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DEVELOPMENT GUIDE
VOLUME 2:
ENVIRONMENTAL AUDIT PROTOCOL

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ENVIRONMENTAL AUDIT PROTOCOL

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ENVIRONMENTAL AUDIT PROTOCOL

OBJECTIVES OF THE MANUAL

The purpose of this manual is to serve as a guide for auditing professionals to plan and conduct environmental audits at industrial or government 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.

Two comprehensive manuals and two supporting documents are presented in order to assist government agencies and candidate companies of any size to understand the practice of environmental auditing and to help them develop specific programs, procedures and protocols tailored to their operations in Canada. Management is encouraged to invest the time required to understand the content of these manuals, in order that they can implement an effective environmental management system. This proactive strategy for improved environmental performance will result in more efficient facility operations overall.

The manuals are:

1. Principles of Effective Environmental Auditing (Volume 1)
2. Environmental Audit Protocol (Volume 2)
 - Environmental Auditing Legal Issues (Appendix Document A)
 - Bibliography of Environmental Auditing References (Appendix Document B)

The first volume is divided into two parts, one which provides an introduction to environmental auditing and the second which describes the auditing program as a means of providing the organizational and communicative framework which gives auditing its applicability. The second volume is comprised of the general environmental audit protocol with detailed instructions on how to tailor the document to a site and to specific environmental goals and objectives. The protocol and associated detail guidelines on how to conduct an effective environmental audit become the tools for a successive environmental auditing program.

Two supplementary documents are also available as part of the Environment Canada auditing series. Appendix Document A gives a detailed discussion related to environmental auditing, on legal issues which may have a bearing on industry and government departments and agencies across Canada. A summarized version of this document appears in Volume 1, "Principles of Effective Environmental Auditing". Appendix Document B is a bibliography of environmental auditing related material to reference for further information.

This series on environmental auditing was prepared by ALTECH Environmental Consulting Ltd. of Toronto, Ontario on behalf of Environment Canada Industrial Programs Branch, Hull, Quebec, except for Appendix Document A, which was prepared by Baker & McKenzie, Barristers and Solicitors, also of Toronto. The summarized version of Appendix A was prepared by ALTECH using the Baker & McKenzie manuscript as reference, and appears as Section 7 of Part 1 in the "Principles of Effective Environmental Auditing" volume. References for Section 7 are given in Appendix Document A.

ENVIRONMENTAL AUDIT PROTOCOL

INTRODUCTION: UNDERSTANDING THE PROTOCOL INVESTIGATION

COMPLIANCE AND MANAGEMENT SYSTEMS

The protocol provides detailed instructions to assist knowledgeable environmental personnel in conducting a thorough audit investigation. On the surface, the 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 and policies;
- (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, spills and impact on land.

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 the accompanying "Environment Canada, Principles of Effective Environmental Auditing" document 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 for this specific purpose.

Facilities of any size can utilize this protocol by determining sections and questions that are applicable to the particular site. The protocol is provided as a guide for experienced auditors to conduct a comprehensive investigation of the environmental systems operating at the facility, and should be tailored to the specific audit scope and objectives which are prerequisites to performing the audit. This may be accomplished by adding or removing any questions or topics as required. 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 requests for information from the facility to be audited;
- 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 facility 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 for wastewater, waste, air emissions, spills, and land impact. 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 for 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 against 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, spills and emergency procedures, and land use and site management, are included for the above review. 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 and insights by thoroughly applying this review during the audit.

It should be noted that smaller facilities 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 include photocopies of support documentation as required. Each paper should reference the specific protocol question, be dated, and be initialized 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;
- gain insight into problems or events the individual may be familiar with;
- track the understanding of management systems especially in terms of role, responsibility, and reporting requirements;
- measure the level of effectiveness of training programs; and,
- verify information gained from other sources.

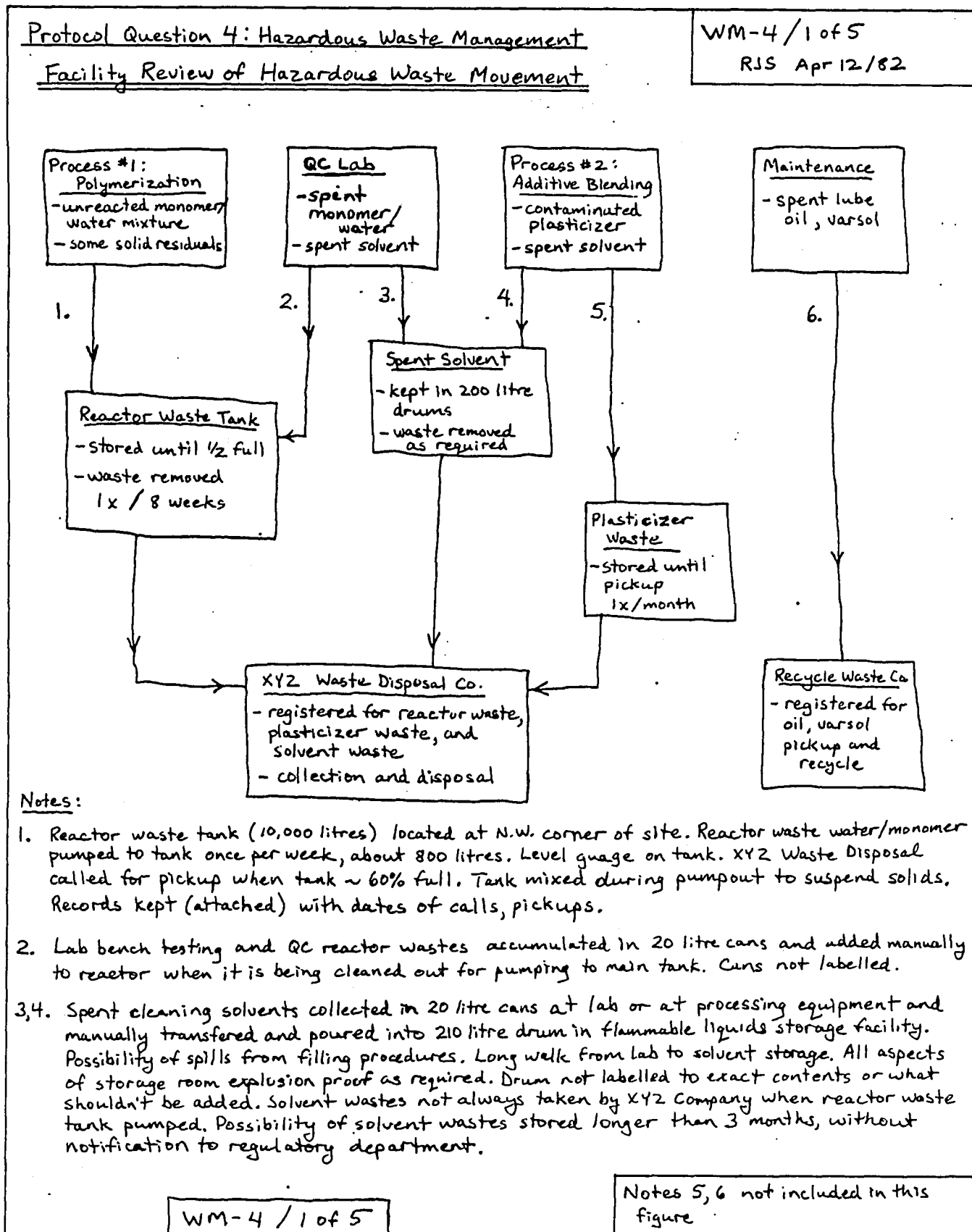
The communications interviews are generally 20-40 minutes in length, depending on the role of the individual. They are pre-scheduled and conducted in a private room for comfort and confidentiality. The skill and experience of the auditor will be critical to the quality of the information received. Verbal 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
ENVIRONMENTAL AUDIT**



Information on interviewing techniques is included in Part 2, Section 4 of the Principles of Effective Environmental Auditing manual.

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 over a period of several days, 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 facility;
- 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 normally 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, job descriptions, departments, number of employees, etc.;
 - Blueprints, site plans, process flow diagrams, etc. relating to environmental control;
 - Management plans, procedures, methods for facility operations, maintenance and training;
 - Previous audit reports;
 - Control orders or compliance violation documents;
 - Internal 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;
 - Ambient air quality records;
 - Sediment records;
 - Community and public complaints;
 - Files of managers, supervisors, and other staff;
 - 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 should be used by the audit team leader to assist the audit team in becoming prepared for the on-site audit investigation. Facility background information will be collected through communications with facility management and subsequently reviewed and audit team resources will be finalized.

ENVIRONMENTAL AUDIT PROTOCOL

PART 1: PRE-AUDIT ACTIVITIES

1. **Pre-audit Preparation**
 - Contact facility manager and discuss objectives and scope of the audit.
 - Confirm dates of the on-site work and resources required.
 - Send confirmation letter and attachment detailing types of documentation which are required by the audit team at least four weeks before the on-site visit.

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 (eg. special waste management facilities such as an incinerator) so that the audit team can prepare appropriately.
 - Review any other information readily available with respect to environmental activities on-site, such as landfilling, hazardous waste storage, etc.

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

*Sample audit confirmation letter
with Pre-audit requests.*

**FACILITY
ADDRESS**

Dear Facility Manager:

The upcoming environmental audit of the _____ facility will be conducted during the week of _____, 1991. The audit team will be comprised of _____. We expect to arrive on Monday at 8:30 a.m., when we would proceed to conduct a pre-audit informational meeting to inform management at your facility what will be required of them throughout the on-site audit investigations. This meeting will also provide the opportunity for you to ask any questions which have arisen.

On the afternoon of _____, at the conclusion of the on-site work, the audit team will present a summary of preliminary audit findings at an audit exit meeting for facility management. This meeting will serve to communicate the findings, clarify any points addressed during the audit, and detail the time required by the audit team to write the final audit report.

To expedite the audit, we would appreciate the assembly and shipment to our office of 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,

PRE-AUDIT DOCUMENTATION

GENERAL:

- Blueprints of the facility, including a site plan, sewer plans, major equipment, tank, and building configurations, etc.
- 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.
- Any 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 facility. 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 in this section 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 for management 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 a complete set of regulations for industry and government facilities under the Canadian Environmental Protection Act (CEPA). As the full regulatory structure of CEPA is being formulated to deal with all aspects of environmental protection, the specific regulations and compliance standards of provincial and municipal regulations must be used to determine facility compliance status. It is this combination of regulations with which a facility should comply 100% of the time. This expectation also applies to Canadian federal facilities for overall environmental control, as detailed in CEPA Part IV.

A protocol document similar to this one, has been developed recently by the U.S. Environmental Protection Agency for auditing federal government facilities in the United States. Inspection of the EPA protocol reveals a significant difference between the regulatory structures of Canada and the U.S.A. Canadian federal legislation contains more general regulations than comparable federal legislation in the United States, resulting in a requirement for provincial and municipal governments to administer more specific issues. In addition, best management practices and guidelines are used extensively in Canada to assist Canadian companies and government 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 environmental legislation is that a comprehensive listing of environmental regulations cannot be included in this protocol document for general use during audits across Canada. Such a listing might quickly become dated. It then becomes a requirement of the audit team to assemble pertinent regulations and by-laws for wastewater, waste, air emissions, spills, and land impacts, 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 facility, 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 regulations and guidelines under the following Acts must be applied directly to all industrial and government facilities:

- Canadian Environmental Protection Act (CEPA)
- 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 ¹						X
	PROVINCIAL	X			X	X	
	REGIONAL (GVRD) ³		X	X			
	MUNICIPAL		X	X			
ALBERTA	FEDERAL ¹						
	PROVINCIAL	X			X	X	X
	MUNICIPAL		X	X			
SASKATCHEWAN	FEDERAL ¹						
	PROVINCIAL	X			X	X	X
	MUNICIPAL		X	X			
MANITOBA	FEDERAL ¹						
	PROVINCIAL	X			X	X	X
	MUNICIPAL		X	X			
ONTARIO	FEDERAL ¹						
	PROVINCIAL	X			X	X	X
	MUNICIPAL		X	X			
QUEBEC	FEDERAL ¹		X ⁷				X ⁷
	PROVINCIAL	X	X		X ⁷	X	X
	REGIONAL (MUC) ³	X		X			
	MUNICIPAL			X			
MARITIMES	FEDERAL ¹		X ⁷			X	X ⁷
	PROVINCIAL	X		X	X		X
	MUNICIPAL						
YUKON ⁴ TERRITORY	FEDERAL ¹	X	X		X	X	X
	TERRITORIAL			X			
	MUNICIPAL			X			
NORTHWEST ^{4,5} TERR.	FEDERAL ¹	X	X	X	X	X	X
	TERRITORIAL						
	MUNICIPAL						
FEDERAL FACILITIES/ DEPARTMENTS/CROWN CORPORATIONS	FEDERAL ⁹	X	X	X	X	X	X

FIGURE 2 cont'd

NOTES:

1. Federal government has responsibilities under CEPA for all aspects of environmental control, but specific administration of many programs has been delegated to lower governments as detailed herein.
2. Air quality for emissions of specific regulated substances is administered by Federal government.
3. GVRD - Greater Vancouver Regional District
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 governments. 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 land-fill 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 transboundary emissions or effects (interprovincial, to USA or other countries) are administered by the Federal government (Environment Canada).
9. Part IV of CEPA provides specifically for environmental operations of federal facilities. All other federal legislation also applies. For a detailed regulatory structure in all environmental areas, federal facilities are encouraged to follow CEPA by applying all regulations and guidelines from federal, provincial, and municipal levels.

Regulatory requirements under the above and other legislation provide a yardstick against which any facility's compliance status can be measured. However, this legislation and accompanying regulatory structure is not all-encompassing and does not provide complete 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 (BMP's). 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 with regulations as well as performance against environmental goals. Specific details regarding best management practices is available in Volume 1 of this series of auditing documents.

This protocol will assist the audit team in investigating the compliance issues at a particular facility, 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. Identification of non-compliance without subsequent remedial action would likely serve to indicate a lack of due diligence, and would be viewed negatively by regulatory officials. Section 125 of CEPA specifically identifies 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 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

W.P. Ref.

During the opening meeting with management:

1. Summarize the purpose, scope and objectives of the audit as understood by the audit team. Ensure that attendees of the meeting know what is expected of them in terms of interview time and tours. Communicate when the exit meeting will take place.

2. Using the Management Controls Questionnaire (following pages) and the points below, gain a preliminary understanding of the operations of the facility. Review and document the following:
 - Type of operations the facility undertakes;
 - Physical size of the facility and site;
 - Number of staff employed (eg. maintenance, operators, clerical, etc.);
 - Management structure of the facility including personnel responsible for each function;
 - Environmental management structure, including job descriptions and personnel responsible;
 - Accountability framework of organization;
 - Type of environmental management activities (eg. wastewater treatment, air scrubbing, on-site waste storage or disposal, etc.);
 - Any unique or particular facility environmental concerns; and,
 - Any remote or mobile locations or operations under the control of the facility manager.



3. Educate and prepare audit team regarding safety procedures for visitors to the facility, 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 facility. The information gathered requires further investigation and follow-up during the Management Systems Review portion of the audit.

YES NO

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?

- Spill Response?

2. Are people identified in (1) above responsible for keeping up to date with regulations and guidelines in these areas?

MANAGEMENT CONTROLS QUESTIONNAIRE

		YES	NO
3.	Does the facility have any specific policies or procedures for 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 (eg. air, water)?	_____	_____
	• Acceptable uses and methods for disposal of cleaning agents (eg. chromic and nitric acid mixtures)?	_____	_____
	• Storage, handling or disposal of other chemicals (eg. bottled gases, solvents, toxics, etc.)?	_____	_____
	• Storage, handling or disposal of carcasses or other biological/pathological materials (including contaminated clothing)?	_____	_____
	• Limiting materials discharged "down-the-sewers" from the facility?	_____	_____
	• Responding to citizen complaints (eg. odours, etc.)?	_____	_____
	• Waste characterization?	_____	_____
	• Selection of hazardous waste treatment storage and transporter vendors?	_____	_____
	• Off-site waste disposal?	_____	_____
	• Other? _____	_____	_____

MANAGEMENT CONTROLS QUESTIONNAIRE

	YES	NO
4. Does the facility conduct any periodic or routine environmental monitoring?	_____	_____
• Air emissions?	_____	_____
• Water discharges?	_____	_____
• Ground water?	_____	_____
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 facility 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?	_____	_____
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 implemented and 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?	_____	_____

MANAGEMENT CONTROLS QUESTIONNAIRE

	YES	NO
<ul style="list-style-type: none"> • 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:		
<ul style="list-style-type: none"> • 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?		
<ul style="list-style-type: none"> • Spill responses? _____ • Hazardous waste? _____ • Emergency response? _____ • Wastewater treatment? _____ • Releases of hazardous substances? _____ • Uses, storage, handling and disposal of materials? _____ 		

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, 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 systems in place to handle additional hazardous materials which are used at the site, using the rigour of the PCB questions as a sample for the required investigations.

The questions contained in the Management Systems Review guide the audit team through a formalized procedure for gathering and verifying audit evidence. The inventories, documentation collection, evaluation, analysis and personal interviews required, lead to 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. 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 the federal, provincial, and municipal legislation and regulations which were compiled to make the Regulatory Compliance Standard in Part 2 of this protocol. 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. Based on information gathered from facility management, review the following as applicable to the facility:
 - (a) Facility layout including sewer/ditch diagrams/blueprints, wastewater process flow diagrams, holding tanks, grease traps, catch basins etc.;
 - (b) All locations where water is or potentially can be used, especially in terms of large scale uses such as plant, divisional, and pilot 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 operations, utility rooms, shipping and receiving, and storage areas.
 - (a) Physically follow sewers and trace sewer blueprints to verify layout. 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 those in the ceiling or basement, etc. Based on inquiry, process flow diagrams and observation, identify any interconnections between the sanitary and storm sewers. (Note whether it is sanitary to storm or storm to sanitary). Carefully scrutinize any use of the storm sewer inside the facility.

3. Tour the property external to the facility to:
 - (a) Cross-reference that observed discharge locations are correctly mapped on process flow diagrams, sewer diagrams and facility layout plans.

- (b) Identify and trace all storm and sanitary sewers, including storm laterals (eg. parking lot drainage, etc.), ensuring no interconnections and noting the nature of the receiving environment and any visual impacts present, such as discolouration or pipe corrosion at a creek or ditch.
- (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, especially in terms of large scale uses, process discharges, or accidents/emergencies. 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, safety (eg. flammability concerns). Assess risks.
- (b) Inventory engineering controls at:
- the point of discharge;
 - where the sewer lateral meets main sewer trunk system; and,
 - end of pipe discharge.
- (c) Evaluate engineering controls in terms of:
- suitability of technology to control expected contaminant and/or unexpected contaminant discharge (eg. spill); and,
 - matching design capacity and sizing of equipment with expected flow and contaminant loading including daily and surge flows. Obtain design documentation from engineering, maintenance or supplier.



- (d) Evaluate maintenance of system and equipment in terms of:
- regular, routine maintenance of system. Obtain records. If preventive maintenance program in effect, obtain schedule, what is checked, and documentation indicating adherence to the program; and,
- (e) 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 (eg. metal), a sludge, two phase liquid (eg. water and oil), or mechanical problems such as clogging (fines) or other damage to the sewer (eg. corrosion); and,
 - possible compatibility problems, either in terms of safety or compliance, at the junctions of sewer laterals where flow streams from different areas 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 (c); and,
- (c) Perform maintenance assessment as outlined in 4 (d).



PERMITS AND COMPLIANCE

6. Using the permit and regulatory compliance standard already assembled:
- (a) Evaluate the approval permits and/or the facility applications, for the following:
- perform a walk-through inventory of equipment and discharge points to verify accuracy and completeness of permits. Determine if basis for current permit was properly substantiated. Note any changes in operations or facility activities that may have required the permit to be reissued (eg. process changes, building additions, new formulations which affect effluent composition, etc.); and,
 - inspect permit application and approval documents for signatures of facility personnel authorized to submit them.
- (b) Determine current compliance status. Document deviations in the Regulatory Compliance Deviations pages at the conclusion of this subsection. Use Working Papers to note the following:
- actual compliance deviation and regulation referenced;
 - date of deviation;
 - action taken when deviation noted with respect to required reporting, rectification of problem, follow-up, etc; and,
 - any unresolved matters between facility and regulatory departments.
- (c) For the audit period being investigated, assess whether facility compliance programs were undertaken before compliance deadlines had elapsed. For current and future regulations being implemented, determine that plans for compliance are appropriate.



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7. Investigate all procedures and equipment used to generate data for regulatory compliance reporting and/or in-house environmental programs. Include composite or discrete samplers, flow measurement devices, control systems, recorders, etc. Perform the following:
- (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) Observe and document procedures for obtaining representative samples from effluent streams with respect to locations, quantities taken, frequency of sampling, proper containers, etc. Determine which parameters are being analyzed and check that standard laboratory analytical methods are being used. Document deviations. Record any quality control methods utilized to maintain scientific independence.
 - (c) Review maintenance and calibration procedures for sampling, control, and laboratory equipment and assess sufficiency to keep equipment working to specifications.
8. Obtain a representative sample of monitoring records and evaluate for completeness. Records should include the date, place and time of sampling, equipment used, names of individuals performing the sampling and analysis, and the analytical methods used and results of such analyses. Document deviations.
9. Identify and document who in the organization is responsible for programs related to wastewater management such as operations, sampling, analysis, data recording, equipment maintenance and calibration, and compliance reporting and communication.

MANAGEMENT SYSTEMS

10. Develop an understanding of the wastewater management systems operating at the facility through interviews with appropriate personnel and documentation review. Use a flow chart or narrative form to provide details of programs, procedures and responsibilities for the 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 facility 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 they meet 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:
- 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,

- iii) quarterly, semi-annual, 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.
11. Based on the responses obtained in the Management Control 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 facility 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 (eg. 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.
12. Through interviews with appropriate personnel and documentation review, develop a working knowledge of 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, facility



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

INTERVIEWS

13. 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 facility personnel and test their knowledge of procedures.



WASTE MANAGEMENT

THE MANAGEMENT SYSTEMS REVIEW

W.P. Ref.

FACILITY CONTROL

1. Based on information gathered from facility management, review the following as applicable to the facility:

 - (a) Facility layout in terms of waste generation, treatment, and storage including solid non-hazardous as well as hazardous wastes. Identify waste storage areas, waste processing equipment (eg. incinerator, solvent still, autoclave), and waste shipping areas.
 - (b) Division mandate and activities and potential wastes generated especially as activities relate to changing processes and, therefore, potentially changing waste streams.


2. Tour the facility including production areas, 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 the facility, 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, emergency/spill clean-up and mobile activities 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.
 - (b) Evaluate seasonal changes and how facility activities can change. Evaluate impact on waste stream profile (eg. changing wastes, volumes or strengths).

W.P. REF

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 area. 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 (eg. 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 eg. neutralization, detoxification, etc.
 - (g) Track procedures or equipment that alert to full waste 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 all wastes.
 - (h) For waste streams not associated with production, eg. oil change-outs 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.

W.P. REF

5. Review on-site central waste storage facilities. Specifically:
- (a) Assess layout, housekeeping, containment, special conditions for safe storage (eg. explosion proof wiring) in terms of wastes stored and provincial and federal requirements. Ensure containers are in good condition, secure and compatible with wastes in terms of size, materials of construction and method of operation. Note availability of spill cleanup materials and equipment.
 - (b) Review inventory control procedures. Inspect a representative number of waste containers noting type and quantity of material(s) inside and cross-reference this information to written inventory. Ensure that containers are labelled according to regulations.
 - (c) Track documentation of material handling of waste materials from generation through storage to disposal. If stored greater than 90 days, ensure appropriate regulatory notification performed.
6. For wastes that are shipped off-site for disposal, document the following:
- (a) Names, addresses, and provincially issued transport disposal numbers of all off-site disposal contractors and carriers;
 - (b) Facility procedures for selecting and screening waste contractors, including policy and schedule for visiting and inspecting disposal destinations;
 - (c) That disposal permits are up-to-date and approved for waste stream(s) in question; and,
 - (d) Completeness and accuracy of manifest forms with respect to regulatory requirements. 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.
7. In terms of non-hazardous solid waste management, develop an understanding of the systems operating at the facility through interviews with appropriate personnel and documentation review. Use a flow chart or narrative form to provide details of programs, procedures and responsibilities for the system controlling non-hazardous solid waste as follows:

- (a) Evaluate the plan for collection, material transfer, recycling, and disposal of non-hazardous solid wastes, including appropriate labelling, sampling and analysis, if applicable. Determine risk of mixing hazardous wastes with non-hazardous wastes based on the above system; and,
- (b) Determine that haulers have non-hazardous solid waste handling permits, registrations or licenses.
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 all risks including health and safety, potential for fire and explosion, emergency release accidents and spills.
- (a) Consider the potential for a dangerous release either in terms of environmental impact or public/worker safety (eg. fire and explosion risk).
- (b) Evaluate the possibility of external impacts or accidents. For example, look for storage in traffic patterns, storage of flammables in direct sunlight, storage in areas where other potential risks may impact on waste (eg. possible flammable risk close to waste container etc.).
- (c) Consider human interactions causing a reaction or release, eg. 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. Ascertain whether major equipment is available on a shared basis with neighbouring facilities, if applicable.
10. If significant waste control facilities have been identified, such as incinerators, 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;



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- (b) Evaluate engineering controls in terms of:
- suitability of technology to treat expected wastes and assess expected and unexpected contaminant discharge (eg. spill); and,
 - matching design capacity and sizing of equipment with expected processing volumes. Obtain design documentation from engineering, maintenance or supplier;
- (c) Evaluate maintenance of system and equipment in terms of:
- regular, routine maintenance of system. Obtain records. If preventive 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. Develop through interviews with appropriate personnel and documentation review, an understanding of past disposal practices which have operated at the facility . 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 facility 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,

W.P. REF

- evaluate from the inventory whether further registration is required.
- (b) If the facility 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 or disposal? Establish compliance requirements.
- (c) Determine current compliance status. Document deviations in the Regulatory Compliance Deviations pages at the conclusion of this subsection. Use Working Papers to note the following:
- actual compliance deviation and regulation referenced;
 - date of deviation;
 - action taken when deviation noted with respect to required reporting, rectification of problem, follow-up, etc; and,
 - any unresolved matters between facility and regulatory departments.
- (d) For the audit period being investigated, assess whether facility compliance programs were undertaken before compliance deadlines had elapsed. For current and future regulations being implemented, determine that plans for compliance are appropriate.
13. Identify and document who in the organization is responsible for programs related to wastewater management such as operations, sampling, analysis, data recording, equipment maintenance and calibration, and compliance reporting and communication.
14. Investigate all operating procedures and systems used to generate data for regulatory compliance reporting and/or in-house environmental programs. Note where changes in practice will reduce the risks of non-compliance.

W.P. REF

- 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 from compliance;
 - ii) situations involving increasing incidents, etc. that may present a risk of non-compliance in the near future;
 - iii) quarterly, semi-annual, or yearly performance monitoring and evaluation against 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 all acceptable practices and policies, safe operating practices, and procedures as they relate to direction on 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 facility 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?
 - (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.

MANAGEMENT SYSTEMS

15. Develop an understanding of the waste management systems operating at the facility through interviews with appropriate personnel and documentation review. Use a flow chart or narrative form to provide details of programs, procedures and responsibilities for the 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 (eg. cost controls) achieved.
- b) Determine documentation and recordkeeping programs implemented by the facility for waste collection, storage, and disposal including waste analytical results, waste manifests, 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 they meet 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:
- investigate who monitors and reviews the data. Is the review frequent enough to catch deviations especially as they may impact on compliance; and



- (e) Identify how adherence to the procedures is monitored and deviations or incidents recorded. How is the report made (eg. 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. Through interviews with appropriate personnel and documentation review, develop a working knowledge of operations and maintenance planning and programs for 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, facility 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 each 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 facility operations.
- (d) Investigate established performance improvement programs, both capital and procedural changes, and assess adequacy and timeliness of implementation.
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. Identify 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) and general staff and their knowledge of waste management procedures. Include individuals with specific roles and responsibilities in monitoring and reporting compliance issues.



AIR MANAGEMENT**THE MANAGEMENT SYSTEMS REVIEW**

W.P. Ref.

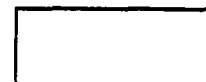
FACILITY CONTROL

1. Based on information gathered from facility management, review the following as applicable to the facility:
 - (a) Facility layout including 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 scrubbers, demisters, incinerators, etc.

2. Tour the facility, both inside buildings and on the external site. Include operations, 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) 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.
 - (c) Determine impact on neighbouring community buildings and personnel. Note odours, dusting, noise, etc. Note sensitive receptors and emission locations.

3. Investigate and inventory all points of potential air discharges including boilers/utilities, open burning, equipment releases and venting, such as pressure release, etc. looking for batch, continuous and non-routine/ emergency related events. Where the facility operates a Central Heating Plant, pay special attention to activities including fuels burned.

- (a) Identify and characterize contaminants that are or may possibly go into the air. Identify concentrated vs dilute, odour, toxic, safety (eg. 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 (eg. 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 engineering, maintenance or supplier.
- (c) Evaluate maintenance of system and equipment in terms of:
- regular, routine maintenance of system. Obtain records. If preventive 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;
 - materials incompatible with ventilation systems in terms of damage which could be caused (corrosion, flammability), personnel safety, or compliance.
4. If significant air pollution control facilities have 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 standard already assembled:



- (a) Evaluate the approval permits and/or the facility applications, for the following:
 - perform a walk-through inventory of equipment and emission points to verify accuracy and completeness of permits. Determine if basis for current permit was properly substantiated. Note any changes in operations or facility activities that may have required the permit to be reissued (eg. process changes, building additions, new formulations which affect emission composition, etc.); and,
 - inspect permit application and approval documents for signatures of facility personnel authorized to submit them.
- (b) Determine current compliance status. Document deviations in the Regulatory Compliance Deviations pages at the conclusion of this subsection. Use Working Papers to note the following:
 - actual compliance deviation and regulation referenced;
 - date of deviation;
 - action taken when deviation noted with respect to required reporting, rectification of problem, follow-up, etc; and,
 - any unresolved matters between facility and regulatory departments.

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- (c) For the audit period being investigated, assess whether facility compliance programs were undertaken before compliance deadlines had elapsed. For current and future regulations being implemented, determine that plans for compliance are appropriate.
6. Investigate all procedures and equipment used to generate data for regulatory compliance reporting and/or in-house environmental programs. Include sampling equipment, flow measurement devices, control systems, recorders, etc. Perform the following:
- (a) Inventory all emission monitoring equipment or procedures and assess sufficiency. Include monitoring of a routine or periodic nature and for non-routine or emergency emissions. Document findings and note possible improvements. Where emissions are not monitored, determine risk of non-compliance;
- (b) Observe and document procedures for obtaining representative emission samples with respect to locations, quantities taken, frequency of sampling, etc. Determine which parameters are being analyzed and check that standard laboratory analytical methods are being used. Document deviations. Record any quality control methods utilized to maintain scientific independence.
- (c) Review maintenance and calibration procedures for sampling, control, and laboratory equipment and assess sufficiency to keep equipment working to specifications.
7. Obtain a representative sample of monitoring records and evaluate for completeness. Records should include the date, place and time of sampling, equipment used, names of individuals performing the sampling and analysis, and the analytical methods used and results of such analyses. Document deviations.
8. Identify and document who in the organization is responsible for programs related to air emission management such as operations, sampling, analysis, data recording, equipment maintenance and calibration, and compliance reporting and communication.
9. 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.

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10. If fuel oil is used for boilers or process equipment, contact supply company or use purchasing records to determine whether the sulphur content is below that specified by regulation.
11. Check facility understanding of noise regulations that effect the facility. Review monitoring data where provided.
12. 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) Document responsibilities as in 8 as applicable.

MANAGEMENT SYSTEMS

13. Develop an understanding of the air emission management systems operating at the facility through interviews with appropriate personnel and documentation review. Use a flow chart or narrative form to provide details of programs, procedures and responsibilities for the 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 facility for sample collection, analysis and data recording including analytical results for compliance, but also log notations, event/incident summaries, inspection records, etc. Inventory every recording procedure 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 they meet regulated requirements if applicable.
- (c) In terms of recordkeeping, review the follow-up programs to monitor and evaluate the data. Use interviews and the paper trail to:
- 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 from 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, semi-annual, 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.
14. Based on the responses obtained in the Management Control Questionnaire, identify, obtain and review all acceptable practices and policies, as they relate to air emissions. Investigation may be through inquiry, observations and documentation review.
- (a) Tour the facility 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 (eg. 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.
15. Through interviews with appropriate personnel and documentation review, develop a working knowledge of operations 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, facility 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.
- (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 each 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 air emissions. Review maintenance operations separate from regular facility operations.
- (d) Investigate established performance improvement programs, both capital and procedural changes, and assess adequacy and timeliness of implementation.



INTERVIEWS

16. 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 facility staff and their knowledge of procedures.



**SPILL PREVENTION AND CONTROL
(includes Emergency Response)**

THE MANAGEMENT SYSTEMS REVIEW

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1. Based on the previous characteristics of water discharges, wastes, and air emissions, 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, fuel dispensing facilities etc. Look for visual evidence of staining, pooling, etc. and investigate past incidents and "near misses".

2. In conjunction with the analysis done on wastewater, document your understanding of drainage systems on facility property. Examine all passive retention systems such as berms, earthen walls, impervious liners, etc. and ensure that all components of the system can retain or divert a spill as required. Note any contingency factors such as rainwater bleed valves or sumps which may affect proper operations. Use engineering calculation estimates to confirm.

3. Identify and map means of discharge to the occupational or natural environment, eg. drains in proximity of spill risk, vent to atmosphere, migration of material to adjacent areas. Assessment of significance of risk will be determined by evaluation of hazardous properties of substances (eg. 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 releases.

 - (b) For releases to the occupational environment, evaluate potential impact in terms of personnel evacuation, etc. Consider positive or negative air pressures, floor slopes, drains, etc and the potential for migration of the spill in the liquid or vapour form. Smoke tube testing may be required.

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

4. Identify and inventory engineering controls to control spills/emergency releases. Physically inspect to confirm.

- (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 surface waters, soils, and groundwater are adequately protected from the impact of a spill by spill control systems. Estimate the risk of a spill where controls are lacking or deficient, 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) Inventory all tanks and materials stored within and evaluate whether tank construction is compatible with conditions of storage and properties of contents. For underground tanks and piping, determine whether corrosion protection is present (eg. cathodic protection and resistant coatings). Consult manufacturer's specifications and facility purchasing records for assistance.
- (b) Inspect all truck and rail loading and unloading facilities, noting adequacy of vehicle warning signs and associated procedures, specifically noting the following:
- Is surrounding containment area large enough to hold at least the maximum capacity of any single compartment of a tank truck or car?
 - Are storm sewers or drainage to any receiving waters present in the immediate area?
 - Is there a risk of vehicle or tanker leaving facility before completely disconnecting?
6. Review maintenance system for equipment identified in Question 4. Evaluate system in terms of:
- (a) Regular, routine maintenance on system. Obtain records. If preventive 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.

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- (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) For storm drainage on facility property, determine that catchment basins are inspected for pooling or periodic flooding and records maintained of inspections.
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 a flow chart showing emergency response capability and responsibilities for action and reporting for spills or emergencies:
- (a) of hazardous chemicals;
- (b) to land; and,
- (c) to a water course.

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

9. Through facility records, document spill reporting 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 information is verified through documentation or other employees including dates, times, events, etc. Compare to compliance requirements and facility 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. Develop an understanding of the Emergency and Spill Prevention and Control Program operating at the facility through interviews with appropriate personnel and documentation review. Use a flow chart or narrative form to provide details of programs, procedures and responsibilities for the 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 company persons and alternates to receive notification of any discharges? Consider facility operations during off-peak hours when personnel are at a minimum.

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- (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 (eg. 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, and are these estimates readily available.
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:
- (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 from compliance;
 - situations involving increasing incidents that may present a risk of non-compliance in the near future; and,

- quarterly, semi-annual, or yearly performance monitoring and evaluation to targets.
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 employee interviews, investigate spill response training provided. Document understanding of roles, responsibilities and response actions of training team members.



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, past practices and groundwater, 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 nature of the facility or operations, as well as the depth of the analysis predetermined in the pre-audit management discussions. For example, a federal government facility might include a review of the implementation of the Environmental Assessment Review Process in this section, or a large industrial manufacturer may include an analysis of management systems to handle specific heavy metals. 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.

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PCB MANAGEMENT

1. Determine whether the facility has in use or in storage PCB's or PCB contaminated transformers, capacitors, electromagnets, hydraulic systems. 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. Develop an understanding of the PCB management systems operating at the facility through interviews with appropriate personnel and documentation review. Use a flow chart or narrative form to provide details of programs, procedures and responsibilities for the management system for PCB materials.
 - (a) Review the action plan for identifying the PCB's and ensuring safe removal, storage and disposal to federal and provincial government regulations; and,
 - (b) Determine that proper compliance records are kept and that compliance monitoring and reporting is done on the proper schedule and in accordance with applicable regulations.
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.

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- (a) Identify inspection and monitoring program for the equipment including site personnel as well as 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 and provincial government regulations 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.;
 - (c) Ensure that labelling of equipment, storage facilities, drums, etc is compliant with regulations; and,
 - (d) Assess external risks that may impact on the storage facility.



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 against 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



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status. If removed, obtain anecdotal evidence as to whether contamination was observed. Check procedures for blanking underground lines and capping terminal connections of obsolete piping.

- (d) For documented or anecdotal evidence of soil contamination, determine whether an assessment of groundwater contamination was also undertaken. Obtain documentation of procedures used and results of testing or monitoring performed.
6. Develop an understanding of the underground storage tank management systems operating at the facility through interviews with appropriate personnel and documentation review. Use a flow chart or narrative form to provide details of programs, procedures and responsibilities for the following:
- (a) Maintaining current inventory of existing tanks, including full descriptions as well as site sensitivity;
 - (b) Preventive 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.



IMPACT OF PAST PRACTICES

7. Investigate the existence of past practices and historical land usage that may have impacted on the facility 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 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.
8. 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) Use a flow chart or narrative form to provide details of programs, procedures and responsibilities relating to environmental concerns from past practices.



GROUNDWATER MANAGEMENT

9. Based on previous identification during this audit of past or current situations involving risks to groundwater integrity at or passing through this site, investigate all remediation monitoring, sampling, cleanup, and treatment procedures and activities which have been or are being performed.
- (a) Review available program documentation to ensure that adequate measures have been taken to characterize contamination and monitor its spread (eg. observation wells surrounding a capped landfill site)
- (b) Document in a flow chart or narrative form your understanding of programs, procedures and responsibilities relating to maintaining groundwater integrity.
- (c) Are there any situations which exist onsite where a groundwater program has not been implemented but should be?
- (d) Assess the environmental performance of existing groundwater programs, including timely response to compliance requirements and follow-up of program action items.



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.

ENVIRONMENTAL AUDIT PROTOCOL

PART 5: THE EXIT MEETING AND AUDIT

REPORT WRITING

Additional information on this topic is contained in the Principles of Effective Environmental Auditing document, Section 4.

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 division within the facility, with respect to environmental controls;
- immediate compliance or high risk situations;
- unforeseen problems encountered;
- making note of any findings which were corrected during the on-site work;
- 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 management 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
- A clear, concise discussion of the findings, 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 facility staff will formulate appropriate action plans to upgrade or remediate environmental systems.

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.