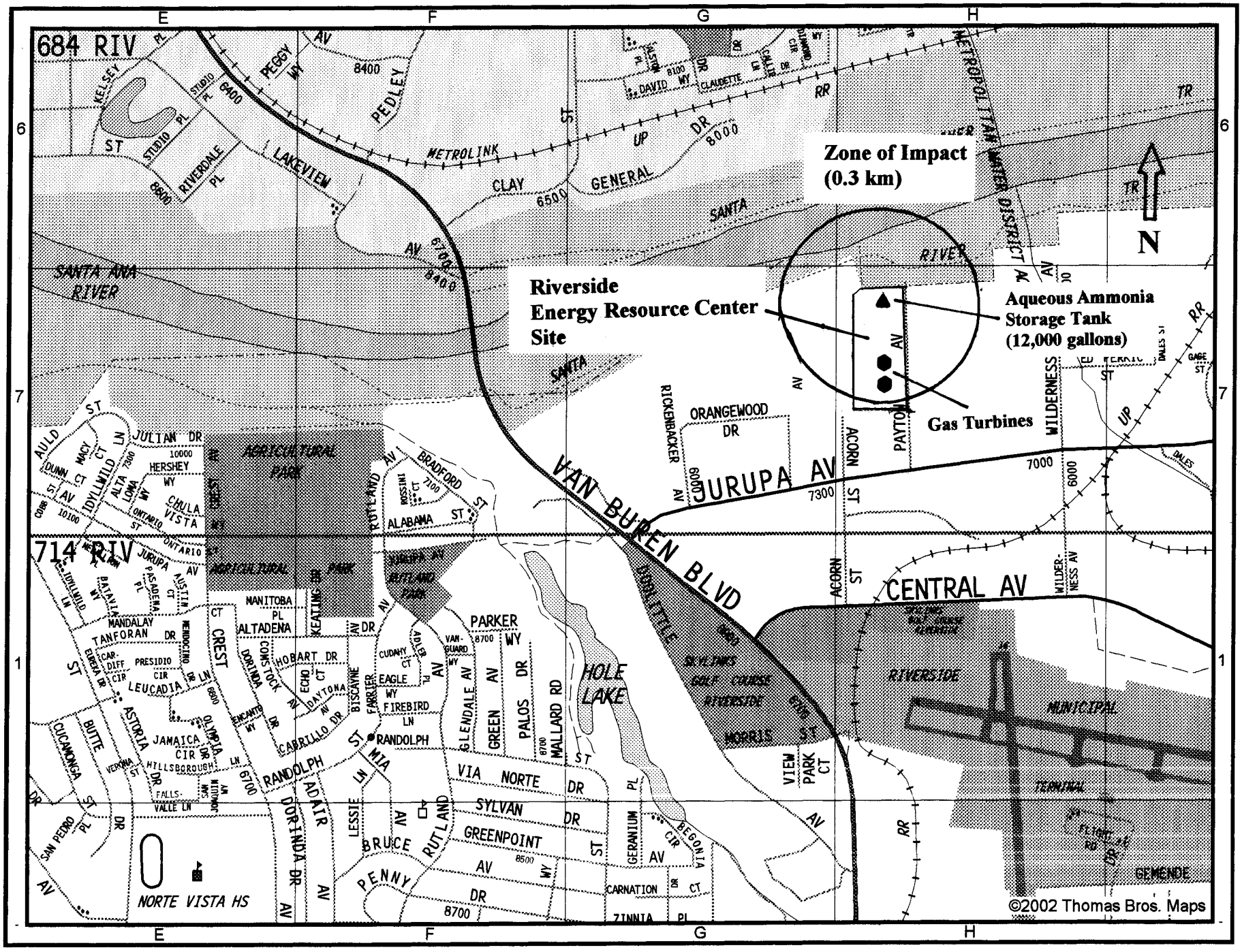
APPENDIX A

AQUEOUS AMMONIA HAZARD ASSESSMENT ATTACHMENTS

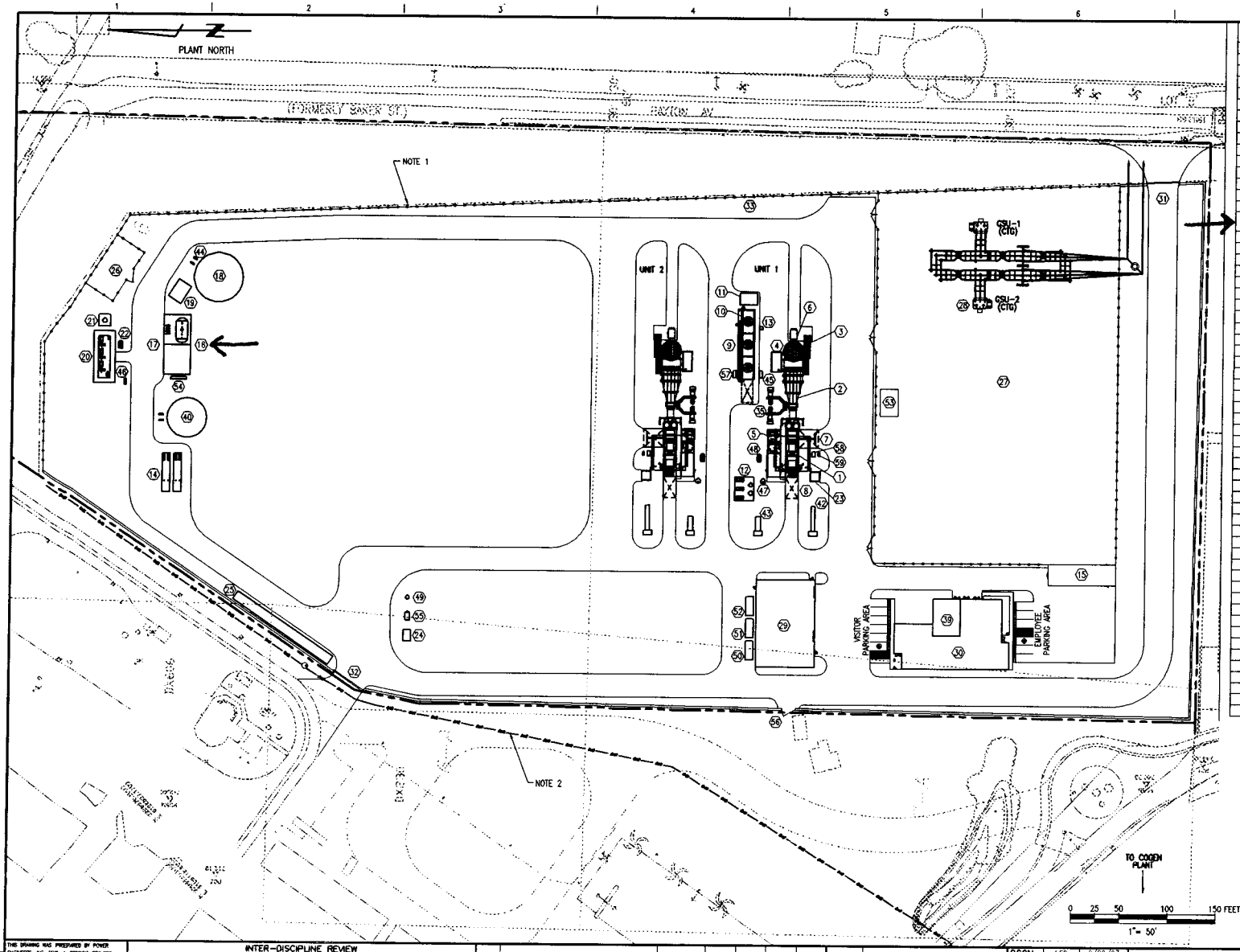
- **Hazard Assessment Parameters**
- **Zone of Impact Diagram**
- **Facility Diagram**
- **RMP Comp Output**
- **Aqueous Ammonia MSDS**

Aqueous Ammonia Hazard Assessment Parameters
Riverside Energy Resource Center

Parameter	Description		Source of Information
Tank Size	12,000 Gallons		Project Owner
Ammonia	<20% Solution	CAS# 7664-41-7	Project Owner
Category	Toxic Liquid		-
Scenario	Worst-Case		SCEC
Quantity Released	12,000 Gallons		SCEC
Release Rate	15.8 lbs/minute		Calculated by RMP Comp.
Mitigation Measure	Containment Dikes		Project Owner
Topography	Rural		SCEC
Toxic Endpoint	0.14 mg/L		Calculated by RMP Comp.
Wind Speed	1.5 m/second	3.4 miles/hour	Calculated by RMP Comp.
Stability Class	F		Calculated by RMP Comp.
Air Temperature	77 F		SCEC
Model	RMP Comp (ver 1.07)		-
Distance to Toxic Endpoint	0.2 Miles	0.3 km	Calculated by RMP Comp.


Zone of Impact
(0.3 km)
Riverside
Energy Resource Center
Site
Aqueous Ammonia
Storage Tank
(12,000 gallons)
Gas Turbines
N
684 RIV
714 RIV
VAN BUREN BLVD
JURUPA AV
CENTRAL AV
METROLINK
SANTA ANA RIVER
HOLE LAKE
RIVERSIDE MUNICIPAL
NORTE VISTA HS
METROPOLITAN WATER DISTRICT
©2002 Thomas Bros. Maps

1 cm = 157 m



ITEM	DESCRIPTION	NOTES
1	COMBUSTION TURBINE GENERATOR	
2	SELECTIVE CATYLST REDUCTION UNIT	
3	EXHAUST STACK	80' HIGH
4	AMMONIA EVAPORATION SKID	
5	CTG AUXILIARY SKID	
6	CEMS SHELTER	
7	TURBINE REMOVAL AREA	
8	GENERATOR REMOVAL AREA	
9	CHILLER PACKAGE	
10	AUXILIARY COOLING TOWER	
11	AUX COOLING TOWER CHEM FEED SKID	
12	AIR COMPRESSOR/DRYER SKID & RECEIVER	3 COMPRESSORS PER 2 CTG'S
13	CTG LUBE OIL COOLING WATER PUMP SKID	
14	DEMINERALIZED WATER TRAILERS	
15	SWITCHYARD CONTROL SHELTER	22' x 75'
16	AQUEOUS AMMONIA STORAGE TANK AND PUMPS (4)	10' DIA x 19'-0" (12000 gal)
17	AQUEOUS AMMONIA UNLOADING PAD	
18	RAW/FIRE WATER STORAGE TANK	(500,000 gal)
19	FIRE WATER PUMP HOUSE	
20	FUEL GAS COMPRESSOR SKID	INCLUDES SOUND ENCLOSURE
21	FUEL GAS COMPRESSOR BYPASS COOLER	
22	FUEL GAS LIQUID DRAINS TANK	
23	CTG SWITCHGEAR	
24	PROCESS WATER SUMP AND PUMPS	
25	STORM WATER RETENTION/INFILTRATION BASIN	10' x 30'
26	GAS METERING STATION	
27	SUBSTATION	
28	GSU TRANSFORMER (2)	
29	WAREHOUSE	60' x 90'
30	ADMINISTRATION/CONTROL BUILDING	72' x 118'
31	MAIN PLANT ENTRANCE	SLIDING GATE
32	EMERGENCY PLANT ENTRANCE	SLIDING GATE
33	PLANT PERIMETER FENCE (10'-0" HIGH)	
34	NOT USED	
35	TEMPERING AIR FANS	
36	NOT USED	
37	NOT USED	
38	NOT USED	
39	CONTROL ROOM	
40	DEMINERALIZED WATER TANK & PUMPS (2)	(300,000 gal)
41	NOT USED	
42	4160V MCC W/AUXILIARY TRANSFORMER	
43	480V SAS W/AUXILIARY TRANSFORMER	
44	RAW WATER PUMPS (2)	
45	480V SCR AREA MCC	
46	480V FUEL GAS COMPRESSOR AREA MCC	
47	COIL CONDENSATE TANK AND PUMP	
48	WATER WASH DRAIN TANK	
49	OILY WASTE COLLECTION SUMP & PUMPS	
50	FLAMMABLE STORAGE	8' x 20'
51	WASTE OIL STORAGE	8' x 20'
52	CHEMICAL STORAGE	8' x 20'
53	TRANSFORMER OIL SUMP	
54	480V BOP COMMON MCC	
55	OIL/WATER SEPARATOR	
56	EQUIPMENT/PERSONNEL ACCESS GATE	SLIDING GATE WITH MAN GATE
57	CHILLER REFRIGERANT DRAIN SUMP	
58	CTG FINAL FUEL FILTER SKID	
59	CTG FINAL FUEL FILTER DRAINS TANK	

LEGEND

- PROPERTY LINE
- SECURITY FENCE
- EXISTING DIGESTER GAS LINE
- SECURITY WALL

NOTES

1. APPROXIMATE TOE OF SLOPE
2. ESTIMATED LOCATION OF GAS LINE. (NOT PART OF THE SURVEY).
3. COMBINED CYCLE CONFIGURATION HAS NOT BEEN SELECTED. PROVISIONS HAVE BEEN MADE FOR A 4 x 1, 4 x 2, OR TWO 2 x 1'S.
4. TRANSITION PIECE WAS ADDED BETWEEN CTG AND SCR TO AVOID AN INTERFERENCE BETWEEN THE TEMPERING AIR BLOWERS AND THE CTG AUXILIARY SKID. THIS TRANSITION PIECE MAY NOT BE USED. CTG MANUFACTURER WILL PROVIDE A SOLUTION.
5. EQUIPMENT SHOWN ON THIS DRAWING IS BASED ON THE BEST AVAILABLE INFORMATION. THIS DRAWING WILL NEED TO BE REVISED BASED ON ACTUAL VENDOR DRAWINGS AND DETAILED DESIGN.

THIS DRAWING WAS PREPARED BY POWER ENGINEERS, INC. FOR A SPECIFIC PROJECT, TAKING INTO CONSIDERATION THE SPECIFIC AND UNIQUE REQUIREMENTS OF THE PROJECT. REUSE OF THIS DRAWING OR ANY INFORMATION CONTAINED IN THIS DRAWING FOR ANY PURPOSE IS PROHIBITED UNLESS WRITTEN PERMISSION FROM BOTH POWER AND POWER'S CLIENT IS GRANTED.

M1-3.dwg

INTER-DISCIPLINE REVIEW

DISC	ARCH	CIVIL	ELECT	HVAC	I&C	MECH	STRUCT
DATE	1/21/04	1/21/04	1/21/04		1/21/04	1/21/04	
INIT	SD	KW	LT		WAC	PR	

REV	REVISIONS	DATE	DRN	DSGN	CKD	APPD
A	ISSUED FOR BID	2/12/04	CEA	CEA	JPB	JPB
B	ISSUED FOR REVIEW	1/26/04	CEA	CEA	JPB	JPB
C	ISSUED FOR REVIEW	9/3/03	DC	LED	JPB	JPB

REFERENCE DRAWINGS

DSGN	LED	6/20/03
DRN	LED	6/20/03
CKD	JPB	6/20/03

SCALE: 1"=50'

FOR 22x34 DWG ONLY

POWER ENGINEERS

RIVERSIDE PUBLIC UTILITIES

RIVERSIDE ENERGY RESOURCE CENTER

PLANT ARRANGEMENT
2 X 0 SIMPLE CYCLE

JOB NUMBER 101414

REV C

DRAWING NUMBER M1-3

Results of Consequence Analysis

Chemical: Ammonia (water solution) 20%
CAS #: 7664-41-7
Category: Toxic Liquid
Scenario: Worst-case
Quantity Released: 12000 gallons
Liquid Temperature: 75 F

Mitigation Measures:
Diked area: 750 square feet
Dike height: 3 feet

Release Rate to Outside Air: 15.8 pounds per minute
Topography: Rural surroundings (terrain generally flat and unobstructed)
Toxic Endpoint: 0.14 mg/L; basis: ERPG-2
Estimated Distance to Toxic Endpoint: 0.2 miles (0.3 kilometers)

--------Assumptions About This Scenario---------
Wind Speed: 1.5 meters/second (3.4 miles/hour)
Stability Class: F
Air Temperature: 77 degrees F (25 degrees C)
[redacted]

SOLUTIA™

Applied Chemistry, Creative Solutions

Material Safety Data Sheet

Responsible Care®
A Public Commitment

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: AQUA AMMONIA

MSDS Number: S00011711 Date: September 23, 1998

Chemical Family: Not applicable

Chemical Name: Aqueous Ammonia Solution

Synonyms: Ammonium hydroxide solution

SOLUTIA INC., 10300 OLIVE BOULEVARD, P.O. BOX 66760, ST. LOUIS, MO 63166-6760

FOR CHEMICAL EMERGENCY, SPILL, LEAK, FIRE, EXPOSURE, OR ACCIDENT
Call CHEMTREC - Day or Night - 1-800-424-9300 Toll free in the continental U.S., Hawaii, Puerto Rico, Canada, Alaska, or Virgin Islands. For calls originating elsewhere: 703-527-3887 (collect calls accepted)

For additional non-emergency information, call: 314-674-6661

2. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS No.	% by weight
Ammonium hydroxide	1336-21-6	27 - 37
Water	7732-18-5	63 - 73

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Appearance and Odor: Clear, colorless solution; pungent, suffocating odor

WARNING STATEMENTS

DANGER!
HARMFUL IF SWALLOWED
CAUSES SEVERE EYE, SKIN AND RESPIRATORY TRACT BURNS
MAY CAUSE LUNG DAMAGE
THIS SUBSTANCE IS CLASSIFIED AS A POISON UNDER THE FEDERAL CAUSTIC POISON ACT

POTENTIAL HEALTH EFFECTS

Likely Routes of Exposure: Skin contact and inhalation

EYE CONTACT: This product causes pain, redness, and tearing based on human experience. At high concentrations or direct contact of liquid material with eyes, it causes damage to eye tissue, and severe eye burns, leading to temporary or permanent blindness.

SKIN CONTACT: This product causes pain, redness, swelling, and blisters based on human experience.

INHALATION: This product causes shortness of breath, severe respiratory irritation and /or burns, violent coughing, chest pain, nausea and vomiting including the possibility of severe lung damage leading to death.

INGESTION: This product causes severe corrosive action to the mouth, throat and stomach.

Refer to Section 11 for toxicological information.

4. FIRST AID MEASURES

IF IN EYES OR ON SKIN: immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. If easy to do, remove any contact lenses. Get medical attention. Wash clothing and thoroughly clean shoes before reuse.

IF INHALED: remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Remove material from eyes, skin and clothing.

IF SWALLOWED: rinse mouth thoroughly with water. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. Get medical attention. Contact a Poison Control center. Do not induce vomiting unless directed by medical personnel.

5. FIRE FIGHTING MEASURES

FLASH POINT: Not applicable

HAZARDOUS PRODUCTS OF COMBUSTION: Under certain conditions ammonia can dissociate to nitrogen and hydrogen. Hydrogen is flammable. Certain metals, such as nickel, accelerate decomposition at temperatures as low as 585 degrees F.

EXTINGUISHING MEDIA: In case of fire, use water spray (fog), foam, dry chemical, or CO_2.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Ammonia is capable of forming flammable mixtures with air. Contact with oil, mercury, chlorine, bromine, calcium, and silver can lead to an explosion.

FIRE FIGHTING EQUIPMENT: Fire fighters and others exposed to products of combustion should wear self-contained breathing apparatus. Equipment should be thoroughly decontaminated after use.

6. ACCIDENTAL RELEASE MEASURES

Spill or Leak Procedures: Ventilate area of leak or spill. Remove all sources of ignition. Clean-up personnel must wear full protective clothing and self-contained breathing apparatus. Contain and recover liquid when possible. Absorb with vermiculite, dry sand, earth or similar material. Collect and place in containers for disposal.

Refer to Section 13 for disposal information and Sections 14 and 15 for reportable quantity information.

7. HANDLING AND STORAGE

Handling:
Do not get in eyes, on skin, on clothing.
Avoid breathing vapor or mist.

Keep container closed.

Use only with adequate ventilation.
Wash thoroughly after handling.

Emptied container retains vapor and product residue. Observe all labeled safeguards until container is cleaned, reconditioned, or destroyed. The reuse of this material's container for non-industrial purposes is prohibited and any reuse must be in consideration of the data provided in the MSDS.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

EYE PROTECTION: Where there is potential for eye contact, wear chemical goggles and have eye flushing equipment immediately available.

SKIN PROTECTION: Wear appropriate protective clothing and chemical resistant gloves to prevent skin contact. Consult clothing/glove manufacturer to determine appropriate type clothing/glove for given application. Wear chemical safety goggles, a face shield and chemical resistant clothing when splashing is likely. Wash immediately if skin is contaminated. Remove contaminated clothing promptly and launder before reuse. Clean protective equipment before reuse. Provide a safety shower at any location where skin contact can occur. Wash thoroughly after handling.

RESPIRATORY PROTECTION: Avoid breathing vapor and/or mist. Use NIOSH approved respiratory protection equipment when airborne exposure limits are exceeded (See below). Consult respirator manufacturer to determine appropriate type equipment for given application. Observe respirator use limitations specified by NIOSH/MSHA or the manufacturer. Respiratory protection programs must comply with 29 CFR 1910.134.

VENTILATION: Provide natural or mechanical ventilation to control exposure levels below airborne exposure limits (see below). The use of local mechanical exhaust ventilation at sources of air contamination such as open process equipment is preferred.

AIRBORNE EXPOSURE LIMITS:

Product /Component: Ammonia

OSHA PEL:	35 ppm (STEL)#	ACGIH TLV:	25 ppm TWA 35 ppm (STEL)#

Short Term Exposure Limit.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Colorless or liquid
Odor:	Pungent, suffocating odor
Vapor Pressure:	45.0 psi @ 30 degrees F
Boiling Point:	minus 36 degrees C

NOTE: These physical data are typical values based on material tested but may vary from sample to sample. Typical values should not be construed as a guaranteed analysis of any specific lot or as specifications for the product.

10. STABILITY AND REACTIVITY

STABILITY: Product is stable under normal conditions of storage and handling.

MATERIALS TO AVOID: Oil, mercury, chlorine, bromine, silver, silver solder, hypochlorite (bleach) and calcium in contact with ammonia can lead to an explosion.

HAZARDOUS POLYMERIZATION: Does not occur.

11. TOXICOLOGICAL INFORMATION

Toxicological Data

Solutia has not conducted toxicity studies with aqua ammonia. Information from the available scientific literature is reported below:

Based on results from single exposure (acute) studies with animals, aqua ammonia is considered to be moderately toxic orally (rat). It is severely irritating to rabbit eyes and corrosive to rabbit skin. Eye, skin and respiratory tract irritation was reported in a variety of laboratory animals following inhalation.

Adverse effects reported in several species following repeated inhalation exposures at low concentrations include liver, kidney, spleen, brain and lung damage. Eye damage, permanent blindness, respiratory difficulty, lung injury and deaths were reported at higher concentrations. Positive results were reported in standard tests designed to measure genetic changes using animals and bacterial cells.

12. ECOLOGICAL INFORMATION

Solutia has not conducted environmental toxicity or biodegradation studies with this product. Published aquatic toxicity studies indicate that this material would be toxic to very toxic to invertebrates, fish and algae. Biodegradation studies reported in the literature suggest that this material would meet the criteria for OECD classification as "readily biodegradable".

13. DISPOSAL CONSIDERATIONS

This material when discarded is a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA), 40 CFR 261.22, due to its characteristic of corrosivity, EPA hazardous waste number D002. Best Demonstrated Available Treatment (BDAT) as defined by RCRA is disposal by Deactivation. Waste liquid may be reclaimed or disposed of in an approved hazardous waste incinerator. Contaminated soils and solid material should be treated and residual materials disposed of in an approved hazardous waste landfill. Small quantities of this material can be diluted and treated in a municipal sewage treatment plant with prior approval from local authorities. In all cases, disposal should be in accordance with all applicable local, state and federal laws and regulations. Consult your attorney or appropriate regulatory officials for information on appropriate disposal.

This product should not be dumped, spilled, rinsed or washed into sewers or public waterways.

14. TRANSPORT INFORMATION

The data provided in this section is for information only. Please apply the appropriate regulations to properly classify your shipment for transportation.

US DOT Classification: Ammonia solutions, 8, UN2672, III

US DOT Label: Corrosive

US DOT Reportable Quantity: Packages of 1000 lbs or more contain a 1000 lb RQ of ammonium hydroxide.

IMDG Code: Same as U.S. DOT

IATA/ICAO: Same as U.S. DOT

15. REGULATORY INFORMATION

TSCA Inventory: Listed
SARA Hazard Notification
Hazard Categories Under Title III Rules (40 CFR 370): Immediate, delayed
Section 302 Extremely Hazardous Substances: None
Section 313 Toxic Chemical(s): None

CERCLA Reportable Quantity: 1000 lb RQ of Ammonium hydroxide

Release of more than 1000 pounds of this product to the environment in a 24 hour period requires notification to the National Response Center (800-424-8802 or 202-426-2675).

California Proposition 65: Not applicable

Refer to Section 11 for OSHA Hazardous Chemical(s) and Section 13 for RCRA classification.

16. OTHER INFORMATION

Reason for revision: Conversion to Solutia 16 section format. Supersedes MSDS dated: 11/5/96.

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