EXECUTIVE DEVELOPMENT

Identifying Requirements for Reporting Hazardous Materials Storage to Local Fire Departments

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CERTIFICATION STATEMENT

I hereby certify that this paper constitutes my own product, that where the language of others is set forth, quotation marks so indicate, and that appropriate credit is given where I have used the language, ideas, expressions, or writings of another.

Signed:_____

Abstract

The problem was that the Rock Springs Fire Department did not have a method to collect hazardous materials storage information. The purpose of the research was to identify requirements and methods to collect that information from facilities within the city of Rock Springs. A descriptive research methodology was utilized to answer the research questions. The literature review and interviews identified how government agencies, fire departments, and industry maintained and reported hazardous materials storage. The data regulations required was compared to the data industry and fire departments used to maintain hazardous materials inventory. Recommendations were made to enhance reporting of hazardous materials storage information. Further recommendations were made to ensure required storage information was submitted within the city of Rock Springs.

Table of Contents

Appendixes

Identifying Requirements for Reporting Hazardous Materials Storage to Local Fire Departments

Introduction

Responding to an unknown hazardous materials release, at a facility, can be one of the most dangerous situations a first responder may face. Without the proper response measures and equipment there is a risk of injury, exposure, or death to both the responders and the public. To ensure the responders are prepared for what they may face, accurate and adequate information is needed on materials stored at the facility and the associated hazards. It is paramount that this hazardous materials storage information be gathered prior to the incident so proper response measures and equipment can be in place.

The problem is that the Rock Springs Fire Department (RSFD) does not have a method to collect hazardous materials storage information from facilities, thus placing responders at risk from undocumented hazards. The purpose of this research is to identify requirements and methods to collect hazardous materials storage information from facilities within the city of Rock Springs. A descriptive research methodology will be utilized to answer the following questions:

1. What hazardous materials storage information do regulating agencies require to be reported to local fire departments?
2. What hazardous materials storage information do other fire departments require?
3. What hazardous materials storage information does industry maintain?
4. What data should be included in hazardous materials storage information?

Background and Significance

Throughout modern history the accidental release of hazardous materials has led to catastrophic results. Incidents in the United States as well as other countries have led federal,

state, and local governments to the creation of regulations on the storage and use of hazardous materials (Adams & Miller, 2004; Kompanik, 2001). One of the most famous and possibly most tragic incidents was the 1984 chemical release in Bhopal, India. A Union Carbide plant accidentally released methyl isocyanate, a chemical used in the manufacture of pesticides (Kompanik, 2001; Union Carbide Corporation, 2006). The release resulted in the death of over 2,000 people and injured tens of thousands more.

Another incident key to the formation of hazardous materials regulations took place at an area called Love Canal in New York (Adams & Miller, 2004; Pigg, 2007). Love Canal was a housing development around Niagara Falls that had previously been used as a waste disposal site. Over time it was found that the contamination left in the ground had led to health problems and birth defects in those living in the area. In 1978 Love Canal was declared a federal disaster area and the occupants evacuated.

While the city of Rock Springs has never experienced a catastrophic hazardous material release, resulting in death or injury, the possibility exists. Since the city's incorporation, the history of Rock Springs has been associated with mining and oilfield exploration. Many of the materials involved in the mining and oilfield processes as well as the end products meet the regulatory definition of a hazardous material. This has been true from the early 1800s when the city of Rock Springs grew around coal mine camps, through the ongoing soda ash mining, to today's natural gas and oil exploration. The present growth in oil and gas exploration has led to an increase in the storage and use of hazardous materials in the city of Rock Springs. New hazardous materials storage facilities have been built and those previously in the community have increased their inventory due to an increase in demand. While many facilities report their

hazardous materials inventory, due to varying sizes and types of storage, not all are required to do so.

One of the emergency roles of the RSFD is to respond to accidents involving hazardous materials. To ensure responding personnel are properly prepared, the RSFD requires all personnel to be trained to the hazardous materials technician level. The RSFD also maintains a response trailer containing hazardous materials mitigation equipment and supplies. While the RSFD has the training and resources to respond to a hazardous materials release accurate hazardous materials storage information is needed. Without knowledge of the hazardous materials storage, prior to the incident, proper emergency response planning cannot take place. As the city of Rock Springs grows and the storage of hazardous materials expands, the possibility of a hazardous materials accident or release increases. The need for the RSFD to obtain accurate hazardous materials storage information increases along with the increased threat.

In 1988 the Kansas City, Missouri Fire Department responded to a fire at a construction site storing explosives (Adams & Miller, 2004). Shortly after arrival one of the storage trailers detonated killing six firefighters. Incidents such as this show the need for responders to obtain the proper hazardous materials storage information. With accurate information and proper planning prior to the incident tragedies like the Kansas City explosion might be prevented.

The Executive Development Student Manual explains that in order for a team to be effective they need to work in a unified manner toward a clear and common goal (Department of Homeland Security, 2006). The manual goes on to explain that an essential part of creating this teamwork is clear and accurate information for all team members. Without clear and accurate hazardous materials storage information the RSFD cannot work as an effective team towards

resolving the threat of a hazardous materials accident or release. This places both the responders and community at risk.

One of the five operational objectives of the United States Fire Administration (USFA) is to "help communities develop comprehensive all-hazard risk reduction plans" (USFA, 2003). The hazardous materials storage information examined in this research plays a key part in the development of risk reduction plans and in turn supports the USFA operational objective. By providing the necessary hazardous materials storage information prior to an incident the major hazards can be determined and the appropriate strategies and tactics preplanned. This allows the risk from a hazardous materials release to be minimized.

Literature Review

Due to the tragic history of hazardous materials incidents the federal government has created regulations for the storage and use of hazardous materials (Adams & Miller, 2004; Kompanik, 2001). The Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), and other federal agencies have regulations controlling the storage and use of hazardous materials (Adams & Miller, 2004; Delmar, 2004; Woodside, 1993). The federal regulations are published in documents referred to as *Code of Federal Regulations* (*CFR*). Regulations from different federal agencies as well as from the same agency may have an overlap in requirements. An example of this is the Hazardous Waste and Emergency Response regulation also known as HAZWOPER. The same regulatory requirements can be found in 29 CFR 1910.120 for OSHA and in 40 CFR 311 for the EPA. This redundancy allows both agencies to enforce the same regulatory requirements within their area of enforcement (Adams & Miller, 2004; Delmar, 2004; Hazardous Waste Operations and Emergency Response, 2007; Worker Protection, 2007).

In 1986 the EPA Superfund Amendments and Reauthorization Act (SARA) became law (Adams & Miller, 2004; N. P. Cheremisinoff & P. N. Cheremisinoff, 1995; Delmar, 2004; Kompanik, 2001; Woodside, 1993). Part of SARA is the Emergency Planning and Community Right-to-Know Act (EPCRA) also known as SARA Title III. EPCRA is intended to inform government agencies, local fire departments, and the public of hazardous materials storage within their community.

Facilities that maintain a hazardous chemical inventory above designated threshold limits are required to submit specific information to the State Emergency Response Commission (SERC), Local Emergency Planning Committee (LEPC), and the local fire department (Protection of Environment, 2007; see also N. P. Cheremisinoff & P. N. Cheremisinoff, 1995; Delmar, 2004; Kompanik, 2001; U.S. General Services Administration, 2001). For most hazardous chemicals the threshold limit is any amount greater than 10,000 pounds. Chemicals designated by the EPA as extremely hazardous substances are required to be reported in quantities above 500 pounds or the individual chemical threshold planning quantity, whichever is lower.

The EPA has two designated forms for the submittal of chemical inventory information (Protection of Environment, 2007; see also Delmar, 2004; U.S. General Services Administration, 2001). The Tier I is the simplest form while the Tier II form includes more detailed information. For Tier I and Tier II data details see *Appendix A*. Facilities can choose to submit the Tier II form instead of a Tier I form. In addition the SERC, LEPC, or local fire department can require the Tier II form be submitted. In either case facilities required to report under EPCRA must submit their hazardous materials storage information by March first of each year.

The 1983 OSHA Hazard Communication Standard (HCS) also called the Workers Right-to-Know Act requires employers to inform their employees of the chemical hazard that they may be exposed to in the workplace (Hazard Communication, 2007; see also N. P. Cheremisinoff & P. N. Cheremisinoff, 1995; Clansky & Adkins, 1988; Delmar, 2004; Rooney, 2005; Westerkamp, 2005; Woodside, 1993). The format required for the communication of the chemical hazards in the work place is the Material Safety Data Sheet (MSDS) (Beckel, 2006a, 2006b; N. P. Cheremisinoff & P. N. Cheremisinoff, 1995; Delmar, 2004; Natarajan, Tsvetkova, & Webber, 2007; Rooney, 2005; Westerkamp, 2005; Woodside, 1993). There is no fixed format for the MSDS but OSHA does mandate the minimum information to be included. See *Appendix A* for MSDS data. Some chemicals are exempt from MSDS requirements but the HCS requires that if a facility has any amount of hazardous chemicals that requires a MSDS the facility must have MSDSs for all hazardous chemicals on site (Hazard Communication, 2007; see also N. P. Cheremisinoff & P. N. Cheremisinoff, 1995; Clansky & Adkins, 1988; Delmar, 2004; Natarajan, et al., 2007).

Facilities that are required to have MSDSs available and have hazardous chemicals above the EPCRA limits are required to submit hazardous chemical information to the SERC, LEPC, and local fire department. The facility must submit this chemical information in the form of either individual MSDSs or a list of chemicals (N. P. Cheremisinoff & P. N. Cheremisinoff, 1995; Hazard Communication, 2007; Protection of Environment, 2007). If a list of chemicals is submitted the facility must be ready to provide copies of MSDSs upon request.

The storage of explosives is regulated by several federal agencies. As already covered EPCRA (Protection of Environment, 2007) requires the local fire department be notified of explosives storage above the listed threshold limit. The Bureau of Alcohol Tobacco and Firearms

(ATF) requires that anyone storing explosives verbally notify the local fire department of the type, magazine capacity, and location within 24 hours of the day storage commences (Commerce in Explosives, 2007; State Fire Marshals, n.d.). Written notice must be given within 48 hours of the commencement of storage. The ATF also requires explosive storage facilities follow all state and local storage regulations. The requirements of OSHA 29 CFR 1910.109 mirror those of the ATF (Explosives and Blasting Agents, 2007; Explosives Storage, 2007).

The Nuclear Regulatory Committee (NRC) regulates the use and storage of radioactive material. States can assume NRC regulatory authority under the Atomic Energy Act of 1954 (Jones, 2000). Section 274 of this act allows the NRC to relinquish some regulatory authority to individual states. Wyoming has not assumed regulatory authority therefore the NRC maintains regulatory control of radioactive material. While the NRC does require marking of storage sites and containers it does not require local reporting (Adams & Miller, 2004; Jones, 2000; Woodside, 1993).

A review of EPCRA reporting requirements from the Wyoming SERC was conducted. The review found that the Wyoming SERC requires the Tier II form to be submitted to the SERC, LEPC, and local fire department (Wyoming SERC, n.d.). The Wyoming SERC further requires that MSDS be submitted along with the Tier II form the first year a company stores reportable quantities of hazardous materials.

The state of Wyoming has adopted the 2003 edition of the *International Fire Code* (*IFC*) as a minimum fire and life safety code for both the state and jurisdictions requesting local code enforcement (Local Enforcement, 2007). The *IFC* (2003) allows the fire code official to require hazardous material storage information to be submitted during the permitting process for a facility. Section 2701.5.1 of the *IFC* allows the fire code official to require submittal of a

hazardous materials management plan (HMMP) showing facility layout and hazardous materials storage location. Section 2701.5.2 of the *IFC* allows the fire code official to require submittal of a hazardous materials inventory statement (HMIS) which gives chemical information. See *Appendix A* for data in the HMMP and HMIS. The requirements of the HMMP and HMIS only pertain to facilities with new hazardous materials storage. Section 2703.5 of the *IFC* requires that signs conforming to the requirements of the *National Fire Protection Association* (*NFPA*) *704* system be posted at hazardous materials storage facilities unless specifically exempted by the fire code official.

A review of the ordinances of the city of Rock Springs indicates that a permit is required to store over five gallons of gasoline or inflammable liquids (Permit Required, 2006). The ordinance defines an inflammable liquid as one having a flash point of 200 degrees Fahrenheit or less, and any fuel oil regardless of the flash point. The definition of an inflammable liquid combines the *IFC* definitions of a flammable liquid and a combustible liquid (International Code Council, 2003, 2006).

The ordinances of the city of Rock Springs require the RSFD to conduct annual inspections on all commercial and public facilities within the city (Routine Inspection of Buildings, 2006). City ordinance further requires the RSFD to inspect facilities with especially hazardous storage or processes twice a year (Routine Inspection of Hazardous Premises, 2006).

In July of 2006 the city of Rock Springs adopted the 2006 edition of the *IFC* (Adoption of the International Fire Code, 2006). A review for differences was conducted between the 2003 and 2006 editions (International Code Council, 2003, 2006). No changes were found in the requirements of the HMMP, HMIS, or *NFPA 704* marking.

The NFPA has several standards dealing with hazardous materials storage. A standard is not a regulation but rather a recommended practice that does not hold the weight of law unless specifically adopted (Delmar, 2004). *NFPA 704: Standard System for the Identification of the Hazards of Materials for Emergency Response* requires that a sign identifying a numerical value for health, flammability, reactivity, as well as special hazards be posted at facilities that store or use hazardous materials (NFPA, 2001). The numerical value for each category can range from zero showing no hazard to four indicating a high hazard. The values given on the *NFPA 704* sign are the highest hazard ratings of all chemicals found in the area not of any one specific chemical. Both the *IFC* as adopted by the state of Wyoming and city of Rock Springs require *NFPA 704* markings be posted at hazardous materials storage facilities unless it is specifically exempted by the fire code official (International Code Council, 2003, 2006).

NFPA 1620: Recommended Practice for Pre-Incident Planning gives recommendations on pre-incident planning of hazardous materials storage facilities (NFPA, 2003). While chapter 8 discusses hazardous materials by major hazard the chapter does give some general recommendations. *NFPA 1620* general recommendations suggest that maximum inventory amounts, storage method, and location be requested during the preplanning of special hazard facilities. *NFPA 1620* also recommends that a method of obtaining updated information during emergencies be developed. See *Appendix A* for general *NFPA 1620* data.

Sources (Beckel, 2006b; Clark, 2003; Natarajan, et al., 2007) indicate that most state and local agencies have few requirements beyond those of the federal hazardous materials regulations. By meeting federal reporting requirements the majority of state and local requirements will also be met. The sources go on to agree that an accurate inventory is an important step for facilities to meet federal, state, and local reporting requirements. To maintain

an accurate inventory the hazardous materials stored and used at the facility must be identified (N. P. Cheremisinoff & P. N. Cheremisinoff, 1995; Clark, 2003; Griffin, 1988; Kraus, 2007). In order for the inventory to be useful for meeting regulatory requirements it must be tied to the accurate maintenance of MSDS information (Griffin, 1988; Kraus, 2005, 2007; Westerkamp, 2005; Wysong, 2005). Wysong (2005) indicated that 50% to 85% of facilities are out of compliance with maintaining MSDS information. With so many facilities doing so poorly in maintaining inventory information those facilities that do are not only able to avoid fines but also have a strategic advantage over competitors (Kraus, 2007; Wysong, 2005).

The hazardous materials data a facility maintains must be based on the hazardous materials they store and use. Sources (Clark, 2003; Kraus, 2005, 2007) suggest as a minimum the chemical name, manufacturer name, quantity, and location. This minimum information will allow the hazardous material to be linked to the correct MSDS.

To summarize the literature review federal, state, and local regulations require the reporting of hazardous materials to the local fire department at the beginning of storage or use. Other regulations are in place to identify to the employee the hazardous materials they may be exposed to in the workplace. Federal regulations require that this workers right to know information must be maintained at the facility (N. P. Cheremisinoff & P. N. Cheremisinoff, 1995; Clansky & Adkins, 1988; Delmar, 2004; Hazard Communication, 2007; Rooney, 2005; Westerkamp, 2005; Woodside, 1993). EPCRA requires the ongoing yearly reporting of hazardous materials storage information to local fire departments such as the RSFD (Adams & Miller, 2004; N. P. Cheremisinoff & P. N. Cheremisinoff, 1995; Delmar, 2004; Kompanik, 2001; Woodside, 1993). The Wyoming SERC requires facilities reporting under EPCRA must report hazardous materials storage using the Tier II form (Wyoming SERC, n.d.).

Sources (N. P. Cheremisinoff & P. N. Cheremisinoff, 1995; Clark, 2003; Griffin, 1988) suggest the safe storage of hazardous materials centers on the maintenance of an accurate inventory. The inventory must be linked to the correct MSDS in order for it to be useful in meeting federal, state, and local reporting requirements (Griffin, 1988; Kraus, 2005, 2007; Westerkamp, 2005; Wysong, 2005).

Procedures

The research began with a review of literature on storage and reporting requirements for hazardous materials. The literature review included books, journals, and other written as well as Internet sources. The literature review then focused on federal, state, and local regulations dealing with hazardous materials storage and reporting. Particular emphasis was placed on regulations requiring reporting of hazardous materials storage to local fire departments. A limitation in the research of the regulations for hazardous materials storage was omitting of the Department of Transportation (DOT). Transportation of hazardous materials was outside the scope of this research paper therefore DOT regulatory requirements were not covered.

After the literature review the author focused on the first research question covering what hazardous materials storage information hazardous materials regulating agencies require to be reported to local fire departments. To ensure that the literature review was accurate unstructured phone interviews were conducted with representatives from state regulating agencies. Representatives of agencies were chosen for interview based on their involvement with hazardous materials reporting requirements. At the beginning of the interview the author stated the purpose of the interview and the research being conducted. During the interview the author inquired if the agency had reporting requirements beyond those of EPCRA. Based on the results of the phone interviews further research was conducted into the agencies reporting requirements.

The second research question pertaining to the hazardous materials storage information other fire departments require was addressed with a questionnaire developed by the author. See *Appendix B* for the questionnaire. The questionnaire was developed to allow specific hazardous materials storage information to be gathered using a multiple choice answer format. An opportunity for the responder to expand on each question was also provided. The questions in the questionnaire were divided into three general areas. The first part of the questionnaire was designed to identify if the responding fire department received the federally mandated hazardous materials storage information and in what form they received that information. The questionnaire then identified if the fire department required notification of hazardous materials storage beyond federal requirements. Finally, the questionnaire captured data the fire department required to be included in any additional hazardous materials notification.

The author looked for a method to submit the questionnaire that would allow input from fire departments of various types, sizes, and industrial base. As the fire marshal is typically involved with permitting of new construction and inspection of buildings the author chose the electronic forum of the Prevention Advocacy Resources and Data Exchange (EPARADE) to submit the questionnaire to fire departments. According to the EPARADE (2007) website “the group is made up of State and Metro Fire Marshals and is established to provide a clearinghouse for ideas, questions, and a way to network among fire marshals about life safety issues”. A blind questionnaire format was used with recipients requested to email their reply directly to the author. The use of EPARADE did set several limitations on the questionnaire results. First, EPARADE was not intended to be a statistical sample of all fire departments. Second, an assumption was made that the person responding to the questionnaire was knowledgeable on questionnaire terminology and reporting requirements within the jurisdiction.

To answer the third research question pertaining to the hazardous materials storage information industry maintains the author conducted interviews with facilities storing hazardous materials within the city of Rock Springs. To identify what facilities store hazardous materials within the city a comparison was done between the facilities the Sweetwater County LEPC indicate reported Tier II information to the RSFD and the Tier II information the RSFD have received (RSFD, 2007; Sweetwater County Emergency Management, 2007). Facilities were then chosen on the basis that they had previously submitted Tier II information to the RSFD.

The use of local hazardous materials storage facilities allowed the research to reflect the types of hazardous materials and inventory data available to the RSFD. The author conducted interviews at selected facilities with the person responsible for hazardous materials storage and inventory. At the beginning of the interview the author stated the purpose of the interview and research being conducted. A questionnaire developed to obtain information on fire department storage requirements was utilized to guide the interviews. See *Appendix B* for the questionnaire. The general question from the questionnaire was asked with the facility representative allowed to freely discuss and expand. Approximately 30 minutes were scheduled to conduct each interview.

Limitations in the selected method of facilities included the use of hazardous materials storage facilities within the city of Rock Springs. The information gained was not intended to be representative of hazardous materials storage facilities throughout the United States. A further limitation was the use of facilities that had previously submitted Tier II information to the RSFD. This method did not identify how facilities that store quantities of hazardous materials below reporting levels maintain storage information. A final limitation was encountered to ensure that facilities would answer questions truthfully. The identity of facilities was not included in this

research paper to protect facilities that may not have submitted required hazardous materials storage information.

The fourth research question concerning what data should be included in hazardous materials storage information was initially addressed during the literature review. This information was then collected into a table to allow comparison of the data required by federal, state, and local regulations. See *Appendix A* for data table. The questionnaire sent to fire departments was used to capture information on the data individual fire departments required to be included in hazardous materials notification. See *Appendix B* for questionnaire and *Appendix C* for questionnaire results. The data that industry maintains on hazardous materials storage was addressed during interviews with facilities within the city of Rock Springs.

Definition of Terms

Hazardous material – any substance or chemical that is a physical hazard or health hazard to people (Adams & Miller, 2004, p. 591).

Health hazard – material that may directly affect an individual's health once it enters or comes in contact with the body (Adams & Miller, 2004, p. 592).

LEPC – a group comprising of members of the community, industry, and emergency responders to plan for a chemical incident and to ensure that local resources are adequate to handle an incident (Delmar, 2004, p. 889).

Physical hazard – material that presents a threat to health because of its physical properties (Adams & Miller, 2004, p. 600).

Questionnaire – a written or electronic survey instrument comprised of a series of questions, designed to measure a specific item or set of items (Georgetown University Information Services, 2003).

SERC – a group that ensures that the state has adequate training and resources to respond to a chemical incident (Delmar, 2004, p. 895).

Results

Research Question 1. What hazardous materials storage information do regulating agencies require to be reported to local fire departments? EPCRA requires that facilities storing hazardous materials above their threshold limits report the hazardous material storage to the local fire department on an annual basis (Adams & Miller, 2004; N. P. Cheremisinoff & P. N. Cheremisinoff, 1995; Delmar, 2004; Kompanik, 2001; Woodside, 1993). Unstructured phone interviews were conducted with representatives of the Wyoming Department of Environmental Quality (DEQ) to determine if the Wyoming DEQ had additional requirements for reporting of hazardous materials storage beyond those of EPCRA.

A phone interview was conducted with R. W. Breuer of the Wyoming DEQ Solid Waste Division. The Solid Waste Division was contacted for interview since it is charged with regulating hazardous waste and hazardous waste sites within the state. R. W. Breuer knew of no additional state reporting requirements for hazardous materials but suggested that the Wyoming DEQ Storage Tank Program be contacted (personal communication, July 16, 2007). At the suggestion of the Solid Waste Division a phone interview was conducted with B. Leucht of the Storage Tank Program. B. Leucht was contacted to ensure that the Storage Tank Program, which regulates flammable and combustible liquid storage, did not have additional hazardous materials reporting requirements. B. Leucht confirmed that the Storage Tank Program had no additional reporting requirements above those required by EPCRA (personal communication, July 16, 2007).

A phone interview was conducted with K. Lee of the Wyoming Office of Homeland Security. K. Lee was interviewed since he is the program manager for the Wyoming SERC. During the interview K. Lee indicated that the Wyoming SERC requires the Tier II form be submitted by facilities to report EPCRA information (personal communication, July 16, 2007). A further review was then conducted on the Wyoming SERC hazardous materials reporting requirements confirming what K. Lee had indicated (Wyoming SERC, n.d.). It was further found that the Wyoming SERC requires MSDSs be submitted along with the Tier II form the first time a company reports hazardous materials storage.

In addition to other requirements the ATF requires explosive storage facilities follow all state and local storage regulations. The ATF also requires that the local fire department be verbally notified of explosives storage within 24 hours of commencement (Commerce in Explosives, 2007; State Fire Marshals, n.d.). Written notice must follow within 48 hours of explosive storage commencement.

Research Question 2. What hazardous materials storage information do other fire departments require? A questionnaire was developed to answer the second research question. See *Appendix B* for the questionnaire. The questionnaire was then posted to EPARADE, an electronic discussion group for fire code officials. Fire departments were then requested to reply to the author by email. In total 28 fire departments replied to the questionnaire. Results of the questionnaire can be found in *Appendix C*.

In the first question 100% of the responding fire departments reported that they received SARA Title III information. One fire department reported that while they did receive the information they did not utilize it.

The questionnaire found that 61% of responding fire departments required MSDS submittal. Several fire departments reported that they require both Tier II and MSDS submittal. One fire department expanded that they require MSDSs to be submitted at the time they permit the facility and update the MSDS information when they inspect the facility.

On the third question 64% of responding fire departments reported they did not receive ATF notification of explosives storage. One fire department explained that explosives storage is not allowed in their community. Two fire departments that did not receive notification expanded on the question by stating that notification goes to other agencies. One fire department explained notification of explosives storage goes to their local law enforcement agency. The other fire department explained that notification goes to their community homeland defense department.

The fourth question asked if the fire department requested facilities to report hazardous materials storage amounts other than those required by the EPCRA Tier II form. Of responding fire departments 78% required reporting of other than Tier II amounts of storage.

The fifth question of the questionnaire inquired on the types of hazardous materials the fire department required to be reported. The majority of fire departments required the reporting of all hazardous materials listed in the question. Individual fire departments expanded the list to include etiological, toxic, highly toxic, unstable materials, liquefied petroleum gas, flammable gases, and other regulated materials.

The questionnaire asked what facilities must report hazardous materials inventory to the fire department. Of the fire departments answering the question 80% reported that all facilities must report storage. One fire department indicated other amounts. The other 16% of answering fire departments listed any facility storing amounts above adopted model code allowance must

report. One fire department that required all facilities report storage expanded on the question by explaining that they require all facilities to report even if it is to report they have no storage.

The seventh question asked the reporting fire department to expand on the facilities that must report hazardous materials storage. The department in the sixth question that reported they require other amounts of hazardous materials storage to be reported explained that they required anyone storing hazardous materials above the limits set by the *IFC* to report storage. As this is a model code the total on question six should be corrected to 20% of fire departments requiring reporting of hazardous materials storage above model code limits. Several fire departments expanded on other requirements in this question. One fire department explained they require the submittal of a HMIS on a yearly basis and depending on the amount and type of storage schedule inspections accordingly. One fire department required a special permit for the storage of radioactive materials as it is not covered by the *IFC*. One fire department explained that it had special permitting levels for flammable and combustible liquids.

The final question of the questionnaire asked what information the fire department required to be included in hazardous materials submittals. The results of information reporting fire departments required be submitted can be found in *Table 1*. Over 60% of the responding fire departments required all but toxicology information to be included in submitted data.

Table 1

Data Required to be Reported by Fire Departments

Chemical name……..86%	Storage method……..79%
UN ID number……...75%	Normal storage quantity…….79%
CAS number……..82%	Maximum storage quantity…82%
Hazard class……...82%	Storage location……..82%

Fire response……..61%	Physical properties…….79%
Spill response…….64%	Chemical properties……...79%
Medical response……...61%	Toxicology……..46%
Other (please explain)…46%	

In summary the results of the questionnaire to other fire departments indicates that while all the reporting fire departments received SARA Title III information a majority required further hazardous materials reporting. The majority of fire departments that required further reporting required it on any amount of hazardous materials storage. Most fire departments required MSDSs to be submitted for stored hazardous materials. While the majority of fire departments did not receive ATF explosives storage notification some indicated the information went to other agencies within the jurisdiction.

Research Question 3. What hazardous materials storage information does industry maintain? Interviews with local facilities determined how they tracked hazardous materials storage and the data they maintained on hazardous materials. Six facilities were chosen for interview because they had previously submitted Tier II information to the RSFD. While reviewing the information on facilities that are required to submit Tier II information to the RSFD it was found that the Sweetwater County LEPC had several facilities within the jurisdiction of the RSFD listed as supplying Tier II information to different fire departments (Sweetwater County Emergency Management, 2007). The review of Tier II information also found that some facilities within the jurisdiction of the RSFD have not submitted Tier II information on a consistent basis (RSFD, 2007; Sweetwater County Emergency Management, 2007).

During the interviews facilities indicated they update their hazardous materials inventory anywhere from a daily to a monthly basis. Facilities that maintain hazardous materials for their own use tracked their inventory less frequently. This frequency was typically weekly or monthly. Facilities that sold their hazardous materials were found to track their storage on an ongoing or daily basis. All facilities interviewed reported that they maintained MSDSs on site for their hazardous materials storage.

When questioned about SARA Title III submittal two facilities indicated they did not personally submit the information but sent it to their parent company for submittal. A review of the RSFD (2007) records indicated that both companies had submitted Tier II information to the RSFD in the past. During the interviews and the follow up review of Tier II submittals one company was found to be submitting Tier II information to the wrong address.

Research Question 4. What data should be included in hazardous materials storage information? The literature review of industrial hazardous materials storage requirements recommended that facilities use the chemical name, manufacturer, quantity, and location to track hazardous materials inventory (Clark, 2003; Kraus, 2005, 2007). Interviews with facilities in the city of Rock Springs indicated that facilities tracked chemical storage by chemical name, quantity, and location. Tier II data included the information suggested by industrial sources as well as physical form, hazard class, maximum yearly amount, and average yearly amount. Several facilities indicated that while they did not use the hazard class to track storage they did store and segregate it based on the major chemical hazard. See *Appendix A* for Tier II data.

The MSDS is the format federal regulations require for communication of chemical hazards in the work place (Beckel, 2006a, 2006b; N. P. Cheremisinoff & P. N. Cheremisinoff, 1995; Delmar, 2004; Natarajan, Tsvetkova, & Webber, 2007; Rooney, 2005; Westerkamp, 2005;

Woodside, 1993). See *Appendix A* for MSDS data. All facilities interviewed reported that they maintained MSDSs for the hazardous chemicals they store and use. The fire department questionnaire indicated that the majority of fire departments require MSDS to be submitted. See *Appendix C* for questionnaire results.

Discussion

Several federal, state, and local agencies regulate the storage and use of hazardous materials. Many of the regulations are specifically aimed at the new storage of hazardous materials at a facility. The Wyoming SERC requires that MSDSs be submitted along with the Tier II form during the first year of hazardous materials storage at a facility (Wyoming SERC, n.d.). The *IFC* 2003 edition adopted as the life safety code by the state of Wyoming and the *IFC* 2006 edition adopted by the city of Rock Springs both allow the fire code official to require a permit as well as a HMIS and HMMP for new storage of hazardous materials (International Code Council, 2003, 2006). The ordinances of the city of Rock Springs require a permit for the storage or sale of inflammable liquids in amounts greater than five gallons (Permit Required, 2006). Explosives storage must meet even stricter ATF notification requirements. Upon the start of storage the local fire department must be verbally notified within 24 hours and in writing within 48 hours (Commerce in Explosives, 2007; State Fire Marshals, n.d.). All these requirements allow the RSFD to collect hazardous materials storage information for the new storage of hazardous materials within the city of Rock Springs.

The EPCRA regulation requires the reporting of hazardous materials storage information to the local fire department on an ongoing basis (Adams & Miller, 2004; N. P. Cheremisinoff & P. N. Cheremisinoff, 1995; Delmar, 2004; Kompanik, 2001; Woodside, 1993). Facilities storing hazardous materials above federally preset limits must report that storage to the local fire

department by March first of each year. The Wyoming SERC requires facilities to report EPCRA information by the use of the Tier II form (Wyoming SERC, n.d.).

The majority of fire departments contacted during this research required reporting of hazardous materials storage beyond the requirements of EPCRA. This is in conflict of the sources (Beckel, 2006b; Clark, 2003; Natarajan, et al., 2007) that claimed local government typically had few storage requirements beyond federal regulations. Fire departments indicated that they required notification of any amount of hazardous materials storage. The RSFD presently has no requirements for ongoing reporting of hazardous materials storage beyond those at the federal or state level.

During this research it was found that some facilities within the city of Rock Springs were not reporting the required EPCRA information to the RSFD (2007). At least one facility was found to have the incorrect address for reporting. Other facilities did not do their own Tier II reporting but relied on their parent company for reporting. It was further found during the review of the LEPC Tier II reporting records the LEPC had the incorrect fire department for some facilities within the city of Rock Springs (Sweetwater County Emergency Management, 2007).

Information contained in the Tier II report includes chemical name, maximum quantity, and storage method (Delmar, 2004; Protection of Environment, 2007; U.S. General Services Administration, 2001). While this information is useful to the responder the format used in the Tier II form is somewhat problematic. The format for listing quantities in the Tier II is calculated in pounds. This includes the storage of gases and liquids where gallons or volume might be more useful. Next the Tier II uses ranges for reporting quantities not actual amounts. Finally the Tier II report is based on the maximum storage amounts from the previous year. While all of this makes

the information problematic the Tier II is the only hazardous materials storage information facilities are mandated to provide to the RSFD on a yearly basis.

Sources (Clark, 2003; Kraus, 2005, 2007) recommend industry maintain hazardous materials storage information including chemical name, manufacturer, quantity, and location to track hazardous materials inventory. This information should allow the facility to link the hazardous material inventory to the appropriate MSDS (Griffin, 1988; Kraus, 2005, 2007; Westerkamp, 2005; Wysong, 2005). This not only helps industry meet reporting requirements but also gives them a competitive edge (Kraus, 2007; Wysong, 2005).

For new storage of hazardous materials the *IFC* requires a HMIS be submitted (International Code Council, 2003, 2006). The HMIS requires MSDSs be submitted for the stored chemicals. The majority of fire departments who responded to the questionnaire indicated that they require MSDSs to be submitted for hazardous materials storage. Further comparing the data the majority of fire departments indicated must be submitted for hazardous materials storage information shows that it is similar to that found in a MSDS. See *Appendix A* for MSDS data and *Appendix C* for questionnaire data.

In summary the Tier II form is the only hazardous materials storage information required to be submitted on a yearly basis. The down side of Tier II reporting is that only facilities storing hazardous materials above mandated threshold limits must report. The RSFD presently has codes in place requiring the reporting requirements for storage of new hazardous materials but no ongoing reporting requirements beyond EPCRA (International Code Council, 2006; Permit Required, 2006).

The MSDS is the format industry typically uses to maintain hazardous materials storage data. For both industry and the fire department the MSDS contains the most in depth hazardous

material information. MSDSs can be requested from facilities required to maintain MSDSs and required to report under EPCRA (N. P. Cheremisinoff & P. N. Cheremisinoff, 1995; Hazard Communication, 2007; Protection of Environment, 2007).The Wyoming SERC already requires MSDSs to be submitted along with the Tier II the first year of hazardous materials storage (Wyoming SERC, n.d.).

Recommendations

Based on the information gathered through this research the author recommends that the RSFD begin a more aggressive approach to permitting of new hazardous materials storage within the city of Rock Springs. While federal and state regulations require MSDS and Tier II reporting of hazardous materials storage over mandated limits (Adams & Miller, 2004; N. P. Cheremisinoff & P. N. Cheremisinoff, 1995; Delmar, 2004; Kompanik, 2001; Woodside, 1993) the local ordinances and codes already in place allow the city of Rock Springs to require reporting at lower limits (International Code Council, 2006; Permit Required, 2006). Based on the data obtained about the reporting requirements of other fire departments a requirement for a lower reporting level would not be out of normal practice. The RSFD may wish to look into permit fees to offset the costs associated with collecting and maintaining hazardous materials inventory information.

The author recommends that the HMMP and HMIS from the adopted *IFC* be used as the format for reporting of new hazardous materials storage in the city of Rock Springs. The *IFC* 2006 edition has already been adopted by the city of Rock Springs so the legal requirements are in place (Adoption of the International Fire Code, 2006). The research conducted shows that the HMMP and HMIS contain all the data typically required for a complete hazardous materials

inventory submittal. See *Appendix A* and *Appendix C* for data typically required. Further research may be needed to determine the best method for submitting and storing the HMMP and HMIS.

At this time the RSFD has no ongoing reporting requirements beyond EPCRA. Another issue is that facilities not required to report under EPCRA do not have to report hazardous materials storage to the RSFD. The author suggests that the RSFD investigate lower ongoing hazardous materials reporting requirements. The reporting requirements of other fire departments indicate that ongoing reporting outside EPCRA requirements would not be out of normal practice. By ordinance the RSFD is required to inspect hazardous materials storage facilities at a minimum once a year. The RSFD should reevaluate fire and life safety inspections and implement a system to ensure hazardous materials inventory information is updated during inspections. This method could include the requirement for the ongoing submittal of MSDSs.

During the research it was found that several facilities were not submitting mandated EPCRA information to the RSFD. The author recommends that further review of facilities required to report Tier II information to the RSFD be conducted. Steps should then be taken to ensure that facilities with incorrect contact information have the correct information for reporting. While it would be easy to say incorrect reporting is the problem of the individual facility a more proactive approach would be to work with the facilities required to do Tier II reporting and ensure they report correctly and to the proper jurisdiction.

The author feels the recommendations in this paper are attainable by the RSFD. A new mindset to hazardous materials storage and inspections may be required by both the RSFD and hazardous materials storage facilities within the city of Rock Springs. From the cooperation given during this research project the author feels the facilities are willing to cooperate with the changes that may need to take place.

References

Adams, B., & Miller, L. (Eds.). (2004). *Hazardous materials for the first responders* (3rd ed.). Stillwater, OK: Fire Protection Publications Oklahoma State University.

Adoption of the International Fire Code, Ordinance of the City of Rock Springs § 7-108.6 (2006).

Beckel, M. (2006a, June). Ease the pain of hazmat regulatory compliance. *Occupational Health and Safety*. Retrieved July 4, 2007, from http://www.ohsonline.com/articles/45013/

Beckel, M. (2006b, July). Using the web to simplify compliance. *Occupational Health and Safety*. Retrieved July 4, 2007, from http://www.ohsonline.com/articles/45032/

Cheremisinoff, N. P., & Cheremisinoff, P. N. (1995). *Hazardous materials and waste management: A guide for the professional hazards manager.* Park Ridge, NJ: Noyes Publications.

Clansky, K. B., & Adkins, J. M. (Eds.). (1988). *Chemical guide to SARA Title III* (2nd ed.). Burlingame, CA: Roytech Publications.

Clark, A. (2003, December). The lowdown on regulatory reporting. *Occupational Health and Safety , 72* (12), pp. 58-59.

Commerce in Explosives, 27 C.F.R. § 55 (2007).

Delmar. (2004). *Firefighter's handbook: Essentials of firefighting and emergency response* (2nd ed.). Clifton Park, NY: Author.

Department of Homeland Security. (2006). *Executive developement* (3rd ed.). Emmitsburg, MD: Author.

EPARADE. (2007). Retrieved July 7, 2007, from Yahoo Groups: http://groups.yahoo.com/group/EPARADE/

Explosives and Blasting Agents, 29 C.F.R. § 1910.109 (2007).

Explosives storage. (2007). Retrieved July 7, 2007, from Lab Safety Supply: http://www.labsafety.com/refinfo/ezfacts/ezf326.htm

Georgetown University Information Services. (2003, July 22). *Questionnaire definition*. Retrieved August 4, 2007, from www.georgetown.edu/uis/ia/dw/GLOSSARY0816.html

Griffin, R. D. (1988). *Principles of Hazardous Materials Management.* Chelsea, MI: Lewis Publishers.

Hazard Communication, 29 C.F.R. § 1910.1200 (2007).

Hazardous Waste Operations and Emergency Response, 29 C.F.R. § 1910.120 (2007).

International Code Council. (2003). *International Fire Code.* Country Club Hills, IL: Author.

International Code Council. (2006). *International Fire Code.* Country Club Hills, IL: Author.

Jones, C. G. (2000, August). The U.S. Nuclear Regulatory Commission and how it works (pub NUREG/BR-0256). Washington, D.C.: Office of Nuclear Material Safety and Safeguards.

Kompanik, K. L. (2001). *Implementation of federal programs at the local level: An examination of SARA Title III Local Emergency Planning Committees and project impact.* Newark, DE: Disaster Research Center.

Kraus, J. F. (2005, July). World-class compliance that doesn't cost a fortune. *Occupational Health and Safety , 74* (7), p. 66+.

Kraus, J. F. (2007, May). Improving compliance through accurate MSDSs and hazmat inventory. *Occupational Hazards , 69* (5), pp. 62-64.

Local Enforcement, Wyoming Statute 35 § 9-121 (2007).

Natarajan, P., Tsvetkova, J., & Webber, T. (2007, January). Cradle-to-grave management. *Occupational Health and Safety*. Retrieved July 4, 2007, from http://www.ohsonline.com/articles/45102/

National Fire Protection Association. (2001). *NFPA 704: Standard system for the identification of the hazards of materials for emergency responders.* Quincy, MA: Author.

National Fire Protection Association. (2003). *NFPA 1620: Recommended practice for pre-incident planning.* Quincy, MA: Author.

Permit Required, Ordinance of the City of Rock Springs § 4-302 (2006).

Pigg, L. (2007, Summer). Hazardous materials. *Rapid Access , 9* (3), pp. 4-5.

Protection of Environment, 40 C.F.R. § 370 (2007).

Rock Springs Fire Department. (2007). *Submitted Tier II Reports.* Rock Springs, WY: Author.

Rooney, J. (2005, September). Right-to-Know vs. Right-to Understand. *Occupational Health and Safety , 74* (9), pp. 186-187.

Routine Inspection of Buildings, Ordinance of the City of Rock Springs § 8-303 (2006).

Routine Inspection of Hazardous Premises, Ordinance of the City of Rock Springs § 8-303 (2006).

State fire marshals. (n.d.). Retrieved July 28, 2007, from http://www.atf.treas.gov./explarson/firemarshal.htm

Sweetwater County Emergency Management. (2007). *SARA Title III, Tier II reports - 2006 reporting period.* Rock Springs, WY: Author.

U.S. General Services Administration. (2001). *SARA Title III: Community right to know technical guide (Publication No. E205.0701).* Retrieved July 10, 2007, from

http://www.gsa.gov/gsa/cm_attachments/GSA_DOCUMENT/SARA_Title_III_R2-sE8-r_0Z5RDZ-i34K-pR.pdf

Union Carbide Corporation. (2006). *The incident, response, and settlement.* Retrieved July 4, 2007, from http://www.bhopal.com/irs.htm

United States Fire Administration. (2003). *USFA 5-year operational objectives.* Retrieved July 7, 2007, from http://www.usfa.dhs.gov/about/strategic

Westerkamp, T. A. (2005, September). Hazardous materials: Make a list, check it twice. *Maintenance Solutions*. Retrieved July 4, 2007, from http://www.facilitiesnet.com/ms/article.asp?id=3351&keywords=hazmat,%20hazardous%20materials,%20hazmat%20compliance,%20chemicals

Woodside, G. (1993). *Hazardous materials and hazardous waste management: A technical guide.* New York: John Wiley and Sons.

Worker Protection, 40 C.F.R. § 311 (2007).

Wyoming State Emergency Response Commission. (n.d.). *Reporting of hazardous substance inventory.* Cheyenne: Wyoming Office of Homeland Security.

Wysong, M. (2005, September). Uncovering chemical inventory dangers. *Occupational Health and Safety*. Retrieved July 4, 2007, from http://www.ohsonline.com/articles/44912/

Appendix A

Data Required in Storage Information

	Tier I	Tier II	MSDS	HMMP	HMIS	NFPA 1620
Chemical name	…	Yes	Yes	…	Yes	…
Hazardous ingredients	…	…	Yes	…	Yes	…
Physical form	…	Yes	Yes	…	…	…
Manufacturer	…	…	Yes	…	Yes	…
Emergency contact number	…	…	Yes	…	Yes	…
Hazard classification	Yes	Yes	…	…	Yes	…
CAS number	…	Yes	…	…	Yes	…
UN ID number	…	…	…	…	Yes	…
Maximum quantity	Yes	Yes	…	Yes	Yes	Yes
Average quantity	…	Yes	…	…	…	…
Storage method	…	Yes	…	Yes	…	Yes
Storage location	Yes	Yes	…	Yes	…	Yes
Temperature and pressure	…	…	…	…	Yes	…
Physical characteristics	…	…	Yes	…	Yes	…
Chemical characteristics	…	…	Yes	…	Yes	…
Physical hazards	…	…	Yes	…	Yes	…
Health hazards	…	…	Yes	…	Yes	…
Routes of entry	…	…	…	…	…	…
Toxicology	…	…	Yes	…	Yes	…
Carcinogen information	…	…	Yes	…	Yes	…

	Tier I	Tier II	MSDS	HMMP	HMIS	NFPA 1620
Handling precautions	…	…	Yes	…	Yes	…
Control measures	…	…	Yes	…	Yes	Yes
First aid	…	…	Yes	…	Yes	…
Site plan	…	…	…	Yes	…	…
Isolation valve location	…	…	…	Yes	…	…
Piping layout	…	…	…	Yes	…	…
Storage arrangement	…	…	…	Yes	…	…
Emergency equipment location	…	…	…	Yes	…	Yes

Appendix B

Fire Department Questionnaire

My name is Carl Blanksvard Fire Inspector for the Rock Springs Fire Department. As a participant in the National Fire Academy Executive Fire Officer Program I am required to complete an applied research project. I am requesting your assistance in completing this questionnaire to collect data on the hazardous materials storage information fire departments require from facilities within their community.

I would like to thank you for your help and want to assure you that the names of participants and their department will be kept anonymous. If you should wish results from this questionnaire please feel free to contact me.

1. SARA Title III is a federal regulation requiring facilities that store or using hazardous materials above certain amounts report storage to the local fire department. Typically this is done with Tier I or Tier II forms. Does your fire department receive such information?

__Yes __No

2. Some jurisdictions require Material Safety Data Sheets be submitted instead of a list of chemicals. Does your fire department follow this practice?

__Yes __No

3. The ATF requires persons storing explosives notify the local fire department in writing within 48-hours of storage. Does your fire department receive such information?

__Yes __No

4. Do you require facilities to report other than Tier II amounts of hazardous materials storage to your fire department?

__Yes __No

5. If so what type of materials do you require reporting of? Mark all that apply.

__Explosives

__Compressed gases/cryogenic materials

__Flammable/combustible liquids

__Flammable solids

__Oxidizers/organic peroxides

__Poisons

__Radioactive materials

_Corrosives

_Others (please explain)

6. What facilities must report this storage?

_All facilities

_Any facility storing limits over those allowed by adopted model code

_Any facility storing limits over those allowed by local City Ordinance

_Others

7. Please expand on requirements from question 6.

8. What information must be included? Mark all that apply.

_Chemical name
_UN ID number
_CAS number
_Hazard class
_Fire response
_Spill response
_Medical response
_Other (please explain)

_Storage method
_Normal storage quantity
_Maximum storage quantity
_Storage location
_Physical properties
_Chemical properties
_Toxicology

Appendix C

Results from Fire Department Questionnaire

1. Receive Tier I or Tier II forms?

   Yes 28 No 0

2. Require MSDS submitted?

   Yes 17 No 11

3. Receive ATF explosives notification?

   Yes 10 No 18

4. Report other than Tier II?

   Yes 22 No 6

5. Materials require reporting?

   Explosives 24

   Compressed gases/cryogenic materials 23

   Flammable/combustible liquids 24

   Flammable solids 24

   Oxidizers/organic peroxides 22

   Poisons 23

   Radioactive materials 22

   Corrosives 22

   Others (please explain) 16

6. What facilities must report storage?

All facilities	20
Any facility storing limits over those allowed by adopted model code	4
Any facility storing limits over those allowed by local City Ordinance	0
Other	1

7. Requirements for 6?

8. Information included?

Chemical name	24	Storage method	22
UN ID number	21	Normal storage quantity	22
CAS number	23	Maximum storage quantity	22
Hazard class	23	Storage location	23
Fire response	17	Physical properties	22
Spill response	18	Chemical properties	22
Medical response	17	Toxicology	13
Other (please explain)	13		