Louisiana Division
Consolidated Audit

AUDIT PREP: 120 MHRS
PRESENTATION: 16 MHRS
PEC PEY

Chemical Exposure Index

March 1991

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Dow U.S.A.

The Dow Chemical Company
P.O. Box 150
Plaquemine, Louisiana 70765-0150

LOUISIANA DIVISION
MARCH, 1991

TO: PLANT SUPERINTENDENT/DEPARTMENT HEAD

RE: CHEMICAL EXPOSURE INDEX AUDIT

The CEI Audit will be a part of the Louisiana Division Consolidated Audit Program. The audit will be the responsibility of the Superintendent/Department Head.

The purpose of this audit is to provide an in-depth review of our Louisiana Division plant facilities that produce or handle quantities of materials which could, if released, possibly cause injury to persons outside our fence lines. The audit will be reviewing the section(s) of the plant that have a Chemical Exposure Index (CEI) of 100 or greater.

You should start your preparations by reviewing the attached Chemical Exposure Index Guide and developing or updating the C.E.I.'s for your plant's various chemicals and potential loss of containment scenarios. You will need to complete and send a copy of the review package to the Audit Facilitator ten (10) calendar days prior to the audit.

A CEI Functional Audit Team, Major Manager and a Superintendent from another department is required for areas with a CEI of 100-300. In addition, a U.S. Area Loss Prevention Representative will be required for a CEI of 300 or greater. Also, a Corporate Representative will be required for a CEI above 400. A CEI of 100 requires a review by the Superintendent and Major Manager only.

NOTE: Prompt response to the CEI calculations is necessary. A 30 day pre-audit notification to the U.S. Area will be necessary for some areas. Contact Jim Gibson at Ext. 8163, for a U.S. Area Loss Prevention Representative required on C.E.I.'s of greater than 300. Jim should also be contacted for a Functional Audit Team if the CEI is 100 or greater.

Attached is a guide including instructions on what is needed to prepare for the audit and how the audit will be conducted. If there are any questions concerning the audit, please contact me.

Jim Gibson
CEI Functional Team Leader
Building 3301W
Ext. 8163

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Guide for a

Chemical Exposure Index Audit

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Contents

Purpose	1
Preparation Instructions	2
Agenda	4
Personal Interview Questions	6
Pre-Audit Questionnaire	7
CEIndex-Chemical Exposure Index and Radii of Exposure Program (Index)	16

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CHEMICAL EXPOSURE INDEX AUDIT

PURPOSE

To review potential release scenarios with a CEI greater than 100, or those that result in odor detection beyond the fence line.

The goal is to prevent these potential releases from occurring.

This goal can be accomplished by taking the following actions when possible. These actions are in priority order.

1. ELIMINATE THE POTENTIAL HAZARD WHERE POSSIBLE.

2. REDUCE THE POTENTIAL RELEASE.

   a. Reduce the quantity of material.
   b. Reduce the duration of the release.
   c. Reduce the frequency of the release.

3. PROVIDE MITIGATION

   Reduce the impact of the potential release.

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CHEMICAL EXPOSURE INDEX AUDIT

PREPARATION INSTRUCTIONS

These Audit Instructions are being sent to Louisiana Division plants/departments as an audit to be accomplished in the Consolidated Audit Program. You should start your preparation early to assure a thorough review package. A copy of the audit package should be sent to the Functional Team Leader at least ten calendar days prior to the audit.

A. AREAS OF CONCERN

Only the area(s) of your operation which has a calculated Chemical Exposure Index(es) greater than 100 is covered by this audit, or those that show an odor detection radius beyond the fence line.

(A CEI of less than 100 requires a review by the Superintendent and his Manager only!)

B. REVIEW PACKAGE

The following package requirements must be completed and sent to the Louisiana Division Auditing Facilitator at least 10 calendar days prior to the audit.

1. LIST OF ALL CHEMICALS FOR WHICH CEI CALCULATIONS DONE

   This includes those with CEI's less than 100 or those with a potential odor detection beyond the fence line.

2. A CHEMISTRY SHEET

   This sheet should include all desired reactions as well as all undesired reactions.

3. A SIMPLIFIED PROCESS FLOWSHEET

   This flowsheet should include the vessels and quantity of chemicals with CEI's 100 or greater or those with an odor problem.

4. A BRIEF DESCRIPTION OF THE "WORST CREDIBLE' SCENARIO FOR EACH SCENARIO WITH A CEI GREATER THAN 100.

5. A COPY OF THE SUMMARY SHEETS AS PER ATTACHED CE INDEX PROGRAM FOR CEI AND DISPERSION FOR EACH SCENARIO WITH A CEI GREATER THAN 100 OR THOSE WITH AN ODOR PROBLEM.

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6. A PLOT PLAN AND AREA MAP WITH:

   a. Three circles based on EEPG numbers

      These circles represent the distance (radii of exposure) that 1, 10 and 100 times the EEPG concentrations are predicted to travel for NEUTRAL atmospheric conditions.

   b. A circle based on the Odor Threshold

      If the Odor Threshold is less than the EEPG concentration, include a circle for the distance that concentration is predicted to travel for NEUTRAL atmospheric conditions.

   c. Location of gas monitors, spill detectors, etc.

      Clearly show the location and type of any device used to detect a release.

7. THE CEI PRE-AUDIT QUESTIONNAIRE (Attached, nine pages)

8. ONE COPY OF THE MASS & ENERGY BALANCE FOR YOUR PLANT.

   One mass and energy balance flowsheet set should be sent to the Process Engineering representative only.

C. U.S. Area and Corporate Representatives

The Functional Team Leader will invite appropriate Dow U.S. Area or Corporate Safety and Loss Prevention representatives for for reviews with CEI's of greater than 300 or greater than 400 respectively. Notification for outside auditors must be done thirty days in advance of the audit.

Chemical Exposure Index Audit
Agenda

I. OVERVIEW PRESENTATION TO THE AUDIT TEAM (*Allow 30 Minutes)

1. What is the status of the recommendations made in the previous review?

   a. Have there been any major changes or additions to the plant since the last review?

   b. Are there any other specific concerns which should be addressed but were not identified in the CEI review?

2. Summarize the results of the CEI calculations. Include results of the odor threshold dispersion modeling.

3. Review the "worst credible" case loss of containment release scenarios including plot plans showing dispersion model results.

4. Discuss any CEI related incidents that have occurred.

5. Discuss your lines of defense that would prevent your "worst credible" release scenario from occurring.

6. Discuss the mitigation procedures for each scenario.

7. Discuss your plant's CEI related concerns generated from the audit preparation.

8. Discuss your plans for improving your operations from a CEI standpoint.

II. PRE-AUDIT QUESTIONNAIRE (* Allow 30 minutes)

A. Review the information provided in the questionnaire on an exception basis.

III. DOCUMENTATION AUDIT (* Allow one hour)

Following the plant's presentation, two members of the audit team will examine the plant's program documentation. The plant's documentation should include:

Emergency Plan
P&ID's/Material Balance Flowsheet
Operation Discipline
In-Plant Training Program
Maintenance Checklist
Operating Procedure
Area Monitoring System Records
Piping Specifications

Completeness and quality will be used as a criteria for evaluating the documentation.

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IV. HYPOTHETICAL EXERCISE (* Allow one hour)

Two members of the audit team will simultaneously conduct an exercise designed to evaluate the response to an emergency situation involving a major release of chemical X.

The production shift on duty the day of the audit will be given a written description of an emergency involving a major release of chemical X. The Superintendent and Safety Superintendent has previously developed an exercise based on an actual potential concern. The shift personnel will be given five minutes to develop a response to the situation (i.e., who would be notified, what actions would be taken in the field, etc.). Written materials may be utilized by the shift, i.e., operating discipline, checklists, etc. The production shift will then be asked to verbally describe their response to the audit team members.

V. INTERVIEW (* Allow one hour)

A member of the audit team will interview an operator in the plant. See the attached questions.

VI. WRAP UP (* Allow 30 minutes)

The CEI Functional Team Leader will prepare a written report to be sent to the Audit Facilitator to be included in the Consolidated Audit report to the plant.

If there are any questions on the audit procedures, please call Jim Gibson at Ext. 8163.

* Note: The documentation audit, hypothetical exercise, and interview will take place currently.

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CHEMICAL EXPOSURE INDEX AUDIT

PERSONNEL INTERVIEW

Introduce yourself and explain purpose of the audit to the interviewee.

Emphasize to the interviewee that his/her information may be used in the feedback session at the end of the EOPC/CEI audit. However, names will be held in confidence.

NOTE: All questions are not applicable to all interviewees. These are only guidelines.

1. How long have you been a Dow employee and in which plants and areas have you worked?

2. Explain your current job function.

3. Is this plant a good place to work in relation to chemical exposures and their effect on the public in general, beyond the Dow fence line?

4. Do you feel that supervision is receptive to suggestions regarding emergency response practice? Do you feel that supervision takes issues related to the CAER program, emergency planning, etc., seriously? Can you give an example?

5. What type of emergency response training have you received? Do you understand the hazards and the appropriate emergency responses? Does the training program include procedures to respond to spills or releases in the environment that may affect the public at large?

6. Are you familiar with the Chemical Exposure Indices (CEI) of your plant's products and raw materials?

7. What procedure do you follow for emergencies such as gas releases, spills, fires, etc.?

8. When was the last time you were personally involved in a planned emergency drill in your plant for the release of gas or liquid of concern?

9. How are emergency response policies communicated?

10. What type of training have you received in the proper use of personnel protective equipment employed for combating spills, gas releases, and fires?

11. Do you feel that Dow overall is doing all that is necessary to prevent you, your neighboring plants, and the public from being exposed to chemicals that are handled in your plant?

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CHEMICAL EXPOSURE INDEX AUDIT

PRE-AUDIT QUESTIONNAIRE

Please check off YES, NO, or N/A (not applicable) for each question.
Provide additional details if requested.

When was the last CEI review?_____

What chemicals were discussed and what were the CEI values?

Chemical	CEI

Please list all chemicals in your plant that exhibit a Chemical Exposure Index (CEI) of 100 or greater.

1._____.
2._____.
3._____.

Please list all chemicals that have spill/release scenarios (neutral atmospheric condition and "EEPG X 1") exhibiting a radius of exposure that exceeds the distance from your plant to the public.

1._____.
2._____.
3._____.

YES	NO	N/A	
___	___	___	Have these scenarios been included in the CAER/MIDAS program?
			Please have appropriate map plots available for review at the audit.

Please list all chemicals that have spill release scenarios (neutral atmospheric condition and "ODOR THRESHOLD X 1") exhibiting a radius of exposure that exceeds the distance from your plant to the public.

1._____.
2._____.
3._____.

YES	NO	N/A	
___	___	___	Have these scenarios been included in the CAER/MIDAS program?
			Please have appropriate map plots available for review at the audit.

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The following pre-audit questions apply to those areas of the operation that process, transfer, or store chemicals whose impact in the event of a release incident would have a significant negative impact on public areas. Impacts on or of immediately surrounding facilities should be considered in a secondary way.

A. OPERATING PROCEDURES

Yes No N/A

___ ___ ___ 1. Does the plant have checklists that are used to shut down and clear equipment/piping to insure that the contents are not left in the equipment, or accidentally released into the environment?

If the answer is yes:

a. Please have documentation available for review at the audit.

If the answer is no:

b. How is this function accomplished? _____

_____

c. What are the plant's plans for doing this in the future? _____

_____

___ ___ ___ 2. Does the plant have checklists that are used for starting up out of service equipment/piping that insures that no raw material, process streams or product will be accidentally released into the environment?

If the answer is yes:

a. Please give examples and documentation.

If the answer is no:

b. How does the plant accomplish this function?

_____

_____

c. What are the plant's plans for this in the future?

_____

_____

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Yes No N/A

___ ___ ___ 3. Does the plant have procedures for the initial opening of lines and equipment?

If the answer is yes:

a. Please have the documentation available for review at the audit.

4. Does the plant have procedures that define exactly who is responsible for the operation, inspection and maintenance of adjacent and intra/interplant pipelines and associated equipment?

If the answer is yes:

___ ___ ___ a. Do they include normal operations?

___ ___ ___ b. Do they include emergency operations?

c. Please have the documentation available for review at the audit.

If the answer is no:

c. What are the plant's plans for developing these procedures? _____

_____

B. PLANT COMMUNICATIONS

___ ___ ___ 5. Does the plant have an up-to-date emergency call list?

If the answer is no:

a. What are the plant's plans for developing one?

_____

_____

_____

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Yes No N/A

6. Does the plant have written notification procedures for the following emergencies?

___ ___ ___ a. Gas Release

___ ___ ___ b. Spill

___ ___ ___ c. Fire

___ ___ ___ d. Emergency Response

___ ___ ___ e. Other _____

If yes to any of the above:

a. Please provide documentation at the audit for review.

If no to any of the above:

f. Describe what the plant's plans are in this area?

_____

_____

_____

___ ___ ___ 7. Does the plant have procedures for establishing contact with Field Headquarters during an emergency?

If the answer is yes:

a. Please provide documentation at the audit for review.

C. AREA MONITORING SYSTEMS

___ ___ ___ 8. Does the plant use an area monitoring system for toxic materials?

If the answer is yes:

a. How often are these monitors checked and calibrated?

_____

_____

b. Please have documentation available at the audit for review.

___ ___ ___ 9. Are plant personnel trained to respond to the alarms from area monitors?

If the answer is yes:

a. What is the frequency of retraining? _____

_____

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D. PLANT PIPING SYSTEMS

Yes	No	N/A	
___	___	___	10. Does the plant monitor corrosion in the piping systems of the facility?

If the answer is yes:

a. How is monitoring done? _____

b. Please provide the documentation at the audit for review.

___	___	___	11. Does the plant have areas in the piping system that requires constant or repetitive repairs?

If the answer is yes:

a. Please describe what is being done to prevent recurrence. _____

_____

_____

___	___	___	12. Does the plant have a preventive maintenance program in please to monitor the integrity of the piping system? Consider all elements; i.e., paint, insulation, corrosion, supports, shoes, etc.

a. Be prepared to discuss this at the audit.

___	___	___	13. Are outside-the-block material distribution systems monitored for leaks?

a. How is this done? _____

_____

b. How frequently? _____

___	___	___	14. Do the plant's toxic material distribution systems undergo pressure testing on a routine basis?

If the answer is yes:

a. How often? _____

b. Please provide documentation at the audit for review.

___	___	___	15. Do the plant's toxic material distribution systems have prominently displayed phone numbers for notification of problems and emergencies?

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E. PLANT MECHANICAL EQUIPMENT

Yes	No	N/A		
___	___	___	16.	What kind of pumps does the plant use in toxic service?
___	___	___	17.	Are these the kind of pump systems that will minimize leak potential? (i.e., tandem or dual seals, sealess pumps, etc.)
___	___	___		If not can they be?
___	___	___	18.	Does the plant have a preventive maintenance program in place for mechanical equipment?
				If the answer is yes:
				a. Please have the documentation available for review at the audit.
				If the answer is no:
				b. What are the plant's plans to develop one?

F. TRAINING FOR EMERGENCY RESPONSE

			19.	Have the scenarios for chemical spills and gas releases, that have the most probable chance of occurring, been reviewed with:
___	___	___		a. Plant operators/technicians?
___	___	___		b. Supervision?
___	___	___		c. Other affected employees?
___	___	___		d. Process Engineering (CEINDEX Program)?
___	___	___		e. Safety and Loss Prevention?
___	___	___		f. Environmental (data of MIDAS system)?
___	___	___		g. Adjacent plant supervision?
___	___	___	20.	Have your reviews included all possible scenarios that would be deemed "major releases", affecting the public beyond the Dow fence line?

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Yes	No	N/A		
___	___	___	21.	Does the plant conduct routine, periodic "what if" emergency drills on the release of toxic chemicals?
___	___	___		a. Is each shift involved?
___	___	___		b. Do supervisors participate?
				If yes, what level of supervision? _____
___	___	___		c. Is there a regular schedule for these exercises?
___	___	___		d. Is Industrial Security involved in these practice drills in any way?
				If yes, in what way? _____
				e. How often are drills conducted? _____
				f. When was the last time your plant had a planned emergency drill involving the release of a toxic gas or liquid? _____
				g. What chemical was used in your last planned emergency drill? _____
				h. Have you used different toxic or odorless chemicals in previous drills? _____
___	___	___	22.	Does the plant have a formalized training program for those people who conduct periodic inspections of concerned facilities? (Example: weekly pipe inspection checklist, what to look for, etc.)
			23.	How do you insure that "lessons to be learned" from incident investigations are passed on to all concerned personnel? _____

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Yes	No	N/A	
___	___	___	24. Does the plant have written procedures detailing how to mitigate releases of toxic chemicals in the plant? (Examples: pump to another tank, apply foam, drive a wooden peg, etc.)

If the answer is yes:

___	___	___	a. Does the plant periodically train operating personnel on these procedures and methods for mitigating liquid spills or gas releases from the facility?

If yes, how often? _____

_____

If yes, how is the training documented? _____

_____

b. Please provide at least one example for review at the audit.

___	___	___	25. Has the plant reviewed its emergency response personnel protective equipment inventory with Industrial Hygiene? (appropriateness, types, numbers, etc.)
___	___	___	26. Does the plant have sufficient quantities of emergency response personnel protective equipment on hand to satisfy the need in the event of a major emergency?

If the answer is yes:

___	___	___	a. Is it kept at strategic locations for ease of access in case of an emergency?
___	___	___	27. Are there checklists employed for the periodic inspection, maintenance, and testing of the plant emergency equipment? (ammonia curtains, foam deluge systems, and fire monitors)

If the answer is yes:

a. How often? _____

b. Who does it? _____

_____

If the answer is no:

c. Please discuss the plant's plans. _____

_____

_____

_____

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Yes	No	N/A	
___	___	___	28. Are all plant personnel <u>trained</u> in the proper use of the various personnel protective equipment employed for combatting liquid spills, gas releases, and fires?

If the answer is <u>yes</u>:

a. How often? _____

b. How is this training documented? _____

_____

29. How many people are involved in training on the proper emergency response to a liquid/vapor chemical release of concern?

a. Operators/technicians _____
b. Supervision (all levels) _____
c. Others _____
d. Total of above _____

___	___	___	30. Have you consulted with <u>neighboring plants</u> immediately surrounding your facility to determine the effects of spills/releases by them on your plant and personnel?

If the answer is <u>yes</u>:

___	___	___	a. Do you have the proper type of personnel protective equipment if your plant is downwind of a spill or release from those facilities?
___	___	___	b. Sufficient quantities of equipment?
___	___	___	c. Is this equipment inspected or checked periodically?

If yes, how often? _____

___	___	___	d. Do you train your plant personnel on how to respond when exposed to a gas released from an adjacent plant?

If <u>yes</u>, how often? _____

___	___	___	e. Do you participate in emergency drills when hypothetical releases originate in plants other than your own?

If <u>yes</u>, how often? _____

If the answer is <u>no</u> to <u>#30</u>:

Please describe what the plant does in the event of one of these emergencies, and future plans. _____

_____

_____