Thoughts on Process Safety Information

By Jake Tilley, SCS Tracer Environmental

Process Safety Information and RAGAGEP

Process Safety Information (PSI) is one of the principal elements in OSHA’s Process Safety Management (CFR Title 29, §1910.119, “PSM”), EPA’s Risk Management Program (40 CFR Part 68, “RMP”), as well as several state-specific programs. It requires subject facilities to compile specific information about the equipment in the process as well as the chemical(s) used in the process. With recent changes to regulatory auditing protocols, there is an increased tendency for inspectors to find issue with Process Safety Information for many ammonia refrigeration facilities.

Some of the key elements of a compliant PSI are discussed below including: 1) the hazards of the regulated chemical, 2) technical design details of the process and equipment, and 3) recognized and generally accepted good engineering practices (RAGAGEP). In this article, anhydrous ammonia and facilities that use ammonia as a refrigerant in industrial refrigeration systems will be used as an example.

Hazard of the Regulated Substance

Historically, Material Safety Data Sheets (MSDS), which will soon be called Safety Data Sheets) have commonly been used to satisfy the element of PSI that requires information about the toxicity of the chemical, permissible exposure limits (PELs), physical data and characteristics, corrosivity data, reactivity data, etc. Updates have been made to anhydrous ammonia MSDS (typically published by chemical suppliers) over the years to ensure that changes to regulatory exposure limits have been captured. One notable inspection resulted in an OSHA citation for the MSDS not including the state’s PEL for ammonia, which differed from the federal limit.

Design Information of the Process and Equipment

PSI also requires that facilities compile information specific to the regulated process(es) and equipment on site. In fact, PSI is required to be assembled prior to conducting the Process Hazard Analysis (PHA) study.

One of the primary components of PSI that most ammonia facilities are familiar with is piping and instrument diagrams (P&IDs), which are typically referred to as: blueprints, CAD drawings, schematics, P&IDs, flow sheets, etc. It is critical that these drawings are kept current and accurate as they are an integral part of many of the other policies and procedures required under the PSM and RMP standards (Process Hazard Analysis, Operating Procedures, Mechanical Integrity, etc.), not to mention several other components within the PSI section as listed below:

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• Block flow diagrams;
• Maximum intended inventory calculations;
• Materials of construction;
• Safety systems (i.e., ammonia vapor leak detection systems, interlocks, compressor safety cutouts);
• Relief system design and design basis;
• Engine room ventilation system design;
• Electrical classification; and
• Safe operating ranges for temperatures, pressures, levels, etc.

Some of the most frequently cited elements within PSI include Safety Systems, Relief System Design Info and Ventilation System Design. Recent findings from regulatory inspections have led to a precedent that ammonia leak detection systems should be considered part of the regulated process. This means that design details about the leak detection system should be documented within the PSI including: locations of each sensor, setpoint(s) of each sensor, and alarms plus other actions taken upon detection of ammonia vapors (i.e., activate emergency engine room ventilation, initiate call-back sequence via alarm company, send alarm signal to operators/managers, close liquid supply solenoid valves and/or King valves, disable electrical supply to engine room equipment, etc.). Some inspectors have even required live tests of leak detectors while on-site!

Another element of PSI that receives a lot of scrutiny by regulatory inspectors is the pressure relief system, including the pressure relief valves themselves. Hopefully by now, we all know that pressure relief valves (PRVs) utilized in ammonia refrigeration systems are required to be replaced or recertified at least every five years. Not only will inspectors physically check date tags on PRVs to see if they are within the five year life span, they will likely want to see the calculations behind the sizing (flow capacities) of the valves and the associated headers. Refrigeration engineers typically refer to industry publications such as ANSI/IIAR-2-2008 to ensure their calculations are defensible and representative of recognized engineering practices.

Design detail of ammonia engine room ventilation systems is another area that has been targeted in recent audits. Several codes and industry guidelines have published design criteria regarding ventilation of refrigeration engine rooms. Depending on the age and location of a specific system (i.e., which codes and standards are applicable), the level of detail required to satisfy the ventilation design information may be surprising to some. There are specific criteria for continuous and emergency ventilation including: flow capacities (air changes per hour [ACH], which considers CFM ratings of the fan(s) and volume of the engine room), makeup air, electrical supply sources for the fans, temperature control inside engine rooms, interaction with ammonia leak detection systems, capability to manually control the fan(s), etc. To satisfy most inspectors, these details about the ventilation system, including which codes and standards were referenced, should be documented and included with the PSI.

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**Recognized and Generally Accepted Good Engineering Practices (RAGAGEP)**

One clause in the Process Safety Information section that is garnering more attention in recent OSHA audits is 1910.119(d)(3)(ii) that states: “The employer shall document that equipment complies with recognized and generally accepted good engineering practices.” This has been interpreted to mean that ammonia refrigeration facilities must abide by codes and standards that are applicable to the facility. Some of the publications that have been specifically referenced by name in recent OSHA citations include:

- Uniform and International Mechanical Codes (UMC/IMC);


- ANSI/IIAR-2 American National Standard for Equipment, Design, and Installation of Closed-Circuit Ammonia Mechanical Refrigerating Systems; and


It is recommended that ammonia refrigeration facilities determine which codes and standards are applicable (considering geographic region) and include documentation in the PSI element that shows compliance with the recognized and generally accepted good engineering practices.

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**Product Safety Notice**

Hansen has issued a recall on certain pressure relief valves sold for industrial use from February 16, 2011 to April 4, 2013 which are more susceptible to internal corrosion when exposed to standing water inside the valve. Although this risk is remote, Hansen has initiated a program to send replacement valves so that any valves currently at risk can be replaced promptly.

Specifically: Hansen H5600A, H5601, H5602, H5600R, H5602R and H5632R valves with serial numbers 02B11 through 04B13 are susceptible, regardless of pressure setting.


For additional questions, please contact Hansen Technologies at +1-866-442-6736 or via email at sales@hantech.com.

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