Clean Air Act 112(r) Risk Management Program (RMP) EPCRA

CHEMICAL EMERGENCY PREVENTION & PLANNING Newsletter

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Cowiche Growers in Washington State fined over $17,000 for Clean Air Act Violations

(Cowiche, WA) Cowiche Growers, Inc. reached a $17,538 settlement with the U.S. Environmental Protection Agency (EPA) for alleged federal Clean Air Act (CAA) emergency prevention and planning violations. In addition to the penalty, Cowiche Growers agreed to provide over $43,000 to purchase new equipment to safely store their ammonia as well as communications equipment for Yakima Fire District #1.

As part of the settlement with the EPA, CGI has corrected all alleged violations, agreed to pay the penalty and spend at least $43,615 on implementing two Supplemental Environmental Projects (SEPs) within the next six months. One of the SEPs involves the installation of new equipment that will store the company's anhydrous ammonia in a safer and more secure location. The other SEP involves the purchase of communications equipment for Yakima Fire District #1 that serves the cities of Cowiche and Tieton.

CGI owns and operates a cold storage warehouse in Cowiche, Washington where it utilizes more than 10,000 lbs of anhydrous ammonia. At that level of use, section 112(r) of the Clean Air Act requires CGI to implement a Risk Management Program (RMP) at the facility.

Based on an inspection of CGI in June of 2006, EPA found the facility's prevention program to be insufficient. EPA was particularly concerned about the lack of safety information pertaining to: the hazards of ammonia; procedures for identifying, evaluating, and controlling the hazards involved in the cold storage process; sufficient operating procedures and operator training; and documentation regarding process equipment maintenance.
Following the inspection, CGI has worked diligently towards coming into compliance.

Pioneer Americas, LLC agrees to provide over $59,000 in Emergency Response Equipment for Tacoma Fire Department for EPRCA Violation

(Tacoma, WA) The U.S. Environmental Protection Agency (EPA) reached a settlement with Pioneer Americas, LLC (Pioneer) for its failure to report the release of nearly 900 lbs of chlorine from their Tacoma facility in a timely manner. The settlement includes $15,804 in penalties and $59,144 to provide emergency response equipment for local firefighters.
The settlement agreement alleges that on February 12, 2007, the Pioneer facility (located at 2001 Thorne Road in Tacoma, Washington) failed to immediately notify local and state agencies about the chlorine release. The chlorine release and the failure to notify appropriate agencies are violations of the federal Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the Emergency Planning and Community Right-to-Know Act (EPCRA).

Don't forget the Lessons of the Past!

The Flixborough Disaster Case History

[The following information has been taken from the UK government publication *The Flixborough Disaster – Report of the Court of Inquiry.* While this summary has been condensed and paraphrased, it is believed to have been consistent with the facts and conclusions outlined in the report.]

On June 1, 1974, the Flixborough Works of Nypro (UK) Limited experienced a massive vapor cloud explosion. 28 employees were killed and 36 injured (18 of the fatalities were in the control room building, which collapsed during the explosion). In addition, hundreds of persons off-site were injured, 53 with injuries significant enough to be classified by the authorities as "casualties." Fortunately, there were no off-site fatalities, and the on-site fatalities were limited by the fact that the explosion occurred during the weekend.

The explosion and subsequent fires totally destroyed the plant, which was never rebuilt. Over 1800 houses and 167 businesses in the surrounding communities were damaged.

Subsequent investigation revealed that the most likely cause of the explosion was the failure of a temporary piping modification (bypass line) that was fabricated approximately 8 weeks previously to bridge the gap between the outlet of one reactor and the inlet of another reactor. When the piping failed, an estimated 30 tons of cyclohexane vapor were released. The resulting vapor cloud found an ignition source, producing a deflagration (there is some speculation that the explosion could have been a detonation) releasing the energy equivalent of about 16 tons of TNT.

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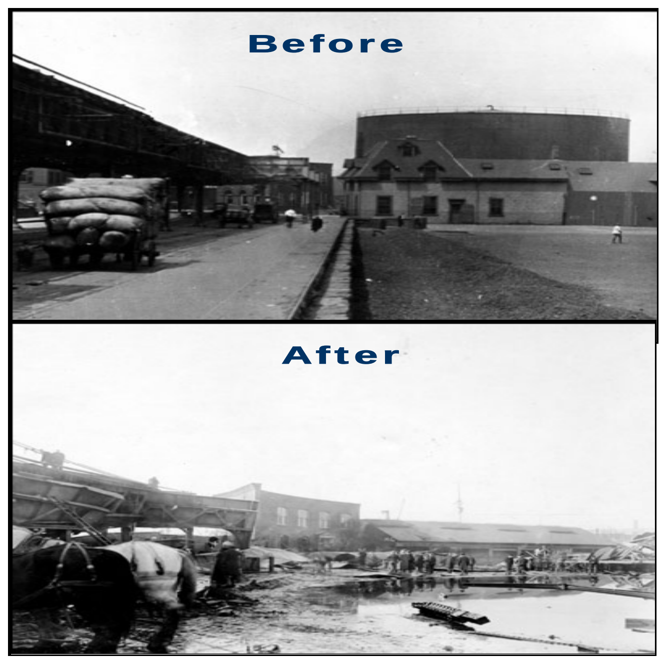
Don't forget the Lessons of the Past!

The Great Boston Molasses Flood of 1919

On January 15, 1919, people in north Boston, Massachusetts heard a loud rumbling noise and watched in horror as a 50 foot high tank containing 2.3 million US gallons of molasses suddenly broke apart, releasing its contents into the city. A wave of molasses over 15 feet high and 160 feet wide surged through the streets. How slow is molasses in January? This wave traveled at an estimated speed of 35 miles per hour for more than 2 city blocks. 21 people were killed, over 150 injured, and the damage estimate was equivalent to over 100 million US dollars in today's currency.



What caused this catastrophic tank failure? Some of the causes identified by the investigation included:

- The tank was not properly inspected during construction.
- The tank was not tested after construction and before filling it with molasses.
- The tank had been observed to be leaking at the welds between the tank's steel plates before the failure, but no action had been taken.

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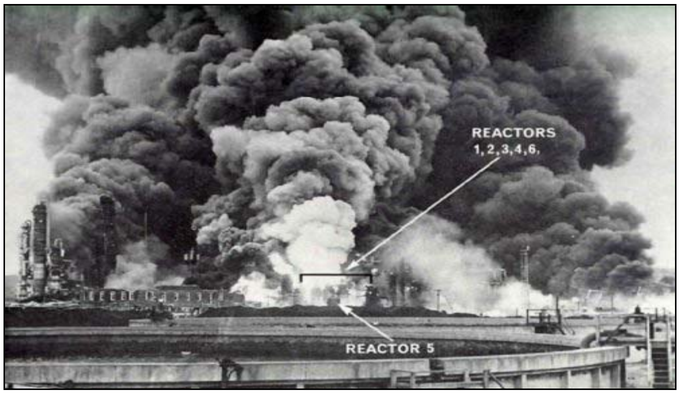
The Flixborough ...



The subsequent investigation revealed the following:

- The works engineer had left early in the year and had not yet been replaced. At the time the bypass line was being planned and installed, there was no engineer on site with the qualifications to perform a proper mechanical design, or to provide critical technical review on related issues.
- Even though a significant crack was found in one of the 6 reactors, the decision was made to restart the process without inspecting the other reactors to determine if similar cracks existed.
- Staff involved in planning and implementing the bypass approached the task as if it were a routine plumbing job.
- The urgency to resume production distracted staff from the sort of critical consideration of their plans that could have identified the hazards involved.
- The fact that the works manager position was vacant also shifted workload to remaining staff. The report implies that company management was not aware of the effect of the short staffing on the performance of the facility staff involved in the modification.
- No consideration was given to the bending movements or hydraulic thrusts of the temporary piping.
- No drawing was made for the design, other than a chalk sketch made on the floor of the maintenance workshop.
- There were no quality assurance checks made on the fabrication or installation of the assembly other than a leak check.
- The facility did not have an adequate system for evaluating and controlling changes to ensure that safety was not impacted.

The Great Boston ...

Do you know?

- A large quantity of any liquid, even a non-hazardous material such as molasses or water, can be dangerous if rapidly released in large quantities, simply because of its volume and mass.

- You might think that an incident that occurred over 80 years ago is not relevant to today's industry. But, we still have catastrophic failures of storage tanks today (see pictures below), and for similar reasons.

January 1988 – Floreffe, Pennsylvania, tank failure releases over 4 million gals of diesel oil into the Monongahela River.

January 2000 – Cincinnati, Ohio, tank failure releases 365,000 gallons of fertilizer solution into the Ohio River.

What you can do

- If you observe leakage, corrosion, or other indication of potential failure in a storage tank, report it immediately to management.

- Make sure that any new tank, or one being returned to service following repair or inactivity, is properly inspected and tested before filling.

- Ensure you know the operating capacities of your tanks and double check the level before filling.

- Don't throw out your old incident reports. Read them again, and remember the lessons. We can learn a lot from things that happened a long time ago.

(Source: Process Safety Beacon)

The Process Safety and Risk Management Program Regulations

The early driving force for Process Safety and Risk Management concepts and the ensuing regulations were major chemical incidents at facilities throughout the world. These incidents raised concerns about a lack of planning and preparation for similar future accidents.

Some Landmark Incidents

- Seveso, Italy - 1976
  Major Dioxin release resulting in on-site and offsite contamination of several square miles of land; as many as 2000 were treated for dioxin poisoning.

- Bhopal, India - 1984
  Major Methyl Isocyanate release resulting in over 3,000 fatalities, mostly off-site.

- Institute, West Virginia - 1985
  Alicarb oxime and methyl chloride release; over 100 persons evacuated

- Pasadena, Texas - 1989
  Petrochemical explosion and fire; 23 fatalities

- Channelview, Texas - 1990
  Petrochemical explosion; 17 fatalities

These incidents and other chemical incidents led to major changes within the entire U.S. chemical industry, and to a series of Federal laws and regulations intended to prevent major chemical accidents, and to mitigate and respond to any that do occur.

The Ensuing Federal Regulations

- Chemical Emergency Preparedness Program - passed in 1985.
- Emergency Planning and Community Right-to-Know (EPCRA), also known as Superfund Amendments and Reauthorization Act (SARA) Title III - passed in 1986.
- Clean Air Act Amendments – passed in 1990
- OSHA's PSM Regulation – Aimed at Worker Safety; Effective 1992
- EPA's RMP Regulation – Aimed at Community Safety; Effective 1999.

The EPCRA Law

The EPCRA law provides an infrastructure at the state and local levels to plan for chemical emergencies. Facilities that have spilled hazardous substances, or that store, use, or release certain chemicals are subject to various reporting requirements. Common EPCRA topics include:

1) Emergency planning
2) Hazardous chemical storage reporting
3) Toxic chemical emergency release reporting & Form R or A
4) Toxic chemical release inventory (TRI) database
5) Public access to chemical information

Clean Air Act Amendments

The Clean Air Act Amendments of 1990 authorized both OSHA's Process Safety Management (PSM) standard and EPA's Risk Management Program (RMP).

OSHA's PSM Regulation

The Occupational Safety and Health Administration (OSHA) developed Process Safety Management, or PSM, which is designed to prevent or minimize the consequences of catastrophic chemical releases. Chemicals can be toxic, reactive, flammable or explosive and may create toxic, fire or explosion hazards. OSHA's PSM is designed to protect workers in industries where certain chemicals are present at or above prescribed threshold quantities.

EPA's RMP Rule

The Risk Management Program (RMP) was created to prevent and prepare for releases of toxic and flammable substances that have the potential for catastrophic consequences. The RMP requires facilities with over a threshold amount of a hazardous substance to conduct hazard analyses,

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develop a prevention program, and develop emergency response procedures.

The **General Duty Clause**, also authorized by Section 112(r) of the Clean Air Act, requires owners and operators to identify the chemical hazards within their facilities and to safely operate their facilities regardless of the quantities available. The Risk Management Program seeks to protect both workers as well as the public and environment offsite by preventing hazardous chemical releases and ensuring that a response plan is in place in case of a release.

The RMP management programs are organized into subject elements. The subject elements include:

1) Management System – Administration of implementation of the RMP elements.

2) Hazard Assessment – Offsite consequence analysis of worst case and alternate case release scenario.

3) Process Safety Information – Hazards of the chemical, technology of process and equipment in the covered process.

4) Process Hazard Analysis - Thorough, organized, systematic approach to identifying, evaluating and controlling the hazards of covered processes.

5) Operating Procedures – Written instructions for safely conducting activities involved in the covered process.

6) Training – Employees, involved in a covered process trained in an overview of process and the operating procedures.

7) Mechanical Integrity – Maintain critical process equipment to ensure proper design and that the equipment operates properly.

8) Management of Change – Manage changes (except "replacement-in-kind") to process chemicals, technology, procedures and equipment.

9) Pre-Startup Safety Review – Review prior to startup of new or significantly modified facilities.

10) Compliance Audits – Documented periodic evaluation of compliance with RMP requirements.

These tanks are part of an enormous petroleum tank farm, which present special hazards due to the large amounts of fuels on-site. Not all of these tanks were full, either. Up-to-date EPCRA reporting can help emergency responders discern this information in the event of a leak or fire.

One of the many incidents that helped get EPCRA passed was the Roseville, Minnesota incident involving just this type of fire. In Roseville, the large gasoline storage tanks leaked and a fire started that damaged homes and killed some people. Because EPCRA did not exist at that time, firefighters and police had no idea what chemicals were stored there, their quantities, or even that they were there in the first place, hindering response. The Roseville fire burned for days.

11) Incident Investigation – Investigation and documentation of incidents.

12) Employee Participation – Documented employee involvement in RMP.

13) Hot Work Permit – Requirements during hot work operations on or near a covered process.

14) Contractors – Management of contractors and contractor employees.

15) Emergency Planning and Response – Written emergency action plan including provisions for training and drills.

RMP and PSM "Periodic Actions"

Once PSM and RMP are in place, there are a number of actions that must be completed periodically for the life of the process. The table next page summarizes the required periodic actions along with the frequency with which each item must be performed. These are the items that typically show up on audits as deficiencies in RMP (Program 3 process) and PSM Prevention Programs. Consider using the periodic action table to do a quick check for compliance and as a reminder of when particular items need to be completed.

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RMP/PSM "Periodic Actions"

Program Element	Required Action	Frequency
Employee Participation	Document	As performed
Process Safety Information	Update Information	As needed, when process changes occur
Process Hazard Analysis (PHA)	Revalidate PHA	Every 5 years or if there are major process change
Operating Procedures	Review, Update, and Certify as accurate in writing	Annually, or when a process change affecting the procedures occurs
Training	Perform Refresher Training (operating and maintenance procedures, including safe work practices)	Every 3 years or less, based on employee consultation
	Perform Training Update	Whenever operating or maintenance procedures are updated following a process change
	Consult with employees about the frequency of training and document the consultation	Once. Ensure new employees are consulted
Contractors	Require training (test submission)	Every 3 years or less (should be the same as employees)
Pre-startup Safety Review	Complete form	As needed for process change
Management of Change	Complete form	As needed for process change
Mechanical Integrity	Update Maintenance Procedures	As needed when process changes occur
Emergency Planning and Response	Perform training	For all employees, initially or if duties or procedures change
Compliance Audits	Perform compliance audits	Every 3 years or less

Cross Reference of PSM and RMP (Program 3 process) Prevention Program

RMP Section	Title	OSHA PSM Reference
§ 68.65	Process Safety Information	PSM standard § 1910.119(d)
§ 68.67	Process Hazard Analysis (PHA)	PSM standard § 1910.119(e)
§ 68.69	Operating Procedures	PSM standard § 1910.119(f)
§ 68.71	Training	PSM standard § 1910.119(g)
§ 68.73	Mechanical Integrity	PSM standard § 1910.119(j)
§ 68.75	Management of Change	PSM standard § 1910.119(l)
§ 68.77	Pre-Startup Review	PSM standard § 1910.119(I)
§ 68.79	Compliance Audits	PSM standard § 1910.119(o)
§ 68.81	Incident Investigation	PSM standard § 1910.119(m)
§ 68.83	Employee Participation	PSM standard § 1910.119(c)
§ 68.85	Hot Work Permit	PSM standard § 1910.119(k)
§ 68.87	Contractors	PSM standard § 1910.119(h)

Process Hazard Identification, Analysis and Control

There are several methods organizations can use to identify hazards. Some rely solely on walk-around inspections by first-line supervisors, management or safety committees, others go through formal hazard analyses of different parts of the operation and some use a combination of methods.

One of the more common tools used for hazard identification are checklists. Checklists can serve as a good starting point for organizations to assist employers and employees identify hazards.

A process hazard analysis (PHA) is generally a more complex procedure. Process hazard analyses are most commonly associated with EPA's Risk Management Program (RMP) rule, 40 CFR Part 68, and OSHA's Process Safety Management (PSM) standards, 29 CFR 1910.119.

Discussions

A process hazard analysis is one of the most important elements of the RMP rule and PSM standard. 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 which 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. The selection of a PHA methodology or technique will be influenced by many factors including the amount of existing knowledge about the process. Is it a process that has been operated for a long period of time with little or no innovation and extensive experience has been generated with its use? Or, is it a new process or one which has been changed frequently by the inclusion of innovative features? Also, the size and complexity

of the process will influence the decision as to the appropriate PHA methodology to use.

All PHA methodologies are subject to certain limitations. For example, the checklist methodology works well when the process is very stable and no changes are made, but it is not as effective when the process has undergone extensive change. The checklist may miss the most recent changes and consequently the changes would not be evaluated. Another limitation to be considered concerns the assumptions made by the team or analyst. The PHA is dependent on good judgment and the assumptions made during the study need to be documented and understood by the team and reviewer and kept for a future PHA.

The team conducting the PHA needs to understand the methodology that is going to be used. A PHA team can vary in size from two people to a number of people with varied operational and technical backgrounds. Some team members may only be a part of the team for a limited time.

The team leader needs to be fully knowledgeable in the proper implementation of the PHA methodology that is to be used and should be impartial in the evaluation. The other full or part time team members need to provide the team with expertise in areas such as process technology, process design, operating procedures and practices, including how the work is actually performed, alarms, emergency procedures, instrumentation, maintenance procedures, both routine and non-routine tasks, including how the tasks are authorized, procurement of parts and supplies, safety and health, and any other relevant subject as the need dictates. At least one team member must be familiar with the process.

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The ideal team will have an intimate knowledge of the standards, codes, specifications and regulations applicable to the process being studied. The selected team members need to be compatible and the team leader needs to be able to manage the team and the PHA study. The team needs to be able to work together while benefiting from the expertise of others on the team or outside the team, to resolve issues, and to forge a consensus on the findings of the study and the recommendations.

The application of a PHA to a process may involve the use of different methodologies for various parts of the process. For example, a process involving a series of unit operations of varying sizes, complexities, and ages may use different methodologies and team members for each operation. Then the conclusions can be integrated into one final study and evaluation.

A more specific example is the use of a checklist PHA for a heat exchanger and the use of a Hazard and Operability PHA for the overall process. Also, for batch type processes like custom batch operations, a generic PHA of a representative batch may be used where there are only small changes of monomer or other ingredient ratios and the chemistry is documented for the full range and ratio of batch ingredients. Another process that might consider using a generic type of PHA is a gas plant.

An Industrial Gas Plant

Often these plants are simply moved from site to site and therefore, a generic PHA may be used for these movable plants. Also, when the facility has several similar size gas plants and no sour gas is being processed at the site, then a generic PHA is feasible as long as the variations of the individual sites are accounted for in the PHA.

When an employer has a large continuous process which has several control rooms for different portions of the process such as for a distillation tower and a blending operation, the employer may wish to do each segment separately and then integrate the final results.

A large continuous process

Many small businesses have processes that are not unique, such as cold storage lockers (refrigeration plant) or water treatment facilities.

A Refrigeration Plant

A Wastewater Treatment Plant

Where employer associations have a number of members with such facilities, a generic PHA, evolved from a checklist or what-if questions, could be developed and used by each employer effectively to reflect his/her particular process; this would simplify compliance for them.

When the employer has a number of processes which require a PHA, the employer must set up a priority system of which PHA to conduct first. A preliminary or gross hazard analysis may be useful in prioritizing the processes that the employer has determined are subject to coverage by the process safety management standard. Consideration should first be given to those processes with the potential of adversely affecting the largest number of employees. This prioritizing should consider the potential severity of a chemical release, the number of potentially affected employees, the operating history of the process such as the frequency of chemical releases, the age of the process and any other relevant factors. These factors would suggest a ranking order and would suggest either using a weighing factor system or a systematic ranking method. The use of a preliminary hazard analysis would assist an employer in determining which process should be of the highest priority and thereby the employer would obtain the greatest improvement in safety at the facility.
(Reference: OSHA)

Chemical Incidents and Lessons Learned

Sulfuric Acid Tank Explosion

On July 17, 2001, an explosion occurred at the Motiva Enterprises refinery in Delaware City, Delaware. A work crew had been repairing a catwalk above a sulfuric acid storage tank farm when a spark from their hot work ignited flammable vapors in one of the tanks. This tank had holes in its roof and shell due to corrosion. The tank collapsed, and one the contract workers was killed; eight others were injured. A significant volume of sulfuric acid was released to the environment.

The investigation found that the facility management systems for mechanical integrity, management of change, and hot work did not adequately prevent and address safety and environmental hazards. Furthermore, the system for investigating "Unsafe Condition" reports at the refinery was inadequate.

Large sulfuric acid storage tank collapsed after an explosion that killed one worker and injured eight.

Petroleum Naphtha Fire

On February 23, 1999, a fire occurred in the crude unit at Tosco Corporation Avon oil refinery in Martinez, California. Workers were attempting to replace piping attached to a 150-foot-tall fractionator tower while the process unit was in operation. During removal of the piping, naphtha was released onto the hot fractionator and ignited. The flames engulfed five workers located at different heights on the tower. Four men were killed, and one sustained serious injuries.

Investigators found that the causes of the incident were: the failure of the refinery management system to recognize hazards posed by performing non-routine maintenance; failure to detect or correct serious deficiencies in the execution of maintenance; failure to conduct a management of change review of operational changes that led to piping corrosion; and inadequate corrosion control program.

Avon refinery's fractionator tower, where a petroleum naphtha leak and fire killed four workers.

Hydrogen Sulfide Poisoning

On January 16, 2002, highly toxic hydrogen sulfide gas leaked from a sewer manway at the Georgia-Pacific Naheola mill in Pennington, Alabama. Several people working near the manway were exposed to the gas. Two contractors were killed. Eight employees were injured. Choctaw County paramedics who transported the victims to hospitals reported symptoms of hydrogen sulfide exposure.

Investigators discovered a failure to follow good engineering and process safety practices; absence of management system to incorporate chemical hazard warnings into process safety information; failure to ensure that sewer remained closed; and inadequate training for contractors about the hazards of hydrogen sulfide

(Reference: CSB Publications)

Truck unloading area where two workers were killed by a hydrogen sulfide release.

What's new with Risk Management Plan (RMP) reporting?

Beginning in 2009, EPA will provide new software called RMP*eSubmit for facilities to use for RMP reporting. Please visit the EPA Office of Emergency Management website for important information on this effort.

http://epa.gov/emergencies/content/rmp/rmp_submit_2009.htm

Free RMP Training in Portland – June 3, 4 and 5

Section 112(r) of the Clean Air Act mandates that facilities that hold or use very toxic or flammable substances at or above threshold quantities develop Risk Management Programs. The Environmental Protection Agency (EPA) is offering FREE one-day RMP Training, which will provide information about how to comply with the RMP reporting and emergency planning requirements.

This one-day training is being offered three separate days. Information can be found at (http://yosemite.epa.gov/R10/CLEANUP.NSF/sites/rmp).

Registration ends May 23rd. For more information contact: allen.stephanie@epa.gov