
	<b>GILES CHEMICAL ~ PREMIER MAGNESIA</b>		
	<b>Company Procedure</b>		
	Title: <b>Acid Spill Response Plan - Waynesville</b>	Number: <b>S12-PG-200-005</b>	
	Owner: <b>Deborah Durbin</b>	Revision: <b>6</b>	
	Effective Date: <b>03/30/16</b>	Page: <b>1 of 21</b>	

## 1.0 Purpose

The following *Acid Spill Response Plan* has been prepared for Giles Chemical, a division of Premier Magnesia, LLC in Waynesville, NC. The purpose of the plan is to protect the safety and welfare of the employees, the community, and the environment in the event of an emergency acid spill incident. This plan has been developed to comply with OSHA standards 29 CFR 1910.120(q) and other applicable Federal, State, and Local laws.

The *Acid Spill Response Plan* is a guide of emergency procedures in the event of a Sulfuric Acid spill. This document is also intended as a reference source to familiarize local emergency response agencies, fire and police departments, and area hospitals on responder operations relating to Sulfuric Acid and the emergency response at Giles.

## 2.0 Scope

The plan outlines the steps to be taken to identify, contain, clean-up and report a Sulfuric Acid spill at the Waynesville Manufacturing facility. This plan does not apply to small leaks and mishaps which can be successfully covered under the plant's Hazard Communication program, 29 CFR 1910.1200. The key points of a hazard communication response are that partial or total evacuation is not necessary and employees in the immediate work area of the spill or mishap can safely handle the situation.

### ○ General Facility Information



The address of the Waynesville Manufacturing facility is:

**Giles Chemical, a division of Premier Magnesia, LLC**  
**102 Commerce Street**  
**Waynesville, NC 28786**  
**828-452-4784**

The property consists of approximately 5.5 acres and is located on the corner of Commerce Street and Smathers Street and is bisected by Richland Creek. Operations at the site started in 1950 and the facility currently employs approximately 45 people. The facility operates 24/7 with four alternating shifts of four to five production workers each shift. The office operates typically 8am-5pm Monday through Friday with up to fourteen employees. Additionally, there are 11 other employees during office hours that are working in the plant. This facility produces bulk Epsom Salt (magnesium sulfate heptahydrate).

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Manufacturing processes at the Waynesville facility are located in a single building and consist of only three raw materials: **Magnesium Oxide**, **Sulfuric Acid** and **Water**. The Magnesium Oxide and Sulfuric Acid are received by railcar (on rare occasion by tanker) and are stored in three silos and two tanks respectively. These materials are dispensed from storage at prescribed rates to digesters where a chemical reaction occurs, and MgSO<sub>4</sub> brine is formed. The brine is filtered and directed to Vacuum Crystallizers where crystal growth is promoted, following which crystals are separated from residual liquor, dried and packaged for shipment to customers. Liquid product is also produced in which the brine, at specified strengths, is shipped direct to customers via liquid transportation. Finished product is shipped out via truck and rail service. No hazardous wastes are generated from the manufacturing process.

The two Sulfuric Acid storage tanks contain 20,000 gallons each of 93-97% acid and are labeled as tanks 1 & 2; these tanks are located outside (behind the building) within secondary containment. There is also a secondary containment beneath the railcars (in front of building) where they are unloaded.

The three Magnesium Oxide storage silos contain 120 tons, 120 tons and 100 tons and are labeled as silo 1 & 2 & 3.

## 2.0 Responsibility



Employees' responsibilities are commensurate with their level of training. See Appendix A for the response roles of specifically named individuals, their job titles, and contact information.

At a minimum, where response activities exceed the defensive action stage, there must be two Level 3 responders and two Level 5 incident commanders (one to initiate the coordination with outside parties listed in Appendix B, and one to coordinate on-scene activities).

- First Responders (Awareness Level 1) – any employee that discovers an acid spill or leak has the responsibility to initiate the *Acid Spill Response Plan* sequence by notifying their supervisor of the release. All plant employees are trained to recognize an acid spill, to understand the risks associated with the spill, and how to make the appropriate notifications of the spill. Training is conducted at hire and annually thereafter by the Safety Department.
- First Responders (Operations Level 2) – employees that respond to an acid spill as part of the initial response to the site for the purpose of protecting nearby persons, property, or the environment from effects of the release. Their responsibility is to contain the release from a safe distance, keep it from spreading, and prevent exposures. They are trained to respond in a

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defensive fashion without actually trying to stop the release. These employees receive HazWoper 8-hour training in addition to Awareness Level 1 training.

- Hazardous Materials Technician (Level 3) – employees that respond to an acid spill for the purpose of stopping the release. They assume a more aggressive role than a level 2 in that they will approach the point of release in order to plug, patch or otherwise stop the release of acid. Level 3 responders receive HazWoper 24-hour training.
- Incident Commanders (ICs Level 5) – assume control of the emergency by activating and coordinating all aspects of the *Acid Spill Response Plan*. The ICs have been selected based on their familiarity with the facility, the *Acid Spill Response Plan*, operation and activities at the facility, the locations and characteristics of Sulfuric Acid, and regulatory requirements. These employees have received HazWoper 24-hour and are certified as Incident Commanders. Certifications are maintained through annual HazWoper 8-hour training. They have complete authority to commit all resources of the company to carry out the *Acid Spill Response Plan* in the event of an acid spill.

### 3.0 Safety Considerations



- **SULFURIC ACID REACTS VIOLENTLY WITH WATER!**
- The main hazard associated with sulfuric acid is its corrosiveness to skin and eyes. It can cause rapid damage to skin and eye tissue on contact and may result in burns and/or permanent eye damage. Inhalation can cause respiratory irritation.
- The main environmental hazard is that it would quickly lower the pH of any water it reaches, causing potential damage to plants and wildlife.
- PPE:
  - Acid Splash Suit – not a rain coat; acid-resistant material (ie. coated PVC) for 93-97% acid that is designed to minimize tears/rips and is properly sized
  - Acid-resistant gauntlet-length gloves
  - Acid-resistant steel-toed boots
  - Chemical goggles with a face shield
  - Respiratory protection is typically not required when handling <100% sulfuric acid under normal conditions; engineering controls (good ventilation) are preferred over respirator use. However, respiratory protection is recommended in the event of a large spill. Where the potential exists for exposure > 0.2 mg/m<sup>3</sup>, use a NIOSH approved full face-piece respirator with an acid gas cartridge specifically approved for Sulfuric Acid, with an R or P100 pre-filter.

See Appendix D, *Right to Know Hazardous Substance Fact Sheet – Sulfuric Acid*

See Appendix E, *Sulfuric Acid Safety Data Sheet (Norfalco)*

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## 5.0 Materials/Equipment

- PPE referenced above
- Lime
- pH paper
- Wheel barrow, shovel

## 6.0 Procedure

The *Acid Spill Response Plan* will be activated for sulfuric acid spills that meet or exceed a reportable quantity of 1000 pounds (67 gallons) or is uncontrolled. Acid spills under the reportable quantity will be documented using the *Incidental Acid Spill Log* in Appendix D.

### A. Identification

Sulfuric acid is a clear to turbid, oily, colorless to light brown or grey, odorless liquid. It has a pH of <1 and is dispersible and soluble in water. Although odorless, it can irritate the nose and throat. It can appear to be greenish when in contact with the plant floor.

Sulfuric acid spills or leaks would mostly likely occur at the Railcar Unloading Station or within the secondary containment from a storage tank outside. All piping from these sources are labeled and encapsulated with secondary containment piping where leakage would be highly unlikely but not impossible.

### B. Immediate Actions



- Immediately call **911** if the acid spill has resulted in injury, fire, or an emergency situation. Activate an Emergency Evacuation air horn 2 times, if necessary, to initiate evacuation procedures (*Emergency Evacuation, S12-PR-200-003*).
- Immediately notify the supervisor and/or one of the Hazardous Materials Technicians (Level 3) on duty listed in Appendix A.
- Do not discuss event with anyone outside of Giles. Jim Hill and/or Matt Haynes are the only individuals authorized to speak publically or to the media.

### C. Emergency Recognition and Prevention

- Supervisor and/or Hazardous Materials Technician will assess the spill to determine if it is an incidental release (under 1000 pounds or 67 gallons, controlled, poses no safety or health hazard) or if the release requires an emergency response.

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- a) Incidental Release – contain spill, neutralize with Lime to pH 6-7, dispose in Mud Pit (waste not to exceed 55 gallons), and record incident on the *Incidental Acid Spill Log* in Appendix D.
- b) Emergency Response Release – Secure operations only if adequate personal protective equipment is available and employ the buddy system. Employees have the option to evacuate without penalty if they subjectively believe response is beyond their capabilities.

Controls to stop leak:



- Emergency Stops at the Commerce Street door, at the pump, or at the top of the steps of the Unloading station will shut down the pump (when activated an audible alarm will sound to alert employees of spill;
- or close valves;
- or shut plant down;

#### D. Coordination Efforts

- Supervisor and/or Hazardous Materials Technician will immediately notify a member of the Incident Commander Team in Appendix A. The incident commander contacted will contact a secondary incident commander.
  - a) On-scene Incident Commander – will manage emergency response activities to a successful conclusion, supervising the response team:
    - ensure all employees are accounted for in the case of an evacuation
    - will designate an alternative safe distance and place of refuge, if required
      - small spill isolation distance is 200 feet
      - large spill isolation distance is 1000 feet
      - isolation distance for fire is ½ mile
    - manage site safety and control by prohibiting unauthorized personnel from entering the danger area
    - create a safe location for a command post
    - will determine if outside emergency assistance is needed
    - document all response activities using Appendix E, *IC On-scene Acid Spill Response Report*
  - b) Secondary Incident Commander – will immediately initiate Federal, State, and Local notification and reporting requirements listed in Appendix B, *Federal*,

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*State, and Local Notifications.* Calls will be recorded using Appendix C, *Acid Spill Response Notifications Log*. The secondary incident commander will also be responsible for required follow-up reports to applicable regulatory agencies.

E. Clean-up Procedures - Those employees trained to at least Level 3 or Hazardous Materials Technician will perform the following under the guidance of the Incident Commander:

- Ensure that the source of the acid spill/leak has been identified, stopped and repaired.
- Prevent the acid spill from entering sewers, waterways, or low areas. If there is an immediate threat and no safety concerns, then attempt to contain the spill using an absorbent (cat litter) and/or sock booms or rags to stop the spill from getting into the drains or to any permeable surfaces.
- Once the spill has been contained and any immediate threat to storm drains or permeable surfaces have been minimized, commence cleanup procedures.
- Cautiously neutralize the spill with Lime to a pH of 6-7.
- If the volume of cleanup does not exceed 55 gallons, it may be disposed of in the Mud Pit. If more than 55 gallons, then it must be contained and disposed of as a Hazardous Waste. In this case, contact Mountain Environmental, our Spill Clean-up Contractor.

F. Decontamination Procedures – any residual sulfuric acid is to be removed from employees and their equipment using copious amounts of water to the extent necessary to preclude the occurrence of foreseeable adverse health effects.



G. Emergency Medical Treatment and First Aid

- If an employee requires emergency medical care, either call 911 or have another employee transport them to the hospital or urgent care.
- First aid treatment is fairly simple – get as much water on the affected area, as fast as possible. Wash/rinse the affected skin for at least 15 minutes. Flush eyes with water for at least 30 minutes. Seek medical attention immediately. Emergency eye wash and shower stations are located throughout the facility. For inhalation, remove the affected person from the source of exposure. If not breathing, institute CPR.

H. Critique of Response and Follow-up – all practice drills and actual incidents will be critiqued within 72 hours for response effectiveness using the *IC On-scene Acid Spill Response Report* (Appendix E). This critique will discuss the high points, low points, successes and failures

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encountered. Any changes or improvements to the plan and/or plant procedures will be noted. This information will serve as a training tool during the annual refresher training.

- I. Personal Protective and Emergency Equipment – all PPE and/or equipment will be cleaned (decontaminated) and evaluated for reuse. This evaluation will be documented on the *Acid Gear Check Sheet* form that is used weekly.

## 7.0 Reference Documents

*Emergency Evacuation (S12-PR-200-003)*

*Acid Gear Check Sheet*

U.S. Department of Transportation 2012 Emergency Response Guide (ERG)



## 8.0 Change Information

Complete re-write of existing procedure.

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## Appendix A

### Emergency Contacts List



Incident Commanders (Level 5)			
<i>Name</i>	<i>Title</i>	<i>Office Phone</i> 828-452-4784	<i>Cell</i>
Jason Bumgarner	Plant Manager	x-13	828-508-4377
Sammy Joe Henson	Maintenance Manger	x-32	828-342-1748
Deborah Durbin	Dir. of Quality & Safety	x-33	828-734-5285
Patrick Owen	Process Engineer	x-25	828-553-8806

Emergency Spill Response Team (Levels 1-3)			
<i>Name</i>	<i>Title-Shift</i>	<i>Training Level</i>	<i>Cell</i>
Phillip Davis	Process Coordinator	3	828-734-7874
Marvin Crawford	Lead Operator-B	3	828-734-1629
Keith James	Lead Operator-C	3	828-734-2779
Joe Phillips	Lead Operator-D	3	828-400-9481
Dalton Messer	Material Handler-A	3	828-400-9433
Daniel Riddle	Material Handler-C	3	828-593-0705
Alberto Quesada	Warehouse-A	3	828-283-1272
James Frizzell	Warehouse-B	3	828-400-2471
Chris Snyder	Warehouse-C	3	727-482-9425
Chris Phillips	Warehouse-D	3	828-450-9622
Lester Parton	Maintenance	3	828-734-4898
Jody Conner	Maintenance	3	828-400-2377
Rex Chambers	Maintenance	3	828-734-5764

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## Appendix B

### Federal, State and Local Emergency Notifications

**National Response Center (NRC) 1-800-424-8802**

- Call immediately; they will contact other appropriate agencies
- On-line report

**North Carolina Emergency Response Commission (NCERC)/  
North Carolina Division of Environmental Management (NCDEM) 1-800-858-0368**

- Call immediately or as soon as possible
- Follow-up report within 30 days

**Haywood County Local Emergency Planning Committee (LEPC) 911**  
(office: 828-456-2391)  
(cell: 828-508-8387)

- Call immediately or as soon as possible
- Contact Chairman Greg Shuping immediately
- Follow-up report within 30 days

**Waynesville Police, Fire and County Sheriff's Department 911**

**Town of Waynesville Waste Water Plant 828-452-4685**

- Call only if property other than Giles affected
- Contact David Smith

**Town of Waynesville Public Works 828-456-4410**

- Call only if property other than Giles affected
- Contact Fred Baker (Director)

**North Carolina OSHA 800-625-2267**

- Call within 8 hours after the death of an employee or hospitalization of three or more

### Remediation Services



**Mountain Environmental Services 828-648-5556**

### Addresses for Follow-up Reports

- North Carolina Emergency Response Commission (NCERC), 4714 Mail Service Center, Raleigh, NC, 27699-4714 Attn: Patrick Lake
- Haywood County Local Emergency Planning Committee (LEPC), Waynesville, NC, 27, Attn: Greg Shuping

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## Appendix C

### Acid Spill Response Notifications Log



Who discover the spill: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_

Quantity of spill: \_\_\_\_\_ Duration of spill: \_\_\_\_\_ Location of spill: \_\_\_\_\_

<i>Calls</i>	<i>Phone Number</i>	<i>Who Called</i>	<i>Date/Time</i>	<i>Comments</i>
<b>NRC</b> National Response Center	<b>800-424-8802</b>			
<b>NCERC/NCDEM</b> NC Emergency Response Center / NC Dept. of Environmental Management	<b>800-858-0368</b>			
<b>LEPC</b> Local Emergency Planning Committee	<b>911</b>			
<b>LEPC Chairman</b> <b>Greg Shuping</b>	<b>828-508-8387(m)</b> <b>828-456-2391 (o)</b>			
<b>Police / Fire</b>	<b>911</b>			
<b>Town of Waynesville</b> <b>Waste Water</b>	<b>828-452-4685</b>			
<b>Town of Waynesville</b> <b>Public Works</b>	<b>828-456-4410</b>			
<b>NC OSHA</b> (Death / Hospitalization 3+)	<b>800-625-2267</b>			
<b>Mountain</b> <b>Environmental</b> Spill Clean-up Contractor	<b>828-648-5556</b>			

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## Appendix D

### Incidental Acid Spill Log (spill under 1000 lbs./67 gallons)

Date/Time	Location	Quantity	Duration	Cause	Corrective Action	Initials

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## Appendix E

### IC On-scene Acid Spill Response Report

<b>Date/Time of Spill:</b>	<b>Location of Spill:</b>	<b>Spill Discovered By:</b>
<b>Duration of Spill:</b>	<b>Quantity of Spill:</b>	<b>Weather Conditions:</b>
<b>Regulatory Notifications Initiated:</b>	<b>Notifications made by:</b>	<b>Report Prepared By:</b>
<b>Fire Dept. Present?</b>	<b>Police Present?</b>	<b>EMT Present?</b>

**Responder Names on Team:**

<b>Incident Commander:</b>	<b>Incident Commander:</b>	<b>HazMat Tech:</b>	<b>HazMat Tech:</b>
<b>HazMat Tech:</b>	<b>HazMat Tech:</b>	<b>First Responder Operations:</b>	<b>First Responder Awareness:</b>

**Outline Actions Taken to Respond to and Contain Release:**


<b>What was the cause of the spill?</b>
<b>Extent of injuries, if any?</b>
<b>Assessment of actual or potential hazards to human health or environment (if applicable)?</b>
<b>Estimated quantity and disposition of material recovered from the spill?</b>
<b>Time Incident was over and 'All Clear' notification announced?</b>
<b>Critique of Response. Are procedural changes recommended?</b>

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## Appendix F

## Right To Know

# Hazardous Substance Fact Sheet

### Common Name: **Sulfuric Acid**

Synonyms: Battery Acid, Hydrogen Sulfate, Oil of Vitriol

Chemical Name: Sulfuric Acid

CAS Number: 7664-93-9

RTK Substance Number: 1761

Dot Number: UN 1830

### Description and Use

**Sulfuric Acid** is a clear, colorless to brown, odorless liquid. It is used to make storage batteries, fertilizers, paper products, textiles, explosives, pharmaceuticals, and in steel and iron production.

### Reasons for Citation

- **Sulfuric Acid** is on the Right to Know Hazardous Substance List because it is cited by OSHA, ACGIH, DOT, NIOSH, NTP, IARC, NFPA and EPA.
- This Chemical is on the Special Health Hazard Substance List.

[SEE GLOSSARY ON PAGE 17 OF THIS PROCEDURE.](#)

### FIRST AID

#### Eye Contact:

- Immediately flush with large amounts of water for at least 30 minutes, lifting upper and lower lids. Remove contact lenses, if worn, while flushing. Seek medical attention immediately.

#### Skin Contact:

- Quickly remove contaminated clothing. Immediately wash contaminated skin with large amounts of soap and water. Seek medical attention immediately.

#### Inhalation:

- Remove the person from exposure
- Begin rescue breathing (using universal precautions) if breathing has stopped and CPR if heart action has stopped.
- Transfer promptly to a medical facility.
- Medical observation is recommended for 24 to 48 hours after overexposure, as pulmonary edema may be delayed.

### EMERGENCY NUMBERS

Poison Control: 1-800-222-1222

CHEMTREC: 1-800-424-9300

National Response Center: 1-800-424-8802

### EMERGENCY RESPONDERS>>>>SEE BACK PAGE

### HAZARD SUMMARY

Hazard Rating	NJDOH	NFPA
Health	-	3
Flammability	-	0
Reactivity	-	2- <del>W</del>

CARCINOGEN

CORROSIVE AND REACTIVE

OXIDIZER

POISONOUS GASES ARE PRODUCED IN FIRE

CONTAINERS MAY EXPLODE IN FIRE

DO NOT USE WATER

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

- **Sulfuric Acid** can affect you when inhaled.
- **Sulfuric Acid** is a CARCINOGEN. HANDLE WITH EXTREME CAUTION.
- **Sulfuric Acid** is CORROSIVE and contact can severely irritate and burn the skin and eyes, and may lead to blindness.
- Inhaling **Sulfuric Acid** can irritate the nose and throat.
- Inhaling **Sulfuric Acid** can irritate the lungs. Higher exposures may cause a build-up of fluid in the lungs (pulmonary edema), a medical emergency.
- Exposure can cause headache, nausea and vomiting.
- Repeated exposure can cause permanent lung damage, damage to teeth, and upset stomach.
- **Sulfuric Acid** is REACTIVE and a DANGEROUS EXPLOSION HAZARD.
- **Sulfuric Acid** is not combustible, but it is a STRONG OXIDIZER that enhances the combustion of other substances.

### Workplace Exposure Limits

OSHA: The legal airborne permissible exposure limit (PEL) is **1 mg/m<sup>3</sup>**.

NIOSH: The recommended airborne exposure limit (REL) is **1 mg/m<sup>3</sup>**.

ACGIH: The threshold limit value (TLV) is **0.2 mg/m<sup>3</sup>** (as the Thoracic fraction) averaged over an 8-hour work shift.

**Sulfuric Acid** is a CARCINOGEN in humans. There may be NO safe level of a carcinogen, so all contact should be reduced to the lowest possible level.

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## GILES CHEMICAL ~ PREMIER MAGNESIA

### Company Procedure

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### Determining Your Exposure

- Read the product manufacturer's Safety Data Sheet (SDS) and the label to determine product ingredients and important safety and health information about the product mixture.

This Fact Sheet is a summary of available information regarding the health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

### Health Hazard Information

#### Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Sulfuric Acid**:

- Contact can severely irritate and burn the skin and eyes, and may lead to blindness.
- Inhaling **Sulfuric Acid** can irritate the nose and throat.
- Inhaling Sulfuric Acid can irritate the lungs causing coughing and/or shortness of breath. Higher exposures may cause a build-up of fluid in the lungs (pulmonary edema), a medical emergency, with severe shortness of breath.
- Exposure can cause headache, nausea and vomiting.

#### Chronic Health Effects

The following chronic (long term) health effects can occur at some time after exposure to **Sulfuric Acid** and can last for months or years:

#### Cancer Hazard

- **Sulfuric Acid** is a CARCINOGEN in humans. There is evidence that occupational exposure to *strong inorganic acid mists* containing **Sulfuric Acid** cause cancer of the larynx in humans.
- Many scientists believe there is no safe level of exposure to a carcinogen.

#### Reproductive Hazard

- While **Sulfuric Acid** has been tested, further testing is required to assess its potential to cause reproductive harm.

#### Other Effects

- **Sulfuric Acid** can irritate the lungs. Repeated exposure may cause bronchitis to develop with coughing, phlegm, and/or shortness of breath.
- Repeated exposure can cause permanent lung damage, damage to teeth, and upset stomach.

### Medical

#### Medical Testing

Before beginning employment and at regular times thereafter, (at least annually), the following are recommended:

- Lung Function tests

If symptoms develop or overexposure is suspected, the following is recommended:

- Consider chest x-ray after acute overexposure

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing, you have a legal right to this information under the OSHA Access to Employee Exposure and Medical Records Standard (29 CFR 1910.1020).

#### Mixed Exposures

- Smoking can cause heart disease, lung cancer, emphysema, and other respiratory problems. It may worsen respiratory conditions caused by chemical exposure. Even if you have smoked for a long time, stopping now will reduce your risk of developing health problems.

### Workplace Controls and Practices

Very toxic chemicals, or those that are reproductive hazards or sensitizers, require expert advice on control measures if a less toxic chemical cannot be substituted. Control measures include:

1. Enclosing chemical processes for severely irritating and corrosive chemicals
2. Using local exhaust ventilation for chemicals that may be harmful with a single exposure.
3. Using general ventilation to control exposures to skin and eye irritants. For further information on workplace controls, consult the NIOSH document on Control Banding at [www.cdc.gov/niosh/topics/ctrlbanding/](http://www.cdc.gov/niosh/topics/ctrlbanding/).

The following work practices are also recommended:

- Label process containers.
- Provide employees with hazard information and training.
- Monitor airborne chemical concentrations.
- Use engineering controls if concentrations exceed recommended exposure levels.
- Provide eye wash fountains and emergency showers.
- Wash or shower if skin comes in contact with a hazardous material.

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- Always wash at the end of the work shift.
- Change into clean clothing if clothing becomes contaminated.
- Do not take contaminated clothing home.
- Get special training to wash contaminated clothing.
- Do not eat, smoke, or drink in areas where chemicals are being handled, processed or stored.
- Wash hands carefully before eating, smoking, drinking, applying cosmetics or using the toilet.

In addition, the following may be useful or required:

- Before entering a confined space where **Sulfuric Acid** may be present, check to make sure that an explosive concentration does not exist.
- Where possible, transfer **Sulfuric Acid** from drums or other containers in an enclosed system.

### Personal Protective Equipment

The OSHA Personal Protective Equipment Standard (29 CFR 1910.132) requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

#### Gloves and Clothing

- Avoid skin contact with **Sulfuric Acid**. Wear personal protective equipment made from material which cannot be permeated or degraded by this substance. Safety equipment suppliers and manufacturers can provide recommendations on the most protective glove and clothing material for your protection.
- Safety equipment manufacturers recommend Butyl, Silver Shield®/4H®, Viton and Barrier® for gloves, and Tychem® fabrics; Zytron® 300; ONESuit®/TEC; and Trellechem® HPS and VPS, or equivalent, as protective materials for clothing.
- All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

#### Eye Protection

- Wear non-vented, impact resistant goggles when working with fumes, gases, or vapors.
- Wear indirect-vent, impact and splash resistant goggles when working with liquids.
- Wear a face shield along with goggles when working with corrosive, highly irritating or toxic substances.

#### Respiratory Protection

**Improper use of respirators is dangerous.** Respirators should only be used if the employer has implemented a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing, and medical exams, as described in the OSHA Respiratory Protection Standard (29 CFR 1910.134).

- Where the potential exists for exposure over **0.2 mg/m<sup>3</sup>**, use a NIOSH approved full face piece respirator with an acid gas cartridge specifically approved for **Sulfuric Acid**, with an R or P100 pre-filter. Increased protection is obtained from full face powered-air purifying respirators.
- Leave the area immediately if:
  1. While wearing a filter or cartridge respirator you can smell, taste, or otherwise detect **Sulfuric Acid**.
  2. While wearing particulate filters abnormal resistance to breathing is experienced.
  3. Eye irritation occurs while wearing a full face piece respirator. Check to make sure the respirator-to-face seal is still good. If it is, replace the filter or cartridge. If the seal is no longer good, you may need a new respirator.
- Consider all potential sources of exposure in your workplace. You may need a combination of filters, pre-filters or cartridges to protect against different forms of a chemical (such as vapor and mist) or against a mixture of chemicals.
- Where the potential exists for exposure over **2 mg/m<sup>3</sup>**, use a NIOSH approved supplied-air respirator with a full face piece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.
- Exposure to **15 mg/m<sup>3</sup>** is immediately dangerous to life and health. If the possibility of exposure above **15 mg/m<sup>3</sup>** exists, use a NIOSH approved self-contained breathing apparatus with a full face piece operated in a pressure-demand or other positive-pressure mode equipped with an emergency escape air cylinder.

### Fire Hazards

If employees are expected to fight fires, they must be trained and equipped as stated in the OSHA Fire Brigades Standard (29 CFR 1910.156)

- **Sulfuric Acid** is not combustible, but it is a **STRONG OXIDIZER** that enhances the combustion of other substances.
- Extinguish fire using an agent suitable for type of surrounding fire. **Sulfuric Acid** itself does not burn.
- **DO NOT USE WATER** directly on Sulfuric Acid.
- **POISONOUS GASES ARE PRODUCED IN FIRE**, including *Sulfur Oxides*.
- **CONTAINERS MAY EXPLODE IN FIRE.**
- **Sulfuric Acid** may ignite combustibles (wood, paper, and oil).



### Spills and Emergencies

If employees are required to clean-up spills, they must be properly trained and equipped. The OSHA Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120) may apply.

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If **Sulfuric Acid** is spilled or leaked, take the following steps:

- Evacuate personnel and secure and control the entrance to the area.
- Eliminate all ignition sources.
- Neutralize spill with crushed limestone, soda ash, or lime and place into sealed containers for disposal.
- DO NOT USE WATER OR WET METHOD.
- Ventilate area of spill or leak, DO NOT wash into sewer.
- It may be necessary to contain and dispose of **Sulfuric Acid** as a HAZARDOUS WASTE. Contact your state Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.

### Handling and Storage

Prior to working with **Sulfuric Acid** you should be trained on its proper handling and storage.

- **Sulfuric Acid** reacts violently with ALCOHOL and WATER to release Heat and will also react violently or explosively with ORGANIC MATERIALS; COMBUSTABLES; STRONG BASES ( such as SODIUM HYDROXIDE and POTASSIUM HYDROXIDE); REDUCING AGENTS (such as LITHIUM, SODIUM, ALUMINUM and their HYDRIDES); and OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLORINE).
- **Sulfuric Acid** reacts with MOST METALS to produce flammable and explosive *Hydrogen gas*.
- **Sulfuric Acid** is not compatible with STRONG ACIDS (such as HYDROCLORIC and NITRIC); MOISTURE; AMINES; and many OTHER SUBSTANCES.
- Store in tightly closed containers in a cool, well-ventilated area away from HEAT SOURCES, MOIST AIR, and COMBUSTABLES.
- **Sulfuric Acid** will absorb WATER from the air.

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## GLOSSARY

**ACGIH** is the American Conference of Governmental Industrial Hygienists. They publish guidelines called Threshold Limit Values (TLVs) for exposure to workplace chemicals.

**Acute Exposure Guideline Levels (AEGLs)** are established by the EPA. They describe the risk to humans resulting from once-in-a-lifetime, or rare, exposure to airborne chemicals.

**Boiling point** is the temperature at which a substance can change its physical state from liquid to a gas.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is unique, identifying number, assigned by the Chemical Abstracts Service, to a specific chemical.

**CFR** is the Code of Federal Regulations, which are the regulations of the United States government.

A **combustible** substance is a solid, liquid, or gas that will burn.

A **corrosive** substance is a solid, liquid, or gas that causes destruction of human skin or severe corrosion of containers.

**DOT** is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

**EPA** is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

**ERG** is the Emergency Response Guidebook. It is a guide for emergency responders for transportation emergencies involving hazardous substances.

**Emergency Response Planning Guideline (ERPG)** values provide estimates of concentration ranges where one reasonably might anticipate observing adverse effects.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form flammable mixture with air.

**IARC** is the International Agency for Research on Cancer, a scientific group.

**Ionized Potential** is the amount of energy needed to remove an electron from an atom or molecule. It is measured in electron volts.

**IRIS** is the Integrated Risk Information System database on human health effects that may result from exposure to various chemicals, maintained by federal EPA.

**LEL or Lower Explosive Limit** is the concentration of a combustible substance (gas or vapor) in the air capable of continuing an explosion.

**mg/m<sup>3</sup>** means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

**NFPA** is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

**NIOSH** is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

**NTP** is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

**OSHA** is the federal Occupational Safety and Health Administration, which adopts and enforces safety and health standards.

**NCOSHA** is the North Carolina Public Employees Occupational Safety and Health Act, which adopts and enforces health and safety standards in public workplaces.

**ppm** means parts per million parts of air. It is a measure of concentration by volume in air.

**Protective Action Criteria (PAC)** are values established by the Department of Energy and are based on AEGLs and ERPGs. They are used for emergency planning of chemical release events.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

**STEL** is a Short Term Exposure Limit which is usually a 15-minute exposure that should not be exceeded at any time during a work day.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

**UEL or Upper Explosive Limit** is the highest concentration in air above which there is too much fuel (gas or vapor) to begin a reaction or explosion.

**Vapor Density** is the ratio of the weight of a given volume of one gas to the weight of another (usually *Hydrogen*), at the same temperature and pressure.

The **vapor pressure** is a force exerted by the vapor in equilibrium with the solid or liquid phase of the same substance. The higher the vapor pressure, the higher concentration of the substance in the air.

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## Emergency Responders Quick Reference

Common Name: **SULFURIC ACID**

Synonyms: Battery Acid; Hydrogen Sulfate; Oil of Vitriol

CAS No: 7664-93-9

Molecular Formula:  $H_2SO_4$

RTK Substance No; 1761

Description: Clear, colorless to brown, odorless liquid

### HAZARD DATA

Hazard Rating	Firefighting	Reactivity
<b>3 Health</b>  <b>0 – Fire</b>  <b>2-W – Reactivity</b>  <b>DOT#:</b> UN 1830  <b>ERG Guide #:</b> 137  <b>Hazard Class:</b> 8 (Corrosive)	<b>Sulfuric Acid</b> is not combustible, but it is a <b>STRONG OXIDIZER</b> that enhances the combustion of other substances.  Extinguish fire using an agent suitable for type of surrounding fire. <b>Sulfuric Acid</b> itself does not burn.  DO NOT USE WATER directly on <b>Sulfuric Acid</b> . POISONOUS GASES ARE PRODUCED IN FIRE, including <i>Sulfur Oxides</i> .  CONTAINERS MAY EXPLODE IN FIRE. <b>Sulfuric Acid</b> may ignite combustibles (wood, paper and oil).	<b>Sulfuric Acid</b> reacts violently with ALCOHOL and WATER to release Heat and will also react violently or explosively with ORGANIC MATERIALS; COMBUSTIBLES; STRONG BASES (such as SODIUM HYDROXIDE and POTASSIUM HYDROXIDE); REDUCING AGENTS (such as LITHIUM, SODIUM, ALUMINUM, and their HYDRIDES); AND OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE).  <b>Sulfuric Acid</b> reacts with MOST METALS to produce flammable and explosive <i>Hydrogen Gas</i> .  <b>Sulfuric Acid</b> is not compatible with STRONG ACIDS (such as HYDROCHLORIC and NITRIC); MOISTURE; AMINES; and many OTHER SUBSTANCES.

### SPILL/LEAKS

#### Isolation Distance:

Small Spill: 60 meters (200 feet)

Large Spill: 300 meters (1,000 feet)

Fire: 800 meters (1/2 mile)

Neutralize spill with crushed limestone, soda ash or lime and place into a sealed container for disposal.

DO NOT USE WATER OR WET METHOD.

DO NOT wash into sewer.

Sulfuric Acid is harmful to aquatic organisms.

### PHYSICAL PROPERTIES

<b>Odor Threshold:</b>	Odorless
<b>Flash Point:</b>	Nonflammable
<b>Vapor Density:</b>	3.4 (air = 1)
<b>Vapor Pressure:</b>	0.001 mm Hg at 68°F (20°C)
<b>Specific Gravity:</b>	1.8 (water = 1)
<b>Water Solubility:</b>	Soluble (mixes)
<b>Boiling Point:</b>	554° to 640°F (290° to 338°C)
<b>Melting Point:</b>	51°F (10°C)
<b>Molecular Weight:</b>	98.1
<b>pH:</b>	0.3

### EXPOSURE LIMITS

<b>OSHA:</b>	1 mg/m <sup>3</sup> , 8-hr TWA
<b>NIOSH:</b>	1 mg/m <sup>3</sup> , 10-hr TWA
<b>ACGIH:</b>	0.2 mg/m <sup>3</sup> , 8-hr TWA
<b>IDLH:</b>	15 mg/m <sup>3</sup> , ERPG-1 = 2 mg/m <sup>3</sup> ERPG-1 = 2 mg/m <sup>3</sup> ERPG-1 = 2 mg/m <sup>3</sup>

### PROTECTIVE EQUIPMENT

<b>Gloves:</b>	Butyl, Silver Shield®/4H®, Viton and Barrier® (>8-hr breakthrough)
<b>Coveralls:</b>	Tychem® fabrics; Zytron® 300; ONESuit®TEC; and Trellechem® HPS and VPS (>8-hr breakthrough)
<b>Respirator:</b>	<2 mg/m <sup>3</sup> - full face piece APR with Acid gas cartridge and R or P100 prefilter >2 mg/m <sup>3</sup> - Supplied Air SCBA

### HEALTH EFFECTS



<b>Eyes:</b>	Severe irritation and burns
<b>Skin:</b>	Severe irritation and burns
<b>Inhalation:</b>	Nose, throat and lung irritation with coughing and severe shortness of breath (pulmonary edema)
<b>Chronic:</b>	Headache, nausea and vomiting Strong <i>inorganic acid mists</i> containing Sulfuric Acid causes cancer of the larynx in humans

### FIRST AID AND DECONTAMINATION

<b>Remove</b> the person from exposure.
<b>Flush</b> eyes with large amounts of water for at least 30 minutes. Remove contact lenses if worn. Seek medical attention immediately.
<b>Quickly</b> remove the contaminated clothing and wash contaminated skin with large amounts of soap and water. Seek medical attention immediately.
<b>Begin</b> artificial respiration if breathing has stopped and CPR if necessary.
<b>Transfer</b> promptly to a medical facility.
<b>Medical</b> observation is recommended as symptoms may be delayed.

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## Appendix G

### **Sulfuric Acid Safety Data Sheet (SDS) - Norfalco**

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# SAFETY DATA SHEET

## 1. Identification

<b>Product identifier</b>	<b>SULFURIC ACID</b>
<b>Other means of identification</b>	
<b>Product code</b>	920044
<b>CAS number</b>	7664-93-9
<b>Synonyms</b>	Dihydrogen Sulfate; Oil of vitriol; Vitriol Brown Oil; Acide sulfurique; 60 Deg Technical; 66 Deg Technical; 93% Technical; 1.835 Electrolyte; 98 % Technical; 99 % Technical; 100 % Technical.
<b>Recommended use</b>	Industrial use. Water treatment chemical. Manufacture of pulp, paper and paper products. Fertilizer.
<b>Recommended restrictions</b>	-
<b>Manufacturer/Importer/Supplier/Distributor information</b>	
<b>Manufacturer</b>	NorFalco LLC, Three Stamford Plaza, 301 Tresser Boulevard, Stamford, Connecticut, 06901-3244, USA NorFalco Sales, a division of Glencore Canada Corporation, 100 King W., Toronto, ON, Canada, M5X 1E3. Noranda Income Limited Partnership (CEZinc), Salaberry-de-Valleyfield (Quebec)Canada J6T 6L4. Horne Smelter-A Glencore company, Rouyn-Noranda (Quebec) J9X 5B6. Brunswick Smelting-A Glencore company, Belledune, New Brunswick E0B 1 G0. Sudbury integrated Nickel Operations-A Glencore company, Falconbridge, Ontario POM 1SO.
<b>Website</b>	www.norfalco.com
<b>Contact Point</b>	General Office : 1-416-775-1400
<b>E-mail address</b>	NorfalcoTechnicalService@glencore-ca.com
<b>Emergency Telephone</b>	Glencore 24/24 7/7 : 1-760-476-3962 (333261)
<b>Transportation Emergency Telephone</b>	USA: 1-800-424-9300 CHEMTREC

## 2. Hazard(s) identification

<b>Physical hazards</b>	Not classified.	
<b>Health hazards</b>	Skin corrosion/irritation	Category 1A
	Serious eye damage/eye irritation	Category 1
<b>OSHA defined hazards</b>	Not classified.	

This SDS adheres to the regulatory requirements of the US OSHA Hazard Communication Standard, 29CFR 1910.1200.

### Label elements



<b>Signal word</b>	Danger
<b>Hazard statement</b>	Causes severe skin burns and eye damage. Causes serious eye damage.

## Precautionary statement

### Prevention

Keep only in original packaging. Do not breathe mist or vapor. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area. Avoid release to the environment. Wear protective gloves/protective clothing/eye protection/face protection.

### Response

If swallowed: Rinse mouth. Do NOT induce vomiting. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. If inhaled: Remove person to fresh air and keep comfortable for breathing. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center/doctor. Wash contaminated clothing before reuse. Absorb spillage to prevent material-damage.

### Storage

Store in a well-ventilated place. Keep container tightly closed. Store locked up. Store in a corrosion resistant container with a resistant inner liner.

### Disposal

Dispose of contents/container in accordance with local/regional/national/international regulations.

### Hazard(s) not otherwise classified (HNOC)

None known.

### Supplemental information

Not applicable.

## 3. Composition/information on ingredients

### Substances

Chemical name	Common name and synonyms	CAS number	%
Sulfuric Acid		7664-93-9	77-100

### Composition comments

All concentrations are in percent by weight. For more detailed chemical composition, refer to the certificate of analysis.

## 4. First-aid measures

### Inhalation

Remove to fresh air and keep at rest in a position comfortable for breathing. Oxygen or artificial respiration if needed. Induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Call a physician or poison control center immediately.

### Skin contact

Immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician or poison control center immediately. Chemical burns must be treated by a physician. For minor skin contact, avoid spreading material on unaffected skin. Thoroughly wash (or discard) clothing and shoes before reuse.

### Eye contact

Immediately flush with plenty of water. Remove any contact lenses and open eyelids wide apart. Call an ambulance and continue flushing during transportation to hospital taking along these instructions.

### Ingestion

Call a physician or poison control center immediately. Rinse mouth thoroughly with water and give large amounts of milk or water, if person is conscious. Seek immediate medical attention. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Do not use mouth-to-mouth method if victim ingested the substance. Induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.

### Most important symptoms/effects, acute and delayed

Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. May cause respiratory irritation.

### Indication of immediate medical attention and special treatment needed

Provide general supportive measures and treat symptomatically. Chemical burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. In case of shortness of breath, give oxygen. Symptoms may be delayed. Keep the affected person warm and at rest.

### General information

Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance. Immediate medical attention is required. In case of shortness of breath, give oxygen.

## 5. Fire-fighting measures

### Suitable extinguishing media

Foam. Powder. Carbon dioxide (CO<sub>2</sub>). Water fog.

### Unsuitable extinguishing media

Do not use water jet as an extinguisher, as this will spread the fire.

### Specific hazards arising from the chemical

Not flammable, but reacts with most metals to form flammable hydrogen gas. The product reacts with water and will generate heat. During fire, gases hazardous to health may be formed.

<b>Special protective equipment and precautions for firefighters</b>	Self-contained breathing apparatus, operated in positive pressure mode and full protective clothing must be worn in case of fire.
<b>Fire fighting equipment/instructions</b>	Cool containers exposed to heat with water spray and remove container, if no risk is involved. Do not allow run-off from firefighting to enter drains or water courses.
<b>Specific methods</b>	Use standard firefighting procedures and consider the hazards of other involved materials.
<b>General fire hazards</b>	Material may react violently with water. Contact with moisture or water may generate sufficient heat to ignite nearby combustible materials. Containers can burst violently when heated, due to excess pressure build-up. Cool containers exposed to heat with water spray and remove container, if no risk is involved.

## 6. Accidental release measures

<b>Personal precautions, protective equipment and emergency procedures</b>	Ventilate closed spaces before entering them. Keep unnecessary personnel away. Wear protective clothing as described in Section 8 of this safety data sheet. Wear appropriate protective equipment and clothing during clean-up. Do not breathe mist or vapor. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.
<b>Methods and materials for containment and cleaning up</b>	<p>Stop the flow of material, if this is without risk. This product is miscible in water. Should not be released into the environment. Prevent entry into waterways, sewer, basements or confined areas. Clean up in accordance with all applicable regulations.</p> <p>Large Spills: Absorb spillage to prevent material damage. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Following product recovery, flush area with water.</p> <p>Small Spills: Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Clean surface thoroughly to remove residual contamination.</p> <p>Flush residual spill area with a large amount of water. Neutralize washings or spill area with soda ash or lime.</p> <p>Never return spills to original containers for re-use. Put material in suitable, covered, labeled containers. For waste disposal, see section 13 of the SDS.</p>
<b>Environmental precautions</b>	Avoid release to the environment. Contact local authorities in case of spillage to drain/aquatic environment. Prevent further leakage or spillage if safe to do so. Do not contaminate water. Avoid discharge into drains, water courses or onto the ground.

## 7. Handling and storage

<b>Precautions for safe handling</b>	Use only outdoors or in a well-ventilated area. Do not breathe mist or vapor. Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling. Avoid release to the environment. Never pour water into acid/base. Dilute by slowly pouring the product into water while stirring. Never add water to this product. When using, do not eat, drink or smoke. Observe good industrial hygiene practices. Wear appropriate personal protective equipment (See Section 8).
<b>Conditions for safe storage, including any incompatibilities</b>	Store in a place accessible by authorized persons only. Store locked up. Store in a cool, dry place out of direct sunlight. Store in corrosive resistant container with a resistant inner liner. Keep only in the original container. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Store away from incompatible materials (see Section 10 of the SDS). Keep away from combustible material. Do not store in unlabelled containers. Never allow product to get in contact with water during storage. Keep away from food, drink and animal feedingstuffs.

## 8. Exposure controls/personal protection

### Occupational exposure limits

#### US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Material	Type	Value
Sulfuric Acid (CAS 7664-93-9)	PEL	1 mg/m3

#### US. ACGIH Threshold Limit Values

Material	Type	Value	Form
Sulfuric Acid (CAS 7664-93-9)	TWA	0.2 mg/m3	Thoracic fraction.



## US. NIOSH: Pocket Guide to Chemical Hazards

Material	Type	Value
Sulfuric Acid (CAS 7664-93-9)	TWA	1 mg/m3
Biological limit values	No biological exposure limits noted for the ingredient(s).	
Appropriate engineering controls	Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Eye wash facilities and emergency shower must be available when handling this product.	
Individual protection measures, such as personal protective equipment		
Eye/face protection	Wear safety glasses with side shields (or goggles) and a face shield.	
Skin protection		
Hand protection	Wear appropriate chemical resistant gloves. Neoprene, butyl rubber, nitrile or Viton gloves are recommended. Be aware that the liquid may penetrate the gloves. Frequent change is advisable. Suitable gloves can be recommended by the glove supplier.	
Skin protection		
Other	Do not get this material in contact with skin. Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended.	
Respiratory protection	Use a NIOSH/MSHA approved air purifying respirator as needed to control exposure. Consult with respirator manufacturer to determine respirator selection, use, and limitations. Use positive pressure, air-supplied respirator for uncontrolled releases or when air purifying respirator limitations may be exceeded. Follow respirator protection program requirements (OSHA 1910.134 and ANSI Z88.2) for all respirator use. Wear positive pressure self-contained breathing apparatus (SCBA).	
Thermal hazards	Wear appropriate thermal protective clothing, when necessary.	
General hygiene considerations	Handle in accordance with good industrial hygiene and safety practice. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. When using, do not eat, drink or smoke. Follow up on any medical surveillance requirements.	

## 9. Physical and chemical properties

### Appearance

<b>Physical state</b>	Liquid.
<b>Form</b>	Oily liquid. Clear to slightly turbid.
<b>Color</b>	Colorless to gray.
<b>Odor</b>	Odorless.
<b>Odor threshold</b>	Not available.
<b>pH</b>	< 1 (1% soln/water)
<b>Melting point/freezing point</b>	-31 - 52 °F (-35 - 11.11 °C)
<b>Initial boiling point and boiling range</b>	379 - 621 °F (192.78 - 327.22 °C)
<b>Flash point</b>	Not available.
<b>Evaporation rate</b>	< 1 (Butyl Acetate = 1)
<b>Flammability (solid, gas)</b>	Not applicable.
<b>Upper/lower flammability or explosive limits</b>	
<b>Flammability limit - lower (%)</b>	Not applicable.
<b>Flammability limit - upper (%)</b>	Not applicable.
<b>Vapor pressure</b>	< 0.3 mm Hg (77°F/25°C) < 0.6 mm Hg (100°F/38°C)
<b>Vapor density</b>	3.4 (Air = 1)
<b>Relative density</b>	1.76 - 1.84

<b>Solubility(ies)</b>	
<b>Solubility (water)</b>	Miscible
<b>Partition coefficient (n-octanol/water)</b>	Not applicable.
<b>Auto-ignition temperature</b>	Not applicable.
<b>Decomposition temperature</b>	644 °F (340 °C)
<b>Viscosity</b>	13.6 mm <sup>2</sup> /s (25 °C / 77 °F)
<b>Other information</b>	
<b>Bulk density</b>	Not applicable.
<b>Dynamic viscosity</b>	22.5 cP (20 °C / 68 °F)
<b>Explosive properties</b>	Not explosive.
<b>Oxidizing properties</b>	Oxidizing agent.
<b>Percent volatile</b>	15 % (Estimated)

## 10. Stability and reactivity

<b>Reactivity</b>	Reacts violently with strong alkaline substances. This product may react with reducing agents. May be corrosive to metals. The product reacts with water and will generate heat.
<b>Chemical stability</b>	Stable at normal conditions.
<b>Possibility of hazardous reactions</b>	Hazardous polymerization does not occur.
<b>Conditions to avoid</b>	Excessive heat. Moisture. Do not mix with other chemicals. Contact with incompatible materials.
<b>Incompatible materials</b>	Water. Never add water to this product. Bases. Strong oxidizing agents. Strong reducing agents. Metals. Organic material.
<b>Hazardous decomposition products</b>	Sulfur oxides (SOx.).

## 11. Toxicological information

### Information on likely routes of exposure

<b>Inhalation</b>	Corrosive. Inhalation produces damaging effects on the mucous membranes and upper respiratory tract. May cause irritation to the respiratory system. Inhalation of vapors may cause lung oedema.
<b>Skin contact</b>	Causes severe skin burns.
<b>Eye contact</b>	Causes serious eye damage.
<b>Ingestion</b>	Causes digestive tract burns.
<b>Symptoms related to the physical, chemical and toxicological characteristics</b>	Contact with this material will cause burns to the skin, eyes and mucous membranes. Burning pain and severe corrosive skin damage. Causes serious eye damage. Contact can cause corrosive burns, corneal damage, and blindness. Permanent eye damage including blindness could result. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. May cause respiratory irritation.

### Information on toxicological effects

<b>Acute toxicity</b>	Causes severe burns. May be harmful if swallowed. Vapors are corrosive. After some hours, injured persons may develop serious shortness of breath and lung edema.
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Product	Species	Test Results
Sulfuric Acid (CAS 7664-93-9)		
<b><u>Acute</u></b>		
<b>Inhalation</b>		
<i>Mist</i>		
LC50	Rat	0.375 mg/l, 4 hours
<b>Oral</b>		
LD50	Rat	2140 mg/kg
<b>Skin corrosion/irritation</b>	Corrosive to skin and eyes. Causes severe skin burns and eye damage.	
<b>Serious eye damage/eye irritation</b>	Corrosive to skin and eyes. Causes serious eye damage. Effects of exposure on eye may include pain, redness, severe deep burns and loss of vision.	
<b>Respiratory or skin sensitization</b>		
<b>Respiratory sensitization</b>	Based on available data, the classification criteria are not met.	

<b>Skin sensitization</b>	Not a skin sensitizer.
<b>Germ cell mutagenicity</b>	Test data conclusive but not sufficient for classification.
<b>Carcinogenicity</b>	Exposure to strong inorganic acid mists containing sulfuric acid has been classified as carcinogenic to humans. The International Agency for Research on Cancer (IARC) has classified "strong inorganic acid mists containing sulfuric acid" as a known human carcinogen, (IARC category 1). This classification applies only to mists containing sulfuric acid and not to sulfuric acid or sulfuric acid solutions.

#### IARC Monographs. Overall Evaluation of Carcinogenicity

Not listed.

#### NTP Report on Carcinogens

Sulfuric Acid (CAS 7664-93-9)

Known To Be Human Carcinogen.

#### OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

<b>Reproductive toxicity</b>	Test data conclusive but not sufficient for classification.
<b>Specific target organ toxicity - single exposure</b>	May cause respiratory irritation.
<b>Specific target organ toxicity - repeated exposure</b>	Test data conclusive but not sufficient for classification.
<b>Aspiration hazard</b>	Not classified.
<b>Chronic effects</b>	Prolonged inhalation may be harmful. Sulfuric acid fumes: Prolonged, repeated exposure to acid fumes/mists may cause chronic bronchitis, irritation of skin, mucous membranes and gastrointestinal tract and erosion of the teeth.
<b>Further information</b>	Be aware that symptoms of lung edema (shortness of breath) may develop up to 24 hours after exposure.

## 12. Ecological information

<b>Ecotoxicity</b>	Because of the low pH of this product, it would be expected to produce significant ecotoxicity upon exposure to aquatic organisms and aquatic systems. The product may affect the acidity (pH-factor) in water with risk of harmful effects to aquatic organisms.
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Product	Species		Test Results
Sulfuric Acid (CAS 7664-93-9)			
Aquatic			
Algae	EC50	Pseudokirchneriella subcapitata	> 100 mg/l, 72 hours
Crustacea	EC50	Daphnia magna	29 mg/l, 24 hours
Fish	LC50	Lepomis macrochirus	16 - 28 mg/l, 96 hours
Persistence and degradability	The product is not biodegradable.		
Bioaccumulative potential	The product is not bioaccumulating.		
Mobility in soil	This product is water soluble and may disperse in soil.		
Mobility in general	The product is water soluble and may spread in water systems.		
Other adverse effects	The product may affect the acidity (pH-factor) in water with risk of harmful effects to aquatic organisms.		

## 13. Disposal considerations

<b>Disposal instructions</b>	This material and its container must be disposed of as hazardous waste. Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents/container in accordance with local/regional/national/international regulations.
<b>Local disposal regulations</b>	Dispose in accordance with all applicable regulations.
<b>Hazardous waste code</b>	D002: Waste Corrosive material [pH ≤2 or ≥12.5, or corrosive to steel] The waste code should be assigned in discussion between the user, the producer and the waste disposal company.
<b>Waste from residues / unused products</b>	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

**Contaminated packaging**

Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers retain product residue, follow label warnings even after container is emptied.

**14. Transport information****DOT**

UN number	UN1830
UN proper shipping name	Sulfuric acid
Transport hazard class(es)	
Class	8
Subsidiary risk	-
Label(s)	8
Packing group	II
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Special provisions	A3, A7, B3, B83, B84, IB2, N34, T8, TP2, TP12
Packaging exceptions	154
Packaging non bulk	202
Packaging bulk	242

**DOT BULK****BULK**

UN number	UN1830
UN proper shipping name	Sulfuric acid
Transport hazard class(es)	
Class	8
Label(s)	8
Packing group	II
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Special provisions	A3, A7, B3, B83, B84, IB2, N34, T8, TP2, TP12
Packaging exceptions	154
Packaging non bulk	202
Packaging bulk	242

**IATA**

UN number	UN1830
UN proper shipping name	Sulfuric acid
Transport hazard class(es)	
Class	8
Subsidiary risk	-
Packing group	II
Environmental hazards	No.
ERG Code	8L
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

**IMDG**

UN number	UN1830
UN proper shipping name	SULFURIC ACID
Transport hazard class(es)	
Class	8
Subsidiary risk	-
Packing group	II
Environmental hazards	
Marine pollutant	No.
EmS	F-A, S-B
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

**Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code** This product is a liquid and when transported in bulk is covered under MARPOL 73/78 Annex II. This product is listed in the IBC Code.  
Ship type: 3  
Pollution category: Y

## 15. Regulatory information

### US federal regulations

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.  
All components are on the U.S. EPA TSCA Inventory List.  
Additional information is given in the Safety Data Sheet.

#### TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

#### OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

#### CERCLA Hazardous Substance List (40 CFR 302.4)

Sulfuric Acid (CAS 7664-93-9)

LISTED

### Superfund Amendments and Reauthorization Act of 1986 (SARA)

#### Hazard categories

Immediate Hazard - Yes  
Delayed Hazard - No  
Fire Hazard - No  
Pressure Hazard - No  
Reactivity Hazard - No

#### SARA 302 Extremely hazardous substance

Chemical name	CAS number	Reportable quantity (pounds)	Threshold planning quantity (pounds)	Threshold planning quantity, lower value (pounds)	Threshold planning quantity, upper value (pounds)
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Sulfuric Acid	7664-93-9	1000	1000		
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SARA 311/312 Hazardous chemical Yes

#### SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
Sulfuric Acid	7664-93-9	77-100

### Other federal regulations

#### Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

#### Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Sulfuric Acid (CAS 7664-93-9)

Clean Water Act (CWA) Hazardous substance  
Section 112(r) (40 CFR 68.130)

Safe Drinking Water Act (SDWA) Not regulated.

#### Drug Enforcement Administration (DEA). List 2, Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2) and Chemical Code Number

Sulfuric Acid (CAS 7664-93-9) 6552

#### Drug Enforcement Administration (DEA). List 1 & 2 Exempt Chemical Mixtures (21 CFR 1310.12(c))

Sulfuric Acid (CAS 7664-93-9) 20 %WV

#### DEA Exempt Chemical Mixtures Code Number

Sulfuric Acid (CAS 7664-93-9) 6552

Food and Drug Administration (FDA) Total food additive  
Direct food additive  
GRAS food additive

### US state regulations

WARNING: This product contains a chemical known to the State of California to cause cancer.

#### US - California Proposition 65 - Carcinogens & Reproductive Toxicity (CRT): Listed substance

Sulfuric Acid (CAS 7664-93-9)

#### US. Massachusetts RTK - Substance List

Sulfuric Acid (CAS 7664-93-9)

#### US. New Jersey Worker and Community Right-to-Know Act

Sulfuric Acid (CAS 7664-93-9)

#### US. Pennsylvania Worker and Community Right-to-Know Law

Sulfuric Acid (CAS 7664-93-9)

**US. Rhode Island RTK**

Sulfuric Acid (CAS 7664-93-9)

**International Inventories**

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

\*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

**16. Other information, including date of preparation or last revision**

**Issue date** 20-January-2017

**Revision date** -



**Version #** 01

**HMIS® ratings** Health: 3  
Flammability: 0  
Physical hazard: 4

**List of abbreviations** LD50: Lethal Dose, 50%.  
LC50: Lethal Concentration, 50%.  
EC50: Effective Concentration, 50%.  
PEL: Permissible Exposure Limit.  
TWA: Time weighted average.

**References** IUCLID  
EPA: AQUIRE database  
NLM: Hazardous Substances Data Base  
US. IARC Monographs on Occupational Exposures to Chemical Agents  
National Toxicology Program (NTP) Report on Carcinogens  
ACGIH Documentation of the Threshold Limit Values and Biological Exposure Indices  
HSDB® - Hazardous Substances Data Bank

**Disclaimer** The information in the sheet was written based on the best knowledge and experience currently available. NORFALCO cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use.

	<b>GILES CHEMICAL ~ PREMIER MAGNESIA</b>		
	<b>Company Procedure</b>		
	Title: <b>Acid Spill Response Plan - Waynesville</b>	Number: <b>S12-PG-200-005</b>	
	Owner: <b>Deborah Durbin</b>	Revision: <b>6</b>	
	Effective Date: <b>03/30/16</b>	Page: <b>20 of 21</b>	

## Appendix H

### Site Layout

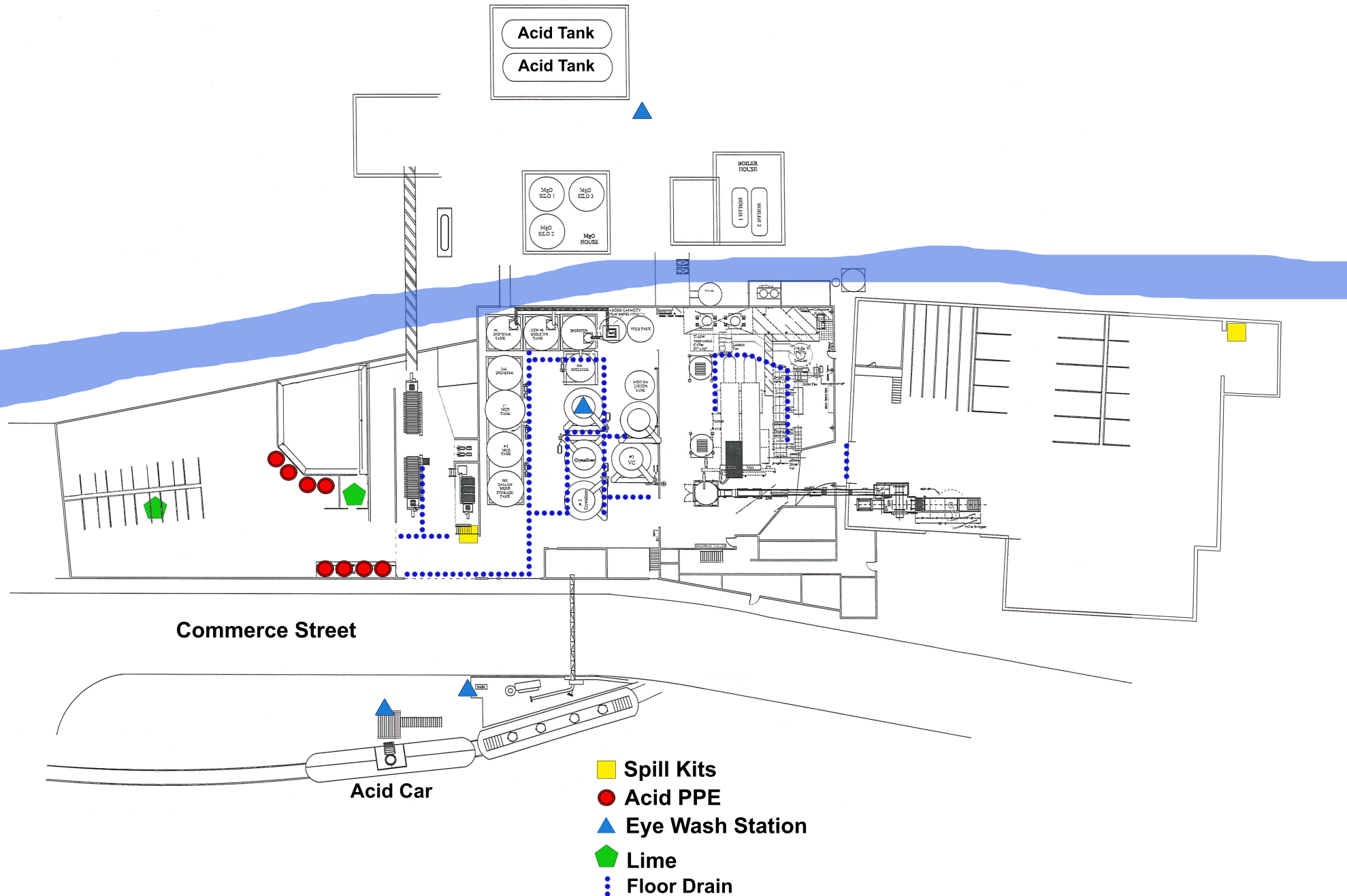
Note locations of spill kits, floor drains, storm drains, and acid storage areas



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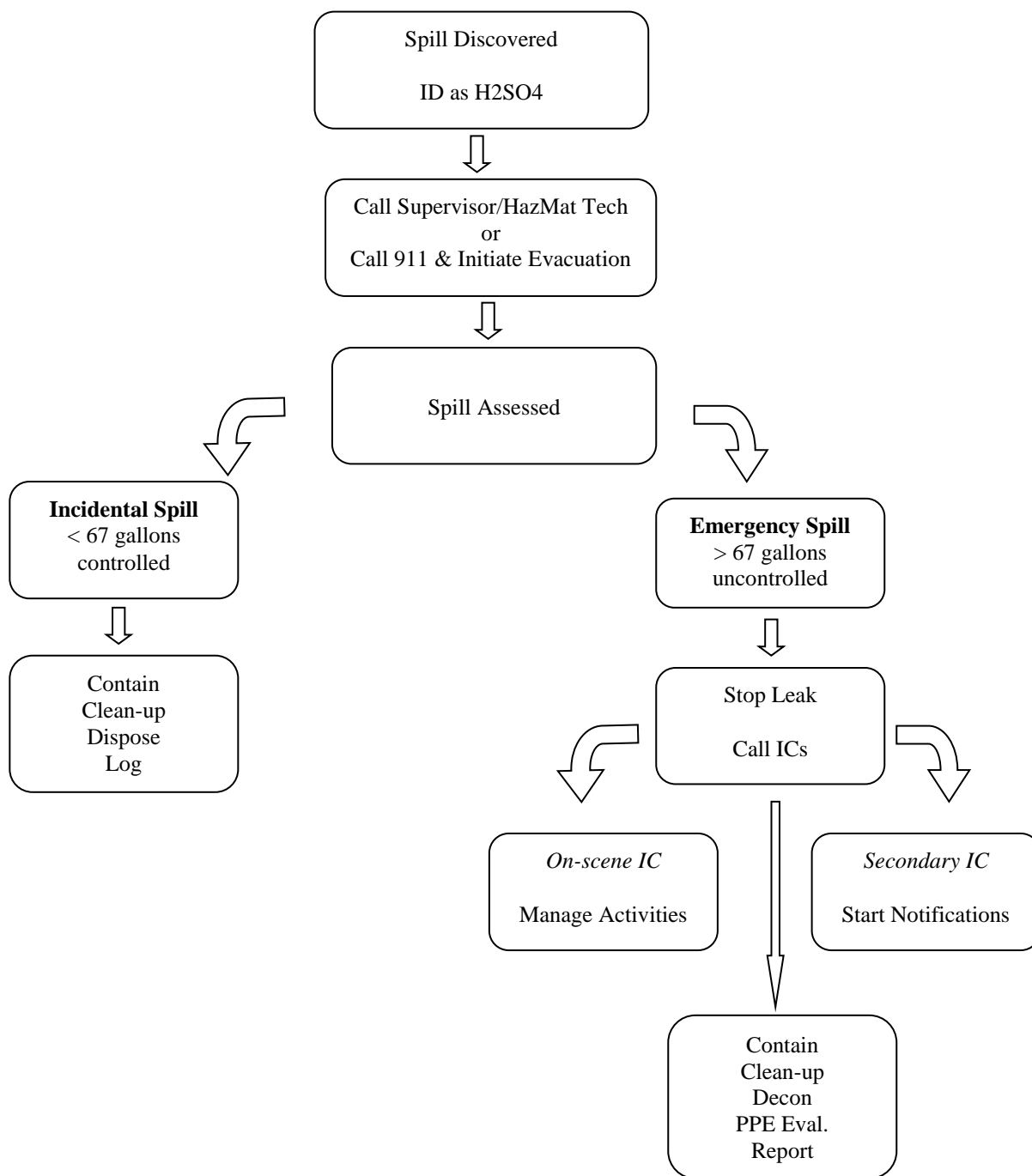
# Acid Spill Protection and Containment



	<b>GILES CHEMICAL ~ PREMIER MAGNESIA</b>		
	<b>Company Procedure</b>		
	Title: <b>Acid Spill Response Plan - Waynesville</b>	Number: <b>S12-PG-200-005</b>	
	Owner: <b>Deborah Durbin</b>	Revision: <b>6</b>	
	Effective Date: <b>03/30/16</b>	Page: <b>21 of 21</b>	

## Appendix I

### Acid Spill Response Flow Chart



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