TO: Rick Thornhill
(Superintendent / Department Head)

RE: PROCESS SAFETY AND LOSS PREVENTION AUDIT

Process Safety and Loss Prevention Audits are included as a part of the unit Consolidated Audit Program for the North American Area. The Process Safety and Loss Prevention Audit is scheduled for October 22, 1993 at 9:00 am and takes approximately 4 to 6 hours with each Plant/Department we audit.

PURPOSE
This Audit is intended to help you identify your department's Process Safety and Loss Prevention strengths and weaknesses by having an outside team review your management systems. This also satisfies the audit requirements set forth in Dow's "Minimum Requirements" and the OSHA Process Safety Management Regulation.

DESIRED OUTCOMES
The Process Safety and Loss Prevention Representative will take notes and summarize the concerns and recommendations of the audit team. The recommendations will be incorporated into the audit report. A written response to the audit report is required from the plant/unit superintendent within eight weeks after receiving the report. It must be signed by the major manager/site manager and sent to the audit team members.

Your active participation in the audit session is one of Dow's best tools for demonstrating management's concerns regarding the use of good Process Safety and Loss Prevention Principles in our units. It is mandatory that you as the superintendent/department head be present and we would like you to lead the audit as it greatly adds to the quality and demonstrates management commitment.

Process Safety and Loss Prevention
Attachments

II. PURPOSE(S)

The overall purpose of the Process Safety and Loss Prevention Audit is to evaluate a plant's facilities and practices with respect to Dow Process Safety and Loss Prevention Requirements, to identify significant hazards, and to evaluate the risk management systems.

Specific elements included in the overall purpose are listed below:

- To assess compliance with the Process Safety and Loss Prevention Minimum Requirements.

- To verify compliance with the following OSHA Process Safety Management elements:
  - -- Process Safety Information
  - -- Process Hazard Analysis
  - -- Operating Procedures
  - -- Pre-startup Safety Review
  - -- Mechanical Integrity
  - -- Management of Change
  - -- Emergency Planning and Response

- The Safety Minimum Requirements Section of the audit will cover the following OSHA PSM elements:
  - -- Employee Participation
  - -- Training
  - -- Contractors
  - -- Hot Work Permit
  - -- Incident Investigation
  - -- Compliance Audit

The Security Section of the audit will cover trade secrets.

- To complete the Loss Prevention Insurance Report.
- To prepare a self-evaluation report by plant personnel covering their process safety and loss prevention concerns along with preliminary recommendations resulting from completion of the pre-audit questionnaire.
- To evaluate the adequacy of procedures and practices developed for Process Safety Management and confirm they are followed.
- To analyze the process for hazards and evaluate the adequacy of engineering and administrative controls intended for the control of those hazards.
- To provide recommendations to improve the Process Safety and Loss Prevention aspects of Dow's facilities and processes.

III. DESIRED OUTCOMES

A desired outcome of this audit process is a written report that summarizes the concerns and recommendations of the audit team. A written response to the audit report outlining an action plan on each of the recommendations is required within eight week after receiving the audit report. Ultimately, all audit report recommendations must be closed out (what was done, by whom, when, if not why).

Other desired outcomes include:

- A completed Loss Prevention Insurance Package (including F&EI Risk Analysis Package).
- A completed Chemical Exposure Index Package.

IV. THE AUDIT TEAM

1. Audit Team Membership

The audit team is composed of people knowledgeable on the audit process, process safety and loss prevention technologies and the specific process technology.

The following audit team membership is recommended:

Auditors:
-- Process Safety and Loss Prevention Representative
-- Safety Representative
-- Process Engineering Representative
-- Technology Center Representative or Peer Superintendent
-- North American/Corporate Process Safety and Loss Prevention Specialist
-- Designated Facilitator } Can be one of the above
-- Designated Recorder } team members.

The Process Safety Representative usually acts as the facilitator and recorder.

Auditees:
- Owner superintendent/department head.
- Plant personnel that prepared the audit questionnaire and documentation.
- Process operators/technicians
- Unit manager/major manager/site manager.

The make up of the audit team must be agreed to by the audit facilitator and the superintendent/department head prior to the audit.

2. Audit team knowledge/skills/experience (attached).

3. Training for the audit team.

The following training is recommended for the audit team. Each member of the team may not have had all the training but the team as a group should have the recommended training. The Process Safety and Loss Prevention Representative must have the training listed below that is designated with an asterisk and must have been a participant in a previous audit with another qualified process safety specialist.

DOW COURSES

* Documentation Creation
  Group Action
  Facilitative Leadership
* Safety, Loss Prevention, Security Workshop (Dowville)
* Loss Prevention Workshop
  HAZOP Facilitator Workshop
  Burner Management Workshop
  Small Boiler Seminar

NON-DOW COURSES

A.I.Ch.E. Hazard Evaluation 1,2,3
Insurance Company Courses (I.R.I., CIGNA, Factory Mutual)
A.I.Ch.E. Loss Prevention Symposium

TO BE DEVELOPED COURSES

Corporate Auditor Training Course
Process Safety and Loss Prevention Auditing

AUDITOR: Knowledge/Skills/Experience

The following are the minimum requirements for the above areas. The team collectively must have the knowledge, skills and experience discussed below.

KNOWLEDGE:
A thorough understanding and working knowledge of the process safety concepts and the Loss Prevention Principles. An understanding of the Dow Safety Standards. Familiarity with state and federal rules and regulations, as well as NFPA Codes, and other applicable codes. (29 CFR, 1910.119 and others)

SKILLS:
Good interview skills. Excellent people skills. Good listener. Able to evaluate a situation with minimal input. Assertive but able to get consensus. Able to use quality performance tools to develop solutions and ideas.

EXPERIENCES:
A background in plant operations with some supervisory responsibilities is desirable. Past practice in auditing. Experience in developing audits or training programs helpful. A good background in Dow's philosophy regarding safety and loss prevention, environmental and industrial hygiene practices. The auditor should have a minimum of five to ten years of Dow experience.

V. AUDIT PLAN

A. Audit Scope

The scope of the process safety audit includes all the processes and people that are responsible to the superintendent or department head. For example, for a typical chemical processing plant, the scope would include all the equipment and buildings and people that are administratively under the control of the superintendent/department head. In some plant organizations, this might include maintenance and other service people. The superintendent/department head must agree with the audit facilitator on the geographical and administrative limitations of the audit.

B. Audit Approach

The overall audit approach starts with a facility self-evaluation based upon a detailed questionnaire and other preparation (i.e.; CEI Package, Risk Analysis Package, Dow Loss Prevention Insurance Package). The questions are answered after a thorough review of actual performance, followed by plant team agreement on the answers. The plant corrects, or develops preliminary recommendations for correction of any concerns uncovered in the self-evaluation. The written answers to the questionnaires, along with recommendations and other documents prepared for the audit meeting will be supplied to the audit team well in advance of the audit meeting date.

Process Safety and Loss Prevention function team members individually review this package to make preliminary judgment regarding the adequacy of the facility's process safety and loss prevention program and to develop a list of questions for further investigation. It is strongly suggested that the team meet prior to the scheduled audit meeting to develop a preliminary group consensus on the same points and to plan the review and verification of activities.

The audit meeting includes presentations by the plant covering performance information, quantified risk data, a report of concerns and recommendations developed from the self-evaluation and an opportunity for the audit team to have their questions answered. There is audit team validation of the facility self-evaluation through field inspection and review of selected documentation. A period of review time outside the audit meeting is planned to test the emergency response, to interview employees and to review additional documentation.

C. Audit Preparation

The following directions are recommended for preparing for the audit.

Answering the Questionnaire
The unit superintendent/department head should assign the appropriate knowledgeable people to prepare the answers to the questionnaire. Many of the questions require the person answering to gather evidence by reviewing documentation or physically checking equipment in the field or interviewing employees. It is recommended that the questionnaire be reviewed by a team of knowledgeable plant people including a final review by the plant superintendent or department head. Your Process Safety and Loss Prevention Representative is available to assist with the audit preparation. Answers from the questionnaire can help formulate the concerns of the plant as well as the plans for improvement.

OSHA Process Safety Management Documentation
Most Dow plants must have the documentation required by the OSHA Process Safety Management Regulation. See Appendix A for required documentation.

D. Audit Material

10 CALENDAR DAYS PRIOR TO THE AUDIT: Provide a copy of the following information to the Process Safety and Loss Prevention Audit Team (As Listed On The Cover Page)

1. Audit Scope including geographical and administrative limitations of the audit.
2. Loss Prevention Insurance Report (See Enclosure)
   a. Site and Unit information as appropriate.
   b. Risk Analysis Package (F&EI, Page 48)
      Use the 6th Edition F&EI Book for calculating your F&EI's. For assistance with the Risk Analysis Package, call Process Safety and Loss Prevention.
3. Completed Process Safety and Loss Prevention Questionnaires and Analysis
4. List of Process Safety and Loss Prevention concerns.
5. Process Safety and Loss Prevention Audit Recommendations and Responses (From the Most Recent Audit)
6. Your Audit Presentation (See Next Page)
7. Chemical Exposure Index Package

FOR THE AUDIT: Have the following on hand:

1. Operating Discipline Self Assessment
2. Emergency Plan
3. Critical Instrument Program Records
4. EBV Test Records
5. Startup and Re-light Procedures for Fired Equipment, If Applicable
6. Inspection records for the following: pressure vessels, relief devices, glass devices, pipe in hazardous service and expansion joints.
7.* Electrical Classification Plot Plan
8.* Plot Plan }
9.* Fire Protection Plot Plan } Can be on a combined sheet.
10.* Drainage Plot Plan }
11. Flowsheets (Simple)
12. P&ID's
13. Smoke Detector Test Records
14. Gas and Spill Detector Test Records
15. Electrical Ground Test Records
16. Management of Change Audit
17. OSHA Process Safety Management Documentation - Appendix A
18. Chemical Exposure Index Documentation (See Chemical Exposure Index Package)

PLEASE HAVE ALL DOCUMENTATION FOR THE AUDIT AVAILABLE AT THE AUDIT MEETING.

E. Pre-Reviews

Process Safety Pre-Audit Reviews (Working Session)

The audit materials must be received by the Audit Team at least ten days prior to the audit. All audit team members should review the materials and forward any issues or questions to the Safety and Loss Prevention Representative.

As a part of the Pre-Audit Review, the Safety and Loss Prevention Representative should review the following with the plant/unit representative.

-- The process hazard analysis
-- Any clarifications on the questionnaire
-- Any questions or issues forwarded by the audit team
-- Loss Prevention Audit Report (Including the F&EI Risk Analysis Package)
-- Any other questions the plant/unit people may have.

A Pre-Audit Meeting is strongly recommended so the audit time can be spent on verification, improvement plans, and discussion of issues.

Chemical Exposure Index Pre-Audit Working Session

A one to two hour working session at least two weeks prior to the audit/assessment is strongly recommended.

PURPOSE: This preliminary working session would let the actual audit focus on what can and will be done to eliminate, reduce and/or mitigate protection releases.

This working session should include the Process Engineering and Safety and Loss Prevention Specialists and have the following agenda:

1. Review each chemical scenario, lines of defense, mitigation measures, and plans for improvement.

2. Discuss any past releases of acutely toxic materials.

3. Interview an operator in plant to determine their specific concerns related to potential release scenarios in their plant. The discussion should include emergency planning.

4. Plant conduct a drill of a hypothetical CEI release scenario. This drill should be developed by the superintendent and safety director/coordinator.

   The drill should be designed to evaluate the response of plant personnel including: who would be notified, what actions are taken in the control room, whether unit emergency plan, operating discipline, operating procedures or checklists were used, and what actions are taken in the field. This drill can be done any time during the calendar year.

4a. If a drill is not conducted during the working session, then the scenario for a drill during the audit should be developed including assignment of duties for each auditor. As an alternative, the plant personnel could review an action release incident.

NOTE: If the plant is planning an emergency drill in the three months prior to the audit, please invite CEI auditors, if possibly, to participate in the drill. This drill may then be used in lieu of a drill during the audit at the team's discretion.

5. Site inspection of equipment and piping related to each scenario with the largest CEI. This inspection will consider the condition of pipe and equipment, location of valves and mitigating devices, etc.

Written reports of the interview, the drill, and the site inspection should be prepared and included in the Chemical Exposure Index Package.

F. Audit Agenda

I. Plant Presentation
Overview of Loss Prevention Activities
(Approximate Time 60 Minutes)

1. Review the significant incidents for your plant since the last audit. (Include toxic releases, spills).
2. Review status of items from the previous Process Safety and Loss Prevention Audit. (Including C.E.I. Audit)
3. Review any Process Safety and Loss Prevention changes since the last audit.
4. Dow Risk Analysis Package (6th Edition, F&EI).
5. Review Chemical Exposure Index scenarios, calculations, hazard distances, lines of defense and mitigation procedures.
6. * Major Process Safety and Loss Prevention concerns of the plant.
7. * Process Safety and Loss Prevention plans.

* These should be the product of the plant self assessment using the audit questionnaire, the Chemical Exposure Index package, Risk Analysis package and other audit tools.

II. Review of Process Safety and Loss Prevention Questionnaire and Analysis (Discussion of Issues and Plans)(Approximate Time 75 Minutes) Risk Analysis Package/Insurance Package Questionnaire

Many questions are based on compliance to a specific Dow requirements. The specific Dow requirement has been referenced as appropriate. Some questions are open ended and intended to promote thought processes that will lead to improvements in process safety. Based on prior review by the auditors, only questions that need further explanation or that indicate deficiencies will be discussed. Answers to these questions will be one of the bases for recommendations. Answers to the questions may trigger the audit team to field verify the responses.

- Operating Discipline
    - Process Safety Information
    - Operating Procedures
- Process Hazard Analysis
    - Flammable Mixtures/Combustible Dusts
    - Drainage (Facility Siting)
    - Warehouse Storage
    - Building Location and Fire Risk (Facility Siting)
    - Human Factors
    - Chemical Exposure Index
    - HAZOP
    - Other Qualitative/Quantitative Risk Analysis
- Mechanical Integrity
    - Electrical Systems
    - Fire Protection Systems
    - Fired Equipment
    - Deluge and Sprinkler Systems Form
    - Critical Instrument Systems
    - Emergency Block Valves
    - Storage Tanks
    - Pressure Vessels and Relief Valves/Glass Devices/Expansion Joints
    - Critical and Rotating Equipment
    - Management Systems
    - Piping, Pumps, Compressors
- Management of Change/Process Safety and Loss Prevention Review
- Pre-Startup Safety Review
- Emergency Planning and Response

III. Verification by Auditors
(Approximately 60 Minutes)

Suggested tour hosts should be available to guide a member of the Audit Team through the following: See Appendix B for checklist.

Suggested Topics for Verification

1 for:	Operating Discipline Emergency Plan Plant Hypothetical Exercises	] Documentation] Verification] Appendix A
1 for:	Fire Protection System Electrical System Fired Equipment EBV's	]] Field] Verification] Appendix B
1 for:	Drainage & Containment Building Location and Fire Risk Tank Farms Equipment Piping Related to CEI Scenarios	]] Field] Verification] Appendix B
1 for:	Pressure Vessels and Relief Devices Tank Instrumentation Detection System Records Critical Instruments	]] Documentation] Verification]

IV. Verification reports from Auditors: (Approximately 30 Minutes) Each auditor will report on the findings of field verifications. Any recommendations not previously made must be made at this time.

V. Audit Concerns and Recommendations: The Audit Team and plant personnel will summarize the major concerns, review the recorded notes, and will agree that all items are included. (30 Minutes)

VI. REPORT REQUIREMENTS

A. The Process Safety and Loss Prevention Representative will summarize the team's concerns in a written report within one week of the audit and send to the Audit Administrator. The consolidated report will be sent to the Core Audit Team within three weeks of the audit..

B. The superintendent should review the written audit concerns and submit a response within eight weeks after receiving the audit report to Process Safety and Loss Prevention. The report must list the action plans that have been developed to address each recommendation. The plan for implementation of the audit recommendations shall be approved by the plant superintendent and should be reviewed by the major manager/site manager.

C. The recommendations from the audit are not closed out until the process safety representative has received a written response stating that the action plan has been completed, who did it, when it was done, if not done, why or what alternative action plan was completed. This will require additional communication in addition to the initial response if all action items have not been closed out at the time of the first written response.

U.S. AREA CONSOLIDATED AUDIT

PROCESS SAFETY AND LOSS PREVENTION

DIVISION:	**Louisiana**
PLANT:	**Chlorine 1**
BUILDING:	**2601**
REVIEW DATE / TIME:	**10/22/93 @ 9:00 am**

PROCESS SAFETY AND LOSS PREVENTION AUDIT TEAM
Superintendent: Rick Thornhill
Process S&LP (Audit) Specialist: Buck Bailey
Safety Representative:
Technology Center:
Department Personnel: Other Audit Team Members:

Major Manager:	Terry Leigh
General Manager:	Ken Hasenbeck

Audit Attendees / Presenters:

Monty Heins, Scott Daigle

PROCESS SAFETY AND LOSS PREVENTION AUDIT

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