Environmental Investigations ALERT

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OSHA 29 CFR 1910.119 - BEGINNING COMPLIANCE WITH THE PROCESS SAFETY MANAGEMENT STANDARD

What is Process Safety Management? Does This Standard Affect Me?

OSHA has recently begun to enforce OSHA's Process Safety Management Standard (29 CFR 1910.119). The standard applies to any manufacturing facility process which stores, manufactures, handles, or transports any toxic or reactive chemical at or above the specific threshold quantities listed in the standard. A listing of these chemicals with threshold quantities is included with this newsletter. This standard additionally covers flammable liquids or gases stored at one location in quantities of 10,000 pounds or more; however, specific detailed exemptions exist which cannot be adequately covered in this alert. The Process Safety Management Standard targets highly hazardous chemicals and flammable liquids or gases that have the potential to cause a catastrophic incident.

The standard as a whole is to aid employers in their efforts to prevent or mitigate episodic chemical releases that could lead to a catastrophe in the workplace and possibly in the surrounding community. Besides complying with stringent OSHA requirements and avoiding costly regulatory penalties, an effective Process Safety Management program will allow you to keep your workers and surrounding community safe. Your corporate image as a good citizen should be protected. Safety management is essential.

An effective process safety management program requires a systematic approach to evaluating the entire process. Using this approach, the process design, process technology, operational and maintenance activities and procedures, non-routine activities and procedures, emergency preparedness plans and procedures, training programs, and other elements which impact the process are all considered in the evaluation. As with any comprehensive management system, the fundamental component in the system's success is the assemblage or development of complete and accurate information.

In this first of a series of newsletters on Process Safety Management, Environmental Investigations, a professional engineering firm, describes the information necessary to thoroughly document process chemicals, process technology, and process equipment. Subsequent newsletters will discuss how this collection of information should be used to perform required process hazard analyses, develop safe operating procedures and practices, conduct training programs, deal with contractors, inspect equipment, manage change, prepare for emergencies, and audit the program's success.

Compilation of a Process Technical Manual

Affected facilities must identify those processes that pose the greatest risk and perform a process hazard analysis (PHA) on these processes. At least 50 percent of processes should have been evaluated by May 26, 1995, with an additional 25 percent completed each following year until 1997, when PHAs on all processes should be complete.

Prior to completing any PHA, a written compilation of process information must be performed to enable employees and employers to identify and understand the hazards associated with a given process. The compiled information, referred to as the Process Technical Manual, will be a fundamental resource to the team performing the PHA; individuals who develop training programs, operating procedures and perform emergency planning; contractors; insurance carriers; and enforcement officials. The Process Technical Manual is to be kept for the lifetime of the process and updated whenever process alterations are made. The written summary must include a discussion of HIGHLY HAZARDOUS CHEMICALS USED OR PRODUCED IN THE PROCESS, TECHNOLOGY OF THE PROCESS, and EQUIPMENT UTILIZED IN THE PROCESS.

Chemical Information. The information to be compiled about the chemicals, including process intermediates, needs to be comprehensive enough for an accurate assessment of the fire and explosion characteristics, reactivity hazards, the safety and health hazards to workers and the community, and the corrosion and erosion effects on the process equipment and monitoring tools. Current material safety data sheet (MSDS) information can be used to help meet this requirement, but must be supplemented with process chemistry information, which includes the formation of secondary compounds during the inadvertent mixing of process chemicals, if applicable. Sometimes MSDSs need to be supplemented by other resources such as product bulletins and safety references.

The following items should be addressed: *(1) toxicity, (2) permissible exposure limits, (3) corrosivity data, (4) physical data, (5) reactivity, thermal stability and chemical stability, and (6) hazardous effects of inadvertent mixing of different materials.*

Process Technology Information. Process technology information will be a part of the process safety information package and should include employer-established criteria for maximum inventory levels for process chemicals. A qualitative estimate of the consequences or results of deviation that could occur if operating beyond the established process limits should also be addressed. Employers are encouraged to use diagrams that will help users understand the process. In order to address a given process technology the following items should be covered:

- *Process flow diagrams* including any associated pollution control equipment. Process flow diagrams should show all main flow streams including valves, as well as pressures and temperatures on all feed and product lines within major vessels and conditions entering/ exiting headers and heat exchangers. Information on construction materials, pump capacities, pressure heads, compressor horsepower and vessel design pressures/temperatures, should also be shown.

- *Process chemistry.*

- *Maximum intended inventory,* which also includes mateials in storage as well as those utilized in the manufacturing process, (limits beyond which would be considered upset conditions).

- *Safe ranges of process operation limits,* including temperatures, pressures, flow rates or chemical compositions. A block flow diagram or table can be utilized to address operation limits.

- *Consequences* of exceeding process technology deviations especially those impacting employee safety and health.

Process Equipment Information. An assessment of process equipment must be conducted to determine compliance with good engineering practices. Piping and instrument diagrams (P&ID's) are an excellent tool to describe the relationship between equipment and instrumentation. Equipment diagrams should clearly identify the location of the process equipment to other systems and population centers (control rooms, offices and maintenance facilities). There should also be a facility layout plan which illustrates the location of safety systems, including firewater headers, hydrants, extinguishers, and flammable material/toxic gas monitors and alarm systems.

Equipment information shall at least include: *(1) construction materials, (2) electrical classifications, (3) backup system designs, (4) ventilation system designs, (5) standard design codes employed in the process, (6) material and energy balances for processes built after May 1992, and (7) safety systems (i.e., interlocks, detection or suppression systems).*

How to Get Started

The task of assembling and organizing the vast amount of chemical, process, and equipment information can be burdensome, especially for smaller companies with limited environmental, safety, and engineering staff resources.

Environmental Investigations (EI) can provide the necessary resources to fully document your processes and evaluate your safety needs. EI has the expertise and experience to assist you in complying with this comprehensive body of regulatory requirements.

Our trained engineering staff can assemble the necessary information and develop a Process Safety Management program that will serve not only as a regulatory compliance document, but will enable your company to provide a safe and efficient workplace.

LIST OF HIGHLY HAZARDOUS CHEMICALS, TOXICS AND REACTIVES

CHEMICAL NAME	*CAS**	*TQ***
Acetaldehyde	75-07-0	2500
Acrolein (2-Propenal)	107-02-8	150
Acrylyl Chloride	814-68-6	250
Alkylaluminums	Varies	5000
Allyl Chloride	107-05-1	1000
Allylamine	107-11-9	1000
Ammonia solutions (greater than 44% ammonia by weight)	7664-41-7	15000
Ammonia, Anhydrous	7664-41-7	10000
Ammonium Perchlorate	7790-98-9	7500
Ammonium Permanganate	7787-36-2	7500
Arsine (also called Arsenic Hydride)	7784-42-1	100
Bis (Chloromethyl) Ether	542-88-1	100
Boron Trichloride	10294-34-5	2500
Boron Trifluoride	7637-07-2	250
Bromine	7726-95-6	1500
Bromine Chloride	13863-41-7	1500
Bromine Pentafluoride	7789-30-2	2500
3-Bromopropyne (also called Propargyl Bromide)	106-96-7	100
Bromine Trifluoride	7787-71-5	15000
Butyl Hydroperoxide (Tertiary)	75-91-2	5000
Butyl Perbenzoate (Tertiary)	614-45-9	7500
Carbonyl Chloride (see Phosgene)	75-44-5	100
Carbonyl Fluoride	353-50-4	2500
Cellulose Nitrate (concentration greater than 12.6% nitrogen)	9004-70-0	2500
Chlorine	7782-50-5	1500
Chlorine Dioxide	10049-04-4	1000
Chlorine Pentrafluoride	13637-63-3	1000
Chlorine Trifluoride	7790-91-2	1000
1-Chloro-2, 4-Dinitrobenzene	97-00-7	5000
Chlorodiethylaluminum (also called Diethylaluminum Chloride)	96-10-6	5000
Chloromethyl Methyl Ether	107-30-2	500
Chloropicrin	76-06-2	500
Chloropicrin and Methyl Bromide mixture	None	1500
Chloropicrin and Methyl Chloride mixture	None	1500
Cumene Hydroperoxide	80-15-9	5000
Cyanogen	460-19-5	2500
Cyanogen Chloride	506-77-4	500
Cyanuric Fluoride	675-14-9	100
Diacetyl peroxide (concentration greater than 70%)	110-22-5	5000
Diazomethane	334-88-3	500
Dibenzoyl Peroxide	94-36-0	7500
Diborane	19287-45-7	100
Dibutyl Peroxide (Tertiary)	110-05-4	5000
Dichloro Acetylene	7572-29-4	250
Dichlorosilane	4109-96-0	2500
Diethylzinc	557-20-0	10000
Diisopropyl Peroxydicarbonate	105-64-6	7500

CHEMICAL NAME	*CAS**	*TQ***
Dilauroyl Peroxide	105-74-8	7500
Dimethylamine, Anhydrous	124-40-3	2500
Dimethyldichlorosilane	75-78-5	1000
Dimethylhydrazine, 1, 1-	57-14-7	1000
2, 4-Dinitroaniline	97-02-9	5000
Ethyl Methyl Ketone Peroxide (also Methyl Ethyl Ketone peroxide; concentration greater than 60%)	1338-23-4	5000
Ethyl Nitrite	109-95-5	5000
Ethylamine	75-04-7	7500
Ethylene Fluorohydrin	371-62-0	100
Ethylene Oxide	75-21-8	5000
Ethyleneimine	151-56-4	1000
Fluorine	7782-41-4	1000
Formaldehyde (Formalin)	50-00-0	1000
Furan	110-00-9	500
Hexafluoroacetone	684-16-2	5000
Hydrochloric Acid, Anhydrous	7647-01-0	5000
Hydrofluoric Acid, Anhydrous	7664-39-3	1000
Hydrogen Bromide	10035-10-6	5000
Hydrogen Chloride	7647-01-0	5000
Hydrogen Cyanide, Anhydrous	74-90-8	1000
Hydrogen Fluoride	7664-39-3	1000
Hydrogen peroxide (52% by weight or greater)	7722-84-1	7500
Hydrogen Selenide	7783-07-5	150
Hydrogen Sulfide	7783-06-4	1500
Hydroxylamine	7803-49-8	2500
Iron, Pentacarbonyl	13463-40-6	250
Isopropylamine	75-31-0	5000
Ketene	463-51-4	100
Methacrylaldehyde	78-85-3	1000
Methacryloyl Chloride	920-46-7	150
Methacryloyloxyethyl Isocyanate	30674-80-7	100
Methyl Acrylonitrile	126-98-7	250
Methyl Bromide	74-83-9	2500
Methyl Chloride	74-87-3	15000
Methyl Chloroformate	79-22-1	500
Methyl Ethyl Ketone Peroxide (concentration greater than 60%)	1338-23-4	5000
Methyl Fluoroacetate	453-18-9	100
Methyl Fluorosulfate	421-20-5	100
Methyl Hydrazine	60-34-4	100
Methyl Iodide	74-88-4	7500
Methyl Isocyanate	624-83-9	250
Methyl Mercaptan	74-93-1	5000
Methyl Vinyl Ketone	79-84-4	100
Methylamine, Anhydrous	74-89-5	1000
Methyltrichlorosilane	75-79-6	500

Nickel Carbonly (Nickel Tetracarbonyl)	13463-39-3	150
Nitric Acid (94.5% by weight or greater)	7697-37-2	500

LIST OF HIGHLY HAZARDOUS CHEMICALS, TOXICS AND REACTIVES

CHEMICAL NAME	*CAS**	*TQ***
Nitric Oxide	10102-43-9	250
Nitroaniline (para Nitroaniline)	100-01-6	5000
Nitrogen Dioxide	10102-44-0	250
Nitrogen Oxides (NO; NO2; N2O4; N2O3)	10102-44-0	250
Nitrogen Tetroxide (also called Nitrogen Peroxide)	10544-72-6	250
Nitrogen Trifluoride	7783-54-2	5000
Nitromethane	75-52-5	2500
Oleum (65% to 80% by weight; also called Fuming Sulfuric Acid)	8014-94-7	1000
Osmium Tetroxide	20816-12-0	100
Oxygen Difluoride (Fluorine Monoxide)	7783-41-7	100
Ozone	10028-15-6	100
Pentaborane	19624-22-7	100
Peracetic Acid (concentration greater 60% Acetic Acid; also called Peroxyacetic Acid)	79-21-0	1000
Perchloric Acid (concentration greater than 60% by weight)	7601-90-3	5000
Perchloromethyl Mercaptan	594-42-3	150
Perchloryl Fluoride	7616-94-6	5000
Peroxyacetic Acid (concentration greater than 60% Acetic Acid; also called Peracetic Acid)	79-21-0	1000
Phosgene (also called Carbonyl Chloride)	75-44-5	100
Phosphine (Hydrogen Phosphide)	7803-51-2	100
Phosphorus Oxychloride (also called Phosphoryl Chloride)	10025-87-3	1000
Phosphorus Trichloride	7719-12-2	1000
Phosphoryl Chloride (also called Phosphorus Oxychloride)	10025-87-3	1000
Propargyl Bromide	106-96-7	100
Propyl Nitrate	627-3-4	2500
Sarin	107-44-8	100
Selenium Hexafluoride	7783-79-1	1000
Stibine (Antimony Hydride)	7803-52-3	500
Sulfur Dioxide (liquid)	7446-09-5	1000
Sulfur Pentafluoride	5714-22-7	250
Sulfur Tetrafluoride	7783-60-0	250
Sulfur Trioxide (also called Sulfuric Anhydride)	7446-11-9	1000
Sulfuric Anhydride (also called Sulfur Trioxide)	7446-11-9	1000
Tellurium Hexafluoride	7783-80-4	250
Tetrafluoroethylene	116-14-3	5000
Tetrafluorohydrazine	10036-47-2	5000
Tetramethyl Lead	75-74-1	1000
Thionyl Chloride	7719-09-7	250
Trichloro (chloromethyl) Silane	1558-25-4	100
Trichloro (dichlorophenyl) Silane	27137-85-5	2500
Trichlorosilane	10025-78-2	5000
Trifluorochloroethylene	79-38-9	10000
Trimethyoxysilane	2487-90-3	1500

*Chemical Abstract Service Number

**Threshold Quantity in Pounds (Amount necessary to be covered by this standard.)