



IIAR Process Safety Management Guidelines for Ammonia Refrigeration. (1998). Provides and overview of OSHA's Process Safety Management (PSM) Standard.

TABLE OF CONTENTS

Chapter 1, Overview of OSHA's Process Safety Management (PSM) Standard

Chapter 2, Employee Participation

Chapter 3, Process Safety Information

Chapter 4, Process Hazard Analysis

Chapter 5, Pre-Startup Safety Review

Chapter 6, Standard Operating Procedures

Chapter 7, Training

Chapter 8, Management of Change

Chapter 9, Mechanical Integrity Program

Chapter 10, Hot Work Permit

Chapter 11, Contractor Qualifications

Chapter 12, Incident Investigation

Chapter 13, Compliance Audits

Chapter 14, Trade Secrets



Chapter 1 - Overview of OSHA's Process Safety Management (PSM) Standard

1-1, Subsection

1-1, Summary of Changes

1-1, Purpose

1-1, Scope

1-1, References

1-1, Procedures

1-1, Identify Covered Processes

1-2, Develop Process Safety Management (PSM) Elements

1-2, Employee Participation

1-2, Process Safety Information

1-3, Process Hazard Analysis

1-3, Operating Procedures

1-3, Operator Training

1-4, Contractors

1-4, Pre-Startup Safety Review

1-4, Mechanical Integrity

1-5, Hot Work Permit

1-5, Management of Change

1-5, Incident Investigation

1-5, Emergency Planning and Response

1-6, Compliance Audits

1-6, Trade Secrets

1-6, Forms



1-6, Document Management

1-6, Personnel

1-6, Written OSHA Clarifications (Threshold Determination)

1-7, Guideline for Customizing the Overview of the OSHA's PSM Regulation Section to Meet the Requirements for Specific Safety

1-7, References

1-7, Definitions

1-9, Attachment 1A - OSHA Interpretation Letter

Chapter 2 - Employee Participation

2-1, Regulatory

2-1, Purpose

2-1, Regulatory Language

2-1, Required Elements

2-1, Explanation

2-2, Methods of Implementation

2-2, Employee Access to Information

2-2, Detailed Explanation with Optional Informative Elements

2-2, Summary of Changes

2-2, Purpose

2-2, Scope

2-3, References

2-3, Procedures

2-3, Employee Awareness

2-4, Employee Involvement

2-4, Employee Access to Information

2-5, Forms

2-5, Document Management

2-5, PSM Awareness



- 2-5, PSM Employee Communication
- 2-5, Employee Concerns/Responses
- 2-5, Employee Meetings/Consultations
- 2-5, Personnel
- 2-5, Written OSHA Clarification
- 2-6, Guideline for Customizing Employee Participation Section to Meet the Requirements of a Specific Facility
- 2-6, Scope
- 2-6, References
- 2-6, Procedures
- 2-6, Document Management
- 2-7, Attachment 2A - Sample Script: Instructions on the Hazards of Ammonia
- 2-7, Sample Script for Instructing Associates on the Hazards of Ammonia
- 2-7, Derived from IIAR R1
- 2-7, General Information
- 2-7, Ammonia (NH₃)
- 2-7, Uses of Ammonia
- 2-7, Ammonia Vapor Compression in Mechanical Refrigeration
- 2-8, Why Ammonia Should be Treated with Respect
- 2-8, Effects on the Human Body
- 2-8, Effects of Ammonia Vapor in Various Concentrations
- 2-8, Ammonia's Self-Alerting Characteristic
- 2-9, Effects of Exposure of Ammonia Gas
- 2-9, Effects of Exposure to Pure Liquid Ammonia
- 2-9, First Aid: Immediate and Temporary Care for Exposure to Anhydrous Ammonia
- 2-9, Eyes
- 2-10, Inhalation
- 2-10, Ingestion (Swallowing of Ammonia)



2-10, Skin Contact

2-11, Attachment 2B - Sample PSM Awareness Documents

2-11, Process Safety Management (PSM)

2-12, Proceso Administrativo De Seguridad

2-13, Attachment 2C - Sample Safety Compliant Notice

2-15, Attachment 2D - Sample Documentation of Employee Participation

Chapter 3 - Process Safety Information

3-1, Regulatory

3-1, Purpose

3-1, Regulatory Language

3-2, Required Elements

3-3, Process Chemicals

3-3, Process Technology Information

3-3, Process Equipment

3-3, Document Location

3-3, Detailed Explanation with Optional Informative Elements

3-3, Summary of Changes

3-4, Purpose

3-4, Scope

3-4, Hazards of the Chemicals Used in the Process

3-4, Process Technology Information

3-4, Process Equipment

3-5, References

3-5, Procedures

3-5, Hazards of the Chemicals Used in the Process

3-6, Process Technology Information

3-6, Block Flow Diagrams and Simplified Process Flow Diagrams



- 3-7, Process Chemistry
- 3-7, Maximum Inventory Levels
- 3-8, Alternative Inventory Levels
- 3-8, Operating Limits and Safety Systems
- 3-9, Process Equipment
- 3-9, Materials of Construction
- 3-9, Piping and Instrument Diagrams (P&IDs)
- 3-10, Electrical Classification
- 3-11, Pressure Safety Relief Design and Design Basis
- 3-12, Ventilation System Design
- 3-12, Design Codes, Standards, and Good Engineering Practices
- 3-13, Material and Energy Balances
- 3-13, Forms
- 3-15, Document Management
- 3-15, Personnel
- 3-15, Written OSHA Clarifications
- 3-15, Guideline for Customizing Process Safety Information Section to Meet the Requirements of a Specific Facility
- 3-15, Scope
- 3-15, References
- 3-16, Procedures
- 3-16, Document Management
- 3-17, Attachment 3A - Sample Block Flow Diagram (BFD)
- 3-17, BFD-1 - Block Flow Diagram
- 3-19, Attachment 3B - Sample Process Flow Diagram (PFD)
- 3-19, PFD-1 - Process Flow Diagram
- 3-20, PFD-2 - Process Flow Diagram/Heat Balance
- 3-21, Attachment 3C - Sample Inventory Calculations



- 3-22, Pressure Vessel Volume Worksheet
- 3-26, Special Purpose and Miscellaneous Equipment
- 3-29, Attachment 3D - Sample Equipment Data Form
- 3-30, Sample Details for Register
- 3-31, Attachment 3E - Sample Piping and Instrument Diagrams (P&IDs)
- 3-31, P&ID 1: Detail - Screw Compressor
- 3-32, P&ID 2: Detail - Reciprocating Compressor
- 3-33, P&ID 3: Detail - High Pressure Receiver
- 3-34, P&ID 4: Detail - Evaporative Condenser
- 3-35, Attachment 3F - Sample Pressure Relief Valve Sizing Calculations and Pressure Relief Design Basis Table
- 3-35, Pressure Relief Valve Sizing Calculations
- 3-35, Pressure Vessel Sizing Calculations
- 3-35, Positive Displacement Compressor Sizing Calculations
- 3-36, Allowable Relief Header Length Calculations
- 3-36, Relief Header Sizing Calculations
- 3-39, Attachment 3G - Sample Ventilation System Design
- 3-39, Machinery Room Specifications
- 3-39, Ventilation Worksheet
- 3-39, BOCA National Mechanical Code
- 3-39, Uniform Mechanical Code
- 3-39, ASHRAE-15
- 3-39, ANSI/IIAR-2
- 3-39, Other
- 3-39, Heat Required to Maintain 60° F with 20° F Outdoor Temperature
- 3-39, Design Procedure
- 3-41, Attachment 3H - Sample Overall System Material and Energy Balance
- 3-41, Load Side Capacities



3-41, Loads

3-41, High Side Capacities

3-41, Loads

3-41, Compressors

3-41, Condenser Capacity

3-41, Loads

3-41, Condensers

Chapter 4 -Process Hazard Analysis

4-1, Regulatory

4-1, Purpose

4-1, Regulatory Language

4-3, Required Elements

4-3, The PHA Method

4-3, The Team

4-3, The Contents of the PHA

4-3, Team Recommendations

4-3, Documentation

4-4, PHA Revalidation

4-4, Document Retention

4-4, Detailed Explanation with Optional Informative Elements

4-4, Summary of Changes

4-4, Minimum Process Hazard Analysis (PHA) Program Requirements

4-4, Purpose

4-5, Scope

4-5, References

4-5, Procedures

4-5, Develop a Schedule for Conducting the PHA



- 4-6, Choose an Appropriate Methodology
- 4-6, Establish the Purpose, Objectives, and Scope
- 4-7, Select the Study Team
- 4-7, Collect Reference Information
- 4-7, Develop What-If Subsystems and Questions
- 4-8, Arrange the Team Meetings
- 4-8, Conduct a PHA Study
- 4-9, Write a PHA Compliance Report
- 4-9, Address the Findings from the PHA Study
- 4-9, PHA Revalidations
- 4-10, Forms
- 4-13, Document Management
- 4-13, Personnel
 - 4-13, PHA Coordinator
 - 4-13, Team Leader
 - 4-13, Process/Utilities Engineer
 - 4-13, Operations/Mechanical Representative
 - 4-13, Scribe or Technical Secretary
 - 4-13, Written OSHA Clarifications
- 4-14, Guideline for Customizing Minimum PHA Program Requirements Section to Meet the Requirements of a Specific Facility
 - 4-14, Scope
 - 4-14, References
 - 4-14, Definitions
- 4-15, Procedures
 - 4-15, Forms
 - 4-15, Document Management
 - 4-15, Personnel



- 4-15, Generic What-If/Checklist for Ammonia Refrigeration
- 4-15, Purpose
- 4-15, Scope
- 4-16, References
- 4-16, Procedures
- 4-16, Determine the Scope of the What-If/Checklist
- 4-17, Confirm the Process Safety Information is Up-To-Date
- 4-17, Select the What-If/Checklist Team
- 4-17, Schedule the Team Meetings
- 4-17, Conduct a Site-Specific What-If/Checklist
- 4-17, Write a Compliance PHA Report
- 4-18, Forms
- 4-18, Document Management
- 4-18, Personnel
- 4-18, Guideline for Customizing Generic What-If/Checklist for Ammonia Refrigeration Section to Meet the Requirements of a Specific Facility
- 4-18, Written OSHA Clarifications
- 4-19, Attachment 4A - Generic What-If/Checklist Log Sheets
- 4-21, Compressors
- 4-27, Condensers
- 4-33, Air Purgers
- 4-34, Pressure Vessels
- 4-41, Evaporators
- 4-48, Piping Systems and Valves
- 4-54, NH₃ Pumps
- 4-60, Instrumentation and Controls
- 4-62, Start-Up of Existing or Modified Systems
- 4-65, Shut-Down of System



4-66, Emergency Situation of System

4-70, Charging NH₃ to System

4-75, Pumping NH₃ Out of Entire System or Specific Equipment

4-77, Review Human Factors Impacting Entire System

4-90, Review of Facility Siting

4-97, Identification and Review of Past Incidents

4-99, Attachment 4B - OSHA Compliance PHA Report

4-102, Executive Summary

4-102, Introduction

4-102, Purpose of Study

4-102, Study Scope

4-102, Exhibit A

4-102, Process Description

4-102, Approach

4-102, PHA Technique

4-103, Consequences and Hazards

4-103, Exhibit B

4-103, Exhibit C

4-103, Engineering and Administrative Controls

4-103, Incident History

4-104, Exhibit D

4-104, Past Incidents: Summary of EPA Data

4-104, Human Factors

4-104, Facility Siting

4-104, Qualitative Evaluation of Consequences and Frequencies

4-105, PHA Team Roles and Responsibilities

4-105, Exhibit E



- 4-105, Results
- 4-105, Documentation Conventions
- 4-105, Exhibit F
- 4-105, Major Risks and Recommendations
- 4-105, Follow-Up
- 4-105, Appendix A - PHA Technique
- 4-105, Introduction
- 4-105, General Overview
- 4-106, What-If/Checklist
- 4-107, Appendix B - IIAR's OSHA Compliance Risk Matrix

Chapter 5 - Pre-Startup Safety Review

- 5-1, Regulatory
 - 5-1, Purpose
 - 5-1, Regulatory Language
 - 5-1, Required Elements
- 5-2, New Facilities
 - 5-2, Modifications to Facilities
 - 5-2, Detailed Explanation with Optional Informative Elements
 - 5-2, Summary of Changes
 - 5-2, Purpose
 - 5-2, Scope
 - 5-2, References
 - 5-2, Procedures
 - 5-2, New Facilities
- 5-3, Modified Facilities
- 5-3, Forms
- 5-6, Document Management



5-6, Personnel

5-6, Written OSHA Clarifications

5-6, Guideline for Customizing Pre-Startup Safety Review Section to Meet the Requirements of a Specific Facility

Chapter 6- Standard Operating Procedures

6-1, Regulatory 6-1

6-1, Purpose

6-1, Regulatory Language

6-2, Required Elements 6-2

6-2, Computerized Control Systems

6-2, Accessibility

6-3, Safe Work Practices

6-3, Review of Operating Procedures

Detailed Explanation with Optional Informative Elements 6-3

6-3, Summary of Changes

6-3, Purpose

6-3, Scope

6-4, References

6-4, Procedures

6-5, Overview of the System

6-5, Technical Operating Specifications (TOS)

6-6, Standard Operating Procedures (SOP)

6-7, Safety and Health Considerations

6-7, Accessibility

6-8, Safe Work Practices

6-8, Periodic Review and Annual Certification

6-8, Forms

6-8, Document Management



6-8, Personnel

6-10, Written OSHA Clarifications

6-10, Guidelines for Customizing Standard Operating Procedures to Meet the Requirements of a Specific Facility

6-10, References

6-10, Definitions

6-10, Procedures

6-11, Document Management

6-11, Example Standard Operating Procedures

Chapter 7 - Training

7-1, Regulatory

7-1, Purpose

7-1, Regulatory Language

7-2, Required Elements

7-2, Initial Training

7-2, Refresher Training

7-2, Grandfathering Operators

7-2, Form of Training

7-2, Documentation Requirements

7-3, Detailed Explanation with Optional Informative Elements

7-3, Summary of Changes

7-3, Purpose

7-3, Scope

7-4, References

7-4, Procedures

7-4, General Requirements for Designing a Training Program

7-5, Basic Requirements for Hire



7-5, Contents of the Training Program

7-5, Refresher Training

7-5, Documentation Requirements

7-6, Initial Refresher Training

7-6, Certification of Employees Operating a Process Before May 26, 1992

7-6, Additional Information

7-6, Classroom Training

7-7, On-the-Job Training

7-7, Competency Requirements

7-8, Granting of Final Qualification

7-8, Training Associated with Changes

7-8, Minimum Training for Supervisors

7-8, Training References

7-9, Forms

7-9, Training Summary Sign-Off Sheets

7-9, Initial Training Certification Form

7-9, Grandfathering Certification Form

7-9, Document Management

7-9, Personnel

7-10, Written OSHA Clarifications

7-10, Guideline for Customizing Training Section to Meet the Requirements of a Specific Facility

7-10, Scope

7-10, References

7-10, Procedures

7-11, Forms

7-11, Document Management

7-11, Personnel



- 7-13, Attachment 7A - Sample Sign-Off Sheet - Classroom Training
- 7-17, Attachment 7B - Sample Sign-Off Sheet - On-the-Job Training for Operations Activities
- 7-21, Attachment 7C - Sample Sign-Off Sheet - On-the-Job Training for Maintenance Activities
- 7-25, Attachment 7D - Sample Sign-Off Sheet - Additional Training for Supervisory Activities
- 7-27, Attachment 7E - Sample - Initial Training Certification Form
- 7-29, Attachment 7F - Sample - Grandfathering Certification Form
- 7-31, Attachment 7G - Potential Resources
- 7-31, General Refrigeration
- 7-31, Refrigerating Engineers and Technicians Association (RETA) Literature
- 7-31, Water Treatment
- 7-31, Electrical
- 7-31, Mathematics
- 7-31, Physics/Chemistry
- 7-32, Steam
- 7-32, Safety
- 7-32, Videos
- 7-32, Miscellaneous

Chapter 8- Management of Change

- 8-1, Regulatory
- 8-1, Purpose
- 8-1, Regulatory Language
- 8-1, Required Elements 8-1
- 8-2, Replacements in Kind
- 8-2, Temporary Changes
- 8-2, Procedure
- 8-3, Detailed Explanation with Optional Informative Elements
- 8-3, Summary of Changes



- 8-3, Purpose
- 8-3, Scope
- 8-4, References
- 8-4, Examples of Changes
- 8-4, Examples of Changes in Equipment
- 8-4, Examples of Changes in Facilities
- 8-4, Examples of Changes in Procedures
- 8-5, Examples of Changes in Process Technology
- 8-5, Examples of Major Changes
- 8-5, Examples of Minor Changes
- 8-5, Examples of Replacement in Kind
- 8-5, Examples of Temporary Changes
- 8-6, Procedures
- 8-6, Overview of Management of Change Procedure
- 8-8, Initiation of Management of Change Form (MCF)
- 8-8, Screening of Management of Change Form
- 8-8, Preliminary Engineering
- 8-9, Review of Recommendations
- 8-10, Conducting Pre-Startup Safety Review
- 8-10, Approval of the Change
- 8-10, Forms
- 8-10, Form MCF-1A (Initiation)
- 8-10, MCF Number
- 8-10, Facility Information
- 8-10, Reason for Request
- 8-10, Description of Technical Basis for Change
- 8-10, Form MCF-1B (Initial Screening)



- 8-10, Change vs. Replacement in Kind
- 8-10, Assess Technical Basis of Change
- 8-11, Form MCF-1C (PSM Elements)
- 8-11, Form MCF-1D (Verification and Approval)
- 8-11, Verification Sign-Off
- 8-11, Approval to Start-Up Process
- 8-11, Final Verification for Temporary Changes
- 8-11, Form MCF-2A (Management of Change Form Log)
- 8-11, Form MCF-3 (Safety Review Checklist)
- 8-11, Verification Sign-Off
- 8-11, Approval to Start-Up Process
- 8-11, Final Verification for Temporary
- 8-11, Question
- 8-11, Answer
- 8-11, Remarks
- 8-11, Recommendations
- 8-11, Comments
- 8-19, Document Management
- 8-19, Personnel
- 8-19, Originator
- 8-19, Site Maintenance Supervisor
- 8-20, Regional Engineer
- 8-20, Written OSHA Clarifications
- 8-20, Guidelines for Customizing Management of Change Procedure to Meet the Requirements of a Specific Facility
- 8-20, Scope
- 8-21, References
- 8-21, Definitions



8-21, Procedures

8-21, Document Management

8-21, Personnel

Chapter 9 - Mechanical Integrity Program

9-1, Regulatory

9-1, Purpose

9-1, Regulatory Language

9-2, Required Elements

9-2, Application and Identification of Process Equipment

9-3, Written Procedures

9-3, Employee Training

9-3, Inspection and Testing

9-3, Equipment Deficiencies

9-3, Quality Assurance

9-3, Detailed Explanation with Informative Elements

9-3, Summary of Changes

9-4, Purpose

9-4, Scope

9-4, References

9-4, Procedures

9-4, Identification and Categorization of MI Program Equipment

9-6, Codes and Standards

9-6, Testing, Inspection, and Preventative Maintenance (T/I/PM) of MI Program Equipment

9-9, Controlling Deficiencies

9-10, Training Procedures

9-10, Quality Assurance Procedures

9-10, Engineering, Design, and Fabrication of MI Program Equipment



- 9-12, Installation of MI Program Equipment
- 9-13, Pre-commissioning and Start-up Safety Review of MI Program Equipment
- 9-13, Work Orders Issued for MI Program Equipment
- 9-14, Quality Assurance of Materials and Spare Parts for MI Program Equipment
- 9-14, Decommissioning of MI Program Equipment
- 9-15, Forms
- 9-15, Document Management
- 9-15, Log Sheets and Inspection Reports
- 9-15, T/I/PM Tasks
- 9-15, Engineering and Design Records
- 9-15, Work Orders
- 9-15, Equipment Files
- 9-15, Personnel
- 9-15, Engineers and Area Supervisors
- 9-15, Purchasing Department Representative
- 9-16, Refrigeration Engineers
- 9-16, Written OSHA Clarifications
- 9-17, Guideline for Customizing Employee Participation Section to Meet the Requirements of a Specific Facility
- 9-17, Scope
- 9-17, References
- 9-17, Procedures
- 9-18, Document Management
- 9-19, Attachment 9A - CMMS Guidelines
- 9-19, Use and Selection of a CMMS
- 9-21, Attachment 9B - Sample System Log
- 9-25, Attachment 9C - Examples of Temporary Limits and Additional Protective Features
- 9-25, Examples of Administrative Controls/Temporary Limits



9-25, Examples of Mechanical/Electrical Protection

9-25, Examples of Increased Monitoring and Inspections

9-25, Examples of Temporary Repair

9-27, Attachment 9D - Sample Pre-commissioning Checklist

9-29, Attachment 9E - Sample De-commissioning Checklist

Chapter 10- Hot Work Permit

10-1, Regulatory

10-1, Purpose

10-1, Regulatory Language

10-1, Required Elements

10-1, Initiation of the Hot Work Permit

10-2, Issuing the Hot Work Permit

10-2, Completing the Hot Work Procedure

10-2, Detailed Explanation with Optional Informative Elements

10-2, Summary of Changes

10-3, Purpose

10-3, Scope

10-3, References

10-3, Examples of Hot Work

10-3, Procedure

10-3, Initiating a Hot Work Permit

10-3, Issuing a Hot Work Permit

10-4, Performing Hot Work

10-5, Completing the Hot Work Permit Procedure

10-5, Personnel Responsibilities

10-5, Originator

10-5, Site Maintenance Supervisor, His / Her Designee, or Other Appropriate Personnel



10-6, Cutter/Welder

10-6, Fire Watch

10-6, Training Requirements

10-6, Facility Personnel and Contractors

10-6, Cutter/Welder

10-7, Fire Watch

10-7, Site Maintenance Supervisor, His / Her Designee, or Other Appropriate Personnel

10-7, Forms

10-7, Document Management

10-7, Hot Work Permit

10-7, Personnel

10-7, Written OSHA Clarifications

10-8, Guideline for Customizing Hot Work Permit Section to Meet the Requirement of a Specific Facility

10-8, Scope

10-8, References

10-8, Procedures

10-8, Forms

10-8, Document Management

10-8, Personnel

Chapter 11- Contractor Qualifications

11-1, Regulatory

11-1, Purpose

11-1, Regulatory Language

11-2, Required Elements

11-2, Employer Responsibilities

11-3, Contract Employer Responsibilities

11-3, Documentation Requirements



- 11-3, Detailed Explanation with Optional Informative Elements
- 11-3, Summary of Changes
- 11-4, Purpose
- 11-4, Scope
- 11-4, References
- 11-4, Procedures
- 11-4, Contractor Selection
- 11-5, Contractor Awareness - Pre-Bid
- 11-5, Contractor Awareness - Post-Bid
- 11-5, Contractor Responsibilities
- 11-6, Periodic Evaluation
- 11-6, Forms
- 11-6, Form CQ-1 (Contractor Questionnaire)
- 11-6, Organization
- 11-6, Bidding Interest
- 11-6, References
- 11-6, Safety
- 11-7, Form CQ-2 (Contractor Confirmation Letter)
- 11-7, Name and Address
- 11-7, List of Items Delivered
- 11-7, Form CQ-3 (Contractor Employee Acknowledgment Record)
- 11-7, Employer and Name
- 11-7, Training Topics
- 11-7, Certification
- 11-7, Form CQ-4 (Contractor Evaluation Inquiry)
- 11-7, Contractor
- 11-7, Evaluation Topics



11-15, Document Management

11-15, Approved Bid List

11-15, Pre-Bid and Post-Bid Meetings

11-15, Training

11-15, Contractor Evaluations

11-15, Contractor Injury and Illness Log

11-15, Personnel

11-15, Department Managers, Engineers, and Area Supervisors

11-15, Purchasing Department Representatives

11-15, Safety Department Representatives

11-15, Contractors

11-16, Written OSHA Clarifications

11-16, Guideline for Customizing Contractor Qualifications Section to Meet the Requirements of a Specific Facility

11-16, Scope

11-16, References

11-16, Definitions

11-16, Procedures

11-17, Document Management

11-17, Personnel



Chapter 12- Incident Investigation

12-1, Regulatory

12-1, Purpose

12-1, Regulatory Language

12-2, Required Elements

12-2, Time Constraints

12-2, Investigation Team

12-2, The Investigation

12-2, The Report

12-3, Communication of the Report

12-3, Detailed Explanation with Optional Informative Elements

12-3, Summary of Changes

12-3, Purpose

12-3, Scope

12-3, References

12-3, Procedures

12-4, Initial Incident Response

12-4, Establish Incident Investigation Team

12-4, Determine the Facts

12-5, Determine the Cause and/or Contributing Factors

12-5, Recommend Corrective and Preventive Actions

12-6, Communicating Results/Follow-up

12-6, Forms

12-6, Form IIR-1A (Incident Summary)

12-6, Reference No.

12-7, Facility Information



12-7, Incident Type

12-7, Primary Source of Release

12-7, Cause(s) Contributing to Release

12-7, Types of Changes Recommended To Prevent Recurrence

12-7, Results of Incident

12-7, Form IIR-1B (Information Needed for EPA's Five-Year Accident History)

12-7, Form IIR-1C (Incident Description)

12-7, Location, Date, Time and Duration

12-7, Circumstances Leading up to Incident

12-7, Events and Actions as Incident Unfolded

12-7, Form IIR-1D (Incident Cause)

12-7, Assessment of Root Cause

12-7, Assessment of Additional Contributing Causes

12-7, Actions of Additional Contributing Causes

12-7, Actions or Circumstances Which Helped

12-7, Form IIR-1E (Approvals, Follow-Up and Reviews)

12-7, Date and Time Team Commenced Investigation

12-7, Team Membership

12-8, Location(s) of Team's Working and Support Documents

12-8, Recommended Changes

12-8, Recommended Employee Reviews

12-8, Form IIR-2A (Close-Out)

12-8, Description of Incident

12-8, Investigation Review Sessions

12-8, Hazard Reduction Actions

12-16, Document Management

12-16, Investigation Team Working and Support Documents



12-16, Investigation Team Weekly Status Reports

12-16, Investigation Report Form IIR-1 (A-E)

12-16, Management of Change Form

12-16, Team Leader's Monthly Status Reports

12-16, Investigation Close-Out Form IIR-2A

12-16, Reference Number Log

12-16, Personnel

12-18, Written OSHA Clarifications

12-18, Guideline for Customizing Incident Investigation Section to Meet the Requirements of a Specific Facility

12-18, Scope

12-18, Quantity of Ammonia Released

12-18, Property Damage

12-18, Fire or Explosion

12-18, Injuries or Deaths

12-18, References

12-18, Definitions

12-19, Procedures

12-19, Forms

12-19, Document Management

12-19, Personnel



Chapter 13- Compliance Audits

13-1, Regulatory

13-1, Purpose

13-1, Regulatory Language

13-1, Required Elements

13-1, Team Members

13-1, Audit Report and Findings

13-2, Documentation Requirements

13-2, Detailed Explanation with Optional Informative Elements

13-2, Summary of Changes

13-2, Purpose

13-2, Scope

13-2, References

13-2, Procedures

13-2, Define the Audit Requirements

13-3, Prepare for the Audit

13-5, Conduct the Audit

13-5, Report on the Audit Findings

13-5, Follow-Up on the Audit Findings

13-6, Forms

13-6, Form Audits-1 (Compliance Audit Certification Page)

13-7, Form Audits-2 (Compliance Audit Report of Findings)

13-7, Compliance Audit Checklists

13-10, Document Management

13-10, Personnel

13-10, Written OSHA Clarifications

13-10, Guideline for Customizing Compliance Audits Section to Meet the Requirements of a Specific Facility



13-11, Scope

13-11, References

13-11, Definitions

13-11, Procedures

13-11, Forms

13-11, Document Personnel

13-13, Attachment 13A, Sample - Audit Plan



Chapter 14- Trade Secrets

14-1, Regulatory

14-1, Summary of Changes

14-1, Purpose

14-1, Scope

14-1, References

14-1, Procedures

14-1, Forms

14-1, Document Management

14-2, Personnel

14-2, Written OSHA Clarifications

14-2, Guideline for Customizing the Trade Secrets Section to Meet the Requirements of a Specific Facility

14-2, Procedures

14-2, Personnel

A-1, Appendix A - OSHA Process Safety Management Standard

Index-1, Index