# **Spill Response**

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Spills happen all too often in industry. Responses that are manageable by the worker who uses a particular chemical will be addressed in this paper. A simple cross reference table can be developed to aid in spill response. Commonly used industry chemicals are included in an example table. The table will show requirements for PPE, the hazardous by-products that result from combining incompatible chemicals and proper disposal of the spilled material. In addition, an overview of the regulations driving spill response will be briefly discussed.

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## Introduction

The workplace has become so inundated with information that we pay little attention to warning signs and labels. However, it is necessary to communicate much information to the worker in the event of a spill. There are spills that are manageable by the worker who regularly works with a chemical. The Material Safety Data Sheet provides information on personal protective equipment, spill procedures and proper disposal methods. Although the MSDS is available all too often it is buried in books of paper and not readily available at the time of the spill. This paper addresses the need for an easy to use resource that covers issues relevant to a spill such as PPE required, disposal and hazards from the combining of incompatible chemicals. In the case of a chemical which one works with daily, then it is easier to identify.

## Reportable Spills

In determining whether or not a spill is reportable, the spill must meet the following tests: It must first be a reportable chemical which is on one of the hazardous chemical lists.<sup>1</sup> If indeed the chemical is on the list, then it must meet or exceed the reportable quantity (RQ) which will be disclosed on the lists. Also, the chemical must leave your property. Chemicals may leave the property via the air, migration through the soil, or to a waterway. Once it has left by any of these conveyances, then it must be reported to the proper agencies.

Reports must be filed with the State and local emergency planning agencies. Usually a phone call followed up by the report is required. The National Response Center (NRC) should be called at 1-800-424-8802 in the U.S. and Canada and 1-202-267-2675 in the District of Columbia. Calling contract response vendors does not constitute compliance to call the NRC.

## **Regulations Governing Spills**

There are several agencies which require spill management. Such as the Occupational Safety and Health Administration (OSHA). It's authority is located in 29 CFR 1910.1200; the

<sup>&</sup>lt;sup>1</sup> The List of Hazardous Chemicals is found in 40 CFR 173.0 Appendix A and also in 49 CFR 172.101 DOT.

Environmental Protection Agency (EPA) 40 CFR 112.0; and facilities with greater than 660 gallons of oil on hand require the development of a Spill Prevention Countermeasures & Control Plan (SPCC). The authority is delegated in 40 CFR Part 109.

#### <u>SPCC</u>

An SPCC plan is a carefully thought out plan which has the full authority of management to commit the necessary resources. Inspections are required and records are to be maintained for a period of three years. The plan also has a requirement for personnel training in 40 CFR 265.0. If a facility is a Treatment, Storage, Disposal Facility, then it is also governed under spill reporting. The primary concern with a TSDF is the potential for groundwater contamination. The Resource Conservation & Recovery Act directs the proper disposal and management of hazardous waste units.

This legislation developed out of the need to protect the environment and communities from plights such as occurred in "Love Canal." The Hooker company had disposed of hazardous waste over a decade ago which later created problems for the community. And hence, the concept of "cradle to grave" for the management of hazardous waste was born. Although companies involved in "Superfund" site cleanups feel that cradle to grave is one thing, but the regulations have resurrected the waste from the grave in a never ending legal battle for those who dispose of hazardous waste.

#### 40 CFR 125 Subpart K

Regulations governing spills also appear in 40 CFR 125 Subpart K. This regulation addresses the Clean Water Act where Best Management Practices are required and also the National Pollutant Discharge Elimination System (NPDES) covers spill response to waterways in point source discharge.

## 49 CFR 130.0

The Department of Transportation (DOT) also addresses spill response. As one might well expect the act of transporting hazardous materials across our transportation conduits will eventually result in spills. One invaluable tool to assist the transporter in the event of a spill is the <u>North American Emergency Response Guidebook</u>. The guidebook is updated every three years.

## The Lists

The lists of hazardous chemicals with reportable quantities are found in 49 CFR 172.101 for DOT and 40 CFR 173.0 Appendix A for EPA. One of the problems in spill response is finding information about the spilled substance. One of the most distressing events is the unintentional combining of incompatible chemicals. Combining incompatible chemicals may result in the generation of toxic gas, fire or an explosion. Several classes of chemicals represent physical hazards when combined. These are as follows:

## Organic vs. Inorganic

Organic chemicals include carbon base materials which may react violently with inorganic materials.

## Acids vs Bases

Chemicals at opposite ends of the pH scale do not like each other. Years ago a Swedish chemist Dr. Soren Paul Lauritz Sorensen of the Carlsberg Laboratory in Copenhagen suggested taking the negative logarithm of the Hydrogen ion concentration numbers. He named the "Hydrogen Exponent" and introduced the term " $p_H$  pondus Hydrogenii" <sup>2</sup> for it. In essence he quantified the measurement of acidity and alkality with his new pH scale. At the lower end of the scale,

<sup>&</sup>lt;sup>2</sup> Helmuth Galster, pH Measurement: Fundamentals, Methods, Applications, Instrumentation, VCH Verlagsgesellschaft mbH, Weinheim, Germany, 1991, p.2.

which runs between 0 and 14, we find acids and at the upper end are bases. Neutral is in the middle at 7.0. When strong acids are mixed with strong bases they may react violently.

## Flammables vs. Oxidizers

Flammables will catch on fire and oxidizers support combustion. Therefore, they should not be stored together.

## <u>PPE</u>

Personal protective equipment is required in spill response. The Material Safety Data Sheet (MSDS) should be consulted to aid in the proper selection of equipment. The levels of protection required ranges from the lighter requirements of a Class D suit to the stringent requirements of Class A which includes Self-Contained Breathing Apparatus (SCBA) and a fully encapsulating suit. Commonly used PPE in the metal finishing industry includes: safety goggles, face shield, gloves, apron, gauntlets and boots for chemical additions to tanks. If the additive is of the fuming nature then a suitable cartridge respirator may be added as well.

#### <u>Disposal</u>

Once a spill has occurred if it cannot be recovered for reuse, then it may become a special or hazardous waste and must be disposed of in accordance with all local, state and federal regulations.

#### Conclusion

When a small spill in the workplace occurs it is always a little disconcerting for employees to stand around because they don't know what to do. Many of these workers have received training. However, the fear level rises in any emergency and confidence can quickly wane. A spill can be a routine event which can be capably handled by most workers with the proper training. Developing a quick reference guide can save valuable time during an emergency and

allow workers to make the proper decisions rapidly. Routine practice can also create more worker confidence in dealing with those occasional spills. It is always more desirable to avoid spills. As the old saying goes "an ounce of prevention is worth a pound of cure" applies until the spill happens. Then the better saying is, "an investment in knowledge always pays the best dividend." <sup>3</sup>

<sup>&</sup>lt;sup>3</sup> Quotation by Benjamin Franklin.

# Appendix.

## SAMPLE GUIDE FOR BASIC CHEMICAL EMERGENCY RESPONSE PROCEDURES<sup>4</sup>

Chemical Name	Symbol	Storage Type	Danger	рН	First Aid Eyes	First Aid Skin	Special Condition	Spill Neutralize
Hydrochloric Acid	HCI	Tote/drum	Corrosive-Serious	<1.0	Flush 15 min.	Flush 15 min.		Soda ash
Sodium Bisulfite	NaHSO <sub>3</sub> Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub>	Tote	Mixed with water, corrosive	5	Flush 15 min.	Flush 15 min.	Reacts Acid-POISON Sulfur Dioxide Gas	Use Bleach (stops fizzing, then stop adding)
Sodium Hydroxide (Caustic Soda)	NaOH	Tote	Caustic-Serious	>12.5	Flush 15 min.	Flush 15 min.	Reacts Acid-release POISON	Dilute with water (10:1, 10 is water)
Sodium Hypochlorite (Bleach)	NaOCI	Tote	Caustic-Serious	>12.5	Flush 15 min.	Flush 15 min.	Reacts Acid-Chlorine Gas POISON	Dilute with Sodium Metabisulfite (1:1)
Sodium Metabisulfite	$NaHSO_{2}$ $Na_{2}S_{2}O_{5}$	Tote	Mixed with water, corrosive	5	Flush 15 min.	Flush 15 min.	Reacts Acids- POISON Sulfur Dioxide Gas	Dilute with water 10:1 (10 is water)
Sulfuric Acid	$H_2SO_4$	Tote	Corrosive-Severe	<1.0	Wipe First Flush 15 min. Get Medical Attention	WIPE FIRST then flush 15 min.	Reacts-Cyanides POISON and strong alkali, bleach	Soda Ash
Sodium Sulfide	Na₂S	Bags	Caustic	8	Flush 15 min.	Flush 15 min.	Reacts acids- POISON Hydrogen Sulfur Gas	If liquid Dilute with water 10:1 (10 is water)
Calcium Chloride	CaCl <sub>2</sub> Granular	Bags	When mixed with water, corrosive	With water <5.0	Flush 15 min.	Flush 15 min.		Dilute with water (10:1, 10 water)
Cyanide	Powder CN	Container	POISON	11-12	Flush 15 min.	Flush 15 min.	Reacts with Acids, POISON- Cyanide Gas	Bleach (Sodium Hypochlorite) 1:1
Ferric Chloride	FeCl <sub>2</sub>	Drums	CORROSIVE	<4	Flush 15 min.	Flush 15 min.	Reacts with alkali	Dilute with water (10:1)
Hydrogen Peroxide	$H_2O_2$	Drums	Strong Oxidizer		Flush 15 min.	Flush 15 min.	Reacts with any organic material (wood paper- causes FIRE)	Dilute with water (10:1)
Copper & Potassium Cyanide	KCN	Container	POISON	11-12	Flush 15 min.	Flush 15 min.	Reacts with Acids, releases POISON-Cyanide Gas	Bleach (Sodium hypochlorite) 1:1
Consult MSDS for your own guide development.								

<sup>&</sup>lt;sup>4</sup>Sample of a Basic Response Chart – Rapid response chart was developed by Mr. Dan Violette, EHS Manager, as a teaching aid for spill response in the workplace.