APPENDIX G

ACCIDENTAL RELEASE PREVENTION PROVISIONS (40 CFR 68 Subparts A through H)

CAA SECTION 112(r)

REGULATION STATUS

On 20 Jun 96 (61 FR 31668), EPA issued Accidental Release Prevention Provisions under the authority of <u>CAA §112(r)</u>. Subsequent corrections and amendments are reflected in latest version of 40 CFR Part 68, Subparts A through H and are also highlighted in the <u>Subsequent Regulatory Activity</u> section of this appendix.

RULE SUMMARY

Overview

The notorious methyl isocyanide release at a <u>Union Carbide facility in Bhopal, India</u> resulted in thousands of deaths and illnesses. Although caused by a disgruntled employee, the release in Bhopal was a wake up call to the world to consider such risks and take action to prevent similar tragedies. Congress enacted CAA §112(r) directing EPA to develop regulations that would prevent catastrophic releases that would have an immediate and severe impact on the public or environment. EPA promulgated the accidental release prevention regulations in 40 CFR 68, subparts A through H, which will be referred to collectively as the risk management (RM) rule.

Important! Regardless of whether or not a facility is affected by the RM rule, the <u>general duty clause</u> contained in <u>CAA section 112(r)(1)</u> applies. EPA states in the preamble of the final RM rule that "*The general duty clause is a self-executing statutory requirement: it requires no regulations or other EPA action to take effect.*"

40 CFR 68 Subpart F: List of Regulated Substances and Thresholds

Military installations must comply with the RM rule if a <u>covered process</u> has present more than a threshold quantity of a regulated substance listed in <u>Subpart F</u>.

Threshold determination is easier to perform than the installation-wide tallies performed under the Emergency Planning and Community Right to Know Act (EPCRA). The thresholds apply to the amount of regulated substances contained in a <u>process</u>, not the installation's entire inventory of the substance.

Inspired by this list, many facilities have modified their processes such that they will no longer exceed a threshold quantity. Such processes are still subject to the <u>general</u> <u>duty clause</u> but avoid the formal requirements of the RM rule. The RM rule has probably reduced the risk of accidental releases more by stimulating rule avoidance than by regulating specific processes.

40 CFR 68 Subparts <u>A</u>, <u>B</u>, <u>C</u>, <u>D</u>, <u>E</u>, <u>G</u>, and <u>H</u>: Accidental Release Prevention

These provisions require owners or operators of covered processes to prepare and submit a RM *plan* which consists of data elements that summarize the installation's

RM *program*. The EPA requires a streamlined program for processes that have no accident history and that would not impact a member of the public, however, all other processes must have a RM program that includes a management program, hazard assessment, accident prevention program, and a response program. The extent of the compliance activities required for these individual programs can range from none to very complex depending on the potential <u>offsite</u> impact.

Key Definitions

<u>Section 68.3</u> of 40 CFR 68 Subpart A contains a complete glossary. Definitions essential to understanding this rule summary are included below.

Article means a manufactured item, as defined under <u>29 CFR 1910.1200</u>(b), that is formed to a specific shape or design during manufacture, that has end use functions dependent in whole or in part upon the shape or design during end use, and that does not release or otherwise result in exposure to a regulated substance under normal conditions of processing and use.

Covered process means a process that has a regulated substance present in more than a threshold quantity as determined under $\frac{68.115}{5}$.

Environmental receptor means natural areas such as national or state parks, forests, or monuments; officially designated wildlife sanctuaries, preserves, refuges, or areas; and Federal wilderness areas, that could be exposed at any time to toxic concentrations, radiant heat, or overpressure greater than or equal to the endpoints provided in §68.22(a), as a result of an accidental release and that can be identified on local U. S. Geological Survey maps.

Mitigation or mitigation system means specific activities, technologies, or equipment designed or deployed to capture or control substances upon loss of containment to minimize exposure of the public or the environment. *Passive mitigation* means equipment, devices, or technologies that function without human, mechanical, or other energy input. *Active mitigation* means equipment, devices, or technologies that need human, mechanical, or other energy input to function.

Offsite means areas beyond the property boundary of the stationary source, **and** areas within the property boundary to which the public has routine and unrestricted access during or outside business hours.

Population means the <u>public</u>.

Process means any activity involving a regulated substance including any use, storage, manufacturing, handling, or on-site movement of such substances, or combination of these activities. For the purposes of this definition, any group of vessels that are interconnected, or separate vessels that are located such that a

regulated substance could be involved in a potential release, shall be considered a single process.

Public means any person except employees or contractors at the stationary source.

Public receptor means <u>offsite</u> residences, institutions (e.g., schools, hospitals), industrial, commercial, and office buildings, parks, or recreational areas inhabited or occupied by the public at any time without restriction by the stationary source where members of the public could be exposed to toxic concentrations, radiant heat, or overpressure, as a result of an accidental release

Retail facility means a stationary source at which more than one-half of the income is obtained from direct sales to end users or at which more than one-half of the fuel sold, by volume, is sold through a cylinder exchange program."

Worst-case release means the release of the largest quantity of a regulated substance from a vessel or process line failure that results in the greatest distance to an endpoint defined in §68.22(a)

Applicability

General Applicability

The RM regulations affect military installations that have one or more "covered processes". A process is "covered" when there exists more than a threshold amount of a toxic or flammable substance listed in Tables 1 through 4 of 40 CFR 68 <u>Subpart F</u>. <u>Table 1</u> and <u>Table 3</u> included in this appendix are edited versions of Tables 1 and 3 of Subpart F which contain an alphabetical listing of regulated toxic and flammable substances, respectively.

Chlorine is the most common covered process found at many military installations. Additional chemicals to watch out for include ammonia, 1,1-dimethylhydrazine, sulfur dioxide, oleum, sulfuric acid, nitric acid, hydrochloric acid, and hydrogen fluoride/hydrofluoric acid. The <u>Military Sources</u> section of this appendix characterizes the military RM Plans submitted in June of 1999.

As an example, a drinking water facility which has chlorine (a listed toxic chemical) in excess of the threshold (2,500 pounds), will cause the drinking water plant to be a covered process.

The appendix discusses only the Federal RM rule. However, some States such as California have chosen lower applicability thresholds for covered processes. For example, the threshold for chlorine in California is only 100 pounds. Be sure to contact your local regulatory agency to see if they have lower thresholds than the Federal rule.

An installation could have combinations of covered processes and listed chemicals. In continuing the chlorine example; chlorine is a listed toxic chemical with a threshold of 2,500 pounds. An installation that has 1,000 pounds of chlorine at the waste water treatment plant, 1,000 pounds of chlorine at the drinking water plant, and 700 pounds of chlorine located at various swimming pools *would not* trigger the threshold and not have to report chlorine, *except* for the unusual case that all of these chlorine sources were co-located or connected via process piping. If this same installation instead has two 1-ton cylinders of chlorine (4,000 pounds) at the waste water treatment plant, the installation would *have one covered process*. If this installation has two 1-ton cylinders at the treatment plant and two 1-ton cylinders at the drinking water plant, it would have *two covered processes with one listed chemical*. The key concept to note here is that the compliance efforts will focus on the areas where there are covered processes. Triggering the chlorine at the waste water treatment plant will not cause additional requirements for the chlorine at the swimming pools provided the swimming pools have less than 2,500 pounds of chlorine.

Applicability determinations become more complicated with the process contains **mixtures**:

- 1. If a substance contains a listed chemical at less than 1% by weight of the mixture, it is exempt from being considered toward the applicability threshold.
- 2. Except for oleum, toluene 2,4-diisocyanate, toluene 2,6-diisocyanate, and toluene diisocyanate (unspecified isomer), for toxic substances present in a mixture or solution at a concentration of one percent or greater by weight, the facility has the option of demonstrating that the partial pressure of the regulated substance in the solution under any or all storage or handling conditions is less than 10mm Hg. In this case, the quantity of the regulated substance in the mixture in the portion of the process with a partial pressure of less than 10mm Hg would be exempt from threshold determination;
- 3. Mixtures that contain regulated flammable substance(s) are exempt from threshold determination if the facility demonstrates that the mixture itself does not meet the criteria for flammability (flash point below 73°F (22.8°C) and boiling point below 100°F (37.8°C).
- 4. If a mixture contains a regulated flammable substance(s) above 1% and does have a flash point below 73°F (22.8°C) and/or a boiling point below 100°F (37.8°C) then the entire weight of the mixture is considered for meeting the threshold regardless of the concentration of the listed flammable.

After **21 Jun 99**, installations which exceed the threshold for a listed toxic or flammable chemical *must have a RM program and plan in place at the time the threshold is exceeded.* Installations must plan ahead for potentially covered processes resulting from mobilization, realignment and facility growth. If EPA adds a chemical to Subpart F, installations with processes that exceed the new threshold will have *three years* to comply from the date the chemical is listed. At the request of the Army Environmental Center and the Army Materiel Command, USACHPPM developed a <u>Compliance Assistance Checklist</u>. The checklist identifies where regulated substances are most commonly located on military installations. This document is available as a part of the <u>USACHPPM Technical Compliance</u> <u>Guide</u>. USACHPPM has also co-authored a <u>Question and Answer Document</u> which contains several <u>military specific questions</u>. **Important!** These documents were written before flammable fuels were exempted and any references to such processes should be ignored.

Exemptions

There are several exemptions in addition to those noted above for certain mixtures. These exemptions are consistent with those provided for threshold calculations under EPCRA (SARA Title III) sections 311 [42 USC 11021] and 312 [42 USC 11022]. EPA considers it less likely that substances stored in these exempt forms could be involved in accidental releases of a catastrophic nature.

In August 1999, the President signed The Chemical Safety Information, Site Security and Fuels Regulatory Relief Act (<u>Pub. L. 106-40</u>), which exempts flammable substances when used as a fuel or held for sale as a fuel at a <u>retail facility</u>. In March 2000, EPA amended the RM rule to reflect this law. Refer to the <u>Subsequent</u> <u>Regulatory Activity</u> section in this Appendix or <u>40 CFR 68.126</u> in a version of the CFR published after March 2000.

Substances contained in <u>articles</u> are exempt from the threshold determination. [§68.115(b)(4)] The OSHA definition of an article in 29 CFR 1910.1200(b) is used. Batteries (after their manufacture) would be considered articles under this definition.

Substances are exempt from inclusion in the threshold determination if they are:

- a structural component of the facility,
- used for routine janitorial maintenance,
- in consumer products, or
- in water drawn from the environment or municipal sources. [§<u>68.115</u>(b)(5)]

EPA also exempts activities in laboratories when under the supervision of a technically qualified person. [§68.115(b)(6)]

Ammonia used as an agricultural nutrient, when held by farmers, is exempt from all provisions of this part. [§68.125]

Sources located on the outer continental shelf are exempt. [40 CFR 55.2]

Program Level Applicability

Once someone determines that their installation has (or will have) a covered process, they must then determine the specific set of compliance requirements known as program levels. If a <u>worst case release</u> could have a significant impact on <u>public receptors</u>, more resource intensive compliance requirements are imposed. If a release would not have a significant impact on public receptors, less stringent requirements apply. Covered processes must comply with one of three sets of requirements referred to as "*Program 1, Program 2, or Program 3*'. The criteria for determining program level eligibility include the potential impact of the toxic or flammable chemical on public receptors, the North American Industry Classification System (<u>NAICS</u>) code for the covered process, and whether or not the covered process is subject to the Occupational Safety and Health Administration Process Safety Management (OSHA PSM) Standard in <u>29 CFR 1910.119</u>.

For all processes, a <u>worst case release</u> scenario is required that demonstrates the potential impact of a catastrophic discharge. Air dispersion modeling or tables can be used to determine the circular area, or "footprint", that could be affected by a flammable explosion or toxic gas cloud. The radius of the footprint is referred to as a toxic or flammable endpoint. If the process could not impact the <u>public</u> (meaning the nearest <u>public receptor</u> is beyond the endpoint distance), **AND** if the process has not had an accidental release for the previous **five years**, **AND** emergency response procedures have been coordinated with local emergency response planning organizations, then the installation may treat that process as a **Program 1** process and compliance requirements are minimal. [40 CFR 68.10(b)]

A covered process that has the potential to impact a public receptor will fall into Program 2 or Program 3. If the process is subject to the OSHA PSM standard **OR** if the process is in NAICS code 32211, 32411, 32511, 325181, 325188, 325192, 325199, 325211, 325311, or 32532 (see table below for descriptions of these codes), then it will be **Program 3**. [40 CFR 68.10(d)]

Important Note: Tri-services counsel issued an <u>opinion</u> that military installations which have 112(r) covered processes must consider their facilities as subject to OSHA PSM when determining Program level applicability. Federal agencies are not legally subject to most OSHA requirements because they are not considered "employers" as defined in the rule. However, Executive Order 12196 requires federal agencies to comply with OSHA or alternative standards that are consistent with OSHA. Since federal agencies are obligated to comply with standards consistent with OSHA PSM, they are effectively (though not legally) subject to OSHA PSM. Therefore, if a covered process at a Federal facility would be subject to OSHA PSM if it were located at a commercial facility, then it must be considered as subject to OSHA PSM when determining program level applicability.

If the covered process does not qualify for Program 1 or Program 3, it is **Program 2.** [40 CFR 68.10(c)]

Use the following step-by-step guide to determine program eligibility (1, 2, or 3) for each covered process. A military installation may have some processes subject to Program 1 requirements, some subject to Program 2, and some subject to Program 3.

Step-By Step Guide to Program Level Applicability

The following steps need to be repeated for each covered process at the installation:

Step 1. If:

There has not been an accidental release of the substance which has led to public death or injury or caused a response or restoration activity to be performed on an environmental receptor.

- and -

• A worst-case release assessment shows that the nearest public receptor is beyond the toxic or flammable endpoint distance.

- and -

Emergency response procedures have been coordinated between the installation • and local emergency planning and response organizations. Note: If the installation meets any EPCRA thresholds, then the EPCRA POC is a member of the Local Emergency Planning Committee (LEPC) and should be aware of the proper response organizations which should be notified.

Then: The process is subject to the *Program 1* requirements. Go to Step 4.

Step 2. If:

- The process in not eligible for Program 1.
- and either -
- The process is one of the following NAICS codes: •
 - 32211 Pulp Mills
 - 32411 Petroleum Refineries
 - 32511 Petrochemical Mfg.
 - 325181 Alkalies & Chlorine Mfg.
- 325192 Cyclic Crude & Intermediate Mfg. 325199 Organic Chemical Mfg.
- 325188 Inorganic Chemical Mfg.
- 325211 Plastics Material & Resin Mfg.
- 325311 Nitrogenous Fertilizer Mfg.
 - 32532 Agricultural Chem Mfg.

- or -

• The process is subject to the OSHA PSM rule (29 CFR 1910.119). (See important note on previous page.)

Then: The process is subject to **Program 3** requirements. Go to Step 4.

Step 3. If:

The process is not subject to Program 1 or 3 as determined in the prior two steps, Then: It is a **Program 2** process.

Step 4. If:

• A covered process becomes eligible for a different Program level (either more stringent or less stringent requirements).

Then: The process must comply with the new Program level and the facility must update its RM Plan. *Note: The Clean Air Act adage for HAP Regulations "once in always in" does not apply to the Section 112(r) regulation. If management actions on a covered process reduce quantities below applicable thresholds, the process is no longer covered.* Go to <u>Step 5</u>.

Step 5. At this point, the Program level for the covered process is determined. If there are more covered processes to consider, then repeat <u>Steps 1</u>-5. Otherwise, determine specific requirements below for each covered process.

Standards

Once it is determined that a facility has a <u>covered process</u> the following requirements must be implemented depending on the applicable program level. To prevent redundancy, compliance requirements are grouped according to the applicable Program level classification. The sections as listed below are:

Requirements Common to All Covered Processes

Additional Requirements for Program 1 Covered Processes

Additional Requirements Common to All Program 2 and 3 Covered Processes

Additional Requirements for Program 2 (Prevention Program)

Additional Requirements for Program 3 (Prevention Program)

Requirements Common to All Covered Processes

Installations must perform the following 3 items for every <u>covered process</u>, regardless of the applicable program level:

- 1. Prepare and submit a RM Plan to the EPA not later than 21 Jun 99 or the date on which a regulated substance is first present above a threshold quantity, whichever is later. Guidance for submitting RM Plan data elements are available on the Internet at <u>http://www.epa.gov/swercepp/rmpsubmt.html</u>. Note: facilities use the same software and submission procedures to submit their initial RM Plan and to <u>update their plan when necessary</u>.
- 2. Analyze a <u>worst-case release</u> scenario for the process. Analyze the worst-case release scenario for each process and document that the nearest <u>public receptor</u> is beyond (Program 1) or within (Program 2 or 3) the distance to a toxic or

flammable endpoint. Note that a worst-case release analysis must be performed for each covered process to determine the applicable program level.

3. Complete a *five-year* accident history for the process. The history must include all accidental releases from covered processes that resulted in deaths, injuries, or significant property damage on site, or known <u>offsite</u> deaths, injuries, evacuations, sheltering in place, property damage, or environmental damage. For each accidental release included in the accident history, the following information is to be included: date, time, and approximate duration of the release; chemical(s) released; estimated quantity released in pounds; the type of release event and its source; weather conditions, if known; onsite impacts; known offsite impacts; initiating event and contributing factors if known; whether offsite responders were notified if known; and operational or process changes that resulted from investigation of the release. Numerical estimates may be provided to two significant digits.

Additional Requirements for Program 1 Covered Processes

For covered processes eligible for Program 1, the following two additional items must be performed in addition to those mentioned above.

- 1. The EPA requires coordination with local emergency planning and response agencies. No specific requirements for this coordination are specified.
- 2. The certification statement from the final rule states in §68.12 (b)(4): Certify in the RMP the following: "Based on the criteria in 40 CFR <u>68.10</u>, the distance to the specified endpoint for the <u>worst-case release</u> scenario for the following process(es) is less than the distance to the nearest <u>public receptor</u>: [list process(es)]. Within the past five years, the process(es) has (have) had no accidental release that caused <u>offsite</u> impacts (40 CFR <u>68.10</u>(b)(1)). No additional measures are necessary to prevent offsite impacts from accidental releases. In the event of fire, explosion, or 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. [Signature, title, date signed]."

Additional Requirements Common to All Program 2 and 3 Covered Processes

The difference between Programs 2 and 3 is the scope and detail required for the prevention program. This section discusses the three prevention program areas common to Programs 2 and 3.

Installations must perform the following for all Program 2 and Program 3 processes:

- 1. Develop and implement a management system. Military installations should have mechanisms in place to ensure Command oversight and visibility of environmental issues. This mechanism can be used to comply with the management plan requirements. The RM rule does not specify who must sign the certification statement nor specify that the individual meet any eligibility criteria such as responsibility for a certain number of employees or budget levels. However, EPA expects certifications to be signed by officials who have knowledge of what they are certifying. Such officials would include the base commander, installation environmental manager, or the RM program manager. Refer to the proper Chain of Command for guidance on determining the appropriate signature authority. Individual requirements for the management system are:
 - a) The owner or operator of the RM plan must develop a management system to oversee the implementation of the RM program elements.
 - b) The owner or operator must designate a qualified person or position that has the overall responsibility for the development, implementation, and integration of the RM plan elements.
 - c) When responsibility for implementing individual requirements of the RM effort is assigned to persons other than the person identified above, the names or positions of these people have to be documented and the lines of authority defined through an organization chart or similar document.
- 2. Conduct a hazard assessment. Requirements under the hazard assessment include:
 - a) *Worst-case release scenario analysis*. The worst-case release scenario analysis should have been performed when determining Program 1, 2, or 3 eligibility. Each process should have a worst-case scenario analysis, however, if more than one process exists in either the toxic chemical or flammable hazard class, then not all analyses may need to be reported in the summary RM plan submitted to the EPA. Only the "worst worst-case" analysis is necessary for submittal.
 - b) Alternative release scenario analysis. The alternative release scenario is considered to be a more realistic modeling effort to determine the impact of a catastrophic release. Active <u>mitigation</u> controls are assumed to be working (such as valve interlocks) and the release rates can use more realistic parameters than that required for the worst-case analysis. **Only one** alternative release scenario needs to be determined to represent **all flammable** covered processes. However, **one** alternative scenario is required for **each toxic** substance. For example, an installation which has five flammable covered processes, two chlorine covered processes and one sulfur dioxide covered process would only have to submit three alternative release scenario to represent the five flammables, one scenario to represent both chlorine processes, and one for the sulfur dioxide.

- c) *Defining offsite population impacts*. The RM compliance documentation must contain an estimate of the population within a circle with its center at the point of the release and a radius determined by the distance to the endpoint. The population must include residential population including; the presence of institutions (schools, hospitals, prisons), parks and recreational areas, and major commercial, office, and industrial buildings. The most recent Census data, or other updated information can be used to estimate the population potentially affected. Also, the population will be estimated to two significant digits. <u>Census</u> data is readily available on the Internet.
- d) *Defining offsite environment impacts.* <u>U.S. Geological Survey</u> maps or any data source containing U.S.G.S. data can be used to identify environmental receptors. The rule defines these receptors as: "natural areas such as national or state parks, forests, or monuments; officially designated wildlife sanctuaries, preserves, refuges, or areas; and Federal wilderness areas."
- e) *Review and update.* The offsite consequence analysis must be reviewed and updated at least once every *five years*. If the process changes such that the distance to the endpoint changes by a factor of two in either direction, the analysis must be revised and a new RM plan submitted within six months.
- 3. Develop and implement an emergency response program. Most military installations have onsite fire departments, emergency action plans, and spill plans that meet the requirements for having an emergency response plan. Incorporation of these items and standard Fire Department and environmental Services regulations should suffice to demonstrate that an emergency response plan is in place. *No* emergency response program is required if employees are not responding to a release and:
 - a) For installations with any regulated toxic substance held in a process above the threshold quantity, the installation is included in the community emergency response plan developed under <u>42 USC 11003</u>.

and -

b) For installations with only regulated flammable substances held in a process above the threshold quantity, the installation has coordinated response actions with the local fire department.

and -

c) Appropriate mechanisms are in place to notify emergency responders when there is a need for a response.

Additional Requirements for Program 2 (Prevention Program)

The Program 2 prevention program is less resource intensive than the Program 3 prevention program but essentially carries out the same purpose. The Program 3 prevention program is later in this appendix. Note that a Program 2 covered process does have the option of implementing the Program 3 prevention steps.

The seven specific elements of the Program 2 prevention program are summarized as follows:

- 1. *Safety information*. Up-to-date safety information related to the regulated substances, processes, and equipment must be compiled and maintained. The installation must ensure that the process is designed in compliance with recognized and generally accepted good engineering practices.
- 2. *Hazard review.* The installation must conduct a review of the hazards associated with the regulated substances, process, and procedures. The review must identify the following: the hazards associated with the process and regulated substances; opportunities for equipment malfunctions or human errors that could cause an accidental release; safeguards used or needed to control the hazards or prevent equipment malfunction or human error; and any steps used or needed to detect or monitor releases. Checklists can be used if developed by persons or organizations knowledgeable about the process and equipment as a guide to conducting the review. For processes designed to meet industry standards or Federal or state design rules, the hazard review must, by inspecting all equipment, determine whether the process is designed, fabricated, and operated in accordance with the applicable standards or rules. The results of the review must be documented and any problems identified must be resolved in a timely manner. The hazard review must be updated at least once every **five years**.
- 3. Operating procedures. Written operating procedures must be prepared that provide clear instructions or steps for safely conducting activities associated with each covered process consistent with the safety information for that process. Operating procedures or instructions provided by equipment manufacturers or developed by persons or organizations knowledgeable about the process and equipment may be used as a basis for a stationary source's operating procedures. The procedures must address the following:
 - a) Initial startup;
 - b) Normal operations;
 - c) Temporary operations;
 - d) Emergency shutdown and operations;
 - e) Normal shutdown;
 - f) Startup following a normal or emergency shutdown or a major change that requires a hazard review;
 - g) Consequences of deviations and steps required to correct or avoid deviations; and
 - h) Equipment inspections.
- 4. *Training*. Each employee presently operating a process, and each employee newly assigned to a covered process must have been trained or tested competent in the operating procedures that pertain to their duties. For those employees

already operating a process on the compliance date of 20 Jun 99, certification in writing that the employee has the required knowledge, skills, and abilities to safely carry out the duties and responsibilities as provided in the operating procedures can be submitted. Refresher training must be provided at least every **three years**, and more often if necessary, to each employee operating a process to ensure that the employee understands and adheres to the current operating procedures of the process. The installation must consult with the employees operating the process to determine the appropriate frequency of refresher training.

- 5. *Maintenance*. The installation must prepare and implement procedures to maintain the ongoing mechanical integrity of the process equipment. Vendors literature, procedures in Federal or State regulations or industry codes can be used as the basis for stationary source maintenance procedures. Employee training in maintaining the ongoing mechanical integrity of the process must be performed. To ensure that the employee can perform the job tasks in a safe manner, each employee must be trained in the hazards of the process, in how to avoid or correct unsafe conditions, and in the procedures applicable to the employee's job tasks. Maintenance contractors must ensure that each contract maintenance employee is trained to perform the maintenance procedures described. Inspections and tests on process equipment must be performed. Inspection and testing procedures must follow recognized and generally accepted good engineering practices. The frequency of inspections and tests of process equipment must be consistent with applicable manufacturers' recommendations, industry standards or codes, good engineering practices, and prior operating experience.
- 6. *Compliance audits*. Every *three years*, the installation must certify that an evaluation of the prevention program has been performed to verify that the procedures and practices developed under the rule are adequate and are being followed. The compliance audit must be conducted by at least one person knowledgeable in the process. A report of the audit findings must be developed and an appropriate response to each of the findings must be documented. Documentation that deficiencies have been corrected must also be prepared. The two most recent compliance audit reports must be retained onsite.
- 7. *Incident investigation*. Each incident which resulted in, or could reasonably have resulted in a catastrophic release must be investigated as promptly as possible, but not later than 48 hours following the incident. A summary must be prepared at the conclusion of the investigation. Investigation findings and recommendations must be addressed and resolved. Resolutions and corrective actions must be documented. The findings must be reviewed with all affected personnel whose job tasks are affected by the findings. The investigation summaries must be retained for *five years*.

Additional Requirements for Program 3 (Prevention Program)

The Program 3 prevention requirements are very similar to the OSHA PSM requirements. The 12 individual elements of the Program 3 prevention program are:

- 1. *Process safety information*. Compile and maintain up-to-date safety information related to the regulated substances, processes, and equipment. The installation must ensure that the process is designed in compliance with recognized and generally accepted good engineering practices. Included in the requirements for the Program 3 information is a block flow diagram for the process, process chemistry, inventory information, upper and lower safe operating limits, deviation and upset evaluation, materials of construction, process and instrumentation diagrams (P&ID's), electrical classification, relief system design, ventilation design, codes and standards, material/energy balances, and, safety system information.
- 2. *Process hazard analysis.* The installation must perform an initial process hazard analysis. The process hazard analysis must be appropriate to the complexity of the process and must identify, evaluate, and control the hazards involved in the process. The installation must determine and document the priority order for conducting process hazard analyses based on a rationale which includes such considerations as extent of the process hazards, number of potentially affected employees, age of the process, and operating history of the process. Process hazards analyses completed to comply with the OSHA PSM rule are acceptable as initial process hazards analyses. These process hazard analyses must be updated and revalidated, based on their completion date.

Use one or more of the following methodologies that are appropriate to determine and evaluate the hazards of the process being analyzed.

- a) What If Analysis: This is frequently used to examine proposed changes to a facility, the what if analysis consists of questions such as "what if pump X stops running..."
- b) Checklist: This is simply a list of things that can go wrong in simple process operations or equipment.
- c) What-if/Checklist. This is a combination of the two methods listed above.
- d) Hazop Study: This is the most popular method of hazard analysis used by the petroleum and chemical industries. A multidisciplinary team is used to identify consequences of deviations of process parameters.
- e) Failure mode and effects analysis (FMEA): This method tabulates each system or unit of equipment with its failure modes, effect of failure on the system, and criticality of the unit on the system. A ranking to determine which units are most likely to cause a serious accident is then performed.
- f) Fault Tree Analysis: This is a formalized deductive technique that works backward from an accident to identify the root cause of the accident. Related

to this is an event tree analysis, this is a fault tree analysis in reverse and is a combination what-if analysis and FMEA analysis.

The process hazard analysis must address: the hazards of the process; any previous incident which had a likely potential for catastrophic consequences; engineering and administrative controls applicable to the hazards and their interrelationships such as appropriate application of detection methodologies to provide early warning of releases (acceptable detection methods might include process monitoring and control instrumentation with alarms, and detection hardware such as hydrocarbon sensors.); the consequences of failure of engineering and administrative controls; stationary source siting; human factors; and a qualitative evaluation of a range of the possible safety and health effects of failure of controls.

A team with expertise in engineering and process operations must perform the process hazard analysis. The team must include at least one employee who has experience and knowledge specific to the process being evaluated. Also, one member of the team must be knowledgeable in the specific process hazard analysis methodology being used.

The owner or operator must establish a system to promptly address the team's findings and recommendations; assure that the recommendations are resolved in a timely manner and that the resolution is documented; document what actions are to be taken; complete actions as soon as possible; develop a written schedule of when these actions are to be completed; communicate the actions to operating, maintenance and other employees whose work assignments are in the process and who may be affected by the recommendations or actions.

At least every *five years* after the completion of the initial process hazard analysis, the process hazard analysis must be updated and revalidated by a team meeting the requirements listed above, to assure that the process hazard analysis is consistent with the current process. Updated and revalidated process hazard analyses completed to comply with the OSHA PSM rule are acceptable to meet the requirements.

The installation must retain process hazards analyses and updates or revalidation for each process covered by this section, as well as the documented resolution of recommendations described in paragraph (e) of this section for the life of the process.

3. *Operating procedures*. Prepare written operating procedures that provide clear instructions or steps for safely conducting activities associated with each covered process consistent with the safety information for that process. The procedures must address the following:

- a) Steps for each operating phase: initial startup; normal operations; temporary operations; emergency shutdown including the conditions under which emergency shutdown is required, and the assignment of shutdown responsibility to qualified operators to ensure that emergency shutdown is executed in a safe and timely manner; emergency operations; normal shutdown; and, startup following a turnaround, or after an emergency shutdown.
- b) Operating limits: consequences of deviation; and steps required to correct or avoid deviation.
- c) Safety and health considerations: properties of, and hazards presented by, the chemicals used in the process; precautions necessary to prevent exposure, including engineering controls, administrative controls, and personal protective equipment; control measures to be taken if physical contact or airborne exposure occurs; quality control for raw materials and control of hazardous chemical inventory levels; and, any special or unique hazards.
- d) Safety systems and their functions.

The operating procedures must be readily accessible to employees who work in or maintain a process reviewed as often as necessary to assure that they reflect current operating practice, including changes that result from changes in process chemicals, technology, and equipment, and changes to stationary sources. The owner or operator must certify annually that these operating procedures are current and accurate.

The installation must develop and implement safe work practices to provide for the control of hazards during operations such as lockout/tagout; confined space entry; opening process equipment or piping; and control over entrance into a stationary source by maintenance, contractor, laboratory, or other support personnel. These safe work practices must apply to employees and contractor employees.

4. *Training.* Each employee presently operating a process, and each employee newly assigned to a covered process must be trained or tested competent in the operating procedures that pertain to their duties. Training emphasis must be placed on specific safety and health hazards, emergency operations, and safe work practices. For employees who were already operating a process on the compliance date of 20 Jun 99, facilities were able to submit a certification in writing that the employee has the required knowledge, skills, and abilities to safely carry out the duties and responsibilities as provided in the operating procedures. Refresher training must be provided at least every *three years*, and more often if necessary, to each employee operating a process to ensure that the employee understands and adheres to the current operating procedures of the process. The installation must consult with the employees operating the process to determine the appropriate frequency of refresher training. Records must be maintained that each employee received and understood the training. Included

in the recordkeeping is the method that was used to verify that the employee understood the training

- 5. *Mechanical integrity*. Requirements for mechanical integrity apply to the following process equipment:
 - a) Pressure vessels and storage tanks;
 - b) Piping systems (including piping components such as valves);
 - c) Relief and vent systems and devices;
 - d) Emergency shutdown systems;
 - e) Controls (including monitoring devices and sensors, alarms, and interlocks) and,
 - f) Pumps.

The installation must establish and implement written procedures to maintain the ongoing integrity of process equipment. Each employee involved in maintaining the ongoing integrity of process equipment must be trained in an overview of that process and its hazards and in the procedures applicable to the employee's job tasks to assure that the employee can perform the job tasks in a safe manner.

Inspections and tests must be performed on process equipment. Inspection and testing procedures must follow recognized and generally accepted good engineering practices. The frequency of inspections and tests of process equipment must be consistent with applicable manufacturers' recommendations and good engineering practices, and more frequently if determined to be necessary by prior operating experience. The installation must document each inspection and test that has been performed on process equipment. The documentation must identify the date of the inspection or test, the name of the person who performed the inspection or test, the serial number or other identifier of the equipment on which the inspection or test was performed, a description of the inspection or test.

The installation must correct deficiencies in equipment that are outside acceptable limits (defined by the process safety information) before further use or in a safe and timely manner when necessary means are taken to assure safe operation. In the construction of new plants and equipment, the installation must ensure that equipment as it is fabricated is suitable for the process application for which they will be used. Appropriate checks and inspections must be performed to assure that equipment is installed properly and is consistent with design specifications and the manufacturer's instructions. Maintenance materials, spare parts and equipment must be assured that they are suitable for the process application for which they will be used.

6. *Management of change*. The installation must establish and implement written procedures to manage changes (except for "replacements in kind") to process

chemicals, technology, equipment, and procedures; and, changes to stationary sources that affect a covered process. The procedures must assure that the following considerations are addressed prior to any change:

- a) The technical basis for the proposed change;
- b) Impact of change on safety and health;
- c) Modifications to operating procedures;
- d) Necessary time period for the change; and,
- e) Authorization requirements for the proposed change.

Employees involved in operating a process and maintenance, and contract employees whose job tasks will be affected by a change in the process, must be informed of, and trained in, the change prior to start-up of the process or affected part of the process. If a change results in a change in the process safety information, such information must be updated accordingly. If a change covered by this paragraph results in a change in the operating procedures or practices, such procedures or practices must be updated accordingly.

- 7. *Pre-startup review*. The installation must perform a pre-startup safety review for new stationary sources and for modified stationary sources when the modification is significant enough to require a change in the process safety information. The pre-startup safety review must confirm that prior to the introduction of regulated substances to a process:
 - a) Construction and equipment is in accordance with design specifications;
 - b) Safety, operating, maintenance, and emergency procedures are in place and are adequate;
 - c) For new stationary sources, a process hazard analysis has been performed and recommendations have been resolved or implemented before startup; and modified stationary sources meet the requirements contained in management of change.
 - d) Training of each employee involved in operating a process has been completed.
- 8. *Compliance audits*. Every *three years*, the installation must certify that an evaluation of the prevention program has been performed to verify that the procedures and practices developed under the rule are adequate and are being followed. The compliance audit must be conducted by at least one person knowledgeable in the process. A report of the audit findings must be developed and an appropriate response to each of the findings must be documented. Documentation that deficiencies have been corrected must also be performed. The two most recent compliance audit reports must be retained onsite.
- 9. *Incident investigation.* The installation must investigate each incident that resulted in, or could reasonably have resulted in a catastrophic release, as promptly as possible, but not later than 48 hours following the incident. The incident investigation team must have at least one person knowledgeable in the

process involved and other persons with appropriate knowledge to investigate the accident. A summary must be prepared at the conclusion of the investigation. Investigation findings and recommendations must be addressed and resolved. Resolutions and corrective actions must be documented. The findings must be reviewed with all affected personnel whose job tasks are affected by the findings. The investigation summaries must be retained for *five years*.

- 10. *Employee participation*. The installation must develop a written plan of action regarding the implementation of the employee participation required by this section. The installation must consult with employees and their representatives on the conduct and development of process hazards analyses and on the development of the other elements of process safety management in this rule. Employees and their representatives must have access to process hazard analyses and to all other information required to be developed under this rule.
- 11. *Hot work permit.* The installation must issue a hot work permit for hot work operations conducted on or near a covered process. The permit must document that the fire prevention and protection requirements in 29 CFR 1910.252(a) have been implemented prior to beginning the hot work operations; it must indicate the date(s) authorized for hot work; and identify the object on which hot work is to be performed. The permit must be kept on file until completion of the hot work operations.
- 12. Contractors. Contractors performing maintenance or repair, turnaround, major renovation, or specialty work on or adjacent to a covered process are covered under this section. Contractors providing incidental services which do not influence process safety, such as janitorial work, food and drink services, laundry, delivery or other supply services are not covered under this section. The installation, when selecting a contractor, must obtain and evaluate information regarding the contract owner or operator's safety performance and programs. The contract owner or operator must be made aware of the known potential fire, explosion, or toxic release hazards related to the contractor's work and the process. The installation must explain to the contract owner or operator the applicable provisions of the emergency response program at the installation. The installation must develop and implement safe work practices to control the entrance, presence, and exit of the contract owner or operator and contract employees in covered process areas. The installation must periodically evaluate the performance of the contract owner or operator in fulfilling their obligations as specified in the next paragraph.

Contract owner or operator responsibilities. The contract owner or operator must:

a) assure that each contract employee is trained in the work practices necessary to safely perform her/his job.

- b) assure that each contract employee is instructed in the known potential fire, explosion, or toxic release hazards related to her/his job and the process, and the applicable provisions of the emergency action plan.
- c) document that each contract employee has received and understood the training required by this section.
- d) prepare a record which contains the identity of the contract employee, the date of training, and the means used to verify that the employee understood the training.
- e) assure that each contract employee follows the safety rules of the stationary source including the safe work practices required by § 68.69(d) of this part.
- f) advise the owner or operator of any unique hazards presented by the contract owner or operator's work, or of any hazards found by the contract owner or operator's work.

Compliance Deadlines

Source owners who had existing covered processes before 21 Jun 99, were required to have a RM Program in place and submit a RM Plan to the EPA by 21 Jun 99.

After 21 Jun 99, source owners who add a new covered process (or modify a process such that it becomes covered) to their facility must have a RM Program in place for that process and submit a new or revised RM Plan by the date on which a regulated substance is first present above a threshold quantity.

In addition, RM Plans must be updated periodically as follows:

- At least every *five years*.
- Within *three years* after EPA adds a new regulated substance to Subpart F.
- **On the day** a regulated substance is first present above a threshold quantity in a new covered process.
- Within *six months* of a change that requires a revised PHA, hazard review, or offsite consequence analysis
- Within *six months* of a change that alters the Program Level or RM Program applicability

Installations must use EPA's <u>RMP*Submit software</u> to submit new or updated RMP data in an electronic format. This software performs some data error checking and then creates a floppy disk which must be mailed to EPA with a signed cover letter.

General Duty Clause

EPA issued implementation guidance for the general duty clause in May 2000. (EPA 550-B00-002) This document contains EPA headquarters guidance to inspectors, auditors, and investigators to develop programs to increase compliance with the general duty clause. The document also goes into great detail outlining the inspector's enforcement authority. The general duty clause requires facilities to

prevent and minimize consequences of releases of extremely hazardous substances even if the quantities involved are below RMP thresholds. The guidance discusses the concept of general duty, suggests approaches regulatory agencies should use to increase compliance, and provides examples of tools to conduct and evaluate accident prevention programs.

Chapter 3 of the document shows what the regulators will be looking for when determining if a facility is complying with general duty. Environmental and Safety Program Managers may want to compare their installation's general duty efforts with Chapter 3 to see how they would fare during a compliance audit.

The general duty clause in CAA 112(r)(1) reads as follows:

"Purpose and general duty. It shall be the objective of the regulations and programs authorized under this subsection to prevent the accidental release and to minimize the consequences of any such release of any substance listed pursuant to paragraph (3) or any other extremely hazardous substance. The owners and operators of stationary sources producing, processing, handling or storing such substances have a general duty in the same manner and to the same extent as section 654, title 29 of the United States Code, to **IDENTIFY HAZARDS** which may result from such releases using appropriate hazard assessment techniques, to **DESIGN AND MAINTAIN A SAFE FACILITY** taking such steps as are necessary to prevent releases, and to **MINIMIZE** THE CONSEQUENCES OF ACCIDENTAL RELEASES which do occur. For purposes of this paragraph, the provisions of section 304 shall not be available to any person or otherwise be construed to be applicable to this paragraph. Nothing in this section shall be interpreted, construed, implied or applied to create any liability or basis for suit for compensation for bodily injury or any other injury or property damages to any person which may result from accidental releases of such substances." [Emphasis Added]

This guidance document emphasizes the three obligations shown in capital letters in the preceding paragraph and expounds on what each obligation requires from facility owners or operators (o/o) and compliance inspectors. Some relevant quotes from the guidance document:

- "Each of these obligations (identify hazards, design and maintain a safe facility, minimize consequences) requires that a series of measures be taken by the o/o but the general duty clause does not prescribe these measures."
- "Regional inspectors may require the o/o to provide info to EPA to determine whether they are in compliance with the general duty clause..."
- "Although the general duty clause does not specify how the o/o should identify hazards, the hazard assessment, when concluded should result in the following info..." (hazards identified, release scenarios, consequences)
- "Modeling or an applicable dispersion analytical technique should be used to determine the potential impact of releases."

"Deficiencies in a source's safety program may now be considered violations of the general duty clause."

For processes containing extremely hazardous substances below the RMP applicability thresholds, EPA believes that facilities should be able to document that they are fulfilling their RMP general duty to protect the public to the same extent as private industry must fulfill their OSHA general duty to protect employees.

SUBSEQUENT REGULATORY ACTIVITY

25 Aug 97 (62 FR 45129) Final Amendments

EPA changed the regulated toxic substances "Hydrochloric acid (conc. **30%** or greater)" to "Hydrochloric acid (conc. **37%** or greater)."

25 Aug 97 (62 FR 45133) Interpretations

This notice clarifies the following aspects of the RM rule:

- 1. The method for calculating whether a quantity of a regulated substance in a mixture exceeds its regulatory threshold.
- 2. That certain reports and studies required by the accident prevention rules do not need to be reported under section 8(e) of the Toxic Substances Control Act (TSCA) or under the rules implementing TSCA section 8(d).

6 Jan 98 (63 FR 640) Final Amendments

EPA removed explosives from the list of regulated substances.

6 Jan 99 (64 FR 963) Final Amendments

These amendments:

- 1. Add four mandatory and five optional RM Plan data elements that must be submitted to EPA by 21 Jun 99,
- 2. Establish specific procedures for protecting confidential business information when submitting RM Plans,
- 3. Adopt the government's use of the new North American Industry Classification System (NAICS) instead of Standard Industrial Classification (SIC) Codes, and
- 4. Make technical corrections and clarifications.

26 May 99 (64 FR 28695) Direct Final Amendments

In accordance with a settlement agreement with the American Petroleum Institute (API), EPA amended the rule such that certain regulated flammable substances are

treated in the same manner as regulated toxic substances for determining the quantity released during a worst-case release scenario analysis. These amendments pertain to flammable substances that are normally gases at ambient temperature, but are handled as liquids due to refrigeration. When calculating the amount of such a substance, sources may assume and take into account any pooling of the liquefied substance into a "passive mitigation" system, where such pooling would occur at a depth greater that one centimeter. This change will make the treatment of refrigerated flammables consistent with the treatment of other liquefied substances under the rule.

13 Mar 00 (65 FR 13243) Final Amendments

The Chemical Safety Information, Site Security and Fuels Regulatory Relief Act (<u>Pub. L. 106-40</u>) exempts flammable substances from the RM regulation when used as a fuel or held for sale as a fuel at a <u>retail facility</u>. These amendments change the regulations to agree with the Act by adding a specific exclusion. The exclusion is stated in the text of the regulation and emphasized in footnotes to the tables of regulated flammable substances. EPA is not defining "fuel" in the rule but will defer to Webster's definition, "a material used to produce heat or power by burning."

Of the 66 listed flammables less that 20 are likely to be used as fuels. Any process that contains more than 10,000 pounds of a flammable substance that does **not** use the substance as fuel, or is **not** a retail facility holding the flammable substance for sale as fuel, is still subject to the RM regulations.

MILITARY SOURCES

Dr. David Reed, USACHPPM, is a qualified researcher and reviewed EPA's RMP databases to characterize military RMPs submitted as of 20 Jun 99. The following table shows his findings.

Characterization of Military RMP Submissions					
	USAF	Army	Navy	USMC	DLA
# of Facilities Submitting	7	27	10	5	1
# of Chemicals Reported	2	6	4	1	2
Chemical	# of Facilities Reporting Each Chemical				
Cl2	6	17	8	5	
NH3		4	2		
HNO3		4			
1,1 DMH	3	3			
Oleum		2	2		
SO2		1	1		
HCI					3
HF					1

Dr. Reed excluded RMPs submitted exclusively for flammable fuels processes since those processes are now exempt. Notice that the military apparently does not have any covered processes that contain regulated flammables; only regulated toxic substances. Chlorine is clearly the predominant covered process.

A closer look at the RMPs submitted for chlorine reveals that facilities with identical one ton cylinders reported widely different endpoint distances. The endpoint distances represent the radius of the circle within which the public could be affected by an accidental release. Six of eight facilities reported endpoints greater than 1.3 miles; one as high as 5 miles. This is surprising because if the EPA guidance were used, the distance would have been 1.3 miles in urban conditions. It would appear that facilities used more conservative modeling techniques than EPA requires.

COMPLIANCE COST

Affected military installations will have to dedicate resources to meet the RM rule requirements. In addition to environmental personnel working with the rule, installation public affairs personnel should also be brought into the compliance process. The RM regulation requires affected installations to disclose information to the public which details the possibilities of what could happen from a catastrophic release, such as a toxic gas cloud dispersing into the surrounding community causing death or significant injuries.

Risk Management Program Establishment

The following cost guidance is an estimate of the total cost of hiring a contractor to help an installation establish a RM program. Day to day implementation of a facilities RM program would be performed using existing manpower. The public affairs aspect of the data release should not be under emphasized. A representative of the Chemical Manufactures Association has said that some private companies, complying with the OSHA PSM rule, expend about the same amount of human and financial resources on public relations as they are for technical compliance.

	Installation Size (Assumed # of Covered Processes)		
Task	Small (2)	Medium (3)	Large (5)
Initial Applicability Assessment	\$10,000	\$15,000	\$20,000
Program Development (\$10,000 x #)	\$20,000	\$30,000	\$50,000
Risk Management Plan Preparation	\$10,000	\$25,000	\$40,000
Total Cost	\$40,000	\$70,000	\$110,000
"#" = Typical Number of Covered Processes			

Risk Management Program Update

The following cost guidance is an estimate of the total cost of updating a Risk Management Program and Plan to reflect the addition of a new covered process or the modification of and existing covered process.

Activity Resulting in the Need to Update	Cost
Planned addition of a new covered process or planned modification of an uncovered process such that it will become a covered process.	\$20,000
Modification of an existing covered process such that analyses (process hazard analysis, off-site consequence analysis) must be updated.	\$10,000

All of these costs are for planning purposes only.

CONTACTS

- EPA: <u>RCRA/Superfund/EPCRA Hotline</u>, 800-424-9346, or <u>EPA Regional Offices</u>
- Military: <u>HAP Subcommittee Contacts</u>

TABLE 1 - LIST OF REGULATED TOXIC SUBSTANCES AND THRESHOLDS
[Edited version of Table 1 from 40 CFR 68 Subpart F § <u>68.130]</u>

	<u> </u>	Threshold
Chemical Name	CAS No	Quantity (lbs)
Acrolein [2-Propenal]	107-02-8	5,000
Acrylonitrile [2-Propenenitrile]	107-13-1	20,000
Acrylyl chloride [2-Propenoyl chloride]	814-68-6	5,000
Allyl alcohol [2-Propen-1-ol]	107-18-6	15,000
Allylamine [2-Propen-1-amine]	107-11-9	10,000
Ammonia (anhydrous)	7664-41-7	10,000
Ammonia (conc 20% or greater)	7664-41-7	20,000
Arsenous trichloride	7784-34-1	15,000
Arsine	7784-42-1	1,000
Boron trichloride [Borane, trichloro-]	10294-34-5	5,000
Boron trifluoride [Borane, trifluoro-]	7637-07-2	5,000
Boron trifluoride compound with methyl ether (1:1) [Boron, trifluoro[oxybis[metane]]-, T-4-	353-42-4	15,000
Bromine	7726-95-6	10,000
Carbon disulfide	75-15-0	20,000
Chlorine	7782-50-5	2,500
Chlorine dioxide [Chlorine oxide (CIO2)]	10049-04-4	1,000
Chloroform [Methane, trichloro-]	67-66-3	20,000
Chloromethyl ether [Methane, oxybis[chloro-]	542-88-1	1,000
Chloromethyl methyl ether [Methane, chloromethoxy-]	107-30-2	5,000
Crotonaldehyde [2-Butenal]	4170-30-3	20,000
Crotonaldehyde, (E)- [2-Butenal, (E)-]	123-73-9	20,000
Cyanogen chloride	506-77-4	10,000
Cyclohexylamine [Cyclohexanamine]	108-91-8	15,000
Diborane	19287-45-7	2,500
Dimethyldichlorosilane [Silane, dichlorodimethyl-]	75-78-5	5,000
1,1-Dimethylhydrazine [Hydrazine, 1,1-dimethyl-]	57-14-7	15,000
Epichlorohydrin [Oxirane, (chloromethyl)-]	106-89-8	20,000
Ethylenediamine [1,2-Ethanediamine]	107-15-3	20,000
Ethyleneimine [Aziridine]	151-56-4	10,000
Ethylene oxide [Oxirane]	75-21-8	10,000
Fluorine	7782-41-4	1,000
Formaldehyde (solution)	50-00-0	15,000
Furan	110-00-9	5,000
Hydrazine	302-01-2	15,000
Hydrochloric acid (conc 37% or greater)	7647-01-0	15,000
Hydrocyanic acid	74-90-8	2,500
Hydrogen chloride (anhydrous) [Hydrochloric acid]	7647-01-0	5,000
Hydrogen fluoride/Hydrofluoric acid (conc 50% or greater) [Hydrofluoric acid]	7664-39-3	1,000
Hydrogen selenide	7783-07-5	500

TABLE 1 - LIST OF REGULATED TOXIC SUBSTANCES AND THRESHOLDS[Edited version of Table 1 from 40 CFR 68 Subpart F §68.130]

Chemical Name	CAS No	Threshold Quantity (lbs)	
Hydrogen sulfide	7783-06-4	10.000	
Iron, pentacarbonyl- [Iron carbonyl (Fe(CO)5), (TB-5-11-]	13463-40-6	2.500	
Isobutyronitrile [Propanenitrile, 2-methyl-]	78-82-0	20.000	
Isopropyl chloroformate [Carbonochloridic acid. 1-methylethyl ester]	108-23-6	15.000	
Methacrylonitrile [2-Propenenitrile, 2-methyl-]	126-98-7	10,000	
Methyl chloride [Methane, chloro-]	74-87-3	10,000	
Methyl chloroformate [Carbonochloridic acid, methylester]	79-22-1	5.000	
Methyl hydrazine [Hydrazine, methyl-]	60-34-4	15,000	
Methyl isocyanate [Methane, isocyanato-]	624-83-9	10,000	
Methyl mercaptan [Methanethiol]	74-93-1	10,000	
Methyl thiocyanate [Thiocyanic acid, methyl ester]	556-64-9	20,000	
Methyltrichlorosilane [Silane, trichloromethyl-]	75-79-6	5,000	
Nickel carbonyl	13463-39-3	1,000	
Nitric acid (conc 80% or greater)	7697-37-2	15,000	
Nitric oxide [Nitrogen oxide (NO)]	10102-43-9	10,000	
Oleum (Fuming sulfuric acid) [Sulfuric acid, mixture w/sulfur trioxide]Note 1	8014-95-7	10,000	
Peracetic acid [Ethaneperoxoic acid]	79-21-0	10,000	
Perchloromethylmercaptan [Methanesulfenyl chloride, trichloro-]	594-42-3	10,000	
Phosgene [Carbonic dichloride]	75-44-5	500	
Phosphine	7803-51-2	5,000	
Phosphorus oxychloride [Phosphoryl chloride]	10025-87-3	5,000	
Phosphorus trichloride [Phosphorous trichloride]	7719-12-2	15,000	
Piperidine	110-89-4	15,000	
Propionitrile [Propanenitrile]	107-12-0	10,000	
Propyl chloroformate [Carbonochloridic acid, propylester]	109-61-5	15,000	
Propyleneimine [Aziridine, 2-methyl-]	75-55-8	10,000	
Propylene oxide [Oxirane, methyl-]	75-56-9	10,000	
Sulfur dioxide (anhydrous)	7446-09-5	5,000	
Sulfur tetrafluoride [Sulfur fluoride (SF4), (T-4)-]	7783-60-0	2,500	
Sulfur trioxide	7446-11-9	10,000	
Tetramethyllead [Plumbane, tetramethyl-]	75-74-1	10,000	
Tetranitromethane [Methane, tetranitro-]	509-14-8	10,000	
Titanium tetrachloride [Titanium chloride (TiCl4) (T-4)-]	7550-45-0	2,500	
Toluene 2,4-diisocyanate [Benzene, 2,4-diisocyanato-1-methyl-]Note 1	584-84-9	10,000	
Toluene 2,6-diisocyanate [Benzene, 1,3-diisocyanato-2-methyl-]Note 1	91-08-7	10,000	
Toluene diisocyanate (unspecified isomer) [Benzene, 1,3-diisocyanatomethyl-] <u>Note 1</u>	26471-62-5	10,000	
Trimethylchlorosilane [Silane, chlorotrimethyl-]	75-77-4	10,000	
Vinyl acetate monomer [Acetic acid ethenyl ester]	108-05-4	15,000	
Note: 1) The mixture exemption in <u>§68.115</u> (b)(1) does not apply to the substance.			

TABLE 3 - LIST OF REGULATED **FLAMMABLE SUBSTANCES** AND THRESHOLDS [Edited version of Table 3 from 40 CFR 68 Subpart F §<u>68.130</u>.)

Chemical Name	CAS No	Threshold Quantity (lbs)
Acetaldehyde	75-07-0	10.000
Acetylene [Ethyne]	74-86-2	10,000
Bromotrifluorethylene [Ethene, bromotrifluoro-]	598-73-2	10,000
1.3-Butadiene	106-99-0	10,000
Butane	106-97-8	10,000
1-Butene	106-98-9	10.000
2-Butene	107-01-7	10,000
Butene	25167-67-3	10,000
2-Butene-cis	590-18-1	10,000
2-Butene-trans [2-Butene, (E)]	624-64-6	10,000
Carbon oxysulfide [Carbon oxide sulfide (COS)]	463-58-1	10,000
Chlorine monoxide [Chlorine oxide]	7791-21-1	10,000
2-Chloropropylene [1-Propene, 2-chloro-]	557-98-2	10,000
1-Chloropropylene [1-Propene, 1-chloro-]	590-21-6	10,000
Cyanogen [Ethanedinitrile]	460-19-5	10,000
Cyclopropane	75-19-4	10,000
Dichlorosilane [Silane, dichloro-]	4109-96-0	10,000
Difluoroethane [Ethane, 1,1-difluoro-]	75-37-6	10,000
Dimethylamine [Methanamine, N-methyl-]	124-40-3	10,000
2,2-Dimethylpropane [Propane, 2,2-dimethyl-]	463-82-1	10,000
Ethane	74-84-0	10,000
Ethyl acetylene [1-Butyne]	107-00-6	10,000
Ethylamine [Ethanamine]	75-04-7	10,000
Ethyl chloride [Ethane, chloro-]	75-00-3	10,000
Ethylene [Ethene]	74-85-1	10,000
Ethyl ether [Ethane, 1,1'-oxybis-]	60-29-7	10,000
Ethyl mercaptan [Ethanethiol]	75-08-1	10,000
Ethyl nitrite [Nitrous acid, ethyl ester]	109-95-5	10,000
Hydrogen	1333-74-0	10,000
Isobutane [Propane, 2-methyl]	75-28-5	10,000
Isopentane [Butane, 2-methyl-]	78-78-4	10,000
Isoprene [1,3-Butadiene, 2-methyl-]	78-79-5	10,000
Isopropylamine [2-Propanamine]	75-31-0	10,000
Isopropyl chloride [Propane, 2-chloro-]	75-29-6	10,000
Methane	74-82-8	10,000
Methylamine [Methanamine]	74-89-5	10,000
3-Methyl-1-butene	563-45-1	10,000
2-Methyl-1-butene	563-46-2	10,000
Methyl ether [Methane, oxybis-]	115-10-6	10,000

Important ! See <u>Note 1</u> at the end of this table.

TABLE 3 - LIST OF REGULATED **FLAMMABLE SUBSTANCES** AND THRESHOLDS [Edited version of Table 3 from 40 CFR 68 Subpart F §<u>68.130</u>.)

		Threshold
Chemical Name	CAS No.	Quantity (lbs)
Methyl formate [Formic acid, methyl ester]	107-31-3	10,000
2-Methylpropene [1-Propene, 2-methyl-]	115-11-7	10,000
1,3-Pentadiene	504-60-9	10,000
Pentane	109-66-0	10,000
1-Pentene	109-67-1	10,000
2-Pentene, (E)-	646-04-8	10,000
2-Pentene, (Z)-	627-20-3	10,000
Propadiene [1,2-Propadiene]	463-49-0	10,000
Propane	74-98-6	10,000
Propylene [1-Propene]	115-07-1	10,000
Propyne [1-Propyne]	74-99-7	10,000
Silane	7803-62-5	10,000
Tetrafluoroethylene [Ethene, tetrafluoro-]	116-14-3	10,000
Tetramethylsilane [Silane, tetramethyl-]	75-76-3	10,000
Trichlorosilane [Silane, trichloro-]	10025-78-2	10,000
Trifluorochloroethylene [Ethene, chlorotrifluoro-]	79-38-9	10,000
Trimethylamine [Methanamine, N,N-dimethyl-]	75-50-3	10,000
Vinyl acetylene [1-Buten-3-yne]	689-97-4	10,000
Vinyl chloride [Ethene, chloro-]	75-01-4	10,000
Vinyl ethyl ether [Ethene, ethoxy-]	109-92-2	10,000
Vinyl fluoride [Ethene, fluoro-]	75-02-5	10,000
Vinylidene chloride [Ethene, 1,1-dichloro-]	75-35-4	10,000
Vinylidene fluoride [Ethene, 1,1-difluoro-]	75-38-7	10,000
Vinyl methyl ether [Ethene, methoxy-]	107-25-5	10,000
Nata		

Important ! See <u>Note 1</u> at the end of this table.

Note:

1) A flammable substance when used as a fuel or held for sale as a fuel at a retail facility is excluded from all provisions of this part (see \S <u>68.126</u>).

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