SAN DIEGO COUNTY
DEPARTMENT OF ENVIRONMENTAL HEALTH
HAZARDOUS MATERIALS DIVISION

California Accidental Release Prevention Program (CalARP) Guidelines

Revised
September 2014

It is recommended that the user read the entire contents of this document prior to proceeding with their Risk Management Plan (RMP).

These Guidelines are intended to assist stationary sources with preparing a Risk Management Program. They are not intended to replace the regulations found in Chapter 4.5, Division 2, Title 19 of the California Code of Regulations.

TABLE OF CONTENTS

Risk Management Plan Work Plan
Risk Management Plan Public Document 1
Guidelines for Technical Supporting Records 7
I. Offsite Consequence Analysis 7
II. Prevention Program 2 15
III. Prevention Program 3 21
IV. External Events including Seismic Analysis 30
V. Emergency Response Plans 31

Appendices
- Fee Policy A-1
- Useful Web Links A-2
- Sample Incident Investigation Forms A-3
- Sample Audit Checklist for Safety Information A-4
- Public Review A-5
- Record of Revision A-6
- Seismic Issue Summary A-7
- Seismic Issue Sheets Checklist A-8
- Seismic Walk down Checklists A-9
- What-If\Checklist Form A10
- Trade Secret\Confidential Information A-11
- Quick Reference Worst Case Scenario Requirements A-12
- Alternative Release Scenario Analysis A-13

SAN DIEGO COUNTY CUPA
DEPARTMENT OF ENVIRONMENTAL HEALTH
HAZARDOUS MATERIALS DIVISION
P.O. BOX 129261, SAN DIEGO, CA 92112-9261
(858) 505-6880 FAX (858) 505-6848
http://www.sdcdeh.org

RISK MANAGEMENT PLAN (RMP) WORK PLAN

I. STATIONARY SOURCE (SS) INFORMATION

NAME OF STATIONARY SOURCE (SS)		UNIFIED PROGRAM FACILITY PERMIT NUMBER	
SITE ADDRESS	CITY	CA	ZIP CODE
LATTITUDE AND LONGITUDE & METHOD FOR OBTAINING THIS		NAICS CODE	
SS USEPA IDENTIFIER	SS DUNN & BRADSTREET #	# FULLTIME EMPLOYEES AT THE SS	
CORP/PARENT COMPANY NAME		CORP/PARENT DUNN & BRADSTREET #	
WEBSITE			

II. STATIONARY SOURCE RMP CONTACT, OWNER/OPERATOR INFORMATION

NAME OF OWNER/OPERATOR SS		OWNER PHONE
NAME OF RMP CONTACT	TITLE	CONTACT PHONE #
MAILING ADDRESS	E-MAIL	CONTACT FAX #
CITY	STATE	ZIP CODE
24-HR EMERGENCY CONTACT NAME	TITLE	PHONE #
24-HR EMERGENCY CONTACT NAME	TITLE	PHONE #

III. CONSULTANT CONTACT INFORMATION (if applicable)

COMPANY NAME	CONSULTANT NAME	CONSULTANT'S PHONE #
CONSULTANT'SADDRESS	CONSULTANT'S E-MAIL	CONSULTANT'S FAX #
CITY	STATE	ZIP CODE

IV. PROCESS INFORMATION

NAME OF REGULATED SUBSTANCE (one sheet per item)	CAS NUMBER	MAX QUANTITY (in Lbs.)	RMP PROGRAM LEVEL (Circle) 1 2 3

Is stationary source subject to Part 355 of Title 40 CFR?	Is process subject to PSM Sec. 5189 of Title 40 CFR?	Is process subject to Title V Permit?
☐ YES ☐ NO	☐ YES ☐ NO	☐ YES ☐ NO

PROCESS INSTALLATION DATE (new/modified facility) ____/____/____

LAST SAFETY INSPECTION DONE BY A: ☐ **FEDERAL** ☐ **STATE** ☐ **LOCAL AGENCY**
DATE OF INSPECTION : ____/____/____

V. RMP TECHNICAL STUDIES

TYPE OF HAZARD EVALUATION [TO BE] CONDUCTED: Methods for Air Dispersion Modeling:
Manual Calculation (Tables) ☐ YES ☐ NO **or** Computerized Air Model ☐ YES ☐ NO

DATE OF SEISMIC WALKTHOUGH: ____/____/____

Name of Computerized Model (if applicable):

Passive Mitigation considered for Worst-Case Scenario (specify):

Reason for RMP Change:

CERTIFICATION BY:	PRINTED NAME:	DATE
		____/____/____

WORK PLAN SUBMISSION/INSTRUCTIONS GUIDELINES

I. STATIONARY SOURCE (SS) INFORMATION

NAME OF STATIONARY SOURCE: ENTER YOUR BUSINESS/FACILITY NAME OR DBA.
STATIONARY SOURCE UPF PERMIT NUMBER: ENTER THE UNIFIED PROGRAM FACILITY PERMIT (UPFP) NUMBER IF KNOWN.
ADDRESS OF STATIONARY SOURCE: THIS IS THE SITE (PHYSICAL) ADDRESS OF YOUR FACILITY.
LATITUDE AND LONGITUDE: ENTER THE LATITUDE AND LONGITUDE OF THE SS AND THE METHOD USED FOR OBTAINING THE LAT AND LONG.
NAICS CODE: ENTER THE 6 DIGIT NORTH AMERICAN INDUSTRY CLASSIFICATION SYSTEM (NAICS) CODE.
SS USEPA IDENTIFIER: ENTER THE SS USEPA ID NUMBER (IF APPLICABLE)
NUMBER OF FULL-TIME EMPLOYEES AT THE SS: ENTER THE NUMBER OF FULL-TIME EMPLOYEES AT THE STATIONARY SOURCE.
SS DUN AND BRADSTREET (D&B) #: ENTER THE STATIONARY SOURCE DUN AND BRADSTREET NUMBER
CORP/PARENT COMPANY NAME: PROVIDE THE NAME OF PARENT OR CORPORATE OWNER.
CORP/PARENT COMPANY D&B#: PROVIDE THE DUN AND BRADSTREET NUMBER OF THE PARENT OR CORPORATE OWNER.
WEBSITE: WEB ADDRESS (URL) FOR THE CORPORATE/PARENT ORGANIZATION, IF APPLICABLE.

II. SS RMP CONTACT, OWNER/OPERATOR INFORMATION

NAME OF OWNER/OPERATOR: PROVIDE THE NAME OF THE OWNER OF THE SS
NAME OF RMP CONTACT: PROVIDE THE NAME OF THE PERSON WHO WILL BE YOUR PRIMARY RMP CONTACT FOR THE SS.
TITLE: PROVIDE THE TITLE OF THE RMP CONTACT
MAILING ADDRESS: PROVIDE RMP CONTACT'S MAILING ADDRESS.
PHONE#: PROVIDE THE PHONE NUMBER FOR YOUR PRIMARY RMP CONTACT.
FAX#: PROVIDE A FAX NUMBER FOR THE PRIMARY RMP CONTACT.
E-MAIL: PROVIDE THE E-MAIL ADDRESS FOR YOUR PRIMARY RMP CONTACT IF ONE IS AVAILABLE.
24-HOUR EMERGENCY CONTACT: PROVIDE THE NAME OF A PERSON AVAILABLE FOR EMERGENCIES 24 HR A DAY.
TITLE: TITLE OF THE 24 HR EMERGENCY CONTACT PERSON.
PHONE#: PROVIDE THE 24 HR PHONE NUMBER FOR THE CONTACT PERSON
24-HOUR EMERGENCY CONTACT: PROVIDE THE NAME OF AN ALTERNATE PERSON AVAILABLE FOR EMERGENCIES 24 HR A DAY.
TITLE: TITLE OF THE ALTERNATE 24 HR EMERGENCY CONTACT PERSON.
PHONE#: PROVIDE THE 24 HR PHONE NUMBER FOR THE ALTERNATE CONTACT PERSON

III. CONSULTANT CONTACT INFORMATION (IF APPLICABLE)

COMPANY NAME: PROVIDE THE COMPANY NAME OF YOUR CONSULTANT PROJECT COORDINATOR.
ADDRESS: PROVIDE THE ADDRESS OF YOUR CONSULTANT.
PHONE#: PROVIDE THE PHONE NUMBER OF THE RMP CONSULTANT PROJECT COORDINATOR.
FAX#: PROVIDE THE FAX NUMBER OF YOUR CONSULTANT PROJECT COORDINATOR.
NAME OF PROJECT COORDINATOR: PROVIDE THE NAME OF THE PRIMARY RMP CONSULTANT PROJECT COORDINATOR.
E-MAIL: PROVIDE THE E-MAIL OF YOUR CONSULTANT, IF KNOWN.

IV. PROCESS INFORMATION

REGULATED SUBSTANCES: PROVIDE THE NAMES AND QUANTITIES (IN POUNDS) OF THE REGULATED SUBSTANCES IN YOUR PROCESS(ES).
CAS NUMBER: PROVIDE THE CHEMICAL ABSTRACT SERVICE NUMBER OF THE REGULATED SUBSTANCE.
RMP PROGRAM LEVEL: CIRCLE THE PROGRAM LEVEL THAT YOU WILL BE DEVELOPING OR HAVE DEVELOPED FOR YOUR RMP(S).
SS IS SUBJECT TO PART 355 OF TITLE 40 OF CFR: MARK YES IF THE SS IS SUBJECT TO CHEMICAL DISCLOSURE UNDER TITLE 40 CFR PART 355 OR MARK NO IF QUANTITY ONSITE IS BELOW EPCRA THRESHOLD PLANNING QUANTITIES.
PROCESS SUBJECT TO PSM: MARK YES IF YOU PROCESS IS SUBJECT TO OSHA PROCESS SAFETY MANAGEMENT (PSM) OR NO IF NOT SUBJECT TO PSM.
PROCESS SUBJECT TO TITLE V PERMIT: MARK YES IF YOUR PROCESS IS SUBJECT TO THE TITLE V AIR PERMIT REQUIREMENTS OR NO IF NOT SUBJECT TO TITLE V.
DATE OF SEISMIC WALKTHROUGH: PROVIDE THE PROJECTED DATE YOU PLAN TO DO OR YOU HAVE DONE YOUR SEISMIC WALKTHROUGH.
PROCESS INSTALLATION DATE (NEW/MODIFIED FACILITY): IF YOU ARE ADDING A NEW PROCESS OR MODIFYING AN EXISTING PROCESS, PROVIDE THE DATE YOU PLAN TO START-UP THE PROCESS.
DATE OF THE LAST SAFETY INSPECTION: PROVIDE THE DATE AND THE NAME OF THE AGENCY THAT LAST PERFORMED A SAFETY INSPECTION OF THE SS. MARK IF SAFETY INSPECTION WAS PERFORMED BY FEDERAL STATE OR LOCAL AGENCY

V. RMP TECHNICAL STUDIES

TYPE OF HAZARD EVALUATION TO BE CONDUCTED: PROVIDE THE NAME OF THE TYPE OF HAZARD EVALUATION YOU PLAN TO CONDUCT OR DID CONDUCT, I.E., WHAT-IF/CHECKLIST, HAZOP, ETC.
METHODS OF AIR DISPERSION MODELING: **MANUAL CALCULATIONS (TABLES):** IF YOU PLAN TO USE OR USED MANUAL CALCULATIONS OR EPA LOOK-UP TABLES FOR YOUR OFFSITE CONSEQUENCE ANALYSIS (OCA) CHECK YES OR NO, AS APPLICABLE.
COMPUTERIZED AIR MODEL: IF YOU PLAN TO USE OR USED A COMPUTERIZED AIR MODEL FOR OFFSITE CONSEQUENCE ANALYSES CHECK YES, IF NOT, CHECK NO.
IF YOU PLAN TO USE OR USED A COMPUTER AIR MODEL PROVIDE THE NAME AND VERSION.
PASSIVE MITIGATION FOR WORST-CASE (SPECIFY): SPECIFY THE TYPE OF PASSIVE MITIGATION YOU PLAN TO USE OR USED FOR YOU WORST-CASE OFFSITE CONSEQUENCE ANALYSIS (OCA). IF YOU DO NOT PLAN TO USE OR DID NOT USE PASSIVE MITIGATION IN YOUR OCA STATE "NONE".
LIST THE REASON FOR RMP CHANGE
CERTIFIED BY: THIS LINE MUST BE SIGNED BY THE PERSON CERTIFYING THAT THE INFORMATION PROVIDED IS TRUE AND ACCURATE.
PRINTED NAME: PRINT THE NAME OF THE PERSON CERTIFYING THAT THE INFORMATION PROVIDED IS TRUE AND ACCURATE.
DATE: PROVIDE THE DATE THE WORK PLAN WAS COMPLETED AND SIGNED.

GENERAL GUIDELINES FOR THE PREPARATION AND SUBMISSION OF A RISK MANAGEMENT PLAN PUBLIC DOCUMENT

The Risk Management Plan ((RMP) Public Document should reflect a facilities overall effort in the management and prevention of risks associated with the storage, use and/or processing of regulated substances (RS).

The RMP Public Document is **supported** by the following technical studies:

- Off-Site Consequence Analysis
- Program 2 or Program 3 Prevention Program (if applicable)
- External Event Analysis

The RMP Public Document shall be in the form of **a single volume for all Regulated Substances** handled unless otherwise instructed by the Hazardous Materials Division (HMD).

Submitting to USEPA – (For regulated substances greater than federal threshold level)

Those facilities that have regulated substances **greater than the federal thresholds** must submit their RMP to USEPA either electronically using *RMP e Submit™* or in the case of small businesses lacking computer access, the RMP can be reported on paper. An "electronic waver" must be obtained from USEPA or contact the HMD Cal ARP Coordinator at 858-505-6893.

Submitting to HMD – (For regulated substances greater than state threshold level)

The RMP public document submitted to HMD shall be indexed and tabbed with individual sections as follows (ONLY SECTION 1 - RMP EXECUTIVE SUMMARY and SECTION 2 – EPA RISK MANAGEMENT DATA ELEMENTS ARE SUBMITTED TO USEPA):

1. **RMP EXECUTIVE SUMMARY** - The RMP Executive Summary should be brief and concise*, no more than four pages in length for sources with one or two regulated substances. Your executive summary shall include:

   (a) The accidental release prevention and emergency policies in place at your facility.

   (b) A description of your regulated processes and regulated substances handled. This information may be presented in a paragraph or as bullets. The information should include the following:
   - Primary activities (e.g., manufacture of polyethylene, pulp mill, chlorine wholesaler);
   - Use of regulated substances (e.g., chlorine used to produce bleach, treat wastewater, repackage for sale);
   - Quantities handled or stored.

   (c) The general accidental release prevention program and chemical-specific prevention steps. For example, you may state that you are in compliance with the OSHA PSM rule and the CalARP requirements. Consider highlighting general or specific steps that you believe are key to your prevention program. These steps may be either technological (e.g., backup systems) or procedural/managerial (e.g., improved maintenance or training).

   (d) The five-year accident history. This should be a summary (e.g., we have had five accidental releases of chlorine in the past five years; the largest

release was 1500 pounds. No one offsite was injured, but several houses were evacuated as a precautionary measure during the releases). Do not present this information in a table format.

(e) A summary of the emergency response program.

(f) Planned changes to improve safety.

* A more detailed description is to be provided in the body of the report.

2. **EPA RISK MANAGEMENT DATA ELEMENTS/ REGISTRATION** –
(a) Those facilities that have regulated substances **greater than the federal thresholds** must submit their RMP Data Elements to USEPA using *RMP* e Submit*™ and submit a copy of all Data Elements to HMD.
(b) For those facilities that have regulated substances below the federal threshold but above the California thresholds, complete and submit to HMD the USEPA RMP Data Elements Section 2 and 3 only. The USEPA RMP Data Elements can be obtained on the EPA web site at http://www.epa.gov/ttn/caaa/t3/memoranda/data-ins.pdf.

3. **SAFETY –** List and describe all the safety features (equipment, administrative, etc.) that are in place to make this a safe process(s) or are to be implemented. Include the dates of implementation. A Safety Data Sheet is highly recommended.

4. **OFFSITE CONSEQUENCE ANALYSIS COMPONENT** - The Offsite Consequence Analysis (OCA) describes the potential exposure levels for surrounding populations and environmental receptors from accidental releases of **regulated substances**. Provide the following information for each Program 1, 2, or 3 covered process:

(a) **For the worst-case scenarios**, describe the largest vessel or pipeline in the process and the regulated substance used for the worst-case, assumptions and parameters used. Assumptions should include any passive mitigation that used to limit the quantity that could be released. State the distance to end point. Documentation should include the anticipated effect of the controls and mitigation on the release quantity and rate. Use a summary table to present the parameters. (**See Appendix for example**).

(b) **For the alternative release scenarios (not needed in Program 1)**, describe the scenarios identified, assumptions and parameters used, and the rationale for the selection of specific scenarios. Assumptions shall include use of any active and passive mitigation that was assumed to limit the quantity that could be released. State the predicted distance to end point. Documentation shall include the effect of the controls and mitigation on the release quantity and rate. Use a summary table to present the parameters. (**See Appendices for example**).

(c) For each scenario state the chemicals name, quantity in pounds, and physical state (toxic only).

(d) Describe the methodology. Give the computer air model used (if applicable) or state which USEPA Guideline (include version date) was used. If a USEPA Guideline was used, identify the specific tables referenced. If a computer air model was used, describe the known limitations of the air model.

(e) Document the estimated quantity released, release rate, and duration of the release.

(f) Document the wind speed and atmospheric stability class (toxic only).

(g) Document the topography i.e., rural or urban (toxic only).

(h) Document passive and/or active mitigation (alternative scenario only) considered.
(i) Provide the data used to estimate the potentially affected population and environmental receptors.
(j) Provide a list of the following known to be within the zone of vulnerability: the estimated residential population; presence of any schools, hospitals, long term health care facilities, child day care facilities; parks and recreational areas; major commercial, office or industrial areas; and prisons. Populations estimated need only include residential populations and may be rounded to two significant digits (e.g., 5,500; 11,000). Also identify and list any environmental receptors, National or state parks, forests, or monuments; officially designated wildlife sanctuaries, preserves, or refuges; and federal wilderness areas.
(k) Provide a map showing the location of the facility, the vulnerable zone within the radius equal to the distance to the toxic or flammable endpoint for the worst case and alternative scenarios. Identify within the vulnerable zone offsite residences, institutions (e.g., schools, hospitals) industrial, commercial, and office buildings, parks, or recreational areas inhabited or occupied by the public and any identified environmental receptor.

5. **ACCIDENT HISTORY/INVESTIGATION** - Provide the following information:

(a) Identify who is responsible by title for investigating accidents.
(b) Describe management's involvement.
(c) State if the accident investigation program addresses "near misses". A "near miss", is any incident, which would have resulted in an unintentional release of a Regulated Substance, if action outside the scope of normal operating procedures had not occurred.
(d) Provide the date time, and approximate duration of the release;
(e) The regulated substance releases;
(f) Estimated quantity in pounds of the regulated substance released;
(g) The NAICS code that most closely corresponds to the process;
(h) The type of release event and its source;
(i) Weather conditions if known;
(j) On-site impacts:
(k) Known offsite impacts;
(l) Initiating event and contributing factors if known;
(m) Whether offsite impacts were notified;
(n) Operational or process changes that resulted from the investigation.

6. **PREVENTION PROGRAM 2** – Provide the following supplemental information:

(a) Provide a specific list of the Federal or state regulations or industry-specific codes and standards used to demonstrate compliance with the safety information requirements. Include the date of the most recent review or revision of the safety standards.
(b) Provide a table of detection and monitoring devices and methods. Include their sensitivities.
(c) Provide a list of the standard operating procedures in place for the process.
(d) Provide a list of maintenance procedures in place. Provide a list the major equipment components of the process that are inspected or tested.
(e) Provide a summary of the Prevention Program 2 elements: safety information, hazard review, operating procedures, training program,

maintenance, compliance audits, and incident investigations. The summary should include enough detail to clearly explain how each program element will be managed.

(f) Provide a list of any changes to the process (SOPs, maintenance, training, etc.) as a result of the compliance audit. A person knowledgeable in the process **must conduct a compliance audit at least once every three years.**

7. **PREVENTION PROGRAM 3** – For each Program 3 process, provide the following information:

(a) Provide a specific list of the Federal or state regulations or industry-specific codes and standards used to demonstrate compliance with the safety information requirements. Include the date of the most recent review or revision of the safety standards.

(b) Provide a table of detection and monitoring devices and methods. Include their sensitivities.

(c) Provide a list of the standard operating procedures in place for the process.

(d) Provide a list of maintenance procedures in place. Provide a list the major equipment components of the process that are inspected or tested.

(e) Provide a list of any changes to the process (SOPs, maintenance, training, etc.) as a result of the compliance audit. A person knowledgeable in the process **must conduct a compliance audit at least once every three years.**

(f) Describe your management of change procedures you have in place to manage changes (other than "replacement in kind") to process chemicals, technology, equipment, and procedures. Summarize the following items regarding management accountability: Titles of individuals responsible for implementing the RMP and associated programs; Chain-of-command and responsibilities; and the designated RMP coordinator.

(g) Briefly describe the plan you have in place to ensure your employees and their representatives have access to process hazard analysis(s) and other Risk Management Plan information.

(h) Provide a summary of your Prevention Program 3 elements: safety information, operating procedures, training program, mechanical integrity, management of change, pre-start up review, compliance audit, incident investigations, employee participation, hot work permit, and contractors. The summary should include enough detail to clearly explain how each program element will be managed.

(i) Summarize your and the contractor's responsibilities where contractors perform maintenance or repair, turnaround, major renovation, or specialty work on or adjacent to a covered process.

8. **EXTERNAL EVENTS** - Provide the following information regarding external events that were reviewed as part of or separate from you process hazard analysis:

(a) A list of the types of natural or human caused external events considered.

(b) A description of the parameters used in considering a seismic analysis.

(c) Provide the edition of the Uniform Building Code that was used when the process was designed.

(d) Provide for each external event, with a potential to create a release of a regulated substance that will reach an endpoint offsite: the expected date of completion of any changes to mitigate the potential release; a description of

the major hazards identified; process controls and mitigation in place; monitoring and detection systems in use.

9. **EMERGENCY RESPONSE PLAN –** Provide the following supplemental information [a copy of your Hazardous Materials Business Plan may suffice for (a) and (b)].

(a) Describe what emergency response procedures you have in place in the event of a release of a regulated substance. This must describe the actions to be taken by employees and other individuals on-site over the entire course of the release event including at least the following:
- Activation of alarm system and interpretation of signals;
- Safe evacuation, assembly, and return;
- Selection of response strategies and incident command structure;
- Use of response equipment and other release mitigation activities; and
- Post-release equipment and personnel cleanup and decontamination.

(b) Describe what offsite response assistance you will require for potential release scenarios, including firefighting, security, and notification of the public.

(c) Describe who will be in charge of the response operation and how will authority be delegated down the internal and offsite chain of command.

(d) Describe any planned drills with emergency responders. Provide dates.

(e) List all other federal or state emergency plan requirements to which your facility is subject.

10. **CERTIFICATION** – The RMP shall be certified as follows:

(a) **Program 1**, certify in the RMP the following: "Based on the criteria in Section 2735.4 of Title 19 CCR, the distance to the specified endpoint for the worst-case accidental release scenario for the following process(es) is less than the distance to the nearest public receptor: [list process(es)]. Within the past five years, the process(es) has (have) had no accidental release that caused offsite impacts provided in the risk management program Section 2735.4(c)(1). No additional measures are necessary to prevent offsite impacts from accidental releases. In the event of fire, explosion, or a release of a regulated substance from the process(es), entry within the distance to the specified endpoints may pose a danger to public emergency responders. Therefore, public emergency responders should not enter this area except as arranged with the emergency contact indicated in the RMP. The undersigned certifies that, to the best of my knowledge, information, and belief, formed after reasonable inquiry, the information submitted is true, accurate, and complete". This certification must be signed by the owner or operator of the stationary source, and shall include his or her title, and the date signed.

(b) **For Program 2 and 3**, the owner or operator shall submit in the RMP a single certification that, to the best of the signer's knowledge, information, and belief formed after reasonable inquiry, the information submitted is true, accurate, and complete. This certification must be signed by the owner or operator of the stationary source, and shall include his or her title, and the date signed.

11. **Updates** The RMP must be updated when the following exist:
    - At least every five years from the initial submittal date
    - Within six months of a process change that requires a new process hazard analysis
    - Within six months of a change that causes the offsite consequence to change by a factor of two
    - Within six months of a change that results in a Prevention Program level change

12. **Corrections** The following corrections must be submitted to include in the RMP:
    - Information on any accidental releases that require an incident investigation
    - New emergency contact information within 30 days of a change in personnel

GUIDELINES FOR TECHNICAL SUPPORTING RECORDS AND STUDIES

CALIFORNIA ACCIDENTAL RELEASE PREVENTION PROGRAM (CalARP)
Separate records for supporting technical information must be prepared and maintained in the custody of the facility. The County of San Diego, Department of Environmental Health, Hazardous Materials Division (HMD) may choose to review the facility's supporting technical information by either requesting submittal of such information or requesting to review such information during an audit of the facility.

Facilities are to categorize the records of their supporting technical information as follows:

I. Offsite Consequence Analysis
II. Prevention Program
    a. Program 2 (if applicable)
    b. Program 3 (if applicable)
III. External Events (Seismic Analysis)

In developing your Risk Management Program the HMD recommends the following USEPA Guidance Documents: (Download them from the EPA web site: http://www2.epa.gov/rmp/guidance-facilities-risk-management-programs-rmp)

Accidental Release Information Program- all facilities

Risk Management Program and Plan for Ammonia Refrigeration - Ammonia Refrigeration facilities

Risk Management Program and Plan for Water Treatment - Water Treatment facilities

Risk Management Program and Plan for Propane Users and Small Retailers - Propane facilities

Risk Management Program and Plan for Propane Storage Facilities – Propane facilities

Risk Management Program and Plan for Wastewater Treatment Plants – Wastewater Treatment facilities

Risk Management Program and Plan for Warehouses – Warehouse facilities

Risk Management Program and Plan for Chemical Distributors – Chemical Distribution facilities

I. OFFSITE CONSEQUENCE ANALYSIS

The Offsite Consequence Analysis (OCA) describes the potential exposure levels for surrounding populations and environmental receptors from accidental releases of regulated substances. Specific release scenarios and dispersion models are used to generate a circular area of theoretical exposure around the point of accidental release. This generated exposure area is referred to as a "zone of vulnerability".

Computer air dispersion models or tables such as those provided in USEPA's *"RMP Offsite Consequence Analysis Guidance"* document are used to calculate the air concentration of a regulated substance as a function of distance from the point of release. A "toxic endpoint" concentration value for the regulated substance is input into a computer model, or looked up in table, for the selected release scenario to calculate the "zone of vulnerability".

A. General Requirements

Section 2745.4 in Title 19 CCR, requires that the following offsite consequence scenarios be performed:

Program 1
Worst-Case
One worst-case release scenario for each Program 1 level process must be evaluated.

Program 2 or 3
Worst-Case
A minimum of one worst-case release scenario to represent all toxic regulated substances held above the threshold quantity and one worst-case release scenario to represent all flammable regulated substances held above the threshold quantity. Additional worst-case release scenarios may be needed depending on the regulated substances in process and their location within the facility.

Alternative
A minimum of one alternative release scenario for each toxic regulated substance held above the threshold quantity and one alternative release scenario to represent all flammable regulated substances held above the threshold quantity.

B. Air Dispersion Models

The USEPA has developed a "RMP Offsite Consequence Analysis Guidance" document that includes tables for calculating air dispersion of toxic regulated substances and flammable regulated substances. One model accepted is RMP Comp. This is available to download at no cost from:
http://www2.epa.gov/rmp/general-rmp-guidance-chapter-4-offsite-consequence-analysis

Proprietary computer air models must be approved by the HMD. Prior to approval for use, the HMD may request a copy of the proprietary computer air model from the facility or their consultant for review.

C. Worst-Case Release Scenario Analysis

1. Definition of Worst-Case Scenario

USEPA has defined worst-case release as the release of the largest quantity of a regulated substance from a vessel or process line failure that results in the greatest distance to a specified endpoint. For the worst-case analysis, you do not need to consider the possible causes of the worst-case release or the probability that such a release might occur; the release is simply assumed to take place.

2. Determining the Quantity for the Worst-Case Scenario

For analysis of the worst-case scenario, you must consider the largest quantity of a regulated substance handled on site in a single vessel or process line failure at any one time. A summary of worst case release scenario requirements is provided in the appendices.

It is the HMD's opinion that administrative controls to limit vessel inventories are often disregarded by facilities under special circumstances when additional inventory is

needed. Therefore, the HMD does not allow administrative controls to be taken into account when determining worst-case analysis.

3. Selecting a Worst-Case Scenario

The hazard assessment requires a single offsite consequence analysis of the worst-case scenario for substances in each hazard category (i.e., one for regulated toxic substances and one for regulated flammable substances). Only the hazard for which the substance is listed needs to be considered (i.e., substances on the list of regulated toxic substances that are also flammable should only be analyzed for their toxic hazard; substances on the list of regulated flammable substances should be considered only for flammability).

The regulated substance chosen for the consequence analysis for each hazard should be the regulated substance that has the potential to cause the greatest offsite consequence. Choosing the toxic regulated substance that might lead to the greatest offsite consequence may require a screening analysis of all the regulated toxic substances on site, because the potential consequences are dependent on a number of factors, including quantity, toxicity, and volatility. Location (distance to fence line) and conditions of processing or storage (e.g., a high temperature process) also should be considered.

For regulated flammable substances, the consequences of a vapor cloud explosion must be considered in the analysis. The severity of the consequences of a vapor cloud explosion depends on the quantity of the released regulated substance in the vapor cloud and its heat of combustion. In most cases, the analysis probably should be based on the regulated flammable substance present in the greatest quantity; however, a substance with a high heat of combustion may have a greater potential offsite impact than a larger quantity of a substance with a lower heat of combustion. In some cases, a regulated flammable substance that is close to the fence line might have a greater potential offsite impact than a larger quantity farther from the fence line.

For worst-case scenarios, you are allowed to consider passive mitigation system, such as dikes, firewalls, blast walls, enclosures, etc. Active mitigation systems are not allowed to be considered for worst-case scenarios.

4. Release Rates for Worst-Case Scenarios

Toxic Substances

Toxic Gases (Normally Gases at Ambient Temperature)
Toxic gases include all regulated toxic substances that are gases at ambient temperature (temperature 25°C, 77°F). For consequence analysis, a gaseous release of the total quantity is assumed to occur in 10 minutes. The release rate shall be assumed to be the total quantity divided by 10.

Toxic Gases (Refrigerated Liquids at Ambient Pressure)
For regulated toxic substances handled as refrigerated liquids at ambient pressure, if the released regulated toxic substance is not contained by passive mitigation systems or if the contained pool would have a depth of 1 centimeter or less, you must assume that the regulated toxic substance is released as a gas in 10 minutes. If the released regulated toxic substance is contained by passive mitigation systems in a pool with a depth greater than 1 centimeter (0.39-inch), you may assume that the quantity of regulated toxic

substance is spilled instantaneously to form a liquid pool. The volatilization rate (release rate) shall be calculated at the boiling point of the regulated toxic substance.

Toxic Liquids
For regulated toxic substances handled as liquids, the total quantity in a vessel is assumed to be spilled onto a flat, non-absorbing surface. (NOTE: if the release would occur onto a surface that is not paved or smooth, you may take into account the actual surface characteristics). For toxic liquids carried in pipelines, the quantity that may be released from the pipeline is assumed to form a pool.

The surface area of the pool shall be determined by assuming that the liquid spreads to 1 centimeter (0.39-inch) unless passive mitigation systems are in place that serves to contain the spill and limit the surface area. Where passive mitigation is in place, the surface area of the contained liquid shall be used to calculate the volatilization rate.

The volatilization rate shall account for the highest daily maximum temperature occurring in the past three years, the temperature of the substance in the vessel, and the concentration of the substance if the liquid spilled is a mixture or solution.

The rate of release to air shall be determined from the volatilization rate of the liquid pool. You may use the methodology in USEPA's *"RMP Offsite Consequence Analysis Guidance"* or any other publicly available techniques that account for the modeling conditions and are recognized by industry as applicable as part of current practices.

Flammables
For regulated flammable substances, including both flammable gases and volatile flammable liquids, the worst-case release is assumed to result in a vapor cloud containing the total quantity of the regulated substance that could be released from a vessel or pipeline. The entire quantity of the cloud is assumed to be between the upper and lower flammable limits of the regulated substance. A yield rate of 10 percent of the available energy released in the explosion shall be used to determine the distance to the explosion endpoint if the model used is based on TNT-equivalent methods.

Required Parameters for Modeling a Worst Case Scenario

Endpoints

Toxic - The toxic endpoints to be used in a worst-case analysis shall be taken from the most current Tables listed in Appendix A Title 19 CCR. These endpoints are based on the Emergency Response Planning Guidelines (ERPG) developed by the American Industrial Hygiene Association. The ERPPG 2 is the maximum airborne concentration below which it is believed nearly all individuals could be exposed for up to one hour without experiencing or developing irreversible or other serious health effects or symptoms which could impair an individual's ability to take protective action.

Flammables - The flammable endpoint used in a worst-case analysis is an overpressure of 1 pound per square inch (psi), a radiant heat/exposure time of 5kw/square meter, or the lower flammability limit. USEPA chose this endpoint as the threshold for potential serious injuries to people as a result of property damage caused by an explosion such as injuries from flying glass from shattered windows or falling debris from damaged houses.

Wind Speed/Atmospheric Stability
For worst-case analysis use a wind speed of 1.5 meters per second and an F atmospheric stability class unless you can demonstrate that local meteorological data applicable to the site show a higher minimum wind speed or less stable atmosphere at all times during the previous three years.

Ambient Temperature/Humidity
For worst-case analysis of regulated toxic substances use the highest daily maximum temperature in the previous three years and average humidity for the site, based on temperature/humidity data gathered at the stationary source or at a local meteorological station. If you use 25°C and 50% humidity as values for these variable if you are using the USEPA's RMP Offsite Consequence Analysis Guidance or RMP Comp as your air model.

Height of Release
For worst-case analysis of regulated toxic substances assume a ground level (0 feet) release.

Surface Roughness (Topography)
For worst-case analysis use either urban or rural topography, as appropriate. Urban means that there are many obstacles in the immediate area and the terrain is generally flat and unobstructed. Rural means there are no buildings in the immediate area and the terrain is generally flat and unobstructed.

Dense or Neutrally Buoyant Gases
For worst-case analysis tables or models used for dispersion of regulated toxic substances must appropriately account for gas density.

Temperature of the Released Substance
For worst-case analysis consider liquids (other than gases liquefied by refrigeration) to be released at the highest daily maximum temperature, based on data for the previous three years, or at process temperature, whichever is higher. Assume gases liquefied by refrigeration at atmospheric pressure are released at their boiling points.

D. Alternative Release Scenario Analysis

1. Selecting Alternative Release Scenarios

You are required to analyze at least one alternative release scenario for each listed regulated toxic substance you have in a **Program 2** or **Program 3** process above its threshold quantity. You are also required to analyze one alternative release scenario to represent all regulated flammable substances covered in your Program 2 or Program 3 processes. You do not need to analyze an alternative release scenario for each regulated flammable substance. For example, if you have five regulated substances – ammonia, chlorine, hydrogen chloride, acetylene, and propane – above the threshold quantity in either Program 2 or Program 3 processes, you will need to analyze one alternative scenario each for ammonia, chlorine, and hydrogen chloride; and a single alternative scenario to cover both acetylene and propane.

For alternative release scenarios, you are allowed to consider active mitigation systems, such as scrubber systems, shutdown systems, pressure relieving devices, emergency isolation systems, fire sprinklers, and deluge systems, as well as passive mitigation systems.

Alternative Release Scenarios for Regulated Toxic Substances
Alternative release scenarios for regulated toxic substances should be those that will reach an endpoint offsite, unless no such scenario exists. Those releases that have the potential to reach the public are of the greatest concern.

You should consider the following when selecting an alternative release scenario:

- You may use your worst-case release scenario and apply your active mitigation system to limit the quantity released and the duration of the release.
- You may use information from your *process hazard analysis.
- You may use an actual event based on your five-year accident history review.
- You may use an actual event based on industry accident history as it relates to your process.

*If you use information for your process hazard analysis to select your alternative scenario, you should at a minimum consider the following: (a) transfer hose releases due to splits or sudden hose uncoupling; (b) process piping releases from failures at flanges, joints, welds, valves, and valve seals, and drains or bleeds; (c) process vessel or pump releases due to cracks, seal failure, or drain, bleed, or plug failure; (d) vessel overfilling and spill, or over pressurization an venting through relief valves or rupture disks; and (e) shipping containers mishandling and breakage or puncturing leading to a spill. In addition, if you use your process hazard analysis to select an alternative scenario, you must justify your choice either qualitatively or quantitatively.

Alternative Scenarios for Regulated Flammable Substances
Alternative release scenarios for regulated flammable substances are somewhat more complicated than those release scenarios for regulated toxic substances because the consequences of a release and the endpoint of concern may vary. For the worst-case, the consequence of concern is a vapor cloud explosion, with an overpressure endpoint. For alternative scenarios (e.g., fires), other endpoints (e.g., heat radiation) may need to be considered. Possible scenarios to consider that would involve regulated flammable substances include:

- Vapor cloud fires (flash fires) resulting from dispersion of a cloud of flammable vapor and ignition of the cloud following dispersion. Such a fire could flash back and could represent a severe heat radiation hazard to anyone in the area of the cloud.
- A pool fire, with potential radiant heat effects, resulting from a spill of a flammable liquid.
- A boiling liquid, expanding vapor explosion (BLEVE), leading to a fireball that may produce intense heat and may occur if a vessel containing a flammable material ruptures explosively as a result of exposure to fire. Heat radiation from the fireball is the primary hazard; vessel fragments and overpressure from the explosion also can result. BLEVEs are generally considered unlikely events.

2. Release Rates for Alternative Scenarios

Refer to USEPA's "RMP Offsite Consequence Analysis Guidance" to determine appropriate release rates.

3. Required Parameters for Modeling an Alternative Scenario Endpoints

Toxic
The toxic endpoints used in a worst-case analysis shall be taken from the most current Tables listed in Section 2770.5 of Title 19 CCR.

Flammables
The flammable endpoint to be used in an alternative analysis varies according to the scenarios studied and may be one of the following: (a) an overpressure of 1 pound per square inch (psi); (b) a radiant heat level of 5 kilowatts per square meter (kW/m^2) for 40 seconds for heat from fires (or equivalent dose); or (c) lower flammability limit (LFL) as specified in NFPA documents or other generally recognized sources.

Wind Speed/Atmospheric Stability
For site-specific modeling, use typical meteorological conditions for your site. If you use USEPA's *"RMP Offsite Consequence Analysis Guidance"* you may assume wind speed of 3 meters per second and a D atmospheric stability class.

Ambient Temperature/Humidity
For site-specific modeling, use average temperature/humidity data gathered at the site or at a local meteorological station. Assume 25°C and 50% humidity as values if you are using the USEPA's *"RMP Offsite Consequence Analysis Guidance"* as your air model.

Height of Release
Release height may be determined by the release scenario or by assuming ground level.

Surface Roughness (Topography)
Use either urban or rural topography, as appropriate. Urban means that there are many obstacles in the immediate area and the terrain is generally flat and unobstructed. Rural means there are no buildings in the immediate area and the terrain is generally flat and unobstructed.

Dense or Neutrally Buoyant Gases
Tables or models used for dispersion of regulated toxic substances must appropriately account for gas density. Most computer models automatically take this into account.

Temperature of the Released Substance
Substances may be considered to be released at a process or ambient temperature that is appropriate to the scenario. If you are using the USEPA's *"RMP Offsite Consequence Analysis Guidance"* as your air model 25°C or the boiling point of the released substance may be used.

E. Defining Offsite Impacts to the Population/Environment

For each release scenario, estimate the population within a circle (zone of vulnerability) with its center at the point of the release and a radius determined by the distance to the endpoint. Population shall include residential population. To estimate the population potentially affected, use the most recent Census data or other more accurate information if it is available. Population data shall be estimated to two significant digits.

Include also within the zone of vulnerability the presence of any schools, hospitals, long-term health care facilities, child day care facilities, and prisons. Also identify and list any environmental receptors, parks and recreational areas, major commercial, office, and

industrial buildings. Environmental receptors can be determined from local United States Geological Survey (USGS) maps.

F. Offsite Consequence Analysis Technical Document

The following records shall be maintained on the offsite consequence analyses in a Technical Document. This Technical Document will be subject to submittal upon HMD's request and/or by onsite auditing by HMD:

1. Include a table of contents.

2. Place divider tabs between sections of the OCA.

3. For the worst-case scenarios, describe the vessel or pipeline and substance selected as worst-case, assumptions and parameters used, and the rationale for selection. Assumptions should include any passive mitigation that was assumed to limit the quantity that could be released.

4. For the alternative release scenarios, describe the scenarios identified, assumptions and parameters used, and the rationale for the selection of specific scenarios. Assumptions shall include use of any active and passive mitigation that was assumed to limit the quantity that could be released

5. Include the same information required in the RMP Public Document in this section.

6. If using a computer air model, include the computer-generated runs of the scenario(s). Be prepared to provide a copy of the air modeling software if not using the available USEPA RMP Comp or ALOHA.

II. PREVENTION PROGRAM 2

Most Program 2 processes are likely to be relatively simple and may be located at small businesses. EPA developed the Program 2 prevention program by identifying the basic elements that are the foundation of sound prevention practices - safety information, hazard review, operating procedures, training, maintenance, compliance audits, and accident investigation. As important as each of the elements is, you will not gain the full benefit from them unless you integrate them into a risk management system that you implement on an on-going basis. For example, the hazard review must be built on the safety information; the results of the hazard review should be used to revise and update operating and maintenance procedures. Workers must be trained in these procedures and must use them every day.

There are seven elements in the Program 2 prevention program found in Article 5 of Title 19 CCR.

SUMMARY OF PROGRAM 2 PREVENTION PROGRAM

Subpart C of Title 19	Section Title
Section 2755.1	Safety Information
Section 2755.2	Hazard Review
Section 2755.3	Operating Procedures
Section 2755.4	Training
Section 2755.5	Maintenance
Section 2755.6	Compliance Audits
Section 2755.7	Incident Investigation

You must integrate these seven elements into a risk management program that you and your employees implement on a daily basis. Understanding and managing risks must become part of the way you operate. Doing so will provide benefits beyond accident prevention as well. Preventive maintenance and routine inspections will lessen the number of equipment failures and down time; well trained workers, aware of optimum operating parameters, will allow you to gain the most efficient use of your substances.

A. Safety Information

You must compile and maintain safety information related to the regulated substances and process equipment for each Program 2 process. You probably have much of this information already, because you would have developed it to comply with OSHA or other rules. EPA has limited the information to what is likely to apply to the processes covered under the Program 2 program.

SAFETY INFORMATION REQUIREMENTS

Information you must compile and maintain:	You must ensure:	You must update the safety information if:
✓ Safety Data Sheets ✓ Maximum intended inventory ✓ Safe upper and lower parameters ✓ Equipment specifications ✓ Codes & standards used to design, build, and operate the process.	✓ That the process is designed in compliance with recognized codes and standards	✓ There is a major change at your business that makes the safety information inaccurate

After you have documented your safety information, you should double-check it to be sure that the files you have reflect the equipment you are currently using. It is important to keep this information up to date. Whenever you replace equipment, be sure that you put the new equipment specifications in the file and consider whether any of your other prevention elements need to be reviewed to reflect the new equipment.

B. Hazard Review

You do not have to perform a full Process Hazard Analysis for a Program 2 process, but you must conduct a hazard review. The hazard review will help you determine whether you're meeting applicable codes and standards, identify and evaluate the types of potential failures, and focus your emergency response planning efforts. The hazard review is key to understanding your operation and continuing to operate safely. You must identify and review specific hazards and safeguards of your Program 2 processes. The HMD requires at a minimum a "What-If" hazard evaluation as the hazard review methodology for Program 2 processes.

HAZARD REVIEW REQUIREMENTS

Conduct a review & identify…	Use a guide for conducting the review	Document results & resolve problems	Update your hazard review
✓ The hazards associated with the Program 2 process & regulated substances. ✓ Opportunities for equipment malfunction or human error that could cause a release. ✓ Safeguards that will control the hazards or prevent the malfunction or error. ✓ Steps to detect or monitor releases.	✓ You may use any what-if/checklist (such as you might in a model risk management program) to conduct the review. ✓ For a process designed to industry standards like NFPA-58 or Federal/state design rules, check the equipment to make sure that it's fabricated, installed and operated properly.	✓ Your hazard review must be documented and you must show that you have addressed problems.	✓ You must update your review at least once every five years or whenever there is a major change in the process. ✓ You must resolve problems identified in the new review before you startup the changed process.

Record the Results
The team scribe should record the results during the "What-If" Hazard Evaluation process. An example of the recording format is attached in **Appendix**.

"What-If" Hazard Evaluation Document
The Hazard Evaluation Document **shall include the following:**

- Include a table of contents.
- Place dividers and tabs between the sections of the "What-If" Hazard Evaluation document
- Describe the regulated substance process(es) studied including a review of the chemistry and chemical reactions that take place in the system.
- Provide a copy of the process flow diagram and color code regulated substance lines.

- List the individual pieces of equipment (e.g., pumps, reactors, heat exchangers) and piping that were studied.
- Provide a copy of the "What-If" questions used in the evaluation.
- Provide copies of the "What-If" session worksheets.
- Include a table of the individuals involved in the "What-If" Hazard Evaluation and the role of each individual.
- Include a table of all the procedures reviewed during the "What-If" Hazard Evaluation.
- Include a table of all the documents reviewed during the "What-If" Hazard Evaluation.
- Define the extent of on-site interviewing of operators used to estimate human/operator error probabilities.
- Describe the database or sources used to estimate equipment failure.
- Provide a table of all the recommendations from the "What-If" Hazard Evaluation by individual equipment according to process flow and in order of priority. Separate the recommendations that will be addressed from those that will not be addressed. For all recommendations that will not be addressed explain why they will not be addressed.
- Provide a table of references used in the hazard analysis.

C. Operating Procedures

You must prepare written operating procedures that give workers clear instruction for safely conducting activities involving a covered process. You may use standardized procedures developed by industry groups or provided in model risk management programs as the basis for your operating procedures, but be sure to check that these standard procedures are appropriate for your activities. If necessary, you must update your Program 2 operating procedures whenever there is a major change and before you start up the changed process. The following table briefly summarizes what your operating procedures must address**.**

OPERATING PROCEDURES REQUIREMENTS

Steps for each operating phase	Operating limits
✓ Initial startup ✓ Normal operations ✓ Temporary operations ✓ Emergency shutdown ✓ Emergency operations ✓ Normal shutdown ✓ Startup following a normal or emergency shutdown or a major change	✓ Consequences of deviating ✓ Steps to avoid, correct deviations

You must update your procedures whenever you change your process in a way that alters the steps needed to operate safely. If you add new equipment, you will need to expand your procedures or develop a separate set to cover the new items. Whenever you change your

safety information you should review your procedures to be sure that they are still appropriate. Anytime you conduct a hazard review, check your operating procedures as you implement changes to address hazards.

What Kind of Documentation Must I Keep?
You must maintain your current set of operating procedures. You are not required to keep old versions; in fact, you should avoid doing so because keeping copies of outdated procedures may cause confusion. You should date all procedures so you will know when they were last updated.

D. Training

Training programs often provide immediate benefits because trained workers have fewer accidents, damage less equipment, and improve operational efficiency. Training gives workers the information they need to understand how to operate safely and why safe operations are necessary. A training program, including refresher training, is the key to ensuring that the rest of your prevention program is effective. You already have some type of training program because you must conduct training to comply with OSHA's Hazard Communication standard (29 CFR 1910.1200).

The following lists things that you may find useful in developing your training program.

- **Who needs training?** Clearly identify the employees who need to be trained and the subjects to be covered.
- **What are the objectives?** Specify learning objectives, and write them in clear, measurable terms before training begins. Remember that training must address the process operating procedures.
- **How will you meet the training objectives?** Tailor the specific training modules or segments to the training objectives. Enhance learning by including hands-on training like using simulators whenever appropriate. Make the training environment as much like the working environment as you can, consistent with safety. Allow your employees to practice their skills and demonstrate what they know.
- **Is your training program working?** Evaluate your training program periodically to see if your employees have the skills and know the routines required under your operating procedures. Make sure that language or presentations are not barriers to learning. Decide how you will measure your employee's competence.
- **How will you program work for new hires and refresher training?** Make sure all workers - including maintenance and contract employees - receive initial and refresher training. If you make changes to process chemicals, equipment, and technology, make sure that involved workers understand the changes and the effects on their job.

What Kind of Documentation Must I Keep?
You should keep documentation of your training program. An attendance log for any formal training courses and refresher training is required to ensure that everyone who needs to be trained is trained. Such logs will help you when you do a compliance audit.

E. Maintenance/Mechanical Integrity

You must prepare and implement procedures for maintaining the mechanical integrity of process equipment, and train your workers in the maintenance procedures. You may use procedures or instructions from equipment vendors, in Federal or State regulations, or in industry codes as the basis of your maintenance program. You should develop a schedule for inspecting and testing your equipment based on manufacturers' recommendations or your own experience. The following is a summary of the elements of a maintenance program:

Written procedures	Training	Inspection & testing
✓ You may use someone else's procedures as the basis for your program. If you choose to develop your own, you must write them down.	✓ Train process maintenance employees in process hazards and how to avoid or correct an unsafe condition. ✓ Make sure this training covers the procedures applicable to safe job performance.	✓ Inspect & test process equipment ✓ Use recognized and generally accepted good engineering practices ✓ Follow a schedule that matches the manufacturer's recommendations or that prior operating experience indicates is necessary.

What Kind of Documentation Must I Keep?
You must keep your written procedures and schedules as well as any agreements you have with contractors. You are should also keep training logs or maintenance logs. Without some record, you will have to rely on workers' memories about when something was last checked. As workers leave or change jobs at your company, it can be difficult to keep track of when inspections and tests were done. Maintaining a record of when something was last done or is scheduled to be done next can help keep your program working smoothly.

F. Compliance Audits

At least every three years, you must certify that you have evaluated compliance with the requirements for the prevention program for each covered process. At least one person on your audit team must be knowledgeable about the covered process. You must develop a report of your findings, determine and document an appropriate response to each finding, and document that you have corrected any deficiency.

What Kind of Documentation Must I Keep?
You must keep a written record of the findings and actions for five years. You may also want to keep a record of who conducted the audit, but you are not required to do this.

G. Incident Investigation

You must investigate each incident which resulted in, or could have resulted in a "catastrophic release' of a regulated substance." A catastrophic release is one that presents an imminent and substantial endangerment to public health and the environment. The following table briefly summarizes the steps you must take for investigating incidents. You should also consider investigating minor accidents or near misses because they may help you identify problems that could lead to more serious accidents.

INCIDENT INVESTIGATION REQUIREMENTS

✓ Initiate an investigation promptly.	Begin investigating no later than 48 hours following the incident.
✓ Summarize the investigation in a report.	Among other things, this report will include the factors contributing to the incident. Remember that identifying the root cause may be more important than identifying the initiating event. Remember, also, that the purpose of the report is to help management take corrective action.
✓ Address the team's findings and recommendations	Establish a system to address the incident report findings and recommendations and document resolutions and corrective actions.
✓ Review the report with your staff and contractors	You must share the report - its findings and recommendations - with affected workers whose job tasks are relevant to the incident.
✓ Retain the report.	Keep incident investigation summaries for five years.

What Kind of Documentation Must I Keep:
You must maintain the summary of the accident, recommendations, and actions. A sample is in the **Appendices**. Note that the form also includes accident data that you will need for the five-year accident history. These data are not necessarily part of the incident investigation report, but including them will create a record you can use later to create the accident history.

III. PREVENTION PROGRAM 3

If you already have the OSHA Process Safety Management (PSM) program in place you will need to do little that is new to comply with the Program 3 prevention program. Whether you're building on to the PSM standard or creating a new program, keep these things in mind.

- CalARP and OSHA have different authority. If you are already complying with the PSM standard, your Process Hazard Analysis (PHA) team may have to assess new hazards that could affect the public or the environment offsite. Protection measures that are suitable for workers may be the very kind of thing that imperils the public.
- Integrate the elements of your prevention program. You must ensure that a change in any single element of your program leads to a review of other elements to identify any effect caused by the change.
- Most important, make accident prevention an institution at your site. Like the entire risk management program, a prevention program is more than a collection of written documents. It is a way to make safe operations and accident prevention the way you do business every day.

There are twelve elements in the Program 3 prevention program. Two OSHA elements are not included. Emergency Response is addressed separately in CalARP; the OSHA Trade Secrets requirement (provision of trade secret information to employees) is beyond the CalARP statutory authority.

SUMMARY OF PROGRAM 3 PREVENTION PROGRAM

Section	Title	OSHA PSM Reference
Section 2760.1	Process Safety Information	PSM Standard Section 1910.119(d)
Section 2760.2	Process Hazard Analysis (PHA)	PSM Standard Section 1910.119(e)
Section 2760.3	Operating Procedures	PSM Standard Section 1910.119(f)
Section 2760.4	Training	PSM Standard Section 1910.119(g)
Section 2760.5	Mechanical Integrity	PSM Standard Section 1910.119(j)
Section 2760.6	Management of Change	PSM Standard Section 1910.119(l)
Section 2760.7	Pre-Startup Review	PSM Standard Section 1910.119(i)
Section 2760.8	Compliance Audits	PSM Standard Section 1910.119(o)
Section 2760.9	Incident Investigation	PSM Standard Section 1910.119(m)
Section 2760.10	Employee Participation	PSM Standard Section 1910.119(c)
Section 2760.11	Hot Work Permits	PSM Standard Section 1910.119(k)
Section 2760.12	Contractors	PSM Standard Section 1910.119(h)

A. Process Safety Information

The following table summarizes the safety information requirements.

PROCESS SAFETY INFORMATION

For chemicals, you must complete information on:	For process technology, you must provide:	For equipment in the process, you must include:
✓ Toxicity ✓ Permissible exposure limits ✓ Physical data ✓ Reactivity ✓ Corrosivity ✓ Thermal & chemical stability ✓ Hazardous effects you can foresee if you mixed materials together accidentally	✓ A block diagram or simplified process flow diagram ✓ Information on process chemistry ✓ Maximum intended inventory of the CalARP-regulated chemical ✓ Safe upper & lower limits for such items as temperature, pressure, flows, or composition ✓ An evaluation of the consequences of deviation	✓ Materials of construction ✓ Piping & instrumentation diagrams (P&IDs) ✓ Electrical classification ✓ Relief system design & design basis ✓ Ventilation system design ✓ Design codes & standards employed ✓ Safety systems

B. Process Hazard Analysis

A process hazard analysis (PHA), sometimes called a process hazard evaluation, is one of the most important elements of the process safety management program. A PHA is an organized and systematic effort to identify and analyze the significance of potential hazards associated with the processing or handling of highly hazardous chemicals. A PHA provides information that will assist employers and employees in making decisions for improving safety and reducing the consequences of unwanted or unplanned releases of hazardous chemicals.

A PHA is directed toward analyzing potential causes and consequences of fires, explosions, releases of toxic or flammable chemicals and major spills of hazardous chemicals. The PHA focuses on equipment, instrumentation, utilities, human actions (routine and non-routine), and external factors that might impact the process. These considerations assist in determining the hazards and potential failure points or failure modes in a process.

Selection of a PHA methodology

In San Diego County most facilities that conducted a PHA under the previous Risk Management and Prevention Program used either a What-If/Checklist method or Hazard and Operability Analysis (HAZOP). For more detailed information regarding these techniques refer to *"Guidelines for Hazard Evaluation Procedures, 2nd Ed*.", published by Center for Chemical Process Safety of the American Institute of Chemical Engineers.

Offsite impacts

You must consider offsite impacts when you conduct a PHA under CalARP. A well-done PHA should identify all failure scenarios that could lead to significant exposure of workers, the public, or the environment. The only issue that is likely to require consideration above what you have done already for the PSM standard is whether any protection measures that were adequate for worker safety are inadequate for public and environmental safety.

Consider two circumstances - one where PSM and the risk management program rule

should lead to the same result, and another where protecting workers could mean endangering the public and the environment. For flammables, any scenario that could affect the public almost certainly would have the potential to affect workers; measures taken to protect your employees likely will protect the public and the environment. On the other hand, for toxics under PSM, you may plan to address a loss of containment by venting toxic vapors to the outside air. In each circumstance, a PHA should define the failure sequence. However, for toxics, the PHA team must reassess venting as an appropriate mitigation measure.

Rejecting team recommendations

You may not always agree with your PHA team's recommendations and may wish to reject a recommendation. You may decline a team recommendation if you can document one of the following: (1) the analyses upon which the recommendations are based contain factual errors; (2) the recommendation is not necessary to protect the health of employees or contractors; (3) an alternative measure would provide a sufficient level of protection; or (4) the recommendation is infeasible.

Updating and revalidating your PHA

For CalARP, you must complete the initial PHA for each Program 3 process not later than June 21, 1999, and update it at least once every five years. You may complete an initial PHA before that date. You may use an OSHA PHA as your initial PHA, and update and revalidate it every five years on the OSHA schedule.

Revising your PHA

You should revise your PHA whenever there is a new hazard or risk created by changes to your process. Such changes might include introducing a new process, process equipment, or regulated substance; altering process chemistry that results in any change to safe operating limits; or other alteration that introduces a new hazard. However, EPA recommends that you consider revising your PHA whenever adjoining processes create a hazard. Remember that you have a general duty to prevent accidents and ensure safety at your source, which may require you to take steps beyond those explicitly, specified in the risk management program rule.

C. Operating Procedures

You must prepare written operating procedures that give workers clear instruction for safely conducting activities involving a covered process. You may use standardized procedures developed by industry groups or provided in model risk management programs as the basis for your operating procedures, but be sure to check that these standard procedures are appropriate for your activities. If necessary, you must update your Program 3 operating procedures whenever there is a major change and before you startup the changed process. The following table briefly summarizes what your operating procedures must address:

OPERATING PROCEDURES REQUIREMENTS

Steps for each operating phase	Operating limits	Safety & health considerations	Safety systems & their functions
✓ Initial start-up ✓ Normal operations ✓ Temporary operations ✓ Emergency shutdown ✓ Normal shutdown ✓ Start-up following a turnaround or emergency shutdown	✓ Consequences of deviating ✓ Steps to avoid, correct deviations	✓ Chemical properties & hazards ✓ Precautions for preventing chemical exposure ✓ Control measures for exposure ✓ QC for raw materials and chemical inventory ✓ Special or unique hazards	✓ Address whatever is applicable

Required updates Update the procedures whenever you change your process in a way that alters the steps needed to operate safely. If you add new equipment, you will need to expand your procedures or develop a separate set to cover the new items. Whenever you change your safety information you should review your procedures to be sure that they are still appropriate. Anytime you conduct a hazard review, check your operating procedures as you implement changes to address hazards.

What documents must be kept?
Maintain the current set of operating procedures. You are not required to keep old versions; in fact, you should avoid doing so because keeping copies of outdated procedures may cause confusion. You should date all procedures so you will know when they were last updated. Assure that operating procedures are certified annually by an appropriate person.

D. Training

Training programs often provide immediate benefits because trained workers have fewer accidents, damage less equipment, and improve operational efficiency. Training gives workers the information they need to understand how to operate safely and why safe operations are necessary. A training program, including refresher training, is the key to ensuring that the rest of your prevention program is effective.

The following lists things that you may find useful in developing your training program:

- **Who needs training?** Clearly identify the employees who need to be trained and the subjects to be covered.
- **What are the objectives?** Specify learning objectives, and write them in clear, measurable terms before training begins. Remember that training must address the process operating procedures.
- **How will you meet the training objectives?** Tailor the specific training modules or segments to the training objectives. Enhance learning by including hands-on training like using simulators whenever appropriate. Make the training environment as much like the working environment as you can, consistent with safety. Allow your employees to practice their skills and demonstrate what they know.
- **Is your training program working?** Evaluate your training program periodically to see if your employees have the skills and know the routines required under your operating procedures. Make sure that language or presentations are not barriers to learning. Decide how you will measure your employee's competence.

- **How will you program work for new hires and refresher training?** Make sure all workers - including maintenance and contract employees - receive initial and refresher training. If you make changes to process chemicals, equipment, and technology, make sure that involved workers understand the changes and the effects on their job. Careful consideration must be given to assure that employees including maintenance and contract employees receive current and updated training.

What Kind of Documentation Must I Keep?
You should keep documentation of your training program. An attendance log for any formal training courses and refresher training is required to ensure that everyone who needs to be trained is trained. Such logs will help you when you do a compliance audit.

E. Mechanical Integrity

You must have a mechanical integrity program for pressure vessels and storage tanks, piping systems, relief and vent systems and devices, emergency shutdown systems, controls, and pumps. The following table summarizes other requirements of a mechanical integrity program.

MECHANICAL INTEGRITY

Written procedures	Training	Inspection & testing	Equipment deficiencies	Quality assurance
✓ Establish & implement written procedures to maintain the integrity of process equipment	✓ Train process maintenance employees in an overview of the process and its hazards. ✓ Make sure this training covers the procedures applicable to safe job performance	✓ Inspect & test process equipment ✓ Use recognized and generally accepted good engineering practices ✓ Follow a schedule that matches the manufacturer's recommendations or that prior operating experience indicates is necessary ✓ Document each inspection & test	✓ Correct equipment deficiencies before further uses of process equipment or whenever necessary to ensure safety	✓ Establish a QA program for new construction & equipment, newly installed equipment, maintenance materials, and spare parts & equipment

What Kind of Documentation Must I Keep?
You must keep your written procedures and schedules as well as any agreements you have with contractors. You are should also keep training logs, inspection & testing logs, and maintenance logs. Without some record, you will have to rely on workers' memories about when something was last checked. As workers leave or change jobs at your company, it can be difficult to keep track of when inspections and tests were done. Maintaining a record of when something was last done or is scheduled to be done next can help keep your program working smoothly.

F. Management of Change

The following table summarizes the Management of Change requirements:

MANAGEMENT OF CHANGE (MOC) REQUIREMENTS

MOC procedures must address:	Employees affected by the change must:	Update process safety information if:	Update operating procedures if:
✓ Technical basis for the change ✓ Impact on safety and health ✓ Modifications to operating procedures ✓ Necessary time period for the change	✓ Be informed of the change before startup ✓ Trained in the change before startup	✓ A change covered by MOC procedures result in a change in any PSI required under EPA's rule	✓ A change covered by MOC procedures results in a change in any operating procedure required under EPA's rule

To properly manage changes to process chemicals, technology, equipment and facilities, one must define what is meant by change. In this process safety management standard, change includes all modifications to equipment, procedures, raw materials and processing conditions other than "replacement in kind." Copies of process changes need to be kept in an accessible location to ensure that design changes are available to operating personnel as well as to PHA team members when a PHA is being done or one is being updated.

G. Pre-Startup Review

You must conduct a pre-startup review before you introduce a regulated substance into a process. The following table lists items you must address.

PRE-STARTUP REVIEW REQUIREMENTS

Design Specifications	Adequate Procedures	Training
✓ Confirm that new or modified construction and equipment meet design specifications	✓ Ensure that procedures for safety, operating, maintenance, and emergencies are adequate and in place	✓ Confirm that each employee involved in the process has been trained completely

New Processes

The initial startup procedures and normal operating procedures need to be fully evaluated as part of the pre-startup review to assure a safe transfer into the normal operating mode for meeting the process parameters.

Existing Processes

For existing processes that have been shut down for turnaround, or modification, etc., the employer must assure that any changes other than "replacement in kind" made to the process during shutdown go through the management of change procedures. Update P&IDS, operating procedures and instructions as necessary. If the changes made to the process during shutdown are significant and impact the training program, then operating personnel as well as employees engaged in routine and non-routine work in the process area may need some refresher or additional training in light of the changes. Any incident investigation recommendations, compliance audits or PHA recommendations need to be reviewed as well to see what impacts they may have on the process before beginning the startup.

F. Compliance Audits

At least every three years, you must certify that you have evaluated compliance with the requirements for the prevention program for each covered process. At least one person on your audit team must be knowledgeable about the covered process. You must develop a report of your findings, determine and document an appropriate response to each finding, and document that you have corrected any deficiency.

What Kind of Documentation Must I Keep?
You must keep a written record of the findings and actions for five years. You may also want to keep a record of who conducted the audit, but you are not required to do this.

G. Incident Investigation

You must investigate each incident that resulted in, or could have resulted in a "catastrophic release of a regulated substance." A catastrophic release is one that presents an imminent and substantial endangerment to public health and the environment. Although the CalARP requires you to investigate only those incidents that resulted in, or could reasonably have resulted in a catastrophic release, you are encouraged to investigate all accidental releases. Investigating minor accidents or near misses can help you identify problems that could result in major releases if not addressed.

The following is a summary of the steps you must take for investigating an incident:

- Initiate the investigation promptly. Begin investigating no later than 48 hours following the incident.
- Establish a knowledgeable investigation team. Establish an investigation team to gather the facts, analyze the event, and develop the “how” and “why” of what went wrong. At least one team member must have knowledge of the process. Consider adding other workers familiar with the process to the incident team. Their additional knowledge will assist in the fullest insight into the incident.
- Summarize the investigation in report. Among other things, this report will include the factors contributing to the incident. Remember that identifying the root cause may be more important than identifying the initiating event. Also, remember that the purpose of the report is to help management take corrective action.
- Address the team’s findings and recommendations. Establish a system to address the incident report findings and recommendations and document resolutions and corrective actions.
- Review the report with your staff and contractors. You must share the report –its findings and recommendations- with affected workers whose job tasks are relevant to the incident.
- Retain the report. Keep incident investigation reports for five years.

H. Employee Participation

Section 2760.10 in Title 19 of the California Code of Regulations states that employers are to consult with their employees and their representatives regarding the employers efforts in the development and implementation of the process safety management program elements and hazard assessments. Many employers, under their safety and health programs, have already established means and methods to keep employees and their representatives informed about relevant safety and health issues and employers may be able to adapt these practices and procedures to meet their obligations under this section. Employers who have not implemented an occupational safety and health program may wish to form a safety and health committee of

employees and management representatives to help the employer meet the obligations specified by this standard. This committee can become a significant ally in helping the employer to implement and maintain an effective process safety management program for all employees.

The following is a summary of what you must do:

- Write a plan. Develop a written plan of action regarding how you will implement employee participation.
- Consult with employees. Consult your employees and their representatives regarding conducting and developing PHAs and other elements of process safety management and the risk management program.
- Provide access to information. Ensure that your employees and their representatives have access to PHAs and all other information required under the CalARP.

I. Hot Work Permits

Non-routine work that is conducted in process areas needs to be controlled by the employer in a consistent manner. The hazards identified involving the work that is to be accomplished must be communicated to those doing the work, but also to those operating personnel whose work could affect the safety of the process. A work authorization notice or permit must have a procedure that describes the steps the maintenance supervisor, contractor representative or other person needs to follow to obtain the necessary clearance to get the job started. The work authorization procedures need to reference and coordinate, as applicable, lockout/tag out procedures, line breaking procedures, confined space entry procedures and hot work authorizations. This procedure also needs to provide clear steps to follow once the job is completed. These steps must provide closure for those that need to know the job is now completed and equipment can be returned too normal.

The following summarizes how to meet the hot work permit requirements:

Issue a hot work permit. You must issue this permit for hot work conducted on or near a covered process

- ♦ Implement fire prevention and protection. You must ensure that the fire prevention and protection requirements in 8 CCR 5189 are implemented before the hot work begins. The permit must document this.
- ♦ Indicate the appropriate dates. The permit should indicate the dates authorized for hot work.

Identify the work. The permit must identify the object on which hot work is to be performed.

- ♦ Maintain the permit on file. You must keep the permit on file until workers have completed the hot work operations

J. Contractors

Employers, who use contractors to perform work in and around processes that involve highly hazardous chemicals, will need to establish a screening process so that they hire and use contractors who accomplish the desired job tasks without compromising the safety and health of employees at a facility. For contractors, whose safety performance on the job is not known to the hiring employer, the employer will need to obtain information on injury and illness rates and experience and should obtain contractor references. Additionally, the employer must assure that the contractor has the appropriate job skills, knowledge and certifications (such as for pressure vessel welders). Contractor work methods and experiences should be evaluated.

Contract employees must perform their work safely. Considering that contractors often perform very specialized and potentially hazardous tasks such as confined space entry activities and non-routine repair activities it is quite important that their activities be controlled while they are working on or near a covered process. A permit system or work authorization system for these activities would also be helpful to all affected employers. The use of a work authorization system keeps an employer informed of contract employee activities, and as a benefit the employer will have better coordination and more management control over the work being performed in the process area. A well run and well maintained process where employee safety is fully recognized will benefit all of those who work in the facility whether they be contract employees or employees of the owner.

The HMD has no authority to require that you maintain an occupational injury and illness log for contract employees. Be aware, however, that OSHA does have this authority, and that the PSM standard does set this requirement.

The following table summarizes both yours and the contractors' responsibilities:

You must:	Your contractor must:
✓ **Check safety performance.** You must evaluate the safety performance of the contractor ✓ **Provide safety and hazard information.** You must inform the contractor of potential fire, explosion or toxic release hazards; and of your emergency response activities as they relate to the contractor's work and the process. ✓ **Ensure safe practices.** You must assure that you have safe work practices such as controlling the entrance, presence, and exit of contract employees in covered process areas. ✓ **Verify that the contractor acts responsibly.** You must verify that the contractor is fulfilling its responsibility to provide appropriate health, safety, and craft training.	✓ **Ensure training for its employees.** The contractor must train and supervise contract employees to ensure that they perform their jobs safely and in accordance with your source's safety procedures. ✓ **Ensure its employees know process hazards and applicable emergency actions.** The contractor must assure that contract employees are aware of hazards and emergency procedures relating to the employees' work ✓ **Document training.** The contractor must prepare a record documenting and verifying adequate employee training. ✓ **Inform you of hazards.** The contractor must tell you of any unique hazards presented by its work or of any hazards it finds during performance.

IV. EXTERNAL EVENTS

For Program 2 and Program 3 processes you must evaluate as part of your Process Hazardous Analysis (PHA) or Hazard Review any potential natural or human caused external events. At a minimum a seismic analysis must be performed. The following are guidelines to use when conducting a seismic analysis.

A. Seismic Analysis General Requirements

The primary purpose of a seismic analysis is to determine types of regulated substance (RS) releases that might occur due to an earthquake. These guidelines have been developed for businesses that have a relatively simple process. In general, the approach toward seismic analysis should be qualitative unless findings indicate the need for further evaluation by an experienced structural engineer.

The evaluation should be geared towards finding, evaluating, and, if necessary, strengthening governing elements in the process system. Emphasis should be placed on pipes and hoses. Visually inspect the piping system of concern to evaluate flexibility, support, and guide adequate reinforcement. Many of the failures can be traced to one of the following causes:

- Lack of flexibility between piping anchor points. In earthquakes, vessel and piping anchor points can grossly displace relative to each other.
- Branch lines do not have adequate flexibility to accommodate seismic movement of the main line.
- Lack of adequate piping guides or lateral restraints allows a pipe to slide off its supports.
- Lack of reinforcement between branch lines and the main header.

B. Seismic Analysis Resource

The HMD recommends that facilities conducting a California Accidental Release Prevention Program (CalARP) refer to the Toxic Gas Releases in Earthquakes: Existing Programs, Sources, and Mitigation Strategies, Association of Bay Area Governments. This manual can be obtained at the following web page:
http://store.abag.ca.gov/earthquake.asp
The cost is about $25.

This manual can be used by your business to evaluate the potential of an earthquake to cause RS accidental releases and to assist you business in determining appropriate mitigation measures to prevent and/or minimize those potential RS accidental releases. The manual is divided into three sets of issue sheets, (1) Nonstructural Issue Sheets; (2) Emergency Issue Sheets; and (3) General Issue Sheets. An example of an issue sheet can be found in Appendix h 1-5. Because not all the issue sheets may be pertinent to your business, the HMD has developed an accompanying checklist to assist you in determining which issue sheets to review. This checklist is can be found in the Appendix. Complete the checklist and submit it to the HMD to receive the appropriate seismic issue sheets for your facility. The seismic issue sheets can then be used to conduct you RS Seismic Analysis.

Note: The HMD has also developed Seismic Walkdown Checklists that may also be used by more experienced engineers for conducting a qualitative seismic analysis of complex processes. **See Appendices.**

C. External Event Documentation

The following external event records shall be maintained in a Technical Document. This Technical Document will be subject to submittal upon HMD's request and/or onsite auditing by HMD:

1. Include a table of contents.

2. Place dividers and tabs between the sections of the document.

3. Describe the types of external events (other than a seismic analysis) that were evaluated and any potential RS releases that likely could occur; emergency mitigation systems and measures in place; and recommended mitigation or measures that will be implemented to reduce the likelihood of a release.

4. For the seismic analysis list:

    - Any buildings and structures that were evaluated.
    - All the nonstructural components (i.e., piping, tanks, etc.) that were evaluated.
    - Any potential RS releases.
    - The emergency mitigation systems and measures in place to prevent a RS release should an earthquake occur.
    - Any recommended mitigation systems or measures that will be implemented as a result of the seismic analysis.
    - List the edition of the Uniform Building Code that was used when the process was designed.

V. EMERGENCY RESPONSE PLANS

Responding agencies must prepare a written emergency response plan. This plan should explain how accidental releases are handled and actions to take during an external event that can affect a covered process or any other operations at a stationary source. The plan should be detailed enough to provide employees with the proper actions to take during an emergency but allow flexibility to respond in the most appropriate way. An emergency response plan must contain the following:

- Procedures for interfacing with the public and local emergency response agencies about accidental releases, emergency planning, and emergency response
- Documentation of proper first aid and emergency medical treatment necessary to treat accidental human exposures. This can be found in the Safety Data Sheet.
- Procedures for the use of emergency response equipment and for its inspection, testing, and maintenance
- Training for all employees in relevant aspects of the Incident Command System (ICS).
- Procedures to review and update, as appropriate, the emergency response plan to reflect changes at the stationary source and ensure that employees are informed of changes.

If you need any clarification on this guidance document or the CalARP Program, call the County of San Diego CalARP Program Manager at 858-505-6893.

A-1
Fee Policy

The County of San Diego Department of Environmental Health, Hazardous Materials Division (HMD):

Pursuant to County Ordinance 7797, Section 65.107 (h)(10), a business is charged an hour rate for all time involving consultation and Risk Management Plan (RMP) review. Businesses are billed quarterly or at a case closure, whichever comes first. Additionally hourly charges will be used to cover the costs incurred by the HMD in carrying out other elements of the California Accidental Release Prevention (CalARP) Program.

The HMD estimated the RMP review process to involve between 25 and 100 hours. The actual time involved will depend on the scope and complexity of the project. Submitting accurate, well written RMP documents following the guidance document will expedite the review process and consequently save the facility money.

After the RMP review is completed, Program Level I facilities are subject to an annual inspection fee along with the other HMD fees. Program Levels II and III are subject to a higher annual inspection fee.

California State Office of Emergency Services (OES) HMD will add the State OES CalARP service fee to each stationary source subject to the CalARP Program. Service fees are required by the State and collected by the Certified Unified Program Agencies (CUPAs) and submitted to the State OES. The HMD is the CUPA for San Diego County.

If you have questions concerning the Risk Management Program fee policy, contact the County of San Diego CalARP Program Manager at 858-505-6893.

A-2
Useful Web Links

Federal Industry RMP Guidance: A list of RMP guidance documents for specific businesses.
http://www2.epa.gov/rmp/guidance-facilities-risk-management-programs-rmp

RMP Submit link
http://www2.epa.gov/rmp/rmpesubmit

California RMP Guidance: California State guidance on the CalARP program.
http://www.caloes.ca.gov/HazardousMaterials/Pages/California-Accidental-Release-Prevention-(CalARP).aspx

Marplot Mapping. Free mapping software from the U.S. EPA.
http://www2.epa.gov/cameo/cameo-downloading-marplot

EPA RMP Comp Free software for calculating affected areas during release scenarios.
http://www2.epa.gov/rmp/rmpcomp

U.S. Census Bureau. Data for estimating populations.
http://www.census.gov/

A-3
Sample Incident Investigation

Anhydrous Ammonia Tank Release
Date: March 1, 2004 at 08:35
Substance: Anhydrous ammonia
Quantity: 350 lbs
Duration: 1 hour
Weather: Overcast, cool, approximately 55 degrees, light wind from the west at about 5 mph.
Description: During a delivery of anhydrou$ ammonia, the product delivery hose split and released ammonia. The delivery agent and all facility employees were away from the tank for at least 35 minutes when the release occurred. The ammonia pooled around the tank then evaporated. The ammonia spread throughout the outside of the facility and drifted to the adjacent lot, where outside workers at XXX Company were exposed to ammonia gas. The XYZ Company called 911 and sent an employee to investigate where the' ammonia was coming from and notified our business of the outside ammonia release. We immediately implemented our Emergency Response Plan. All ignition sources were shut off and we called 911 to notify emergency responders of the release. The Emergency Response Team was called and they began to prepare for a response. After determining that they could approach the truck from up wind and not be exposed to *over* 250 ppm as measured on a Drager colorimetric tube, our response team, wearing protective clothing and proper respiratory protection, shut off the delivery valve on the ammonia truck within 15 minutes. The County Hazardous Incident Response Team (HIRT) arrived and ordered our facility and XYZ Company to evacuate upwind of the ammonia spill while the remaining ammonia evaporated into the atmosphere.

1. **Findings:** After mitigating the release, we investigated the causes. A 2-inch delivery hose had burst during th~ delivery causing the release. Upon closer inspection the hose was old and deteriorated. The hose was not inspected prior to use. Also, no operators or employees from our company stayed with the truck during delivery. This allowed the release to continue for a longer period of time than if an attendant were present.
2. **Recommendations:** The delivery hose needs to be inspected and replaced at regular intervals to prevent future releases. Also, higher-pressure hoses are available and should be used. Operational procedures need to be changed so that the ammonia tank and delivery truck are never left unattended during ammonia deliveries. The Emergency Response Team should always be put on alert and secure their personal equipment when ammonia deliveries occur. Investigate installing an ammonia sensor near the ammonia tank.
3. **Actions:** Replace the damaged delivery hose with a higher-pressure hose. Assure that the hose is inspected before each weekly delivery. Have one member of the Emergency Response Team put the other members on alert before the delivery begins. Assign one member of the Team to be present during the entire delivery process. Conduct emergency response refresher training with all employees. Install an ammonia sensor to warn of any ammonia leaks near the ammonia tank by July 1, 2004.

A-4
Sample Audit Checklist For Safety Information

Element	Yes/No/NA	Action/Completion Date
SDSs up to date?		
Maximum Inventory determined?		
Determine		
• Safe upper and lower temperature for materials		
• Safe upper and lower pressures		
• Safe process flow rates		
• Compatible equipment with the materials used?		
Storage Tank specifications met?		
Pressure relief valves functioning?		
Emergency shut off valves present and working?		
Gauges working?		
Pumps working and serviced per manufacture's recommendations?		
Compressors serviced and functioning?		
Hoses inspected and in good repair?		
All equipment install to manufacturer's specifications and industry standards?		
Have inspections all been documented?		
Have inspections been conducted after each major change?		

A-5
Public Review

Federal Requirements

Stationary sources that are required to complete a Risk Management Plan (RMP) must submit their RMP to both the USEPA and the San Diego County Department of Environmental Health, Hazardous Materials Division (HMD).

NOTE: Stationary sources that only meet the State threshold planning quantities are not required to submit their RMP to the USEPA.

California State Requirements

California Health and Safety Code Section 25535.2 requires the HMD to make your RMP available to the public for review within 15 days after determining an initial RMP submittal to be complete. The public review comment period is for 45 days. Once an RMP is determined to be complete by the HMD, the stationary source must publish a five-day notice in a daily newspaper stating that the RMP Public Document is available for public review.

NOTE: Stationary Sources must contact the HMD prior to publishing a public notice to assure that all required information is provided in the notice.

All comments received by the HMD during the public comment period will be reviewed and considered prior to the HMD's final review of the RMP. The HMD will notify the stationary source of any deficiencies after the public review period. The stationary source will then have 30 days to correct any deficiencies noted by the HMD.

RMP Updates

When an RMP update is submitted to the HMD, the stationary source will be required to publish a one-day notice in a local newspaper with general circulation. A copy of this notice must be provided to the HMD. Again, the stationary source must contact the HMD prior to publishing the public notice to assure that all required information is provided in the notice.

A-6

PUBLIC DISCLOSURE DOCUMENT
RISK MANAGEMENT PLAN
XXXXXX COMPANY
XXXX RMP

RECORD OF REVISION

REVISION NUMBER	DATE OF CHANGE	DATE ENTERED	SIGNATURE OF PERSON ENTERING CHANGE

A-6

PUBLIC DISCLOSURE DOCUMENT
RISK MANAGEMENT PLAN
XXXXX **COMPANY**
XXXXX **RMP**

RECORD OF REVISION

To all holders of the XXXXX Company XXXXX Risk Management Plan Public Document:

Revision Number ---
Date __ _

Attached are revised pages of the Public Disclosure of the Risk Management Plan for the XXXXX of which you have a copy. Please remove the old pages in your copy and replace them with the following revisions:

OLD PAGE (Page No.)	REVISED PAGE (Page No.)
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

A-7

ISSUE SUMMARY: Seismic Assessment Above Ground Storage Tanks

Problem:

- Cylindrical tanks are vulnerable to several types of failure in earthquakes.
- Leaks can occur due to the failure of internal baffles.
- The top of the outside tank wall can be damaged by battering from the floating roof.
- "Elephant's foot" buckling failures at the base of tanks are caused by horizontal forces and can result in the complete loss of contents.
- Sliding is common for unanchored tanks. If there is enough flexibility in the connecting pipelines, such movement can occur without any loss of contents. However, attached pipelines often break. Even anchored tanks can move, but such movement is usually minor and rarely results in loss of contents.
- Corrosion at the base of tanks can also be a problem. In particular, "pitting corrosion" at the tank base, combined with earthquake forces, can cause the tanks to fail, losing their contents.
- Tank walls can be damaged due to inadequate detailing at connections with external pipes, valves and ladders, and due to improper welding.
- Finally, elevated tanks can topple if inadequately supported. Elevated tanks typically have more performance problems in earthquakes than ground-mounted structures.

Mitigation Options:

Increasing the thickness of tank walls at their base can be used to help prevent "elephant's foot" buckling. However, thick base walls can simply create buckling in the next higher tier of metal if that section is inadequate. Also, the upper sections of the walls can be thickened or otherwise strengthened to accommodate the forces caused by sloshing or the impact of the floating roof.

The factor of safety use in the design of tank walls containing hazardous materials is greater than for those containing water. In some instances, the safety factor for water systems may need to be increased, such as where water may be critical in an emergency or where excessive amounts of water spraying in an area could impede access to critical areas.

Tank/foundation connections should be carefully designed, particularly if associated piping is subject to failure if the tank moves. Often, the use of a larger number of smaller anchor bolts are preferable to fewer larger bolts. Additional coating can be used to help bond fiber-reinforced plastic tanks to their supports to prevent the rolling and shifting of the tank.

Particular attention should be paid to the detailing of connections with external pipes, valves and ladders, for these are frequently weak points. Welds should be inspected to make sure that weld quality and penetration are sufficient. A specific instance of concern is when piping attached to unanchored tank lacks flexibility, such as when it exits the tank and goes directly into the ground or through a wall.

Elevated tank supports can be inadequate because of the tendency to stop the leg at the tank base. Often, it is preferable to extend the support up the tank wall a foot or two and put a ring of additional material for added strength at the tank base. Adequate diagonal cross bracing should also be used on supports for these elevated tanks. If possible, such tanks should be redesigned to function without being elevated.

In addition, elevated tanks may be supported on reinforced concrete frame structures with no redundancy.· These structures may be substandard, especially in the ductile detailing of the connections, and pose a significant risk of catastrophic collapse in a -large earthquake. A qualified structural engineer should evaluate this type of support structure. Retrofits may include adding steel bracing.

The possibility of tall or elevated tanks falling on adjacent buildings and equipment should be a part of the decision on the design and location of those tanks.

Finally, tanks should be adequately maintained to detect corrosion and other tank deterioration before an earthquake exacerbates any problem. Particular care should be used in inspecting the bases of tanks.

A-8

SEISMIC ISSUE SHEETS CHECKLIST

Review the Seismic Issue Sheets and check the ones that are appropriate for your acutely hazardous material situation. Then use those appropriate Seismic Issue Sheets to identify ways to mitigate the potential for a release of an acutely hazardous material during an earthquake.

Nonstructural Issue Sheets		
	Appropriate	
Issue Summary	Yes	No
N-01 - Gas cylinders		
N-02 - Pressure vessels		
N-03 - Tanks-storage		
N-04 - Tanks -open-topped		
N-05 - Piping -process		
N-06 - Equipment -floor mounted		
N-07 - Equipment -suspended		
N-08 - Storage racks and shelves		
N-09 - Storage cabinets		
N-10 - Laboratory countertops		
N-11 - Countertop equipment		

Emergency Equipment Issue Sheets		
	Appropriate	
Issue Summary	Yes	No
E-01 - Shutoff valves (flow, pressure, power, seismic)		
E-02 - Seismic detectors and alarms		
E-03 - Gas detectors and alarms		
E-04 - Ventilation systems		
E-05 - Computer control systems		
E-06 - Piping - fire sprinkler		
E-07 - Water deluge systems		
E-08 - Emergency water systems		
E-09 - Back-up power and emergency generators [j]		
E-10 - Back-up communications		

A-8

SEISMIC ISSUE SHEETS CHECKLIST

Nonstructural Issue Sheets		
	Appropriate	
Issue Summary	Yes	No
G-01 - Site ground conditions		
G-02 - Building collapse		
G-03 - BUilding/contents interaction		
G-04 - Audits, maintenance and testing		
G-05 - Engineering materials		
G-06 - Inventory control		
G-07 - Secondary containment		
G-08 - Chemical separation		
G-09 - Building evacuation routing issues		
G-10 - Release notifications		
G-11 - Education and training on mitigation strategies		
G-12 - Emergency response teams, training and exercises		

A-9

SEISMIC EQUIPMENT WALKDOWN CHEKLISTS

INSTRUCTIN FOR COMPLETION OF
SEISMIC WALKDOEWN WORK SHEET FOR EQUIPMENT

The walkdown team shall complete each work sheet as follows:

The **Equipment Type** block shall include the type and name of equipment inspected (Le., Lean Rich Heat Exchangers)

The **Equipment ID** block should show the equipment 10 or mark number.

The **Location block** shall indicate the location of the equipment inspected, including building and elevation as applicable.

The **Drawing No. block** shall include any drawing number that was used for inspection.

The **Conclusion block** shall be completed to identify the conclusion of the inspection. If modification is suggested or required, it shall be detailed in the **Comments block.** Additional pages may be used to describe any modification.

The Inspection Attributes blocks shall be completed for each attribute. If an attribute is not applicable, **"NA"** shall be so indicated. Completed may be made in the attribute box or the Comments block (e.g., weld is damaged on the backside of panel).

Bolts, Nuts, Washers

All bolts, nuts, and washers used,to support equipment shall be inspected. If any of these items are missing, a ::check in the **"YES" column** shall be made, together with an indication of the condition.

A tightness check of the bolting hardware shall be performed by hand. If the hardware is loose when turned by hand, a check in the **"YES" column** shall be made, together with an indication of the condition.

If there is any significant corrosion present, a check in the **"YES" column** shall be made, together with an indication of the condition. The walkdown engineer shall use judgment in evaluating the level of significant corrosion.

Welds

All welds used to support equipment shall be visually inspected for cracks/damage. A check in the **"YES" column** shall be made if the same is present and an indication of the condition.

Supports

All supports shall be visually inspected for damaged or missing components (Le., cotter pins, stiffeners, etc.). If any components are missing, a check in the **"YES" column** shall be made, along with an identification of the missing component.

An inspection for corrosion shall be made similar to that of the bolting hardware.

Seismic Clearance/Flexibility

All seismic sensitive equipment shall be inspected to check that adequate clearance exists to prevent any adverse interaction with adjacent systems, structures, or components.

Commodities in close proximity shall be evaluated for potential interaction. Suspended systems that are supported with rod hangers or other flexible dead load supports with little or no lateral restraint will result in large displacements due to a seismic event. The walkdown engineer shall use judgment in estimating displacements of commodities in close proximity based on the flexibility of the commodity. If commodities are in close proximity, a check in the **"YES" column** shall be made, along with the identification and location of the commodity.

An evaluation of the flexibility of the system shall be made.

For commodities in close proximity, an inspection of the support system is required to check for structural integrity. (A commodity may not have an adverse interaction due to "swing;" but the anchorage may not be sufficient to prevent the commodity from falling and impacting the sensitive seismic commodity.) Documentation of this inspection shall be performed on a separate **Seismic Walkdown Work Sheet.**

The **Comments block** shall include a description of any modification. It also should include any comments on the seismic adequacy, general condition of the equipment, or any unacceptable condition that is not specifically identified as an inspection attribute.

SEISMIC EQUIPMENT WALKDOWN WORKSHEET	Page ____of____

System Description:	LINE NUMBER:	LOCATION:	DRAWING NO.:

CONCLUSION __ ACCEPTABLE __ ACCEPTABLE (Modification required) __ UNACCEPTABLE See comments __ INACCEPTABLE Acceptability not determined	ENGINEER: _____ DATE: _____

INSPECTION ATTRIBUTES

	YES	NO	N/A	COMMENTS
A. BOLTS, NUTS, WASHERS				
MISSING				
LOOSE				
CORROSION				
B. WELDS		j		
CRACKED/DAMAGED				
C. SUPPORTS				
MISSING PARTS				
CORROSION				
D. SEISMIC CLEARANCE				
PROXIMITY				
FLEXIBILITY				
ADJACENT EQUIPMENT				
COMMENTS:				

SEISMIC PIPING WALKDOWN CHECKLISTS

INSTRUCTIONS FOR COMPLETION OF
SEISMIC WALKDOWN WORK SHEET FOR PIPING

The walkdown team shall complete each work sheet as follows:

The System Description block shall include the system description inspected (i.e., 10"Rich DEA)

The Line Number block should show the line number.

The Location block shall indicate the location of the line inspected, including building and elevation as applicable.

The Drawing No. block shall include any drawing number that was used for inspection.

The Conclusion block shall be completed to identify the conclusion of the inspection. If modification is suggested or required, it shall be detailed in the Comments block. Additional pages may be used to describe any modification.

The Inspection Attributes blocks shall be completed for each attribute. If an attribute is not applicable, "NA" shall be so indicated. Comments may be made in the attribute box or the Comments block (e.g., strap is missing on third pipe support from Lean-Rich Heat Exchanger)

Piping

Piping shall be inspected for cracks or damaged components. If cracking or damaged components exist, a check in the "YES" column shall be made, along with an indication of the piping condition.

If there is any significant corrosion present, a check in the "YES" column shall be made, along with an indication of the condition. The walkdown engineer shall use judgment in evaluating the level of significant corrosion.

Supports

All supports shall be visually inspected for damaged or missing components (Le., cotter pins, stiffeners, etc.). if any components are missing, a check in the "YES" column shall be made along with an identification of the missing components ..

An inspection for corrosion shall be made similar to that of the piping.

Supports hardware (i.e., straps, rods, steel, etc.) shall be inspected for damaged and/or loose components. If an adverse condition exists, a check in the "YES" column shall be made, along with an indication of the adverse condition

Seismic Clearance/Flexibility

All piping shall be inspected to check that adequate clearance exists to prevent any adverse interaction with adjacent systems, structures, or components.

Commodities in close proximity shall be evaluated for potential· interaction. Suspended systems that are supported with rod hangers or other flexible dead load supports with little or no lateral restraint will result in large displacement due to a seismic event. The walkdown engineer shall use judgment in estimating displacement of commodities in close proximity, a check in the **"YES" column** shall be made, along with the identification and location of the commodity.

For commodities in close proximity, an inspection of each commodity's support arrangement is required to check for structural integrity. (A commodity may not have an adverse interaction due to "swing," but the anchorage may not be sufficient to prevent the commodity from falling and impacting the sensitive seismic commodity.) Documentation of this inspection shall be performed on a separate **Seismic Walkdown Work Sheet.**

The **Comments block** shall include a description of any modification. It also should include any comments on the seismic adequacy, general condition of the equipment, or any unacceptable condition that is not specifically identified as an inspection attribute.

SEISMIC PIPING WALKDOWN WORKSHEET			Page ____of____
System Description:	LINE NUMBER:	LOCATION:	DRAWING NO.:

CONCLUSION __ ACCEPTABLE __ ACCEPTABLE (Modification required) __ UNACCEPTABLE See comments __ INACCEPTABLE Acceptability not determined	ENGINEER: _____ DATE: _____

INSPECTION ATTRIBUTES

	YES	NO	N/A	COMMENTS
A. PIPING				
DAMAGED				
CORROSION				
FLG/THRD/JTS				
BURIED RUN		j		
ADEQUATE BRANCH FLEXIBILITY				
RIGIDLY SPANS COMPONENTS				
B. SUPPORTS				
PIPE SPANS OK				
MISSING HARDWARE				
CORROSION				
HARDWARE DAMAGED/ LOOSE				
C. SEISMIC INTERACTION				
ADEQUATE CLEARANCE				
ADJACENT COMPONENTS SECURE				
CLEARANCE AT AOV'S/MOV'S				
COMMENTS:				

SEISMIC WALKDOWN WORKSHEET			Page ____of____
System Description:	LINE NUMBER:	LOCATION:	DRAWING NO.:

COMMENTS SKETCHES

A-10

.

WHAT-IF/CHECKLIST FORM

Analysis Team: _____Date of Analysis:_____

Area of Investigation: _____Page:_____

Scenario No.	Checklist No. OR Drawing No.	What-if?	Consequences	Likelihood	Existing Controls	Recommendation

A-11

Trade Secrets/Confidential Information

Trade Secret
If a business believes that information required or requested involves the release of a trade secret, the business shall provide the Hazardous Materials Division (HMD) with a notification in writing that the information is considered a trade secret. Upon receipt of a claim of a trade secret related to the Risk Management Plan (RMP), the HMD will review the claim and will segregate properly substantiated trade secret information from other information that is otherwise disclosable to the public upon request in accordance with the California Public Records Act (Chapter 3.5 commencing with Section 6250, Division 7, Title 1 of the Government Code).

Trade secret is defined in subdivision (d) of Section 6254.7 of the Government Code and Section 1060 of the Evidence Code.

The HMD may disclose trade secrets to authorized officers or employees of other governmental agencies only in connection with the official duties of those officers or employees pursuant to any law for the protection of health and safety.

Confidential Information
Information that identifies where hazardous materials are used, handled, or stored at a facility, such as site maps, is considered confidential. It is the business's responsibility to ensure that such information is identified within the RMP document and is marked confidential.

A-12

Quick Reference Worst Case. Release Scenario Requirements

Type of Chemical	Assume Time for Total Release	Release Rate (Pounds/minute)
Toxic gases at ambient temperature (handled as a gas or as a liquid under pressure)	Quantity in the vessel or pipe is released as a gas over 10 minutes.	If no passive mitigation systems are in place, total quantity released divided by 10.
		If passive mitigation systems are in place, total quantity released divided by 10, then multiplied by 0.55 (mitigation factor).[1]
Toxic gases at ambient pressure (handled as refrigerated liquids)	If no passive mitigation or if the contained pool would *have* a depth of 1 cm or less: released as a gas in 10 minutes.	Total quantity released divided by 10.
	If contained by passive mitigation in a pool with a depth greater than 1 cm: assume the quantity in the vessel or pipe is spilled instantaneously to form a liquid pool.	The volatilization rate (release rate) shall be calculated at the boiling point of the substance and at the conditions specified in 'Toxic liquids" below.
Toxic liquids at ambient temperature	Assume that the quantity is spilled instantaneously to form a liquid pool. • Undiked: Pool will spread until it is 1 cm deep. • Diked (passive mitigation): Pool will have surface area defined by the area within the dike.	Calculated by a model that includes volatilization rate, surface area, maximum temperature and concentration of the chemical in the pool, and the surface characteristics of the substrate underneath the spill.
Flammables (liquids or gases)	Make appropriate assumptions based on facility conditions. Consider both *active* and passive mitigation systems.[2,3]	
Solids	Assume one-hour release.	Use USEPA, OES or California Air Resources Board approved model. (Currently OES has not identified an air dispersion model for solids. The AA may want to confer with the local air quality management district or air pollution control district on appropriate air dispersion modeling.)

From the California Office of Emergency Services CalARP Program AA Guidance, January 31, 2005

1 USEPA's Off-site Consequence Analysis Guidance Document, April 1999, Section 3.1.2
2 Ibid, Section 1.5.3
3 USEPA's General Guidance for Risk Management Programs, Chapter 4, Section 4-9

A-13

Alternative Release Scenario Analysis (Section 2750.4)

The facility must identify at least one alternative release scenario for each toxic chemical and one alternative release scenario for all flammable chemicals.

Each selected alternative release scenario must:

- Be more likely to occur than the worst-case release scenario above, and
- Potentially reach an endpoint offsite, unless no such scenario exists.

Potential alternative release scenarios might include:

- Transfer hose releases;
- Process piping releases;
- Process vessel or pump releases;
- Vessel overfilling and spill, or vessel over-pressurization and venting through relief valves or rupture disks; or,
- Shipping container mishandling; breakage or puncture leading to a spill. Active and passive mitigation systems may be considered if they can withstand the event that triggered the release and remain functional. The facility must consider the following in selecting alternative release scenarios:
- The five-year accident history required by Section 2750.9; and
- Failure scenarios identified under Section 2755.2 or 2760.2.

From the California State Office of Emergency Services CalARP Program AA Guidance, January 31, 2005.