, review records. If more sophisticated monitoring equipment is used, including groundwater observation wells, review records;

(d) Budget programs for UST replacement;

(e) Reviewing compliance for tank installation, removal and reporting; and,

(f) Training of staff having responsibility for UST management.

RADIOACTIVE MATERIALS

7. Does the facility use radioactive materials in any way.

(a) If the facility is required to be licensed, check documentation on all AECL licensing and permit requirements.

(b) Establish how the materials are used and for what process. If used by a contractor, ie. precision inspection and measurement, check lab procedures to screen for qualified firms.

(c) Investigate whether the lab generates radioactive wastes from tracers, radioactive samples or other uses.

8. Interview facility personnel and review available documents to gain an understanding of the radioactive wastes management systems established at the facility. Document in a flow chart or narrative form your understanding of programs, procedures

W.P. REF.

and responsibilities for the following radioactive waste management activities:

(a) Monitoring and sampling procedures;

(b) Regulatory reporting procedures;

(c) Procedures for handling radioactive wastes;

(d) Radioactive waste disposal procedures;

(e) Procedures for training personnel in the handling and disposal of radioactive material; and,

(f) The location of all potential sources of radioactive waste.

IMPACT OF PAST PRACTICES

9. Investigate the existence of past practices and historical land usage that may have impacted on the laboratory site. Practices include, but are not limited to, past waste disposal/storage, large spills, decommissioned operations, leaking underground tanks, etc. which may affect the long-term integrity of groundwater. Historical use can include former farms, industrial sites, military bases, etc.

- Through interviews, documentation review and observation, establish whether there are any situations on-site that require monitoring, assessment, or remediation.

10. Investigate known and acknowledged past practices which impact on the site with respect to existing programs for environmental remediation.

(a) Review available program documentation for adequacy.

(b) Document in a flow chart or narrative form your understanding of programs, procedures and responsibilities relating to environmental concerns from past practices.

REGULATORY COMPLIANCE DEVIATIONS
LAND MANAGEMENT

NUMBER	FEDERAL LEGISLATION	COMPLIANCE REFERENCE

PROVINCIAL LEGISLATION

MUNICIPAL LEGISLATION

REGULATORY COMPLIANCE DEVIATIONS (CONTINUED)
LAND MANAGEMENT

NUMBER	RISKS OF NON-COMPLIANCE	COMPLIANCE REFERENCE

DEVIATIONS FROM STANDARDS AND GUIDELINES

PART 5

THE EXIT MEETING AND AUDIT REPORT WRITING

OBJECTIVE

This part of the protocol outlines the basic activities to be undertaken after the majority of the on-site investigative processes have been completed. It is intended to provide guidance to the audit team and the individual(s) writing the audit report, in performing the information analysis required for the exit meeting with management and for the audit report.

PART 5: THE EXIT MEETING AND AUDIT REPORT WRITING

THE EXIT MEETING

The exit meeting with facility management is a vital component of the on-site audit process. The meeting is used to communicate the general findings of the audit, as well as to give management the satisfaction and assurance that the audit was worthwhile. Immediate feedback also facilitates action being taken with respect to compliance or high risk issues that the audit team may have observed while on-site.

The exit meeting should be informal, include all personnel who were present at the opening meeting, and touch on the following points:

- major findings, both good and bad, which the audit team has already verified;
- addressing each section of the protocol, giving a brief summary of findings. If some findings and analysis are inconclusive so far, make this point known during the meeting;
- operations of each major department within the laboratory, with respect to environmental controls;
- immediate compliance or high risk situations;
- unforseen problems encountered;
- giving thanks to all personnel for their cooperation during the audit;
- the findings will be subject to further detailed analysis before a draft report is submitted; and,
- the time required by the audit team to write the audit report.

The meeting should include a significant amount of time for discussion of the preliminary results, and of other concerns that management may have regarding the audit process and its findings. The discussion itself should be informal, and all points which arise noted by the audit team. It should be stressed that management must have input into the findings to ensure that the audit results are well-targeted and accurate. This discussion, and comments made on the draft report, will be used for this purpose.

It is important that the audit team properly prepare for the exit meeting. The working papers should be consulted and their logical conclusions used as the preliminary findings. The time management techniques utilized throughout the on-site work as detailed in the introduction of this protocol document, will now result in more efficient use of the limited amount of time available for exit meeting preparation. A rough agenda should be made for the meeting for reference by the audit team during their presentation to management. It is optional whether or not the agenda is distributed to facility personnel present.

THE AUDIT REPORT

A comprehensive environmental audit generates a large amount of information and supporting documentation from which the audit report must be written. Thorough analysis of this information requires the audit team to consult each other with respect to each other's findings and to undertake an involved thinking process which results in logical and substantial conclusions and recommendations. Deductive thinking and previous auditing experience also contribute to an accurate analysis.

After several weeks of information analysis and writing, a draft report should be submitted to the laboratory director for inspection. The report is reviewed to ensure that the information it contains is accurate and that it meets the objectives of the audit. A final report is then prepared based on the previous comments and discussions regarding those comments. The final recommendations should be formally presented with the final report at a meeting involving appropriate facility management and the audit team leader or audit team members as required.

In general, the audit report should contain:

- Verified accurate information
- Clear, concise information, consistent with the scope of the audit including:
  - -program elements which are sufficient or lacking;
  - -performance with respect to goals;
  - -specific, pinpointed examples to convey information and evidence obtained;
    - -schedules used
    - -documentation used
    - -reference to regulations
    - -departments concerned as opposed to names of personnel
- Depth of problems, priority of concern;
- Deficiencies and efficiencies;
- Audit details;
  - -purpose and scope
  - -description of audit team
  - -time period covered by audit
  - -processes, procedures, areas covered
- Compliance review; and,
- Reference to all sections of the protocol.

A typical report format would include sections for executive summary, introduction, description of findings, recommendations, and appendices if required. The recommendations are the most important as it is from these suggestions that action plans are derived. Within the report, content can be organized by directed program (air, water, etc.) or by environmental issue (regulatory compliance, performance, risks, etc.), using the other group as sub-headings. Typically, the report will be organized following the protocol format, which results in overall consistency for subsequent audits.

The body of the report must contain well-developed discussions with evidence from the Audit to substantiate the conclusions. To this end, the Working Papers are very important for use as back up. The organized approach for developing Working Papers on-site, will assist directly in the writing of the audit report.