

## DOCKETED

<b>Docket Number:</b>	09-AFC-05C
<b>Project Title:</b>	Abengoa Mojave Compliance
<b>TN #:</b>	202355-2
<b>Document Title:</b>	Part 2 April 2014 Monthly Compliance Report
<b>Description:</b>	N/A
<b>Filer:</b>	Tiffani Winter
<b>Organization:</b>	Abengoa Mojave Solar, LLC.
<b>Submitter Role:</b>	Applicant
<b>Submission Date:</b>	5/20/2014 11:49:10 AM
<b>Docketed Date:</b>	5/20/2014

**San Bernardino County Fire Department • Hazardous Materials Division**

**INVENTORY SUMMARY FORM**

**I. FACILITY IDENTIFICATION**

FACILITY ID # **F A**

<sup>1</sup> (This number is on your CUPA permit.)

BUSINESS NAME (Same as FACILITY NAME or DBA)

<sup>3</sup>

**Mojave Solar Project LLC – Chemical Inventory – (page 2)**

Item #	Name of Hazardous Material or Waste	Maximum Quantity	Size of Largest Container	Unit of Measure
3.	<i>Lubricating Oil (Example Only)</i>	555	500	Gallon
13	Sodium Bisulfite – 38%	660	330	gallon
14	Sodium Hypochlorite – 12.5%	5280	2640	gallon
15	Magnesium Sulfate – 27%	15320	7660	gallon silo
16	Slacked Lime	21664	21664	gallon silo
17	Soda Ash - 95% Sodium Carbonate	15320	7660	gallon silo
18	Anionic Flocculant Polymer Powder	660	330	gallon
19	Ferric Chloride – 40%	660	330	gallon
20	Sodium Bisulfite – 35%	660	330	gallon
21	Phosphoric Acid	660	330	gallon
22	Liquid Carbon Dioxide	26000	13000	gallon tank
23	Sodium EDTA	600	100	Lb bags
24	Sulfuric Acid - 98%	660	330	gallon

Summarize the Business Plan inventory on this page. Place this summary in front of the inventory section of the Business Plan. Make copies of this sheet as necessary. Reminder: You need not report hazardous materials with a maximum quantity of less than 55 gallons, 500/5000 pounds, 200/1000 cubic feet, or the threshold planning quantity of an extremely hazardous substance. However, hazardous wastes, Category 1 and 2 pesticides, and explosives are reportable at any quantity.

**III. SIGNATURE- EPCRA Facilities MUST sign the bottom of each individual attached inventory form.**

SIGNATURE OF OWNER/OPERATOR

NAME OF SIGNER (*print*)

136

DATE

134

Kirk Anderson

03/15/2014

**San Bernardino County Fire Department • Hazardous Materials Division**

**INVENTORY SUMMARY FORM**

**I. FACILITY IDENTIFICATION**

FACILITY ID # **F A**

<sup>1</sup> (This number is on your CUPA permit.)

BUSINESS NAME (Same as FACILITY NAME or DBA)

3

**Mojave Solar Project LLC – Chemical Inventory – (page 3)**

Item #	Name of Hazardous Material or Waste	Maximum Quantity	Size of Largest Container	Unit of Measure
3.	<i>Lubricating Oil (Example Only)</i>	555	500	Gallon
25	Sodium Hydroxide - 50%	990	330	gallon
26	Heat Transfer Fluid – Biphenyl	2,300,000	57,000	gallon
27	Carbon Dioxide Gas	6272	196	Cu ft
28	Hydrogen Gas	3196	196	Cu ft
29	Nitrogen	26000	13000	gallon

Summarize the Business Plan inventory on this page. Place this summary in front of the inventory section of the Business Plan. Make copies of this sheet as necessary. Reminder: You need not report hazardous materials with a maximum quantity of less than 55 gallons, 500/5000 pounds, 200/1000 cubic feet, or the threshold planning quantity of an extremely hazardous substance. However, hazardous wastes, Category 1 and 2 pesticides, and explosives are reportable at any quantity.

**III. SIGNATURE- EPCRA Facilities MUST sign the bottom of each individual attached inventory form.**

SIGNATURE OF OWNER/OPERATOR	NAME OF SIGNER ( <i>print</i> )	136	DATE	134
	Kirk Anderson		03/15/2014	

## San Bernardino County Fire Department • Hazardous Materials Division HAZARDOUS MATERIALS INVENTORY – CHEMICAL DESCRIPTION

MATERIAL

WASTE

Page 1 of 29

### I. FACILITY INFORMATION

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3

**Mojave Solar Project LLC**

FACILITY ID #	F	A												1	MAP# 1-A	2	3	3	GRID#  F36,C20	204
---------------	---	---	--	--	--	--	--	--	--	--	--	--	--	---	-------------	---	---	---	----------------------	-----

### II. CHEMICAL INFORMATION

CHEMICAL NAME <b>Diesel Fuel</b>	205	TRADE SECRET <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	206
<small>If Subject to EPCRA, refer to instructions</small>			

COMMON NAME <b>Diesel Fuel</b>	207	EHS* <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	208
-----------------------------------	-----	--	-----

CAS#	209	*If EHS is "Yes", all amounts below must be in lbs.	
------	-----	---	--

HAZARDOUS MATERIAL TYPE (Check one item only) <input checked="" type="checkbox"/> a. PURE <input type="checkbox"/> b. MIXTURE <input type="checkbox"/> c. WASTE	211	RADIOACTIVE <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	212	CURIES	213
--	-----	---	-----	--------	-----

PHYSICAL STATE (Check one item only) <input type="checkbox"/> a. SOLID <input checked="" type="checkbox"/> b. LIQUID <input type="checkbox"/> c. GAS	214	LARGEST CONTAINER 4000 gallon tank	215
---	-----	------------------------------------	-----

FED HAZARD CATEGORIES (Check all that apply) <input checked="" type="checkbox"/> a. FIRE <input type="checkbox"/> b. REACTIVE <input type="checkbox"/> c. PRESSURE RELEASE <input type="checkbox"/> d. ACUTE HEALTH <input type="checkbox"/> e. CHRONIC HEALTH	216
---	-----

AVERAGE DAILY AMOUNT	217	MAXIMUM DAILY AMOUNT	218	ANNUAL WASTE AMOUNT	219	STATE WASTE CODE	220
5500		9700					

UNITS* (Check one item only) <input checked="" type="checkbox"/> a. GALLONS <input type="checkbox"/> b. CUBIC FEET <input type="checkbox"/> c. POUNDS <input type="checkbox"/> d. TONS	221	DAYS ON SITE: 365	222
<small>* If EHS, amount must be in pounds.</small>			

STORAGE CONTAINER	<input checked="" type="checkbox"/> a. ABOVE GROUND TANK	<input type="checkbox"/> e. PLASTIC/NONMETALLIC DRUM	<input type="checkbox"/> i. FIBER DRUM	<input type="checkbox"/> m. GLASS BOTTLE	<input type="checkbox"/> q. RAIL CAR
	<input type="checkbox"/> b. UNDERGROUND TANK	<input type="checkbox"/> f. CAN	<input type="checkbox"/> j. BAG	<input type="checkbox"/> n. PLASTIC BOTTLE	<input type="checkbox"/> r. OTHER
	<input type="checkbox"/> c. TANK INSIDE BUILDING	<input type="checkbox"/> g. CARBOY	<input type="checkbox"/> k. BOX	<input type="checkbox"/> o. TOTE BIN	
	<input type="checkbox"/> d. STEEL DRUM	<input type="checkbox"/> h. SILO	<input type="checkbox"/> l. CYLINDER	<input type="checkbox"/> p. TANK WAGON	223

STORAGE PRESSURE	<input checked="" type="checkbox"/> a. AMBIENT	<input type="checkbox"/> b. ABOVE AMBIENT	<input type="checkbox"/> c. BELOW AMBIENT	224
------------------	--	---	---	-----

STORAGE TEMPERATURE	<input checked="" type="checkbox"/> a. AMBIENT	<input type="checkbox"/> b. ABOVE AMBIENT	<input type="checkbox"/> c. BELOW AMBIENT	<input type="checkbox"/> d. CRYOGENIC	225
---------------------	--	---	---	---------------------------------------	-----

%WT		HAZARDOUS COMPONENT (For mixture or waste only)		EHS		CAS #
1	100	Petroleum Products	226	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	228	229
2	230		231	<input type="checkbox"/> Yes <input type="checkbox"/> No	232	233
3	234		235	<input type="checkbox"/> Yes <input type="checkbox"/> No	236	237
4	238		239	<input type="checkbox"/> Yes <input type="checkbox"/> No	240	241
5	242		243	<input type="checkbox"/> Yes <input type="checkbox"/> No	244	245

If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or > 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.

ADDITIONAL LOCALLY COLLECTED INFORMATION 246

Diesel fuel tanks are in various locations around project. Some are mobile.

If EPCRA, Please Sign Here

# ABEINSA EPC MOJAVE

**Document:**

PEM-0002-01 Annex 01

**Revision:**

00

**Date:**

03/15/14

**Page: 5 of 32**

## San Bernardino County Fire Department • Hazardous Materials Division HAZARDOUS MATERIALS INVENTORY – CHEMICAL DESCRIPTION

MATERIAL

WASTE

Page 2 of 29

### I. FACILITY INFORMATION

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3

**Mojave Solar Project LLC**

FACILITY ID #	F	A									1	MAP#	203	GRID#	204
												1-A		F30	

### II. CHEMICAL INFORMATION

CHEMICAL NAME <span style="float: right;">205</span> Gasoline	TRADE SECRET <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <span style="float: right;">206</span> <small>If Subject to EPCRA, refer to instructions</small>
--	--

COMMON NAME <span style="float: right;">207</span> Gasoline	EHS* <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <span style="float: right;">208</span>
--	---

CAS# <span style="float: right;">209</span>	*If EHS is "Yes", all amounts below must be in lbs.
---	---

HAZARDOUS MATERIAL TYPE (Check one item only) <span style="float: right;">211</span> <input checked="" type="checkbox"/> a. PURE <input type="checkbox"/> b. MIXTURE <input type="checkbox"/> c. WASTE	RADIOACTIVE <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <span style="float: right;">212</span>	CURIES <span style="float: right;">213</span>
---	--	---

PHYSICAL STATE (Check one item only) <span style="float: right;">214</span> <input type="checkbox"/> a. SOLID <input checked="" type="checkbox"/> b. LIQUID <input type="checkbox"/> c. GAS	LARGEST CONTAINER <span style="float: right;">215</span> 250 gallon tank
--	---

FED HAZARD CATEGORIES (Check all that apply) <span style="float: right;">216</span> <input checked="" type="checkbox"/> a. FIRE <input type="checkbox"/> b. REACTIVE <input type="checkbox"/> c. PRESSURE RELEASE <input type="checkbox"/> d. ACUTE HEALTH <input type="checkbox"/> e. CHRONIC HEALTH
--

AVERAGE DAILY AMOUNT <span style="float: right;">217</span> 1500	MAXIMUM DAILY AMOUNT <span style="float: right;">218</span> 2000	ANNUAL WASTE AMOUNT <span style="float: right;">219</span>	STATE WASTE CODE <span style="float: right;">220</span>
---	---	--	---

UNITS* (Check one item only) <span style="float: right;">221</span> <input checked="" type="checkbox"/> a. GALLONS <input type="checkbox"/> b. CUBIC FEET <input type="checkbox"/> c. POUNDS <input type="checkbox"/> d. TONS <small>* If EHS, amount must be in pounds.</small>	DAYS ON SITE: <span style="float: right;">222</span> 365
--	---

STORAGE CONTAINER <span style="float: right;">223</span> <input checked="" type="checkbox"/> a. ABOVE GROUND TANK <input type="checkbox"/> e. PLASTIC/NONMETALLIC DRUM <input type="checkbox"/> i. FIBER DRUM <input type="checkbox"/> m. GLASS BOTTLE <input type="checkbox"/> q. RAIL CAR <input type="checkbox"/> b. UNDERGROUND TANK <input type="checkbox"/> f. CAN <input type="checkbox"/> j. BAG <input type="checkbox"/> n. PLASTIC BOTTLE <input type="checkbox"/> r. OTHER <input type="checkbox"/> c. TANK INSIDE BUILDING <input type="checkbox"/> g. CARBOY <input type="checkbox"/> k. BOX <input type="checkbox"/> o. TOTE BIN <input type="checkbox"/> d. STEEL DRUM <input type="checkbox"/> h. SILO <input type="checkbox"/> l. CYLINDER <input type="checkbox"/> p. TANK WAGON
--

STORAGE PRESSURE <input checked="" type="checkbox"/> a. AMBIENT <input type="checkbox"/> b. ABOVE AMBIENT <input type="checkbox"/> c. BELOW AMBIENT <span style="float: right;">224</span>
--

STORAGE TEMPERATURE <input checked="" type="checkbox"/> a. AMBIENT <input type="checkbox"/> b. ABOVE AMBIENT <input type="checkbox"/> c. BELOW AMBIENT <input type="checkbox"/> d. CRYOGENIC <span style="float: right;">225</span>
---

%WT	HAZARDOUS COMPONENT (For mixture or waste only)	EHS	CAS #
1 100 <span style="float: right;">226</span>	Petroleum Distillates <span style="float: right;">227</span>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <span style="float: right;">228</span>	86290-81-5 <span style="float: right;">229</span>
2 <span style="float: right;">230</span>	<span style="float: right;">231</span>	<input type="checkbox"/> Yes <input type="checkbox"/> No <span style="float: right;">232</span>	<span style="float: right;">233</span>
3 <span style="float: right;">234</span>	<span style="float: right;">235</span>	<input type="checkbox"/> Yes <input type="checkbox"/> No <span style="float: right;">236</span>	<span style="float: right;">237</span>
4 <span style="float: right;">238</span>	<span style="float: right;">239</span>	<input type="checkbox"/> Yes <input type="checkbox"/> No <span style="float: right;">240</span>	<span style="float: right;">241</span>
5 <span style="float: right;">242</span>	<span style="float: right;">243</span>	<input type="checkbox"/> Yes <input type="checkbox"/> No <span style="float: right;">244</span>	<span style="float: right;">245</span>

If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or > 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.

ADDITIONAL LOCALLY COLLECTED INFORMATION 246

**San Bernardino County Fire Department • Hazardous Materials Division  
HAZARDOUS MATERIALS INVENTORY – CHEMICAL DESCRIPTION**

MATERIAL

WASTE

Page 3 of 29

**I. FACILITY INFORMATION**

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3

**Mojave Solar Project LLC**

FACILITY ID #	F	A												MAP#	203	GRID#	204
														1-A		E26	

**II. CHEMICAL INFORMATION**

CHEMICAL NAME <span style="float:right">205</span> <b>Hydraulic Oil</b>	TRADE SECRET <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <span style="float:right">206</span> <small>If Subject to EPCRA, refer to instructions</small>
--	--

COMMON NAME <span style="float:right">207 <b>Hydraulic Oil</b></span>	EHS* <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <span style="float:right">208</span>
---	---

CAS# <span style="float:right">209</span>	*If EHS is "Yes", all amounts below must be in lbs.
---	---

HAZARDOUS MATERIAL TYPE (Check one item only) <span style="float:right">211</span> <input type="checkbox"/> a. PURE <input checked="" type="checkbox"/> b. MIXTURE <input type="checkbox"/> c. WASTE	RADIOACTIVE <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <span style="float:right">212</span>	CURIES <span style="float:right">213</span>
---	--	---

PHYSICAL STATE (Check one item only) <span style="float:right">214</span> <input type="checkbox"/> a. SOLID <input checked="" type="checkbox"/> b. LIQUID <input type="checkbox"/> c. GAS	LARGEST CONTAINER <b>330 gallon tote/tank</b> <span style="float:right">215</span>
--	--

FED HAZARD CATEGORIES (Check all that apply) <span style="float:right">216</span> <input checked="" type="checkbox"/> a. FIRE <input type="checkbox"/> b. REACTIVE <input type="checkbox"/> c. PRESSURE RELEASE <input type="checkbox"/> d. ACUTE HEALTH <input checked="" type="checkbox"/> e. CHRONIC HEALTH
---

AVERAGE DAILY AMOUNT <span style="float:right">217</span> <b>3200</b>	MAXIMUM DAILY AMOUNT <span style="float:right">218</span> <b>5280</b>	ANNUAL WASTE AMOUNT <span style="float:right">219</span>	STATE WASTE CODE <span style="float:right">220</span>
--	--	--	---

UNITS* (Check one item only) <span style="float:right">221</span> <input checked="" type="checkbox"/> a. GALLONS <input type="checkbox"/> b. CUBIC FEET <input type="checkbox"/> c. POUNDS <input type="checkbox"/> d. TONS <small>* If EHS, amount must be in pounds.</small>	DAYS ON SITE: <b>365</b> <span style="float:right">222</span>
--	---

STORAGE CONTAINER <span style="float:right">223</span> <input type="checkbox"/> a. ABOVE GROUND TANK <input type="checkbox"/> e. PLASTIC/NONMETALLIC DRUM <input type="checkbox"/> i. FIBER DRUM <input type="checkbox"/> m. GLASS BOTTLE <input type="checkbox"/> q. RAIL CAR <input type="checkbox"/> b. UNDERGROUND TANK <input type="checkbox"/> f. CAN <input type="checkbox"/> j. BAG <input type="checkbox"/> n. PLASTIC BOTTLE <input type="checkbox"/> r. OTHER <input type="checkbox"/> c. TANK INSIDE BUILDING <input type="checkbox"/> g. CARBOY <input type="checkbox"/> k. BOX <input checked="" type="checkbox"/> o. TOTE BIN <input type="checkbox"/> d. STEEL DRUM <input type="checkbox"/> h. SILO <input type="checkbox"/> l. CYLINDER <input type="checkbox"/> p. TANK WAGON
--

STORAGE PRESSURE <input checked="" type="checkbox"/> a. AMBIENT <input type="checkbox"/> b. ABOVE AMBIENT <input type="checkbox"/> c. BELOW AMBIENT <span style="float:right">224</span>
--

STORAGE TEMPERATURE <input checked="" type="checkbox"/> a. AMBIENT <input type="checkbox"/> b. ABOVE AMBIENT <input type="checkbox"/> c. BELOW AMBIENT <input type="checkbox"/> d. CRYOGENIC <span style="float:right">225</span>
---

%WT	HAZARDOUS COMPONENT (For mixture or waste only)	EHS	CAS #
1 100 <span style="float:right">226</span>	<b>Petroleum</b> <span style="float:right">227</span>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <span style="float:right">228</span>	<b>64742-55-8</b> <span style="float:right">229</span>
2 <span style="float:right">230</span>	<span style="float:right">231</span>	<input type="checkbox"/> Yes <input type="checkbox"/> No <span style="float:right">232</span>	<span style="float:right">233</span>
3 <span style="float:right">234</span>	<span style="float:right">235</span>	<input type="checkbox"/> Yes <input type="checkbox"/> No <span style="float:right">236</span>	<span style="float:right">237</span>
4 <span style="float:right">238</span>	<span style="float:right">239</span>	<input type="checkbox"/> Yes <input type="checkbox"/> No <span style="float:right">240</span>	<span style="float:right">241</span>
5 <span style="float:right">242</span>	<span style="float:right">243</span>	<input type="checkbox"/> Yes <input type="checkbox"/> No <span style="float:right">244</span>	<span style="float:right">245</span>

If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or > 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.

ADDITIONAL LOCALLY COLLECTED INFORMATION 246

## San Bernardino County Fire Department • Hazardous Materials Division HAZARDOUS MATERIALS INVENTORY – CHEMICAL DESCRIPTION

MATERIAL

WASTE

Page 4 of 29

### I. FACILITY INFORMATION

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3

**Mojave Solar Project LLC**

FACILITY ID #	F	A										MAP#	203	GRID#	204
												1-A		F32, C21	

### II. CHEMICAL INFORMATION

CHEMICAL NAME <span style="float: right;">205</span> <b>Paints/Solvents</b>	TRADE SECRET <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <span style="float: right;">206</span> <small>If Subject to EPCRA, refer to instructions</small>
--	--

COMMON NAME <span style="float: right;">207</span> <b>Paints/Solvents</b>	EHS* <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <span style="float: right;">208</span>
--	---

CAS# <span style="float: right;">209</span>	*If EHS is "Yes", all amounts below must be in lbs.
---	---

HAZARDOUS MATERIAL TYPE (Check one item only) <span style="float: right;">211</span> <input type="checkbox"/> a. PURE <input checked="" type="checkbox"/> b. MIXTURE <input type="checkbox"/> c. WASTE	RADIOACTIVE <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <span style="float: right;">212</span>	CURIES <span style="float: right;">213</span>
---	--	---

PHYSICAL STATE (Check one item only) <span style="float: right;">214</span> <input type="checkbox"/> a. SOLID <input checked="" type="checkbox"/> b. LIQUID <input type="checkbox"/> c. GAS	LARGEST CONTAINER <b>55 gallon drum</b> <span style="float: right;">215</span>
--	--

FED HAZARD CATEGORIES (Check all that apply) <span style="float: right;">216</span> <input checked="" type="checkbox"/> a. FIRE <input type="checkbox"/> b. REACTIVE <input type="checkbox"/> c. PRESSURE RELEASE <input type="checkbox"/> d. ACUTE HEALTH <input checked="" type="checkbox"/> e. CHRONIC HEALTH
---

AVERAGE DAILY AMOUNT <span style="float: right;">217</span> <b>350</b>	MAXIMUM DAILY AMOUNT <span style="float: right;">218</span> <b>550</b>	ANNUAL WASTE AMOUNT <span style="float: right;">219</span>	STATE WASTE CODE <span style="float: right;">220</span>
---	---	--	---

UNITS* (Check one item only) <span style="float: right;">221</span> <input checked="" type="checkbox"/> a. GALLONS <input type="checkbox"/> b. CUBIC FEET <input type="checkbox"/> c. POUNDS <input type="checkbox"/> d. TONS <small>* If EHS, amount must be in pounds.</small>	DAYS ON SITE: <b>365</b> <span style="float: right;">222</span>
--	---

STORAGE CONTAINER <span style="float: right;">223</span> <input type="checkbox"/> a. ABOVE GROUND TANK <input type="checkbox"/> e. PLASTIC/NONMETALLIC DRUM <input type="checkbox"/> i. FIBER DRUM <input type="checkbox"/> m. GLASS BOTTLE <input type="checkbox"/> q. RAIL CAR <input type="checkbox"/> b. UNDERGROUND TANK <input checked="" type="checkbox"/> f. CAN <input type="checkbox"/> j. BAG <input type="checkbox"/> n. PLASTIC BOTTLE <input checked="" type="checkbox"/> r. OTHER <input type="checkbox"/> c. TANK INSIDE BUILDING <input type="checkbox"/> g. CARBOY <input type="checkbox"/> k. BOX <input type="checkbox"/> o. TOTE BIN <input checked="" type="checkbox"/> d. STEEL DRUM <input type="checkbox"/> h. SILO <input type="checkbox"/> l. CYLINDER <input type="checkbox"/> p. TANK WAGON
--

STORAGE PRESSURE <input checked="" type="checkbox"/> a. AMBIENT <input type="checkbox"/> b. ABOVE AMBIENT <input type="checkbox"/> c. BELOW AMBIENT <span style="float: right;">224</span>
--

STORAGE TEMPERATURE <input checked="" type="checkbox"/> a. AMBIENT <input type="checkbox"/> b. ABOVE AMBIENT <input type="checkbox"/> c. BELOW AMBIENT <input type="checkbox"/> d. CRYOGENIC <span style="float: right;">225</span>
---

#	%WT	CAS #	HAZARDOUS COMPONENT (For mixture or waste only)	EHS	CAS #
1	50	226	Misc. paints <span style="float: right;">227</span>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <span style="float: right;">228</span>	229
2	50	230	Organic solvents <span style="float: right;">231</span>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <span style="float: right;">232</span>	233
3		234	<span style="float: right;">235</span>	<input type="checkbox"/> Yes <input type="checkbox"/> No <span style="float: right;">236</span>	237
4		238	<span style="float: right;">239</span>	<input type="checkbox"/> Yes <input type="checkbox"/> No <span style="float: right;">240</span>	241
5		242	<span style="float: right;">243</span>	<input type="checkbox"/> Yes <input type="checkbox"/> No <span style="float: right;">244</span>	245

If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or > 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.

ADDITIONAL LOCALLY COLLECTED INFORMATION 246

If EPCRA, Please Sign Here

**San Bernardino County Fire Department • Hazardous Materials Division  
HAZARDOUS MATERIALS INVENTORY – CHEMICAL DESCRIPTION**

MATERIAL

WASTE

Page 5 of 29

**I. FACILITY INFORMATION**

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As)

3

**Mojave Solar Project LLC**

FACILITY ID #

F A 1

MAP#

203

GRID#

204

1-A

F32, C21

**II. CHEMICAL INFORMATION**

CHEMICAL NAME

205

Motor Oil

TRADE SECRET

Yes  No

206

If Subject to EPCRA, refer to instructions

COMMON NAME

207

Motor Oil

EHS\*

Yes  No

208

CAS#

209

\*If EHS is "Yes", all amounts below must be in lbs.

HAZARDOUS MATERIAL TYPE (Check one item only)

a. PURE  b. MIXTURE  c. WASTE

211

RADIOACTIVE

Yes  No

212

CURIES

213

PHYSICAL STATE (Check one item only)

a. SOLID  b. LIQUID  c. GAS

214

LARGEST CONTAINER

55 gallon drum

215

FED HAZARD CATEGORIES (Check all that apply)

a. FIRE  b. REACTIVE  c. PRESSURE RELEASE  d. ACUTE HEALTH  e. CHRONIC HEALTH

216

AVERAGE DAILY AMOUNT

217

85

MAXIMUM DAILY AMOUNT

218

110

ANNUAL WASTE AMOUNT

219

STATE WASTE CODE

220

UNITS\* (Check one item only)

a. GALLONS  b. CUBIC FEET  c. POUNDS  d. TONS  
\* If EHS, amount must be in pounds.

221

DAYS ON SITE:

365

222

STORAGE CONTAINER

a. ABOVE GROUND TANK  e. PLASTIC/NONMETALLIC DRUM  i. FIBER DRUM  m. GLASS BOTTLE  q. RAIL CAR  
 b. UNDERGROUND TANK  f. CAN  j. BAG  n. PLASTIC BOTTLE  r. OTHER  
 c. TANK INSIDE BUILDING  g. CARBOY  k. BOX  o. TOTE BIN  
 d. STEEL DRUM  h. SILO  l. CYLINDER  p. TANK WAGON

223

STORAGE PRESSURE

a. AMBIENT  b. ABOVE AMBIENT  c. BELOW AMBIENT

224

STORAGE TEMPERATURE

a. AMBIENT  b. ABOVE AMBIENT  c. BELOW AMBIENT  d. CRYOGENIC

225

%WT

HAZARDOUS COMPONENT (For mixture or waste only)

EHS

CAS #

1 100

226

Petroleum based oils

227

Yes  No

228

64742-55-8

229

2

230

231

Yes  No

232

233

3

234

235

Yes  No

236

237

4

238

239

Yes  No

240

241

5

242

243

Yes  No

244

245

If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or > 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.

ADDITIONAL LOCALLY COLLECTED INFORMATION

246

If EPCRA, Please Sign Here

**San Bernardino County Fire Department • Hazardous Materials Division  
HAZARDOUS MATERIALS INVENTORY – CHEMICAL DESCRIPTION**

MATERIAL

WASTE

Page 6 of 29

**I. FACILITY INFORMATION**

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As)

3

**Mojave Solar Project LLC**

FACILITY ID #

F A

MAP#

203

GRID#

204

1-A

F32, C21, E26

**II. CHEMICAL INFORMATION**

CHEMICAL NAME

205

TRADE SECRET

Yes  No

206

Propane

If Subject to EPCRA, refer to instructions

COMMON NAME

207

EHS\*

Yes  No

208

Propane

CAS#

209

\*If EHS is "Yes", all amounts below must be in lbs.

HAZARDOUS MATERIAL TYPE (Check one item only)

a. PURE  b. MIXTURE  c. WASTE

211

RADIOACTIVE

Yes  No

212

CURIES

213

PHYSICAL STATE

(Check one item only)

a. SOLID  b. LIQUID  c. GAS

214

LARGEST CONTAINER 50 gallon

215

FED HAZARD CATEGORIES (Check all that apply)

a. FIRE  b. REACTIVE  c. PRESSURE RELEASE  d. ACUTE HEALTH  e. CHRONIC HEALTH

216

AVERAGE DAILY AMOUNT

217

MAXIMUM DAILY AMOUNT

218

ANNUAL WASTE AMOUNT

219

STATE WASTE CODE

220

200

300

UNITS\*

(Check one item only)

a. GALLONS  b. CUBIC FEET  c. POUNDS  d. TONS

221

DAYS ON SITE:

365

222

STORAGE CONTAINER

a. ABOVE GROUND TANK  e. PLASTIC/NONMETALLIC DRUM  i. FIBER DRUM  m. GLASS BOTTLE  q. RAIL CAR  
 b. UNDERGROUND TANK  f. CAN  j. BAG  n. PLASTIC BOTTLE  r. OTHER  
 c. TANK INSIDE BUILDING  g. CARBOY  k. BOX  o. TOTE BIN  
 d. STEEL DRUM  h. SILO  l. CYLINDER  p. TANK WAGON

223

STORAGE PRESSURE

a. AMBIENT  b. ABOVE AMBIENT  c. BELOW AMBIENT

224

STORAGE TEMPERATURE

a. AMBIENT  b. ABOVE AMBIENT  c. BELOW AMBIENT  d. CRYOGENIC

225

%WT

HAZARDOUS COMPONENT (For mixture or waste only)

EHS

CAS #

1 100

226

Propane Gas

227

Yes  No

228

74-98-6

229

2

230

231

Yes  No

232

233

3

234

235

Yes  No

236

237

4

238

239

Yes  No

240

241

5

242

243

Yes  No

244

245

If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or > 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.

ADDITIONAL LOCALLY COLLECTED INFORMATION

246

If EPCRA, Please Sign Here



# ABEINSA EPC MOJAVE

**Document:**

PEM-0002-01 Annex 01

**Revision:**

00

**Date:**

03/15/14

**Page: 11 of 32**

## San Bernardino County Fire Department • Hazardous Materials Division HAZARDOUS MATERIALS INVENTORY – CHEMICAL DESCRIPTION

MATERIAL

WASTE

Page 8 of 29

### I. FACILITY INFORMATION

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As)

**Mojave Solar Project LLC**

FACILITY ID #	F	A												1	MAP#	203	GRID#	
															1-A		E35, F31, C22	

### II. CHEMICAL INFORMATION

CHEMICAL NAME	205	TRADE SECRET	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
Oxygen					If Subject to EPCRA, refer to instructions

COMMON NAME	207	EHS*	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
Oxygen					

CAS#	209	*If EHS is "Yes", all amounts below must be in lbs.			
------	-----	---	--	--	--

HAZARDOUS MATERIAL TYPE (Check one item only)	21	1	RADIOACTIVE	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	212	CURIES	
<input checked="" type="checkbox"/> a. PURE <input type="checkbox"/> b. MIXTURE <input type="checkbox"/> c. WASTE								

PHYSICAL STATE (Check one item only)	21	4	LARGEST CONTAINER	282 cu ft
<input type="checkbox"/> a. SOLID <input type="checkbox"/> b. LIQUID <input checked="" type="checkbox"/> c. GAS				

FED HAZARD CATEGORIES (Check all that apply)	21	6	<input checked="" type="checkbox"/> a. FIRE <input type="checkbox"/> b. REACTIVE <input type="checkbox"/> c. PRESSURE RELEASE <input type="checkbox"/> d. ACUTE HEALTH <input type="checkbox"/> e. CHRONIC HEALTH		
--	----	---	---	--	--

AVERAGE DAILY AMOUNT	217	MAXIMUM DAILY AMOUNT	218	ANNUAL WASTE AMOUNT	219	STATE WASTE CODE
2400		3500				

UNITS* (Check one item only)	221	2	DAYS ON SITE:	365
<input type="checkbox"/> a. GALLONS <input checked="" type="checkbox"/> b. CUBIC FEET <input type="checkbox"/> c. POUNDS <input type="checkbox"/> d. TONS				
<small>* If EHS, amount must be in pounds.</small>				

STORAGE CONTAINER	<input type="checkbox"/> a. ABOVE GROUND TANK	<input type="checkbox"/> e. PLASTIC/NONMETALLIC DRUM	<input type="checkbox"/> i. FIBER DRUM	<input type="checkbox"/> m. GLASS BOTTLE	<input type="checkbox"/> q. RAIL CAR
	<input type="checkbox"/> b. UNDERGROUND TANK	<input type="checkbox"/> f. CAN	<input type="checkbox"/> j. BAG	<input type="checkbox"/> n. PLASTIC BOTTLE	<input type="checkbox"/> r. OTHER
	<input type="checkbox"/> c. TANK INSIDE BUILDING	<input type="checkbox"/> g. CARBOY	<input type="checkbox"/> k. BOX	<input type="checkbox"/> o. TOTE BIN	
	<input type="checkbox"/> d. STEEL DRUM	<input type="checkbox"/> h. SILO	<input checked="" type="checkbox"/> l. CYLINDER	<input type="checkbox"/> p. TANK WAGON	

STORAGE PRESSURE	<input type="checkbox"/> a. AMBIENT	<input checked="" type="checkbox"/> b. ABOVE AMBIENT	<input type="checkbox"/> c. BELOW AMBIENT
------------------	-------------------------------------	--	---

STORAGE TEMPERATURE	<input checked="" type="checkbox"/> a. AMBIENT	<input type="checkbox"/> b. ABOVE AMBIENT	<input type="checkbox"/> c. BELOW AMBIENT	<input type="checkbox"/> d. CRYOGENIC
---------------------	--	---	---	---------------------------------------

%WT	HAZARDOUS COMPONENT (For mixture or waste only)	EHS	CAS #
1 100 226	Oxygen Gas 227	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No 228	7782-44-7
2 230	231	<input type="checkbox"/> Yes <input type="checkbox"/> No 232	
3 234	235	<input type="checkbox"/> Yes <input type="checkbox"/> No 236	
4 238	239	<input type="checkbox"/> Yes <input type="checkbox"/> No 240	
5 242	243	<input type="checkbox"/> Yes <input type="checkbox"/> No 244	

If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or > 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.

**San Bernardino County Fire Department • Hazardous Materials Division  
HAZARDOUS MATERIALS INVENTORY – CHEMICAL DESCRIPTION**

MATERIAL

WASTE

Page 9 of 29

**I. FACILITY INFORMATION**

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3

**Mojave Solar Project LLC**

FACILITY ID #	F	A												MAP#						GRID#	
														1-A	203					E35, F31, C22	204

**II. CHEMICAL INFORMATION**

CHEMICAL NAME <span style="float:right">205</span> Aqueous Ammonia	TRADE SECRET <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <span style="float:right">206</span> <small>If Subject to EPCRA, refer to instructions</small>
---	--

COMMON NAME <span style="float:right">207</span> Aqueous Ammonia	EHS* <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <span style="float:right">208</span>
---	---

CAS# <span style="float:right">209</span>	*If EHS is "Yes", all amounts below must be in lbs.
---	---

HAZARDOUS MATERIAL TYPE (Check one item only) <span style="float:right">211</span> <input type="checkbox"/> a. PURE <input checked="" type="checkbox"/> b. MIXTURE <input type="checkbox"/> c. WASTE	RADIOACTIVE <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <span style="float:right">212</span>	CURIES <span style="float:right">213</span>
---	--	---

PHYSICAL STATE (Check one item only) <span style="float:right">214</span> <input type="checkbox"/> a. SOLID <input checked="" type="checkbox"/> b. LIQUID <input type="checkbox"/> c. GAS	LARGEST CONTAINER 330 gallon <span style="float:right">215</span>
--	---

FED HAZARD CATEGORIES (Check all that apply) <span style="float:right">216</span> <input type="checkbox"/> a. FIRE <input checked="" type="checkbox"/> b. REACTIVE <input type="checkbox"/> c. PRESSURE RELEASE <input type="checkbox"/> d. ACUTE HEALTH <input checked="" type="checkbox"/> e. CHRONIC HEALTH
---

AVERAGE DAILY AMOUNT <span style="float:right">217</span> 350	MAXIMUM DAILY AMOUNT <span style="float:right">218</span> 660	ANNUAL WASTE AMOUNT <span style="float:right">219</span>	STATE WASTE CODE <span style="float:right">220</span>
--	--	--	---

UNITS* (Check one item only) <span style="float:right">221</span> <input checked="" type="checkbox"/> a. GALLONS <input type="checkbox"/> b. CUBIC FEET <input type="checkbox"/> c. POUNDS <input type="checkbox"/> d. TONS <small>* If EHS, amount must be in pounds.</small>	DAYS ON SITE: <span style="float:right">222</span> 365
--	---

STORAGE CONTAINER <span style="float:right">223</span> <input checked="" type="checkbox"/> a. ABOVE GROUND TANK <input type="checkbox"/> e. PLASTIC/NONMETALLIC DRUM <input type="checkbox"/> i. FIBER DRUM <input type="checkbox"/> m. GLASS BOTTLE <input type="checkbox"/> q. RAIL CAR <input type="checkbox"/> b. UNDERGROUND TANK <input type="checkbox"/> f. CAN <input type="checkbox"/> j. BAG <input type="checkbox"/> n. PLASTIC BOTTLE <input type="checkbox"/> r. OTHER <input type="checkbox"/> c. TANK INSIDE BUILDING <input type="checkbox"/> g. CARBOY <input type="checkbox"/> k. BOX <input type="checkbox"/> o. TOTE BIN <input type="checkbox"/> d. STEEL DRUM <input type="checkbox"/> h. SILO <input type="checkbox"/> l. CYLINDER <input type="checkbox"/> p. TANK WAGON
--

STORAGE PRESSURE <input checked="" type="checkbox"/> a. AMBIENT <input type="checkbox"/> b. ABOVE AMBIENT <input type="checkbox"/> c. BELOW AMBIENT <span style="float:right">224</span>
--

STORAGE TEMPERATURE <input checked="" type="checkbox"/> a. AMBIENT <input type="checkbox"/> b. ABOVE AMBIENT <input type="checkbox"/> c. BELOW AMBIENT <input type="checkbox"/> d. CRYOGENIC <span style="float:right">225</span>
---

#	%WT	HAZARDOUS COMPONENT (For mixture or waste only)	EHS	CAS #
1	12.5	Aqueous Ammonia	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
2			<input type="checkbox"/> Yes <input type="checkbox"/> No	
3			<input type="checkbox"/> Yes <input type="checkbox"/> No	
4			<input type="checkbox"/> Yes <input type="checkbox"/> No	
5			<input type="checkbox"/> Yes <input type="checkbox"/> No	

If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or > 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.

ADDITIONAL LOCALLY COLLECTED INFORMATION 246

If EPCRA, Please Sign Here

**San Bernardino County Fire Department • Hazardous Materials Division  
HAZARDOUS MATERIALS INVENTORY – CHEMICAL DESCRIPTION**

MATERIAL

WASTE

Page \_10\_ of \_29\_

**I. FACILITY INFORMATION**

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As)

3

**Mojave Solar Project LLC**

FACILITY ID #

F

A

1

MAP#

203

GRID#

204

1-A

E35, F31, C22

**II. CHEMICAL INFORMATION**

CHEMICAL NAME

205

**Carbohydrazide**

TRADE SECRET

Yes  No

206

If Subject to EPCRA, refer to instructions

COMMON NAME

207

**Carbohydrazide**

EHS\*

Yes  No

208

CAS# 497-18-7

209

\*If EHS is "Yes", all amounts below must be in lbs.

HAZARDOUS MATERIAL TYPE (Check one item only)

a. PURE  b. MIXTURE  c. WASTE

211

RADIOACTIVE  Yes  No

212

CURIES

213

PHYSICAL STATE (Check one item only)

a. SOLID  b. LIQUID  c. GAS

214

LARGEST CONTAINER 300

215

FED HAZARD CATEGORIES (Check all that apply)

a. FIRE  b. REACTIVE  c. PRESSURE RELEASE  d. ACUTE HEALTH  e. CHRONIC HEALTH

216

AVERAGE DAILY AMOUNT

217

600

MAXIMUM DAILY AMOUNT

218

1200

ANNUAL WASTE AMOUNT

219

STATE WASTE CODE

220

UNITS\* (Check one item only)

a. GALLONS  b. CUBIC FEET  c. POUNDS  d. TONS

221

DAYS ON SITE:

365

222

STORAGE CONTAINER

a. ABOVE GROUND TANK  e. PLASTIC/NONMETALLIC DRUM  i. FIBER DRUM  m. GLASS BOTTLE  q. RAIL CAR  
 b. UNDERGROUND TANK  f. CAN  j. BAG  n. PLASTIC BOTTLE  r. OTHER  
 c. TANK INSIDE BUILDING  g. CARBOY  k. BOX  o. TOTE BIN  
 d. STEEL DRUM  h. SILO  l. CYLINDER  p. TANK WAGON

223

STORAGE PRESSURE

a. AMBIENT  b. ABOVE AMBIENT  c. BELOW AMBIENT

224

STORAGE TEMPERATURE

a. AMBIENT  b. ABOVE AMBIENT  c. BELOW AMBIENT  d. CRYOGENIC

225

%WT

HAZARDOUS COMPONENT (For mixture or waste only)

EHS

CAS #

1 100

226

**Carbohydrazide**

227

Yes  No

228

**497-18-7**

229

2

230

231

Yes  No

232

233

3

234

235

Yes  No

236

237

4

238

239

Yes  No

240

241

5

242

243

Yes  No

244

245

If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or > 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.

ADDITIONAL LOCALLY COLLECTED INFORMATION

246

**ABEINSA EPC  
MOJAVE**

**Document:**

PEM-0002-01 Annex 01

**Revision:**

00

**Date:**

03/15/14

**Page: 14 of 32**

**San Bernardino County Fire Department • Hazardous Materials Division  
HAZARDOUS MATERIALS INVENTORY – CHEMICAL DESCRIPTION**

MATERIAL

WASTE

Page 11 of 29

**I. FACILITY INFORMATION**

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3

**Mojave Solar Project LLC**

FACILITY ID #

F

A

1

MAP#

203

GRID#

204

1-A

E35, F31, C22

**II. CHEMICAL INFORMATION**

CHEMICAL NAME 205

Trisodium Phosphate Solution

TRADE SECRET

Yes  No 206

If Subject to EPCRA, refer to instructions

COMMON NAME 207

TSP Solution

EHS\* 208

Yes  No

CAS# 7601-54-9 209

\*If EHS is "Yes", all amounts below must be in lbs.

HAZARDOUS MATERIAL TYPE (Check one item only) 211

a. PURE  b. MIXTURE  c. WASTE

RADIOACTIVE  Yes  No 212

CURIES 213

PHYSICAL STATE (Check one item only) 214

a. SOLID  b. LIQUID  c. GAS

LARGEST CONTAINER 200 gal 215

FED HAZARD CATEGORIES (Check all that apply) 216

a. FIRE  b. REACTIVE  c. PRESSURE RELEASE  d. ACUTE HEALTH  e. CHRONIC HEALTH

AVERAGE DAILY AMOUNT 217

200

MAXIMUM DAILY AMOUNT 218

250

ANNUAL WASTE AMOUNT 219

STATE WASTE CODE 220

UNITS\* (Check one item only) 221

a. GALLONS  b. CUBIC FEET  c. POUNDS  d. TONS

DAYS ON SITE: 222

365

STORAGE CONTAINER

- a. ABOVE GROUND TANK  e. PLASTIC/NONMETALLIC DRUM  i. FIBER DRUM  m. GLASS BOTTLE  q. RAIL CAR  
 b. UNDERGROUND TANK  f. CAN  j. BAG  n. PLASTIC BOTTLE  r. OTHER  
 c. TANK INSIDE BUILDING  g. CARBOY  k. BOX  o. TOTE BIN  
 d. STEEL DRUM  h. SILO  l. CYLINDER  p. TANK WAGON 223

STORAGE PRESSURE 224

a. AMBIENT  b. ABOVE AMBIENT  c. BELOW AMBIENT

STORAGE TEMPERATURE 225

a. AMBIENT  b. ABOVE AMBIENT  c. BELOW AMBIENT  d. CRYOGENIC

%WT

HAZARDOUS COMPONENT (For mixture or waste only)

EHS

CAS #

1 100 226

Tri Sodium Phosphate 227

Yes  No 228

7601-54-9 229

2 230

Yes  No 231

232

233

3 234

Yes  No 235

236

237

4 238

Yes  No 239

240

241

5 242

Yes  No 243

244

245

If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or > 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.

ADDITIONAL LOCALLY COLLECTED INFORMATION 246

**San Bernardino County Fire Department • Hazardous Materials Division  
HAZARDOUS MATERIALS INVENTORY – CHEMICAL DESCRIPTION**

MATERIAL

WASTE

Page 12 of 29

**I. FACILITY INFORMATION**

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3

**Mojave Solar Project LLC**

FACILITY ID #	F	A								MAP#	203	GRID#	204
										1-A		E35, F31, C22	

**II. CHEMICAL INFORMATION**

CHEMICAL NAME <span style="float:right">205</span> Phosphoric Acid – 60 - 70%	TRADE SECRET <span style="float:right">206</span> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <small>If Subject to EPCRA, refer to instructions</small>
--	---

COMMON NAME <span style="float:right">207</span> Phosphoric Acid	EHS* <span style="float:right">208</span> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
---	--

CAS# 7664-38-2 <span style="float:right">209</span>	*If EHS is "Yes", all amounts below must be in lbs.
---	---

HAZARDOUS MATERIAL TYPE (Check one item only) <span style="float:right">211</span> <input type="checkbox"/> a. PURE <input checked="" type="checkbox"/> b. MIXTURE <input type="checkbox"/> c. WASTE	RADIOACTIVE <span style="float:right">212</span> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	CURIES <span style="float:right">213</span>
---	---	---

PHYSICAL STATE (Check one item only) <span style="float:right">214</span> <input type="checkbox"/> a. SOLID <input checked="" type="checkbox"/> b. LIQUID <input type="checkbox"/> c. GAS	LARGEST CONTAINER <span style="float:right">215</span> 330 gal
--	---

FED HAZARD CATEGORIES (Check all that apply) <span style="float:right">216</span> <input type="checkbox"/> a. FIRE <input checked="" type="checkbox"/> b. REACTIVE <input type="checkbox"/> c. PRESSURE RELEASE <input checked="" type="checkbox"/> d. ACUTE HEALTH <input type="checkbox"/> e. CHRONIC HEALTH
---

AVERAGE DAILY AMOUNT <span style="float:right">217</span> 450	MAXIMUM DAILY AMOUNT <span style="float:right">218</span> 660	ANNUAL WASTE AMOUNT <span style="float:right">219</span>	STATE WASTE CODE <span style="float:right">220</span>
--	--	--	---

UNITS* (Check one item only) <span style="float:right">221</span> <input checked="" type="checkbox"/> a. GALLONS <input type="checkbox"/> b. CUBIC FEET <input type="checkbox"/> c. POUNDS <input type="checkbox"/> d. TONS <small>* If EHS, amount must be in pounds.</small>	DAYS ON SITE: <span style="float:right">222</span> 365
--	---

STORAGE CONTAINER <span style="float:right">223</span> <input checked="" type="checkbox"/> a. ABOVE GROUND TANK <input type="checkbox"/> e. PLASTIC/NONMETALLIC DRUM <input type="checkbox"/> i. FIBER DRUM <input type="checkbox"/> m. GLASS BOTTLE <input type="checkbox"/> q. RAIL CAR <input type="checkbox"/> b. UNDERGROUND TANK <input type="checkbox"/> f. CAN <input type="checkbox"/> j. BAG <input type="checkbox"/> n. PLASTIC BOTTLE <input type="checkbox"/> r. OTHER <input type="checkbox"/> c. TANK INSIDE BUILDING <input type="checkbox"/> g. CARBOY <input type="checkbox"/> k. BOX <input checked="" type="checkbox"/> o. TOTE BIN <input type="checkbox"/> d. STEEL DRUM <input type="checkbox"/> h. SILO <input type="checkbox"/> l. CYLINDER <input type="checkbox"/> p. TANK WAGON
---

STORAGE PRESSURE <span style="float:right">224</span> <input checked="" type="checkbox"/> a. AMBIENT <input type="checkbox"/> b. ABOVE AMBIENT <input type="checkbox"/> c. BELOW AMBIENT
---

STORAGE TEMPERATURE <span style="float:right">225</span> <input checked="" type="checkbox"/> a. AMBIENT <input type="checkbox"/> b. ABOVE AMBIENT <input type="checkbox"/> c. BELOW AMBIENT <input type="checkbox"/> d. CRYOGENIC
--

%WT	HAZARDOUS COMPONENT (For mixture or waste only)	EHS	CAS #
1 65 <span style="float:right">226</span>	Phosphoric Acid <span style="float:right">227</span>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <span style="float:right">228</span>	7664-38-2 <span style="float:right">229</span>
2 <span style="float:right">230</span>	<span style="float:right">231</span>	<input type="checkbox"/> Yes <input type="checkbox"/> No <span style="float:right">232</span>	<span style="float:right">233</span>
3 <span style="float:right">234</span>	<span style="float:right">235</span>	<input type="checkbox"/> Yes <input type="checkbox"/> No <span style="float:right">236</span>	<span style="float:right">237</span>
4 <span style="float:right">238</span>	<span style="float:right">239</span>	<input type="checkbox"/> Yes <input type="checkbox"/> No <span style="float:right">240</span>	<span style="float:right">241</span>
5 <span style="float:right">242</span>	<span style="float:right">243</span>	<input type="checkbox"/> Yes <input type="checkbox"/> No <span style="float:right">244</span>	<span style="float:right">245</span>

If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or > 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.

ADDITIONAL LOCALLY COLLECTED INFORMATION 246

## San Bernardino County Fire Department • Hazardous Materials Division HAZARDOUS MATERIALS INVENTORY – CHEMICAL DESCRIPTION

MATERIAL

WASTE

Page 13 of 29

### I. FACILITY INFORMATION

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3

**Mojave Solar Project LLC**

FACILITY ID #	F	A									MAP#	203	GRID#	204
											1-A		E35, F31, C22	

### II. CHEMICAL INFORMATION

CHEMICAL NAME <span style="float: right;">205</span> <b>Sodium Bisulfite – 38%</b>	TRADE SECRET <span style="float: right;">206</span> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <small>If Subject to EPCRA, refer to instructions</small>
---	---

COMMON NAME <span style="float: right;">207 <b>Sodium Bisulfite</b></span>	EHS* <span style="float: right;">208</span> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
--	--

CAS# 7631-90-5 <span style="float: right;">209</span>	*If EHS is "Yes", all amounts below must be in lbs.
---	---

HAZARDOUS MATERIAL TYPE (Check one item only) <span style="float: right;">211</span> <input type="checkbox"/> a. PURE <input checked="" type="checkbox"/> b. MIXTURE <input type="checkbox"/> c. WASTE	RADIOACTIVE <span style="float: right;">212</span> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	CURIES <span style="float: right;">213</span>
---	---	---

PHYSICAL STATE (Check one item only) <span style="float: right;">214</span> <input type="checkbox"/> a. SOLID <input checked="" type="checkbox"/> b. LIQUID <input type="checkbox"/> c. GAS	LARGEST CONTAINER <span style="float: right;">215</span> 330
--	---

FED HAZARD CATEGORIES (Check all that apply) <span style="float: right;">216</span> <input type="checkbox"/> a. FIRE <input type="checkbox"/> b. REACTIVE <input type="checkbox"/> c. PRESSURE RELEASE <input type="checkbox"/> d. ACUTE HEALTH <input checked="" type="checkbox"/> e. CHRONIC HEALTH
--

AVERAGE DAILY AMOUNT <span style="float: right;">217</span> 400	MAXIMUM DAILY AMOUNT <span style="float: right;">218</span> 660	ANNUAL WASTE AMOUNT <span style="float: right;">219</span>	STATE WASTE CODE <span style="float: right;">220</span>
--	--	--	---

UNITS* (Check one item only) <span style="float: right;">221</span> <input checked="" type="checkbox"/> a. GALLONS <input type="checkbox"/> b. CUBIC FEET <input type="checkbox"/> c. POUNDS <input type="checkbox"/> d. TONS <small>* If EHS, amount must be in pounds.</small>	DAYS ON SITE: <span style="float: right;">222</span> 365
--	---

STORAGE CONTAINER (Check all that apply) <span style="float: right;">223</span> <input checked="" type="checkbox"/> a. ABOVE GROUND TANK <input type="checkbox"/> e. PLASTIC/NONMETALLIC DRUM <input type="checkbox"/> i. FIBER DRUM <input type="checkbox"/> m. GLASS BOTTLE <input type="checkbox"/> q. RAIL CAR <input type="checkbox"/> b. UNDERGROUND TANK <input type="checkbox"/> f. CAN <input type="checkbox"/> j. BAG <input type="checkbox"/> n. PLASTIC BOTTLE <input type="checkbox"/> r. OTHER <input type="checkbox"/> c. TANK INSIDE BUILDING <input type="checkbox"/> g. CARBOY <input type="checkbox"/> k. BOX <input type="checkbox"/> o. TOTE BIN <input type="checkbox"/> d. STEEL DRUM <input type="checkbox"/> h. SILO <input type="checkbox"/> l. CYLINDER <input type="checkbox"/> p. TANK WAGON
---

STORAGE PRESSURE <span style="float: right;">224</span> <input checked="" type="checkbox"/> a. AMBIENT <input type="checkbox"/> b. ABOVE AMBIENT <input type="checkbox"/> c. BELOW AMBIENT
---

STORAGE TEMPERATURE <span style="float: right;">225</span> <input checked="" type="checkbox"/> a. AMBIENT <input type="checkbox"/> b. ABOVE AMBIENT <input type="checkbox"/> c. BELOW AMBIENT <input type="checkbox"/> d. CRYOGENIC
--

%WT	HAZARDOUS COMPONENT (For mixture or waste only)	EHS	CAS #
1 38 <span style="float: right;">226</span>	Sodium Bisulfite <span style="float: right;">227</span>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <span style="float: right;">228</span>	7631-90-5 <span style="float: right;">229</span>
2 <span style="float: right;">230</span>	<span style="float: right;">231</span>	<input type="checkbox"/> Yes <input type="checkbox"/> No <span style="float: right;">232</span>	<span style="float: right;">233</span>
3 <span style="float: right;">234</span>	<span style="float: right;">235</span>	<input type="checkbox"/> Yes <input type="checkbox"/> No <span style="float: right;">236</span>	<span style="float: right;">237</span>
4 <span style="float: right;">238</span>	<span style="float: right;">239</span>	<input type="checkbox"/> Yes <input type="checkbox"/> No <span style="float: right;">240</span>	<span style="float: right;">241</span>
5 <span style="float: right;">242</span>	<span style="float: right;">243</span>	<input type="checkbox"/> Yes <input type="checkbox"/> No <span style="float: right;">244</span>	<span style="float: right;">245</span>

If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or > 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.

ADDITIONAL LOCALLY COLLECTED INFORMATION 246

If EPCRA, Please Sign Here





**San Bernardino County Fire Department • Hazardous Materials Division  
HAZARDOUS MATERIALS INVENTORY – CHEMICAL DESCRIPTION**

MATERIAL

WASTE

Page 16 of 29

**I. FACILITY INFORMATION**

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3

**Mojave Solar Project LLC**

FACILITY ID #	F	A										MAP#	203	GRID#	204
												1-A		E35, F31, C22	

**II. CHEMICAL INFORMATION**

CHEMICAL NAME <span style="float:right">205</span> <b>Calcium Hydroxide - Slaked Lime</b>	TRADE SECRET <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <span style="float:right">206</span> <small>If Subject to EPCRA, refer to instructions</small>
--	--

COMMON NAME <span style="float:right">207</span> <b>Lime</b>	EHS* <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <span style="float:right">208</span>
---	---

CAS# 1305-62-0 <span style="float:right">209</span>	*If EHS is "Yes", all amounts below must be in lbs.
---	---

HAZARDOUS MATERIAL TYPE (Check one item only) <span style="float:right">211</span> <input type="checkbox"/> a. PURE <input checked="" type="checkbox"/> b. MIXTURE <input type="checkbox"/> c. WASTE	RADIOACTIVE <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <span style="float:right">212</span>	CURIES <span style="float:right">213</span>
---	--	---

PHYSICAL STATE (Check one item only) <span style="float:right">214</span> <input checked="" type="checkbox"/> a. SOLID <input type="checkbox"/> b. LIQUID <input type="checkbox"/> c. GAS	LARGEST CONTAINER 21664 gallon silo <span style="float:right">215</span>
--	--

FED HAZARD CATEGORIES (Check all that apply) <span style="float:right">216</span> <input type="checkbox"/> a. FIRE <input type="checkbox"/> b. REACTIVE <input type="checkbox"/> c. PRESSURE RELEASE <input type="checkbox"/> d. ACUTE HEALTH <input type="checkbox"/> e. CHRONIC HEALTH
---

AVERAGE DAILY AMOUNT <span style="float:right">217</span> <b>35000</b>	MAXIMUM DAILY AMOUNT <span style="float:right">218</span> <b>43328</b>	ANNUAL WASTE AMOUNT <span style="float:right">219</span>	STATE WASTE CODE <span style="float:right">220</span>
---	---	--	---

UNITS* (Check one item only) <span style="float:right">221</span> <input type="checkbox"/> a. GALLONS <input type="checkbox"/> b. CUBIC FEET <input checked="" type="checkbox"/> c. POUNDS <input type="checkbox"/> d. TONS <small>* If EHS, amount must be in pounds.</small>	DAYS ON SITE: <span style="float:right">222</span> <b>365</b>
--	--

STORAGE CONTAINER (Check all that apply) <span style="float:right">223</span> <input type="checkbox"/> a. ABOVE GROUND TANK <input type="checkbox"/> e. PLASTIC/NONMETALLIC DRUM <input type="checkbox"/> i. FIBER DRUM <input type="checkbox"/> m. GLASS BOTTLE <input type="checkbox"/> q. RAIL CAR <input type="checkbox"/> b. UNDERGROUND TANK <input type="checkbox"/> f. CAN <input type="checkbox"/> j. BAG <input type="checkbox"/> n. PLASTIC BOTTLE <input checked="" type="checkbox"/> r. OTHER <input type="checkbox"/> c. TANK INSIDE BUILDING <input type="checkbox"/> g. CARBOY <input type="checkbox"/> k. BOX <input type="checkbox"/> o. TOTE BIN <input type="checkbox"/> d. STEEL DRUM <input checked="" type="checkbox"/> h. SILO <input type="checkbox"/> l. CYLINDER <input type="checkbox"/> p. TANK WAGON
--

STORAGE PRESSURE <input checked="" type="checkbox"/> a. AMBIENT <input type="checkbox"/> b. ABOVE AMBIENT <input type="checkbox"/> c. BELOW AMBIENT <span style="float:right">224</span>
--

STORAGE TEMPERATURE <input checked="" type="checkbox"/> a. AMBIENT <input type="checkbox"/> b. ABOVE AMBIENT <input type="checkbox"/> c. BELOW AMBIENT <input type="checkbox"/> d. CRYOGENIC <span style="float:right">225</span>
---

%WT	HAZARDOUS COMPONENT (For mixture or waste only)	EHS	CAS #
1 <span style="float:right">226</span>	Slaked Lime <span style="float:right">227</span>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <span style="float:right">228</span>	1305-62-0 <span style="float:right">229</span>
2 <span style="float:right">230</span>	<span style="float:right">231</span>	<input type="checkbox"/> Yes <input type="checkbox"/> No <span style="float:right">232</span>	<span style="float:right">233</span>
3 <span style="float:right">234</span>	<span style="float:right">235</span>	<input type="checkbox"/> Yes <input type="checkbox"/> No <span style="float:right">236</span>	<span style="float:right">237</span>
4 <span style="float:right">238</span>	<span style="float:right">239</span>	<input type="checkbox"/> Yes <input type="checkbox"/> No <span style="float:right">240</span>	<span style="float:right">241</span>
5 <span style="float:right">242</span>	<span style="float:right">243</span>	<input type="checkbox"/> Yes <input type="checkbox"/> No <span style="float:right">244</span>	<span style="float:right">245</span>

If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or > 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.

ADDITIONAL LOCALLY COLLECTED INFORMATION 246

If EPCRA, Please Sign Here

**San Bernardino County Fire Department • Hazardous Materials Division  
HAZARDOUS MATERIALS INVENTORY – CHEMICAL DESCRIPTION**

MATERIAL

WASTE

Page 17 of 29

**I. FACILITY INFORMATION**

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3

**Mojave Solar Project LLC**

FACILITY ID #	F	A									1	MAP#	203	GRID#	204
												1-A		E35, F31, C22	

**II. CHEMICAL INFORMATION**

CHEMICAL NAME <span style="float:right">205</span> 95% Sodium Carbonate	TRADE SECRET <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <span style="float:right">206</span> <small>If Subject to EPCRA, refer to instructions</small>
--	--

COMMON NAME <span style="float:right">207</span> Soda Ash	EHS* <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <span style="float:right">208</span>
--	---

CAS# 16482-55-6 <span style="float:right">209</span>	*If EHS is "Yes", all amounts below must be in lbs.
--	---

HAZARDOUS MATERIAL TYPE (Check one item only) <span style="float:right">211</span> <input type="checkbox"/> a. PURE <input checked="" type="checkbox"/> b. MIXTURE <input type="checkbox"/> c. WASTE	RADIOACTIVE <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <span style="float:right">212</span>	CURIES <span style="float:right">213</span>
---	--	---

PHYSICAL STATE (Check one item only) <span style="float:right">214</span> <input checked="" type="checkbox"/> a. SOLID <input type="checkbox"/> b. LIQUID <input type="checkbox"/> c. GAS	LARGEST CONTAINER 7660 gallon silo <span style="float:right">215</span>
--	---

FED HAZARD CATEGORIES (Check all that apply) <span style="float:right">216</span> <input type="checkbox"/> a. FIRE <input type="checkbox"/> b. REACTIVE <input type="checkbox"/> c. PRESSURE RELEASE <input type="checkbox"/> d. ACUTE HEALTH <input type="checkbox"/> e. CHRONIC HEALTH
---

AVERAGE DAILY AMOUNT <span style="float:right">217</span> 10000	MAXIMUM DAILY AMOUNT <span style="float:right">218</span> 15320	ANNUAL WASTE AMOUNT <span style="float:right">219</span>	STATE WASTE CODE <span style="float:right">220</span>
--	--	--	---

UNITS* (Check one item only) <span style="float:right">221</span> <input checked="" type="checkbox"/> a. GALLONS <input type="checkbox"/> b. CUBIC FEET <input type="checkbox"/> c. POUNDS <input type="checkbox"/> d. TONS <small>* If EHS, amount must be in pounds.</small>	DAYS ON SITE: <span style="float:right">222</span> 365
--	---

STORAGE CONTAINER <span style="float:right">223</span> <input type="checkbox"/> a. ABOVE GROUND TANK <input type="checkbox"/> e. PLASTIC/NONMETALLIC DRUM <input type="checkbox"/> i. FIBER DRUM <input type="checkbox"/> m. GLASS BOTTLE <input type="checkbox"/> q. RAIL CAR <input type="checkbox"/> b. UNDERGROUND TANK <input type="checkbox"/> f. CAN <input type="checkbox"/> j. BAG <input type="checkbox"/> n. PLASTIC BOTTLE <input checked="" type="checkbox"/> r. OTHER <input type="checkbox"/> c. TANK INSIDE BUILDING <input type="checkbox"/> g. CARBOY <input type="checkbox"/> k. BOX <input type="checkbox"/> o. TOTE BIN <input type="checkbox"/> d. STEEL DRUM <input checked="" type="checkbox"/> h. SILO <input type="checkbox"/> l. CYLINDER <input type="checkbox"/> p. TANK WAGON
---

STORAGE PRESSURE <input checked="" type="checkbox"/> a. AMBIENT <input type="checkbox"/> b. ABOVE AMBIENT <input type="checkbox"/> c. BELOW AMBIENT <span style="float:right">224</span>
--

STORAGE TEMPERATURE <input checked="" type="checkbox"/> a. AMBIENT <input type="checkbox"/> b. ABOVE AMBIENT <input type="checkbox"/> c. BELOW AMBIENT <input type="checkbox"/> d. CRYOGENIC <span style="float:right">225</span>
---

#	%WT	HAZARDOUS COMPONENT (For mixture or waste only)	EHS	CAS #
1	95	Sodium Carbonate	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	16482-55-6
2			<input type="checkbox"/> Yes <input type="checkbox"/> No	
3			<input type="checkbox"/> Yes <input type="checkbox"/> No	
4			<input type="checkbox"/> Yes <input type="checkbox"/> No	
5			<input type="checkbox"/> Yes <input type="checkbox"/> No	

If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or > 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.

ADDITIONAL LOCALLY COLLECTED INFORMATION 246

If EPCRA, Please Sign Here

**San Bernardino County Fire Department • Hazardous Materials Division  
HAZARDOUS MATERIALS INVENTORY – CHEMICAL DESCRIPTION**
 MATERIAL

 WASTE

Page \_18\_ of \_29\_

**I. FACILITY INFORMATION**

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As)

3

**Mojave Solar Project LLC**

FACILITY ID #

F

A

1

MAP#

203

GRID#

204

1-A

E35, F31, C22

**II. CHEMICAL INFORMATION**

CHEMICAL NAME

205

**Anionic Flocculant**

TRADE SECRET

 Yes

 No

206

If Subject to EPCRA, refer to instructions

COMMON NAME

207

**Flocculant**

EHS\*

 Yes

 No

208

CAS#

209

\*If EHS is "Yes", all amounts below must be in lbs.

HAZARDOUS MATERIAL TYPE (Check one item only)

 a. PURE

 b. MIXTURE

 c. WASTE

211

RADIOACTIVE

 Yes

 No

212

CURIES

213

PHYSICAL STATE (Check one item only)

 a. SOLID

 b. LIQUID

 c. GAS

214

LARGEST CONTAINER

330 gal

215

FED HAZARD CATEGORIES (Check all that apply)

 a. FIRE

 b. REACTIVE

 c. PRESSURE RELEASE

 d. ACUTE HEALTH

 e. CHRONIC HEALTH

216

AVERAGE DAILY AMOUNT

217

450

MAXIMUM DAILY AMOUNT

218

660

ANNUAL WASTE AMOUNT

219

STATE WASTE CODE

220

UNITS\*

 a. GALLONS

 b. CUBIC FEET

 c. POUNDS

 d. TONS

221

DAYS ON SITE:

365

222

STORAGE CONTAINER

 a. ABOVE GROUND TANK

 e. PLASTIC/NONMETALLIC DRUM

 i. FIBER DRUM

 m. GLASS BOTTLE

 q. RAIL CAR

 b. UNDERGROUND TANK

 f. CAN

 j. BAG

 n. PLASTIC BOTTLE

 r. OTHER

 c. TANK INSIDE BUILDING

 g. CARBOY

 k. BOX

 o. TOTE BIN

 d. STEEL DRUM

 h. SILO

 l. CYLINDER

 p. TANK WAGON

223

STORAGE PRESSURE

 a. AMBIENT

 b. ABOVE AMBIENT

 c. BELOW AMBIENT

224

STORAGE TEMPERATURE

 a. AMBIENT

 b. ABOVE AMBIENT

 c. BELOW AMBIENT

 d. CRYOGENIC

225

%WT

HAZARDOUS COMPONENT (For mixture or waste only)

EHS

CAS #

1

226

**Anionic Flocculant**

227

 Yes

 No

228

229

2

230

231

 Yes

 No

232

233

3

234

235

 Yes

 No

236

237

4

238

239

 Yes

 No

240

241

5

242

243

 Yes

 No

244

245

If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or &gt; 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.

ADDITIONAL LOCALLY COLLECTED INFORMATION

246

If EPCRA, Please Sign Here

**San Bernardino County Fire Department • Hazardous Materials Division  
HAZARDOUS MATERIALS INVENTORY – CHEMICAL DESCRIPTION**

MATERIAL

WASTE

Page 19 of 29

**I. FACILITY INFORMATION**

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3  
**Mojave Solar Project LLC**

FACILITY ID #	F	A														1	MAP#	203	GRID#	204
																		1-A	E35, F31, C22	

**II. CHEMICAL INFORMATION**

CHEMICAL NAME <span style="float:right">205</span> Ferric Chloride – 40%	TRADE SECRET <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <span style="float:right">206</span> <small>If Subject to EPCRA, refer to instructions</small>
---	--

COMMON NAME <span style="float:right">207</span> Ferric Chloride	EHS* <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <span style="float:right">208</span>
---	---

CAS# 7705-08-0 <span style="float:right">209</span>	*If EHS is "Yes", all amounts below must be in lbs.
---	---

HAZARDOUS MATERIAL TYPE (Check one item only) <span style="float:right">211</span> <input type="checkbox"/> a. PURE <input checked="" type="checkbox"/> b. MIXTURE <input type="checkbox"/> c. WASTE	RADIOACTIVE <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <span style="float:right">212</span>	CURIES <span style="float:right">213</span>
---	--	---

PHYSICAL STATE (Check one item only) <span style="float:right">214</span> <input type="checkbox"/> a. SOLID <input checked="" type="checkbox"/> b. LIQUID <input type="checkbox"/> c. GAS	LARGEST CONTAINER 330 gal <span style="float:right">215</span>
--	--

FED HAZARD CATEGORIES (Check all that apply) <span style="float:right">216</span> <input type="checkbox"/> a. FIRE <input type="checkbox"/> b. REACTIVE <input type="checkbox"/> c. PRESSURE RELEASE <input type="checkbox"/> d. ACUTE HEALTH <input checked="" type="checkbox"/> e. CHRONIC HEALTH
--

AVERAGE DAILY AMOUNT <span style="float:right">217</span> 450	MAXIMUM DAILY AMOUNT <span style="float:right">218</span> 660	ANNUAL WASTE AMOUNT <span style="float:right">219</span>	STATE WASTE CODE <span style="float:right">220</span>
--	--	--	---

UNITS* (Check one item only) <span style="float:right">221</span> <input checked="" type="checkbox"/> a. GALLONS <input type="checkbox"/> b. CUBIC FEET <input type="checkbox"/> c. POUNDS <input type="checkbox"/> d. TONS <small>* If EHS, amount must be in pounds.</small>	DAYS ON SITE: 365 <span style="float:right">222</span>
--	---

STORAGE CONTAINER <span style="float:right">223</span> <input type="checkbox"/> a. ABOVE GROUND TANK <input type="checkbox"/> e. PLASTIC/NONMETALLIC DRUM <input type="checkbox"/> i. FIBER DRUM <input type="checkbox"/> m. GLASS BOTTLE <input type="checkbox"/> q. RAIL CAR <input type="checkbox"/> b. UNDERGROUND TANK <input type="checkbox"/> f. CAN <input type="checkbox"/> j. BAG <input type="checkbox"/> n. PLASTIC BOTTLE <input type="checkbox"/> r. OTHER <input type="checkbox"/> c. TANK INSIDE BUILDING <input type="checkbox"/> g. CARBOY <input type="checkbox"/> k. BOX <input checked="" type="checkbox"/> o. TOTE BIN <input type="checkbox"/> d. STEEL DRUM <input type="checkbox"/> h. SILO <input type="checkbox"/> l. CYLINDER <input type="checkbox"/> p. TANK WAGON
--

STORAGE PRESSURE <input checked="" type="checkbox"/> a. AMBIENT <input type="checkbox"/> b. ABOVE AMBIENT <input type="checkbox"/> c. BELOW AMBIENT <span style="float:right">224</span>
--

STORAGE TEMPERATURE <input checked="" type="checkbox"/> a. AMBIENT <input type="checkbox"/> b. ABOVE AMBIENT <input type="checkbox"/> c. BELOW AMBIENT <input type="checkbox"/> d. CRYOGENIC <span style="float:right">225</span>
---

%WT	HAZARDOUS COMPONENT (For mixture or waste only)	EHS	CAS #
1 40 <span style="float:right">226</span>	Ferric Chloride <span style="float:right">227</span>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <span style="float:right">228</span>	7705-08-0 <span style="float:right">229</span>
2 <span style="float:right">230</span>	<span style="float:right">231</span>	<input type="checkbox"/> Yes <input type="checkbox"/> No <span style="float:right">232</span>	<span style="float:right">233</span>
3 <span style="float:right">234</span>	<span style="float:right">235</span>	<input type="checkbox"/> Yes <input type="checkbox"/> No <span style="float:right">236</span>	<span style="float:right">237</span>
4 <span style="float:right">238</span>	<span style="float:right">239</span>	<input type="checkbox"/> Yes <input type="checkbox"/> No <span style="float:right">240</span>	<span style="float:right">241</span>
5 <span style="float:right">242</span>	<span style="float:right">243</span>	<input type="checkbox"/> Yes <input type="checkbox"/> No <span style="float:right">244</span>	<span style="float:right">245</span>

If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or > 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.

ADDITIONAL LOCALLY COLLECTED INFORMATION 246

If EPCRA, Please Sign Here

**San Bernardino County Fire Department • Hazardous Materials Division  
HAZARDOUS MATERIALS INVENTORY – CHEMICAL DESCRIPTION**

MATERIAL

WASTE

Page 20 of 29

**I. FACILITY INFORMATION**

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As)

3

**Mojave Solar Project LLC**

FACILITY ID #

F

A

MAP#

203

GRID#

204

1-A

E35, F31, C22

**II. CHEMICAL INFORMATION**

CHEMICAL NAME

205

Sodium Bisulfite – 35%

TRADE SECRET

Yes  No

206

If Subject to EPCRA, refer to instructions

COMMON NAME

207

Sodium Bisulfite

EHS\*

Yes  No

208

CAS# 7631-90-5

209

\*If EHS is "Yes", all amounts below must be in lbs.

HAZARDOUS MATERIAL TYPE (Check one item only)

a. PURE  b. MIXTURE  c. WASTE

211

RADIOACTIVE

Yes  No

212

CURIES

213

PHYSICAL STATE (Check one item only)

a. SOLID  b. LIQUID  c. GAS

214

LARGEST CONTAINER 330 gallon

215

FED HAZARD CATEGORIES (Check all that apply)

a. FIRE  b. REACTIVE  c. PRESSURE RELEASE  d. ACUTE HEALTH  e. CHRONIC HEALTH

216

AVERAGE DAILY AMOUNT

217

450

MAXIMUM DAILY AMOUNT

218

660

ANNUAL WASTE AMOUNT

219

STATE WASTE CODE

220

UNITS\* (Check one item only)

a. GALLONS  b. CUBIC FEET  c. POUNDS  d. TONS

221

DAYS ON SITE:

365

222

STORAGE CONTAINER

a. ABOVE GROUND TANK  e. PLASTIC/NONMETALLIC DRUM  i. FIBER DRUM  m. GLASS BOTTLE  q. RAIL CAR  
 b. UNDERGROUND TANK  f. CAN  j. BAG  n. PLASTIC BOTTLE  r. OTHER  
 c. TANK INSIDE BUILDING  g. CARBOY  k. BOX  o. TOTE BIN  
 d. STEEL DRUM  h. SILO  l. CYLINDER  p. TANK WAGON

223

STORAGE PRESSURE

a. AMBIENT  b. ABOVE AMBIENT  c. BELOW AMBIENT

224

STORAGE TEMPERATURE

a. AMBIENT  b. ABOVE AMBIENT  c. BELOW AMBIENT  d. CRYOGENIC

225

%WT

HAZARDOUS COMPONENT (For mixture or waste only)

EHS

CAS #

1 35 226

Sodium Bisulfite

227

Yes  No

228

7631-90-5

229

2 230

231

Yes  No

232

233

3 234

235

Yes  No

236

237

4 238

239

Yes  No

240

241

5 242

243

Yes  No

244

245

If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or > 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.

ADDITIONAL LOCALLY COLLECTED INFORMATION

246

If EPCRA, Please Sign Here

## San Bernardino County Fire Department • Hazardous Materials Division HAZARDOUS MATERIALS INVENTORY – CHEMICAL DESCRIPTION

MATERIAL

WASTE

Page 21 of 29

### I. FACILITY INFORMATION

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3

**Mojave Solar Project LLC**

FACILITY ID #	F	A										MAP#	203	GRID#	204
												1-A		E35, F31, C22	

### II. CHEMICAL INFORMATION

CHEMICAL NAME <span style="float: right;">205</span> <b>Phosphoric Acid</b>	TRADE SECRET <span style="float: right;">206</span> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <small>If Subject to EPCRA, refer to instructions</small>
--	---

COMMON NAME <span style="float: right;">207</span> <b>Phosphoric Acid</b>	EHS* <span style="float: right;">208</span> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
--	--

CAS#7664-38-2 <span style="float: right;">209</span>	*If EHS is "Yes", all amounts below must be in lbs.
--	---

HAZARDOUS MATERIAL TYPE (Check one item only) <span style="float: right;">211</span> <input type="checkbox"/> a. PURE <input checked="" type="checkbox"/> b. MIXTURE <input type="checkbox"/> c. WASTE	RADIOACTIVE <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <span style="float: right;">212</span>	CURIES <span style="float: right;">213</span>
---	--	---

PHYSICAL STATE (Check one item only) <span style="float: right;">214</span> <input type="checkbox"/> a. SOLID <input checked="" type="checkbox"/> b. LIQUID <input type="checkbox"/> c. GAS	LARGEST CONTAINER <b>330 gallon</b> <span style="float: right;">215</span>
--	--

FED HAZARD CATEGORIES (Check all that apply) <span style="float: right;">216</span> <input type="checkbox"/> a. FIRE <input checked="" type="checkbox"/> b. REACTIVE <input type="checkbox"/> c. PRESSURE RELEASE <input checked="" type="checkbox"/> d. ACUTE HEALTH <input checked="" type="checkbox"/> e. CHRONIC HEALTH
--

AVERAGE DAILY AMOUNT <span style="float: right;">217</span> <b>330</b>	MAXIMUM DAILY AMOUNT <span style="float: right;">218</span> <b>660</b>	ANNUAL WASTE AMOUNT <span style="float: right;">219</span>	STATE WASTE CODE <span style="float: right;">220</span>
---	---	--	---

UNITS* (Check one item only) <span style="float: right;">221</span> <input checked="" type="checkbox"/> a. GALLONS <input type="checkbox"/> b. CUBIC FEET <input type="checkbox"/> c. POUNDS <input type="checkbox"/> d. TONS <small>* If EHS, amount must be in pounds.</small>	DAYS ON SITE: <b>365</b> <span style="float: right;">222</span>
--	---

STORAGE CONTAINER	<input type="checkbox"/> a. ABOVE GROUND TANK	<input type="checkbox"/> e. PLASTIC/NONMETALLIC DRUM	<input type="checkbox"/> i. FIBER DRUM	<input type="checkbox"/> m. GLASS BOTTLE	<input type="checkbox"/> q. RAIL CAR
	<input type="checkbox"/> b. UNDERGROUND TANK	<input type="checkbox"/> f. CAN	<input type="checkbox"/> j. BAG	<input type="checkbox"/> n. PLASTIC BOTTLE	<input type="checkbox"/> r. OTHER
	<input type="checkbox"/> c. TANK INSIDE BUILDING	<input type="checkbox"/> g. CARBOY	<input type="checkbox"/> k. BOX	<input checked="" type="checkbox"/> o. TOTE BIN	
	<input type="checkbox"/> d. STEEL DRUM	<input type="checkbox"/> h. SILO	<input type="checkbox"/> l. CYLINDER	<input type="checkbox"/> p. TANK WAGON	223

STORAGE PRESSURE <input checked="" type="checkbox"/> a. AMBIENT <input type="checkbox"/> b. ABOVE AMBIENT <input type="checkbox"/> c. BELOW AMBIENT <span style="float: right;">224</span>
--

STORAGE TEMPERATURE <input checked="" type="checkbox"/> a. AMBIENT <input type="checkbox"/> b. ABOVE AMBIENT <input type="checkbox"/> c. BELOW AMBIENT <input type="checkbox"/> d. CRYOGENIC <span style="float: right;">225</span>
---

#	%WT	HAZARDOUS COMPONENT (For mixture or waste only)	EHS	CAS #
1	226	Phosphoric Acid <span style="float: right;">227</span>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <span style="float: right;">228</span>	7664-38-2 <span style="float: right;">229</span>
2	230		<input type="checkbox"/> Yes <input type="checkbox"/> No <span style="float: right;">232</span>	233
3	234		<input type="checkbox"/> Yes <input type="checkbox"/> No <span style="float: right;">236</span>	237
4	238		<input type="checkbox"/> Yes <input type="checkbox"/> No <span style="float: right;">240</span>	241
5	242		<input type="checkbox"/> Yes <input type="checkbox"/> No <span style="float: right;">244</span>	245

If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or > 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information. 246

ADDITIONAL LOCALLY COLLECTED INFORMATION 246

If EPCRA, Please Sign Here

## San Bernardino County Fire Department • Hazardous Materials Division HAZARDOUS MATERIALS INVENTORY – CHEMICAL DESCRIPTION

MATERIAL

WASTE

Page 22 of 29

### I. FACILITY INFORMATION

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3

**Mojave Solar Project LLC**

FACILITY ID #	F	A								MAP#	203	GRID#	204
										1-A		E35, F31, C22	

### II. CHEMICAL INFORMATION

CHEMICAL NAME Liquid Carbon Dioxide	205	TRADE SECRET	206
		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
		<small>If Subject to EPCRA, refer to instructions</small>	

COMMON NAME Liquid CO2	207	EHS*	208
		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

CAS# 124-38-9	209	*If EHS is "Yes", all amounts below must be in lbs.	
---------------	-----	---	--

HAZARDOUS MATERIAL TYPE (Check one item only)	211	RADIOACTIVE	212	CURIES	213
<input checked="" type="checkbox"/> a. PURE <input type="checkbox"/> b. MIXTURE <input type="checkbox"/> c. WASTE		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			

PHYSICAL STATE (Check one item only)	214	LARGEST CONTAINER	215
<input type="checkbox"/> a. SOLID <input checked="" type="checkbox"/> b. LIQUID <input type="checkbox"/> c. GAS		13000 gallon	

FED HAZARD CATEGORIES (Check all that apply)	216			
<input type="checkbox"/> a. FIRE <input type="checkbox"/> b. REACTIVE <input type="checkbox"/> c. PRESSURE RELEASE <input checked="" type="checkbox"/> d. ACUTE HEALTH <input type="checkbox"/> e. CHRONIC HEALTH				

AVERAGE DAILY AMOUNT	217	MAXIMUM DAILY AMOUNT	218	ANNUAL WASTE AMOUNT	219	STATE WASTE CODE	220
20000		26000					

UNITS* (Check one item only)	221	DAYS ON SITE:	222
<input checked="" type="checkbox"/> a. GALLONS <input type="checkbox"/> b. CUBIC FEET <input type="checkbox"/> c. POUNDS <input type="checkbox"/> d. TONS		365	
<small>* If EHS, amount must be in pounds.</small>			

STORAGE CONTAINER	223												
<input checked="" type="checkbox"/> a. ABOVE GROUND TANK		<input type="checkbox"/> e. PLASTIC/NONMETALLIC DRUM	<input type="checkbox"/> i. FIBER DRUM	<input type="checkbox"/> m. GLASS BOTTLE	<input type="checkbox"/> q. RAIL CAR								
<input type="checkbox"/> b. UNDERGROUND TANK		<input type="checkbox"/> f. CAN	<input type="checkbox"/> j. BAG	<input type="checkbox"/> n. PLASTIC BOTTLE	<input type="checkbox"/> r. OTHER								
<input type="checkbox"/> c. TANK INSIDE BUILDING		<input type="checkbox"/> g. CARBOY	<input type="checkbox"/> k. BOX	<input type="checkbox"/> o. TOTE BIN									
<input type="checkbox"/> d. STEEL DRUM		<input type="checkbox"/> h. SILO	<input type="checkbox"/> l. CYLINDER	<input type="checkbox"/> p. TANK WAGON									

STORAGE PRESSURE	224			
<input type="checkbox"/> a. AMBIENT <input checked="" type="checkbox"/> b. ABOVE AMBIENT <input type="checkbox"/> c. BELOW AMBIENT				

STORAGE TEMPERATURE	225			
<input type="checkbox"/> a. AMBIENT <input type="checkbox"/> b. ABOVE AMBIENT <input type="checkbox"/> c. BELOW AMBIENT <input checked="" type="checkbox"/> d. CRYOGENIC				

#	%WT		HAZARDOUS COMPONENT (For mixture or waste only)		EHS		CAS #
1	100	226	Carbon Dioxide	227	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	228	124-38-9
2		230		231	<input type="checkbox"/> Yes <input type="checkbox"/> No	232	
3		234		235	<input type="checkbox"/> Yes <input type="checkbox"/> No	236	
4		238		239	<input type="checkbox"/> Yes <input type="checkbox"/> No	240	
5		242		243	<input type="checkbox"/> Yes <input type="checkbox"/> No	244	

If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or > 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.

ADDITIONAL LOCALLY COLLECTED INFORMATION 246

If EPCRA, Please Sign Here

## San Bernardino County Fire Department • Hazardous Materials Division HAZARDOUS MATERIALS INVENTORY – CHEMICAL DESCRIPTION

MATERIAL

WASTE

Page 23 of 29

### I. FACILITY INFORMATION

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3

**Mojave Solar Project LLC**

FACILITY ID #	F	A										MAP#	203	GRID#	204
												1-A		E35, F31, C22	

### II. CHEMICAL INFORMATION

CHEMICAL NAME <span style="float: right;">205</span> <b>Sodium EDTA</b>	TRADE SECRET <span style="float: right;">206</span> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <small>If Subject to EPCRA, refer to instructions</small>
--	---

COMMON NAME <span style="float: right;">207</span> <b>Sodium EDTA</b>	EHS* <span style="float: right;">208</span> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
--	--

CAS# 8013-51-2 <span style="float: right;">209</span>	*If EHS is "Yes", all amounts below must be in lbs.
---	---

HAZARDOUS MATERIAL TYPE (Check one item only) <span style="float: right;">211</span> <input type="checkbox"/> a. PURE <input checked="" type="checkbox"/> b. MIXTURE <input type="checkbox"/> c. WASTE	RADIOACTIVE <span style="float: right;">212</span> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	CURIES <span style="float: right;">213</span>
---	---	---

PHYSICAL STATE (Check one item only) <span style="float: right;">214</span> <input checked="" type="checkbox"/> a. SOLID <input type="checkbox"/> b. LIQUID <input type="checkbox"/> c. GAS	LARGEST CONTAINER <span style="float: right;">215</span> 100 lb bags
--	---

FED HAZARD CATEGORIES (Check all that apply) <span style="float: right;">216</span> <input type="checkbox"/> a. FIRE <input type="checkbox"/> b. REACTIVE <input type="checkbox"/> c. PRESSURE RELEASE <input type="checkbox"/> d. ACUTE HEALTH <input checked="" type="checkbox"/> e. CHRONIC HEALTH
--

AVERAGE DAILY AMOUNT <span style="float: right;">217</span> <b>350</b>	MAXIMUM DAILY AMOUNT <span style="float: right;">218</span> <b>600</b>	ANNUAL WASTE AMOUNT <span style="float: right;">219</span>	STATE WASTE CODE <span style="float: right;">220</span>
---	---	--	---

UNITS* (Check one item only) <span style="float: right;">221</span> <input type="checkbox"/> a. GALLONS <input type="checkbox"/> b. CUBIC FEET <input type="checkbox"/> c. POUNDS <input type="checkbox"/> d. TONS <small>* If EHS, amount must be in pounds.</small>	DAYS ON SITE: <span style="float: right;">222</span> <b>365</b>
---	--

STORAGE CONTAINER (Check all that apply) <span style="float: right;">223</span> <input type="checkbox"/> a. ABOVE GROUND TANK <input type="checkbox"/> e. PLASTIC/NONMETALLIC DRUM <input type="checkbox"/> i. FIBER DRUM <input type="checkbox"/> m. GLASS BOTTLE <input type="checkbox"/> q. RAIL CAR <input type="checkbox"/> b. UNDERGROUND TANK <input type="checkbox"/> f. CAN <input checked="" type="checkbox"/> j. BAG <input type="checkbox"/> n. PLASTIC BOTTLE <input type="checkbox"/> r. OTHER <input type="checkbox"/> c. TANK INSIDE BUILDING <input type="checkbox"/> g. CARBOY <input type="checkbox"/> k. BOX <input type="checkbox"/> o. TOTE BIN <input type="checkbox"/> d. STEEL DRUM <input type="checkbox"/> h. SILO <input type="checkbox"/> l. CYLINDER <input type="checkbox"/> p. TANK WAGON
---

STORAGE PRESSURE <span style="float: right;">224</span> <input checked="" type="checkbox"/> a. AMBIENT <input type="checkbox"/> b. ABOVE AMBIENT <input type="checkbox"/> c. BELOW AMBIENT
---

STORAGE TEMPERATURE <span style="float: right;">225</span> <input checked="" type="checkbox"/> a. AMBIENT <input type="checkbox"/> b. ABOVE AMBIENT <input type="checkbox"/> c. BELOW AMBIENT <input type="checkbox"/> d. CRYOGENIC
--

%WT	HAZARDOUS COMPONENT (For mixture or waste only)	EHS	CAS #
1 <span style="float: right;">226</span>	Sodium EDTA <span style="float: right;">227</span>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <span style="float: right;">228</span>	8013-51-2 <span style="float: right;">229</span>
2 <span style="float: right;">230</span>	<span style="float: right;">231</span>	<input type="checkbox"/> Yes <input type="checkbox"/> No <span style="float: right;">232</span>	<span style="float: right;">233</span>
3 <span style="float: right;">234</span>	<span style="float: right;">235</span>	<input type="checkbox"/> Yes <input type="checkbox"/> No <span style="float: right;">236</span>	<span style="float: right;">237</span>
4 <span style="float: right;">238</span>	<span style="float: right;">239</span>	<input type="checkbox"/> Yes <input type="checkbox"/> No <span style="float: right;">240</span>	<span style="float: right;">241</span>
5 <span style="float: right;">242</span>	<span style="float: right;">243</span>	<input type="checkbox"/> Yes <input type="checkbox"/> No <span style="float: right;">244</span>	<span style="float: right;">245</span>

If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or > 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.

ADDITIONAL LOCALLY COLLECTED INFORMATION 246

If EPCRA, Please Sign Here



## San Bernardino County Fire Department • Hazardous Materials Division HAZARDOUS MATERIALS INVENTORY – CHEMICAL DESCRIPTION

MATERIAL

WASTE

Page 25 of 29

### I. FACILITY INFORMATION

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3

**Mojave Solar Project LLC**

FACILITY ID #	F	A									MAP#	203	GRID#	204
											1-A		E35, F31, C22	

### II. CHEMICAL INFORMATION

CHEMICAL NAME <span style="float: right;">205</span> <b>Sodium Hydroxide</b>	TRADE SECRET <span style="float: right;">206</span> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <small>If Subject to EPCRA, refer to instructions</small>
---	---

COMMON NAME <span style="float: right;">207</span> <b>Sodium Hydroxide</b>	EHS* <span style="float: right;">208</span> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
---	--

CAS# <span style="float: right;">209</span>	*If EHS is "Yes", all amounts below must be in lbs.
---	---

HAZARDOUS MATERIAL TYPE (Check one item only) <span style="float: right;">211</span> <input type="checkbox"/> a. PURE <input checked="" type="checkbox"/> b. MIXTURE <input type="checkbox"/> c. WASTE	RADIOACTIVE <span style="float: right;">212</span> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	CURIES <span style="float: right;">213</span>
---	---	---

PHYSICAL STATE (Check one item only) <span style="float: right;">214</span> <input type="checkbox"/> a. SOLID <input checked="" type="checkbox"/> b. LIQUID <input type="checkbox"/> c. GAS	LARGEST CONTAINER <b>330 gal</b> <span style="float: right;">215</span>
--	---

FED HAZARD CATEGORIES (Check all that apply) <span style="float: right;">216</span> <input type="checkbox"/> a. FIRE <input checked="" type="checkbox"/> b. REACTIVE <input type="checkbox"/> c. PRESSURE RELEASE <input checked="" type="checkbox"/> d. ACUTE HEALTH <input type="checkbox"/> e. CHRONIC HEALTH
---

AVERAGE DAILY AMOUNT <span style="float: right;">217</span> <b>700</b>	MAXIMUM DAILY AMOUNT <span style="float: right;">218</span> <b>990</b>	ANNUAL WASTE AMOUNT <span style="float: right;">219</span>	STATE WASTE CODE <span style="float: right;">220</span>
---	---	--	---

UNITS* (Check one item only) <span style="float: right;">221</span> <input checked="" type="checkbox"/> a. GALLONS <input type="checkbox"/> b. CUBIC FEET <input type="checkbox"/> c. POUNDS <input type="checkbox"/> d. TONS <small>* If EHS, amount must be in pounds.</small>	DAYS ON SITE: <span style="float: right;">222</span> <b>365</b>
--	--

STORAGE CONTAINER (Check all that apply) <span style="float: right;">223</span> <input checked="" type="checkbox"/> a. ABOVE GROUND TANK <input type="checkbox"/> e. PLASTIC/NONMETALLIC DRUM <input type="checkbox"/> i. FIBER DRUM <input type="checkbox"/> m. GLASS BOTTLE <input type="checkbox"/> q. RAIL CAR <input type="checkbox"/> b. UNDERGROUND TANK <input type="checkbox"/> f. CAN <input type="checkbox"/> j. BAG <input type="checkbox"/> n. PLASTIC BOTTLE <input type="checkbox"/> r. OTHER <input type="checkbox"/> c. TANK INSIDE BUILDING <input type="checkbox"/> g. CARBOY <input type="checkbox"/> k. BOX <input type="checkbox"/> o. TOTE BIN <input type="checkbox"/> d. STEEL DRUM <input type="checkbox"/> h. SILO <input type="checkbox"/> l. CYLINDER <input type="checkbox"/> p. TANK WAGON
---

STORAGE PRESSURE <span style="float: right;">224</span> <input checked="" type="checkbox"/> a. AMBIENT <input type="checkbox"/> b. ABOVE AMBIENT <input type="checkbox"/> c. BELOW AMBIENT
---

STORAGE TEMPERATURE <span style="float: right;">225</span> <input checked="" type="checkbox"/> a. AMBIENT <input type="checkbox"/> b. ABOVE AMBIENT <input type="checkbox"/> c. BELOW AMBIENT <input type="checkbox"/> d. CRYOGENIC
--

#	%WT	226	HAZARDOUS COMPONENT (For mixture or waste only)	227	EHS	228	CAS #	229
1	50		Sodium Hydroxide		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		1310-73-2	
2		230		231	<input type="checkbox"/> Yes <input type="checkbox"/> No	232		233
3		234		235	<input type="checkbox"/> Yes <input type="checkbox"/> No	236		237
4		238		239	<input type="checkbox"/> Yes <input type="checkbox"/> No	240		241
5		242		243	<input type="checkbox"/> Yes <input type="checkbox"/> No	244		245

If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or > 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.

ADDITIONAL LOCALLY COLLECTED INFORMATION 246

If EPCRA, Please Sign Here

**San Bernardino County Fire Department • Hazardous Materials Division  
HAZARDOUS MATERIALS INVENTORY – CHEMICAL DESCRIPTION**

MATERIAL

WASTE

Page 26 of 29

**I. FACILITY INFORMATION**

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As)

3

**Mojave Solar Project LLC**

FACILITY ID #

F A 1

MAP#

203

GRID#

204

1-A

E35, F31, C22

**II. CHEMICAL INFORMATION**

CHEMICAL NAME

205

TRADE SECRET

Yes  No

206

Diphenyl Ether, Biphenyl

If Subject to EPCRA, refer to instructions

COMMON NAME

207

EHS\*

Yes  No

208

Heat Transfer Fluid

CAS# 101-84-8

209

\*If EHS is "Yes", all amounts below must be in lbs.

92-52-4

HAZARDOUS MATERIAL TYPE (Check one item only)

a. PURE  b. MIXTURE  c. WASTE

211

RADIOACTIVE

Yes  No

212

CURIES

213

PHYSICAL STATE (Check one item only)

a. SOLID  b. LIQUID  c. GAS

214

LARGEST CONTAINER 57000 gallon tank

215

FED HAZARD CATEGORIES (Check all that apply)

a. FIRE  b. REACTIVE  c. PRESSURE RELEASE  d. ACUTE HEALTH  e. CHRONIC HEALTH

216

AVERAGE DAILY AMOUNT

217

MAXIMUM DAILY AMOUNT

218

ANNUAL WASTE AMOUNT

219

STATE WASTE CODE

220

2,000,000

2,300,000

UNITS\* (Check one item only)

a. GALLONS  b. CUBIC FEET  c. POUNDS  d. TONS

221

DAYS ON SITE:

365

222

STORAGE CONTAINER

a. ABOVE GROUND TANK  e. PLASTIC/NONMETALLIC DRUM  i. FIBER DRUM  m. GLASS BOTTLE  q. RAIL CAR  
 b. UNDERGROUND TANK  f. CAN  j. BAG  n. PLASTIC BOTTLE  r. OTHER  
 c. TANK INSIDE BUILDING  g. CARBOY  k. BOX  o. TOTE BIN  
 d. STEEL DRUM  h. SILO  l. CYLINDER  p. TANK WAGON

223

STORAGE PRESSURE

a. AMBIENT  b. ABOVE AMBIENT  c. BELOW AMBIENT

224

STORAGE TEMPERATURE

a. AMBIENT  b. ABOVE AMBIENT  c. BELOW AMBIENT  d. CRYOGENIC

225

%WT

HAZARDOUS COMPONENT (For mixture or waste only)

EHS

CAS #

1 73.5

226

Diphenyl Ether

227

Yes  No

228

101-84-8

229

2 26.5

230

Biphenyl

231

Yes  No

232

92-52-4

233

3

234

235

Yes  No

236

237

4

238

239

Yes  No

240

241

5

242

243

Yes  No

244

245

If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or > 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.

ADDITIONAL LOCALLY COLLECTED INFORMATION

246

If EPCRA, Please Sign Here

**San Bernardino County Fire Department • Hazardous Materials Division  
HAZARDOUS MATERIALS INVENTORY – CHEMICAL DESCRIPTION**

MATERIAL

WASTE

Page \_27 of 29\_

**I. FACILITY INFORMATION**

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As)

3

**Mojave Solar Project LLC**

FACILITY ID #

F A 1

MAP#

203

GRID#

204

1-A

E35, F31, C22

**II. CHEMICAL INFORMATION**

CHEMICAL NAME

205

Carbon Dioxide

TRADE SECRET

Yes  No

206

If Subject to EPCRA, refer to instructions

COMMON NAME

207

Carbon Dioxide

EHS\*

Yes  No

208

CAS#

209

\*If EHS is "Yes", all amounts below must be in lbs.

HAZARDOUS MATERIAL TYPE (Check one item only)

a. PURE  b. MIXTURE  c. WASTE

211

RADIOACTIVE

Yes  No

212

CURIES

213

PHYSICAL STATE (Check one item only)

a. SOLID  b. LIQUID  c. GAS

214

LARGEST CONTAINER 196 Cu ft

215

FED HAZARD CATEGORIES (Check all that apply)

a. FIRE  b. REACTIVE  c. PRESSURE RELEASE  d. ACUTE HEALTH  e. CHRONIC HEALTH

216

AVERAGE DAILY AMOUNT

217

4800

MAXIMUM DAILY AMOUNT

218

6272

ANNUAL WASTE AMOUNT

219

STATE WASTE CODE

220

UNITS\* (Check one item only)

a. GALLONS  b. CUBIC FEET  c. POUNDS  d. TONS

221

DAYS ON SITE:

365

222

STORAGE CONTAINER

- a. ABOVE GROUND TANK  e. PLASTIC/NONMETALLIC DRUM  i. FIBER DRUM  m. GLASS BOTTLE  q. RAIL CAR  
 b. UNDERGROUND TANK  f. CAN  j. BAG  n. PLASTIC BOTTLE  r. OTHER  
 c. TANK INSIDE BUILDING  g. CARBOY  k. BOX  o. TOTE BIN  
 d. STEEL DRUM  h. SILO  l. CYLINDER  p. TANK WAGON

223

STORAGE PRESSURE

a. AMBIENT  b. ABOVE AMBIENT  c. BELOW AMBIENT

224

STORAGE TEMPERATURE

a. AMBIENT  b. ABOVE AMBIENT  c. BELOW AMBIENT  d. CRYOGENIC

225

%WT	HAZARDOUS COMPONENT (For mixture or waste only)	EHS	CAS #
1 100 226	Carbon Dioxide 227	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No 228	229
2 230	231	<input type="checkbox"/> Yes <input type="checkbox"/> No 232	233
3 234	235	<input type="checkbox"/> Yes <input type="checkbox"/> No 236	237
4 238	239	<input type="checkbox"/> Yes <input type="checkbox"/> No 240	241
5 242	243	<input type="checkbox"/> Yes <input type="checkbox"/> No 244	245

If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or > 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.

**San Bernardino County Fire Department • Hazardous Materials Division  
HAZARDOUS MATERIALS INVENTORY – CHEMICAL DESCRIPTION**

MATERIAL

WASTE

Page \_28 of 29\_

**I. FACILITY INFORMATION**

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As)

3

**Mojave Solar Project LLC**

FACILITY ID #

F

A

MAP#

203

GRID#

204

1-A

E35, F31, C22

**II. CHEMICAL INFORMATION**

CHEMICAL NAME

205

Hydrogen Gas

TRADE SECRET

Yes  No

206

If Subject to EPCRA, refer to instructions

COMMON NAME

207

Hydrogen Gas

EHS\*

Yes  No

208

CAS# 101-84-8

209

\*If EHS is "Yes", all amounts below must be in lbs.

HAZARDOUS MATERIAL TYPE (Check one item only)

a. PURE  b. MIXTURE  c. WASTE

211

RADIOACTIVE  Yes  No

212

CURIES

213

PHYSICAL STATE (Check one item only)

a. SOLID  b. LIQUID  c. GAS

214

LARGEST CONTAINER 196 Cu ft

215

FED HAZARD CATEGORIES (Check all that apply)

a. FIRE  b. REACTIVE  c. PRESSURE RELEASE  d. ACUTE HEALTH  e. CHRONIC HEALTH

216

AVERAGE DAILY AMOUNT

217

1800

MAXIMUM DAILY AMOUNT

218

3196

ANNUAL WASTE AMOUNT

219

STATE WASTE CODE

220

UNITS\*

(Check one item only)

a. GALLONS  b. CUBIC FEET  c. POUNDS  d. TONS

221

DAYS ON SITE:

365

222

STORAGE CONTAINER

a. ABOVE GROUND TANK  e. PLASTIC/NONMETALLIC DRUM  i. FIBER DRUM  m. GLASS BOTTLE  q. RAIL CAR  
 b. UNDERGROUND TANK  f. CAN  j. BAG  n. PLASTIC BOTTLE  r. OTHER  
 c. TANK INSIDE BUILDING  g. CARBOY  k. BOX  o. TOTE BIN  
 d. STEEL DRUM  h. SILO  l. CYLINDER  p. TANK WAGON

223

STORAGE PRESSURE

a. AMBIENT  b. ABOVE AMBIENT  c. BELOW AMBIENT

224

STORAGE TEMPERATURE

a. AMBIENT  b. ABOVE AMBIENT  c. BELOW AMBIENT  d. CRYOGENIC

225

%WT

HAZARDOUS COMPONENT (For mixture or waste only)

EHS

CAS #

1 100

226

Hydrogen

227

Yes  No

228

229

230

231

Yes  No

232

233

3

234

235

Yes  No

236

237

4

238

239

Yes  No

240

241

5

242

243

Yes  No

244

245

## San Bernardino County Fire Department • Hazardous Materials Division HAZARDOUS MATERIALS INVENTORY – CHEMICAL DESCRIPTION

MATERIAL

WASTE

Page \_29 of 29\_

### I. FACILITY INFORMATION

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3

**Mojave Solar Project LLC**

FACILITY ID #	F	A									MAP#	203	GRID#	204
											1-A		E35, F31, C22	

### II. CHEMICAL INFORMATION

CHEMICAL NAME <span style="float: right;">205</span> <b>Nitrogen</b>	TRADE SECRET <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <span style="float: right;">206</span> <small>If Subject to EPCRA, refer to instructions</small>
---	--

COMMON NAME <span style="float: right;">207</span> <b>Nitrogen</b>	EHS* <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <span style="float: right;">208</span>
---	---

CAS# 101-84-8 <span style="float: right;">209</span>	*If EHS is "Yes", all amounts below must be in lbs.
--	---

HAZARDOUS MATERIAL TYPE (Check one item only) <span style="float: right;">211</span> <input checked="" type="checkbox"/> a. PURE <input type="checkbox"/> b. MIXTURE <input type="checkbox"/> c. WASTE	RADIOACTIVE <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <span style="float: right;">212</span>	CURIES <span style="float: right;">213</span>
---	--	---

PHYSICAL STATE (Check one item only) <span style="float: right;">214</span> <input type="checkbox"/> a. SOLID <input checked="" type="checkbox"/> b. LIQUID <input type="checkbox"/> c. GAS	LARGEST CONTAINER 13000 gallon <span style="float: right;">215</span>
--	---

FED HAZARD CATEGORIES (Check all that apply) 216  
 a. FIRE  b. REACTIVE  c. PRESSURE RELEASE  d. ACUTE HEALTH  e. CHRONIC HEALTH

AVERAGE DAILY AMOUNT <span style="float: right;">217</span> <b>18000</b>	MAXIMUM DAILY AMOUNT <span style="float: right;">218</span> <b>26000</b>	ANNUAL WASTE AMOUNT <span style="float: right;">219</span>	STATE WASTE CODE <span style="float: right;">220</span>
---	---	--	---

UNITS* (Check one item only) <span style="float: right;">221</span> <input checked="" type="checkbox"/> a. GALLONS <input type="checkbox"/> b. CUBIC FEET <input type="checkbox"/> c. POUNDS <input type="checkbox"/> d. TONS <small>* If EHS, amount must be in pounds.</small>	DAYS ON SITE: <span style="float: right;">222</span> <b>365</b>
--	--

STORAGE CONTAINER	<input checked="" type="checkbox"/> a. ABOVE GROUND TANK	<input type="checkbox"/> e. PLASTIC/NONMETALLIC DRUM	<input type="checkbox"/> i. FIBER DRUM	<input type="checkbox"/> m. GLASS BOTTLE	<input type="checkbox"/> q. RAIL CAR
	<input type="checkbox"/> b. UNDERGROUND TANK	<input type="checkbox"/> f. CAN	<input type="checkbox"/> j. BAG	<input type="checkbox"/> n. PLASTIC BOTTLE	<input type="checkbox"/> r. OTHER
	<input type="checkbox"/> c. TANK INSIDE BUILDING	<input type="checkbox"/> g. CARBOY	<input type="checkbox"/> k. BOX	<input type="checkbox"/> o. TOTE BIN	
	<input type="checkbox"/> d. STEEL DRUM	<input type="checkbox"/> h. SILO	<input type="checkbox"/> l. CYLINDER	<input type="checkbox"/> p. TANK WAGON	223

STORAGE PRESSURE	<input type="checkbox"/> a. AMBIENT	<input checked="" type="checkbox"/> b. ABOVE AMBIENT	<input type="checkbox"/> c. BELOW AMBIENT	224
------------------	-------------------------------------	--	---	-----

STORAGE TEMPERATURE	<input type="checkbox"/> a. AMBIENT	<input type="checkbox"/> b. ABOVE AMBIENT	<input type="checkbox"/> c. BELOW AMBIENT	<input checked="" type="checkbox"/> d. CRYOGENIC	225
---------------------	-------------------------------------	---	---	--	-----

%WT		HAZARDOUS COMPONENT (For mixture or waste only)		EHS		CAS #
1	100	Nitrogen	226	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	228	229
			230	<input type="checkbox"/> Yes <input type="checkbox"/> No	232	233
3			234	<input type="checkbox"/> Yes <input type="checkbox"/> No	236	237
4			238	<input type="checkbox"/> Yes <input type="checkbox"/> No	240	241
5			242	<input type="checkbox"/> Yes <input type="checkbox"/> No	244	245

# CALIFORNIA ACCIDENTAL RELEASE PREVENTION PROGRAM (CaIARP) REGISTRATION

Page \_\_\_\_ of \_\_\_\_

FACILITY ID #

**F**

**A**

**1**

## I. FACILITY / STATIONARY SOURCE IDENTIFICATION

STATIONARY SOURCE NAME	2203	PHONE	2204
STATIONARY SOURCE ADDRESS	2205	CITY	2206

## II. OWNER/OPERATOR IDENTIFICATION

OWNER/OPERATOR NAME	2207	PHONE	2208
MAILING ADDRESS	2209	CITY	2210
		STATE	2211
		ZIP CODE	2212

## III. REGULATED SUBSTANCES LIST

	2213	2214	2215	2216
A. Name of Each Regulated Substance:		Percent by Weight	Process Maximum Quantity (lbs.)	CAS #
1. _____		_____	_____	_____
2. _____		_____	_____	_____
3. _____		_____	_____	_____

	2217	2218	2219	2220
B. Name of Each Regulated Substance in a Mixture:		Percent by Weight	Process Maximum Quantity (lbs.)	CAS #
<b><u>NOT APPLICABLE</u></b>				
1a. _____		_____	_____	_____
1b. _____		_____	_____	_____
1c. _____		_____	_____	_____
2a. _____		_____	_____	_____
2b. _____		_____	_____	_____
2c. _____		_____	_____	_____

NOTES (Conversion Factors, Calculation Notes, Mixture Information, etc. Note which substance or mixture the note applies to): 2223

## IV. CERTIFICATION

I, as the owner or operator of the aforementioned business, hereby certify that the registration information provided above is true, accurate and complete to the best of my knowledge, based upon reasonable inquiry. I am fully aware that this certification, executed on the date indicated below, is made under penalty of perjury under the laws of the State of California.

	DATE	2224
NAME OF OWNER/OPERATOR	2225	TITLE OF OWNER/OPERATOR
		2226

# ABEINSA EPC

## MOJAVE

### Emergency Plan - HMBP

<b>Title:</b> Annex 02 Material Safety Data Sheets
<b>Process:</b> Business Emergency Contingency Plan
<b>Project:</b> Mojave Solar Project

<b>Document No:</b>	PEM-0002-01 Annex 02
<b>Revision:</b>	01
<b>Date:</b>	03/15/14

<b>Prepared by:</b>	
Kirk Anderson – Environmental Engineer	Electronic Signature

<b>Reviewed by:</b>	
Efrain Perez – Quality Manager	Electronic Signature
Steven Pochmara – Permitting Manager	Electronic Signature

<b>Approved by:</b>	
Nicolas Gallo – Project Sub Director	Electronic Signature
Rafael Sanchez Mendoza – Project Director	Electronic Signature

This document belongs to the Abener Teyma Mojaves. Its total or partial reproduction, by any means, as well as distribution to third parties without the express written consent of the Abener Teyma Mojave is strictly forbidden.

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 2 of 73**

## Sodium hypochlorite, 10-25% chlorine

**MSDS Name** Sodium hypochlorite, 10-25% chlorine

**Catalog Numbers** 1932, 1933

7681-52-9 Sodium hypochlorite 10-25%

231-668-3 Hazard Symbols: C Risk Phrases: 31 34

### EMERGENCY OVERVIEW

*Contact with acids liberates toxic gas. Causes burns. Light sensitive.*

### POTENTIAL HEALTH EFFECTS

**Eye:** Causes eye burns. Causes redness and pain.

**Skin:** Causes skin burns. Causes redness and pain.

**Ingestion:** Causes gastrointestinal irritation with nausea, vomiting and diarrhea.

Causes gastrointestinal tract burns.

**Inhalation:** May cause severe irritation of the respiratory tract with sore throat, coughing, shortness of breath and delayed lung edema. Causes chemical burns to the respiratory tract.

**Eyes:** Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

**Skin:** Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.

**Ingestion:** Do NOT induce vomiting. If conscious and alert, rinse mouth and drink 2-4 cupfuls of milk or water.

**Inhalation:** Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.

Get medical aid.

### General

#### Information:

As in any fire, wear a self-contained breathing apparatus in pressure demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Substance is noncombustible. Oxidizer. Greatly increases the burning rate of combustible materials.

#### Extinguishing

##### Media:

Use water spray, dry chemical, carbon dioxide, or chemical foam.

### General

#### Information:

Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container.

**Handling:** Do not breathe dust, vapor, mist, or gas. Do not get in eyes, on skin, or on clothing. Use only in a chemical fume hood.

**Storage:** Store in a tightly closed container. Store in a dry area. Keep refrigerated. (Store below 4°C/39°F.)

### Engineering

#### Controls

Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.

### PERSONAL PROTECTIVE EQUIPMENT

**Eyes:** Wear chemical splash goggles.

**Skin:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** Follow the OSHA respirator regulations found in 29 CFR 1910.134 or

European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

**Physical State:** Clear liquid

**Color:** yellow

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 3 of 73**

**Odor:** disagreeable odor - sweetish odor

**pH:** Not available

**Vapor Pressure:** 17.5 mm Hg @ 20 deg C

**Viscosity:** Not available

**Boiling Point:** Not available

**Freezing/Melting Point:** -16 deg C ( 3.20°F)

**Autoignition Temperature:** Not available

**Flash Point:** Not available

**Explosion Limits: Lower:** Not available

**Explosion Limits: Upper:** Not available

**Decomposition Temperature:** Not available

**Solubility in water:** Soluble

**Specific Gravity/Density:** 1.2090g/cm<sup>3</sup>

**Molecular Formula:** NaOCl

**Molecular Weight:** 74.44

**Chemical Stability:** Stable under normal temperatures and pressures.

**Conditions to Avoid:** Incompatible materials, light, combustible materials, temperatures above 40°C.

**Incompatibilities:** Metals, reducing agents, strong acids, amines, ammonia, acids with Other Materials (organic, e.g. acetic acid, benzoic acid, formic acid, methanoic acid, oxalic acid), methanol, ammonium salts.

**Hazardous**

**Decomposition**

**Products**

Hydrogen chloride, chlorine, sodium oxide.

**Hazardous**

**Polymerization**

Will not occur.

**RTECS#:** CAS# 7681-52-9: NH3486300

**LD50/LC50:** RTECS:

**CAS# 7681-52-9:** Draize test, rabbit, eye: 10 mg Moderate;

Draize test, rabbit, eye: 1.31 mg Mild;

Oral, mouse: LD50 = 5800 mg/kg;

.

**Carcinogenicity:** Sodium hypochlorite - IARC: Group 3 (not classifiable)

**Other:** See actual entry in RTECS for complete information.

**Ecotoxicity:** Fish: Rainbow trout: 0.07 mg/l; 48h; .

Fish: Fathead Minnow: 5.9 mg/l; 96h; .

Dispose of in a manner consistent with federal, state, and local regulations.

**Section 14 - Transport Information**

**HS Code** 2828 90 00 **Storage class (VCI)** 8 B Non-flammable

corrosive materials

**GGVS Packing**

**category**

A WGK 2 (polluting

substance)

**Storage** Store below +15°C.

Domestic (Land, ADR.)

-----  
Proper Shipping Name: HYPOCHLORITE SOLUTION

Hazard Class: 8

Hazard Code: C9

UN No. : 1791

Packing Group: III

**GGVS** 8/C 9 III **GGVE** 8/C 9 III

**ADR** 8/C 9 III **RID** 8/C 9 III

International (Water, I.M.O.)

-----  
Proper Shipping Name: HYPOCHLORITE SOLUTION

Hazard Class: 8

Hazard Code: C9

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 4 of 73**

UN No. : 1791

Packing Group: III

**IMDG Code 8/III UN number**

**(transport by sea)**

1791

International (Air, I.C.A.O.)

-----  
Proper Shipping Name: HYPOCHLORITE SOLUTION

Hazard Class: 8

Hazard Code: C9

UN No. : 1791

Packing Group: III

**UN number**

**(transport by air)**

1791 CAO CARGO

**Packing**

**instructions**

821

**PAX Packing**

**instructions**

819

**Section 15 - Regulatory Information**

European/International Regulations

WGK (Water Danger/Protection)

CAS# 7681-52-9: 2

Canada

CAS# 7681-52-9 is listed on Canada's DSL List

**US Federal**

European Labeling in Accordance with EC Directives

Hazard Symbols: C

Risk Phrases:

R 31 Contact with acids liberates toxic gas.

R 34 Causes burns.

Safety Phrases:

S 28A After contact with skin, wash immediately with plenty of water.

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

S 50A Do not mix with acids.

TSCA

CAS# 7681-52-9 is listed on the TSCA Inventory.

**Section 16 - Additional Information**

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty, and assume no liability resulting from its use. Users should make their own inquiry to determine the suitability of the information for their particular purposes. In no way the company or any of its employees will be liable for any kind of damages, howsoever arising, even if the company has been advised of the possibility of such damages.

Date of issue 01.08.08

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 5 of 73**

## SODIUM BISULPHITE SOLUTION 35% P/V PRS

SODIUM BISULPHITE SOLUTION 35% P/V PRS

Material Safety Data Sheets (MSDS)

Revision date: 20/3/2008

Página 1 de 5

SODIUM BISULPHITE SOLUTION 35% P/V PRS MSDS (MATERIAL SAFETY DATA SHEETS)

### 1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING.

#### 1.1 Identification of the substance or preparation.

Name: SODIUM BISULPHITE SOLUTION 35% P/V PRS

Code: B1100

#### 1.2 Use of the substance/preparation.

### 2. HAZARDS IDENTIFICATION.

Harmful if swallowed.

Contact with acids liberates toxic gas.

### 3. COMPOSITION OF/INFORMATION ABOUT THE COMPONENTS.

Substances presenting a health or environmental hazard within the meaning of Directive 67/548/EEC:

**Index No CAS No. EC No Registration**

**number Name Concentrate % Symbols R phrases \***

016-064-00-8 7631-90-5 231-548-0 sodium bisulphite

35% 25 - 50 % Xn R22 R31

\* The complete text of the R phrases is given in section 16 of this Safety Data Sheet.

### 4. FIRST AID.

In case of doubt or when symptoms of feeling unwell persist, get medical attention. Never administer anything orally to persons who are unconscious.

#### Inhalation.

Take the victim into open air; keep them warm and calm. If breathing is irregular or stops, perform artificial respiration. Do not administer anything orally. If unconscious, place them in a suitable position and seek medical assistance.

#### Eye contact.

If wearing contact lenses, remove them. Wash eyes with plenty of clean and cool water for at least 10 minutes while pulling eyelids up, and seek medical assistance.

#### Skin contact.

Remove contaminated clothing. Wash skin vigorously with water and soap or a suitable skin cleaner. **NEVER** use solvents or thinners.

#### Ingestion.

If accidentally ingested, seek immediate medical attention. Keep calm. **NEVER** induce vomiting.

### 5. FIRE FIGHTING MEASURES.

#### Recommended extinguishing methods.

Extinguisher powder or CO<sub>2</sub>. In case of more serious fires, also alcohol-resistant foam and water spray. Do not use a direct stream of water to extinguish.

#### Special risks.

Fire can cause thick, black smoke. As a result of thermal decomposition, dangerous products can form: carbon monoxide, carbon dioxide. Exposure to combustion or decomposition products can be harmful to your health.

#### Fire protection equipment.

According to the size of the fire, it may be necessary to use protective suits against the heat, individual breathing equipment, gloves, protective goggles or facemasks, and gloves.

#### Other recommendations.

Use water to cool tanks, cisterns, or containers close to the heat source or fire. Take wind direction into account.

Prevent the products used to fight the fire from going into drains, sewers, or waterways.

### 6. MEASURES TO TAKE IN CASE OF ACCIDENTAL SPILL.

#### Individual precautions.

Eliminate possible ignition points and ventilate the area. Avoid breathing fumes. For exposure control and individual protection measures, see section 8.

#### Cleaning methods.

Pick up the spill with non-combustible absorbent materials (soil, sand, vermiculite, diatomite, etc.). Pour the product and the absorbent in an appropriate container. The contaminated area should be immediately cleaned with an appropriate de-

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 6 of 73**

contaminator. Pour the decontaminator on the remains in an opened container and let it act various days until no further reaction is produced. For later elimination of waste, follow the recommendations under section 13.

**Environmental protection precautions.**

Prevent the contamination of drains, surface or subterranean waters, and the ground. In case of large spills or if the product contaminates lakes, rivers, or sewers, inform the responsible authorities according to local legislation.

**7. HANDLING AND STORAGE.**

**7.1 Handling.**

The fumes are heavier than air and can spread across the ground. They can form explosive mixtures with air. Prevent the creation of flammable or explosive fume concentrations in the air; prevent fume concentrations above work exposure limits. The preparation must only be used in areas where all unprotected flames and other ignition points have been eliminated. Electrical equipment has to be protected according to applicable standards. The preparation can be electrostatically charged: always use earth grounds when transferring the product. Operators must use anti-static footwear and clothing, and floors must be conductors. Keep the container tightly closed and isolated from heat sources, sparks, and fire. Do not use tools that can cause sparks. Prevent the preparation from contacting the skin or eyes. Avoid the inhalation of fumes and mists that form when spraying. For personal protection, see section 8. Never use pressure to empty the containers. They are not pressure-resistant containers. In the application area, smoking, eating, and drinking must be prohibited. Follow legislation on occupational health and safety. Keep the product in containers made of a material identical to the original.

Revision date: 20/3/2008

Página 3 de 5

SODIUM BISULPHITE SOLUTION 35% P/V PRS MSDS (MATERIAL SAFETY DATA SHEETS)

**7.2 Storage.**

Store according to local legislation. Observe indications on the label. Store the containers between 5 and 35° C, in a dry and well-ventilated place, far from sources of heat and direct solar light. Keep far away from ignition points. Keep away from oxidising agents and from highly acidic or alkaline materials. Do not smoke. Prevent the entry of non-authorized persons. Once the containers are open, they must be carefully closed and placed vertically to prevent spills.

**7.3 Specific use(s).**

**8. EXPOSURE CONTROL/PERSONAL PROTECTION.**

**8.1 Exposure limits.**

Work exposure limit for:

Name

VLA-ED \* VLA-EC \*

ppm mg/m3 ppm mg/m3

\* According to the list of Limit Environmental Professional Exposure Values adopted by the National Institute for Safety and Hygiene at Work for the year 2007.

**8.2 Exposure controls**

Measures of a technical nature: provide adequate ventilation, which can be achieved by using good local exhaustventilation and a good general exhaust system. If this were not enough to keep the particulate and fume concentrations of the solvent below the work exposure limit, suitable breathing equipment must be used. Breathing protection: when workers are subjected to concentrations above the exposure limit, they must use suitable and officially approved equipment. Use active carbon masks. Hand protection: for prolonged or repeated contact, use polyvinyl alcohol or nitrile rubber types of gloves. Protective creams can help to protect exposed areas of the skin. These creams must **NEVER** be applied once exposure has occurred. Eye protection: use protective goggles especially designed to protect against liquid splatters. Install emergency eyewashes near the use area. Skin protection: personnel must wear anti-static clothing made of natural fibre or synthetic fibres resistant to high temperatures. All body parts that have been in contact with the preparation must be washed.

**9. PHYSICAL AND CHEMICAL PROPERTIES.**

**9.1. General information.**

Aspect: Liquid with characteristic odour and colour

Smell:

**9.2. Important health, safety and environmental information.**

pH:

Boiling Point: °C

Flash point: °C

Inflammability (solid, gas):

Explosive properties:

Combustive properties:

Vapour pressure:

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 7 of 73**

Relative density: gr/cm3

Solubility

Hydrosolubility:

Liposolubility:

Distribution coefficient (n-octanol/water):

Viscosity:

Vapour density:

Evaporation velocity:

#### 10. STABILITY AND REACTIVITY.

Stable under the recommended handling and storage conditions (see section 7). In case of fire, dangerous decomposition products can be generated, such as carbon monoxide and dioxide and nitrogen fumes and oxides. Keep away from oxidising agents and from highly alkaline or acidic materials in order to prevent exothermic reactions.

#### 11. TOXICOLOGICAL INFORMATION.

There are no tested data available on the product. Exposure to concentrations of solvent fumes above the work exposure limit can have negative effects (for example, irritation of the mucous membranes and respiratory system, adverse effects on the kidneys, liver, and the central nervous system). Among the symptoms are headaches, vertigo, fatigue, muscular weakness, drowsiness, and in extreme cases, unconsciousness. Repeated or prolonged contact with the preparation can cause the elimination of oil from the skin, giving rise to nonallergic contact dermatitis and absorption of the preparation through the skin. Splatters in the eyes can cause irritation and irreversible damage.

#### 12. ECOLOGICAL INFORMATION.

There are no tested data available on the preparation. The product must not be allowed to go into sewers or waterways.

Prevent penetration into the ground. Prevent the emission of solvents into the atmosphere.

#### 13. ELIMINATION CONSIDERATIONS.

Dumping into sewers or waterways is prohibited. Waste and empty containers must be handled and eliminated according to current, local/national legislation.

#### 14. INFORMATION PERTAINING TO TRANSPORT.

Transport following ADR/TPC rules for highway transport, RID rules for railway, IMDG for sea, and ICAO/IATA for air transport.

Transport method

**14.1 Land:** Transport by road: ADR 2007, Transport by rail: RID

UN no.: 2693 Class: 8 Packaging group: III

Labels: 8 Hazard number: 80

Transport documentation: Consignment note and written instructions

**14.2 Sea:** Transport by ship: IMDG 33-06

UN no.: 2693 Class: 8

Packaging group: III Labels: 8

FEm – Emergency sheets (F – Fire, S - Spills): F-A,S-B

Sea pollutant (PP – Strong sea pollutant, P – Sea pollutant):

Transport documentation: Bill of lading

**14.3 Air:** Transport by plane: IATA/ICAO

UN no.: 2693 Class: 8 Packaging group: III

Labels: 8

Transport document: Airway bill

#### 15. REGULATORY INFORMATION.

R22 Harmful if swallowed.

R31 Contact with acids liberates toxic gas.

S2 Keep out of the reach of children.

S25 Avoid contact with eyes.

S46 If swallowed, seek medical advice immediately and show this container or label.

Contains: sodium bisulphite 35%

#### 16. OTHER INFORMATION.

Complete text of the R phrases that appear in section 3:

R22 Harmful if swallowed.

R31 Contact with acids liberates toxic gas.

The information given in this Safety Data Sheet has been drafted in accordance with REGULATION (EC) No 1907/2006 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 18 December 2006 concerning the Registration, Evaluation,

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 8 of 73**

Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC.

The information in this Safety Data Sheet on the Preparation is based on current knowledge and on current EC and national laws, as far as the working conditions of the users is beyond our knowledge and control. The product must not be used for purposes other than those that are specified without first having written instructions on how to handle. It is always the responsibility of the user to take the appropriate measures in order to comply with the requirements established by current legislation. The information contained in this Safety Sheet only states a description of the safety requirements for the preparation, and it must not be considered as a guarantee of its properties.

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 9 of 73**

## Sulfuric acid MSDS

### Section 1: Chemical Product and Company Identification

**Product Name:** Sulfuric acid

**Catalog Codes:** SLS2539, SLS1741, SLS3166, SLS2371, SLS3793

**CAS#:** 7664-93-9

**RTECS:** WS5600000

**TSCA:** TSCA 8(b) inventory: Sulfuric acid

**CI#:** Not applicable.

**Synonym:** Oil of Vitriol; Sulfuric Acid

**Chemical Name:** Hydrogen sulfate

**Chemical Formula:** H<sub>2</sub>-SO<sub>4</sub>

### Section 2: Composition and Information on Ingredients

#### Composition:

**Name CAS # % by Weight**

Sulfuric acid 7664-93-9 95 - 98

**Toxicological Data on Ingredients:** Sulfuric acid: ORAL (LD50): Acute: 2140 mg/kg [Rat.]. VAPOR (LC50): Acute: 510 mg/m

2 hours [Rat]. 320 mg/m 2 hours [Mouse].

### Section 3: Hazards Identification

#### Potential Acute Health Effects:

Very hazardous in case of skin contact (corrosive, irritant, permeator), of eye contact (irritant, corrosive), of ingestion, of inhalation. Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

#### Potential Chronic Health Effects:

**CARCINOGENIC EFFECTS:** Classified 1 (Proven for human.) by IARC, + (Proven.) by OSHA. Classified A2 (Suspected for human.) by ACGIH. **MUTAGENIC EFFECTS:** Not available. **TERATOGENIC EFFECTS:** Not available. **DEVELOPMENTAL TOXICITY:** Not available. The substance may be toxic to kidneys, lungs, heart, cardiovascular system, upper respiratory tract, eyes, teeth. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged

Page. 2

contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

### Section 4: First Aid Measures

#### Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention immediately.

#### Skin Contact:

In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Cold water may be used. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

#### Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

#### Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

#### Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. **WARNING:** It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

#### Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

**Serious Ingestion:** Not available.

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 10 of 73**

**Section 5: Fire and Explosion Data**

**Flammability of the Product:** Non-flammable.

**Auto-Ignition Temperature:** Not applicable.

**Flash Points:** Not applicable.

**Flammable Limits:** Not applicable.

**Products of Combustion:**

Products of combustion are not available since material is non-flammable. However, products of decomposition include fumes of oxides of sulfur. Will react with water or steam to produce toxic and corrosive fumes. Reacts with carbonates to generate carbon dioxide gas. Reacts with cyanides and sulfides to form poisonous hydrogen cyanide and hydrogen sulfide respectively.

**Fire Hazards in Presence of Various Substances:** Combustible materials

**Explosion Hazards in Presence of Various Substances:**

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. Slightly explosive in presence of oxidizing materials.

**Fire Fighting Media and Instructions:** Not applicable.

**Special Remarks on Fire Hazards:**

Metal acetylides (Monocesium and Monorubidium), and carbides ignite with concentrated sulfuric acid. White Phosphorous + boiling Sulfuric acid or its vapor ignites on contact. May ignite other combustible materials. May cause fire when sulfuric acid is mixed with Cyclopentadiene, cyclopentanone oxime, nitroaryl amines, hexalithium disilicide, phosphorous (III) oxide, and oxidizing agents such as chlorates, halogens, permanganates.

**Special Remarks on Explosion Hazards:**

Mixtures of sulfuric acid and any of the following can explode:

p-nitrotoluene,

pentasilver trihydroxydiaminophosphate, perchlorates, alcohols with strong hydrogen peroxide, ammonium

tetraperoxychromate, mercuric nitrite, potassium chlorate, potassium permanganate with potassium chloride, carbides, nitro

compounds, nitrates, carbides, phosphorous, iodides, picrates, fulminates, dienes, alcohols (when heated) Nitramide

decomposes explosively on contact with concentrated sulfuric acid. 1,3,5-Trinitrosohexahydro-1,3,5-triazine + sulfuric acid

causes explosive decomposition.

**Section 6: Accidental Release Measures**

**Small Spill:**

Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. If necessary: Neutralize the residue with a dilute solution of sodium carbonate.

**Large Spill:**

Corrosive liquid. Poisonous liquid. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Neutralize the residue with a dilute solution of sodium carbonate. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

**Section 7: Handling and Storage**

**Precautions:**

Keep locked up.. Keep container dry. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, reducing agents, combustible materials, organic materials, metals, acids, alkalis, moisture. May corrode metallic surfaces. Store in a metallic or coated fiberboard drum using a strong polyethylene inner package.

**Storage:**

Hygroscopic. Reacts violently with water. Keep container tightly closed. Keep container in a cool, well-ventilated area. Do not store above 23°C (73.4°F).

**Section 8: Exposure Controls/Personal Protection**

**Engineering Controls:**

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

**Personal Protection:**

Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.

**Personal Protection in Case of a Large Spill:**

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

**Exposure Limits:**

TWA: 1 STEL: 3 (mg/m3) [Australia] Inhalation TWA: 1 (mg/m3) from OSHA (PEL) [United States] Inhalation TWA: 1 STEL: 3

(mg/m3) from ACGIH (TLV) [United States] [1999] Inhalation TWA: 1 (mg/m3) from NIOSH [United States] Inhalation TWA: 1 (mg/m3) [United Kingdom (UK)] Consult local authorities for acceptable exposure limits.

**ABEINSA EPC****MOJAVE****Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 11 of 73****Section 9: Physical and Chemical Properties****Physical state and appearance:** Liquid. (Thick oily liquid.)**Odor:** Odorless, but has a choking odor when hot.**Taste:** Marked acid taste. (Strong.)**Molecular Weight:** 98.08 g/mole**Color:** Colorless.**pH (1% soln/water):** Acidic.**Boiling Point:**

270°C (518°F) - 340 deg. C Decomposes at 340 deg. C

**Melting Point:** -35°C (-31°F) to 10.36 deg. C (93% to 100% purity)**Critical Temperature:** Not available.**Specific Gravity:** 1.84 (Water = 1)**Vapor Pressure:** Not available.**Vapor Density:** 3.4 (Air = 1)**Volatility:** Not available.**Odor Threshold:** Not available.**Water/Oil Dist. Coeff.:** Not available.**Ionicity (in Water):** Not available.**Dispersion Properties:** See solubility in water.**Solubility:**

Easily soluble in cold water. Sulfuric is soluble in water with liberation of much heat. Soluble in ethyl alcohol.

**Section 10: Stability and Reactivity Data****Stability:** The product is stable.**Instability Temperature:** Not available.**Conditions of Instability:**

Conditions to Avoid: Incompatible materials, excess heat, combustible material materials, organic materials, exposure to moist air or water, oxidizers, amines, bases. Always add the acid to water, never the reverse.

**Incompatibility with various substances:**

Reactive with oxidizing agents, reducing agents, combustible materials, organic materials, metals, acids, alkalis, moisture.

**Corrosivity:**

Extremely corrosive in presence of aluminum, of copper, of stainless steel(316). Highly corrosive in presence of stainless steel(304). Non-corrosive in presence of glass.

**Special Remarks on Reactivity:**

Hygroscopic. Strong oxidizer. Reacts violently with water and alcohol especially when water is added to the product. Incompatible (can react explosively or dangerously) with the following: ACETIC ACID, ACRYLIC ACID, AMMONIUM HYDROXIDE, CRESOL, CUMENE, DICHLOROETHYL ETHER, ETHYLENE CYANOHYDRIN, ETHYLENEIMINE, NITRIC ACID, 2-NITROPROPANE, PROPYLENE OXIDE, SULFOLANE, VINYLIDENE CHLORIDE, DIETHYLENE GLYCOL MONOMETHYL ETHER, ETHYL ACETATE, ETHYLENE CYANOHYDRIN, ETHYLENE GLYCOL MONOETHYL ETHER ACETATE, GLYOXAL, METHYL ETHYL KETONE, dehydrating agents, organic materials, moisture (water), Acetic anhydride, Acetone, cyanohydrin, Acetone+nitric acid, Acetone + potassium dichromate, Acetonitrile, Acrolein, Acrylonitrile, Acrylonitrile + water, Alcohols + hydrogen peroxide, ally compounds such as Allyl alcohol, and Allyl Chloride, 2-Aminoethanol, Ammonium hydroxide, Ammonium triperchromate, Aniline, Bromate + metals, Bromine pentafluoride, n-Butyraldehyde, Carbides, Cesium acetylene carbide, Chlorates, Chlorates, Cyclopentanone oxime, chlorinates, Chlorates + metals, Chlorine trifluoride, Chlorosulfonic acid, 2-cyano-4-nitrobenzenediazonium hydrogen sulfate, Cuprous nitride, p-chloronitrobenzene, 1,5-Dinitronaphthlene + sulfur, Diisobutylene, p-dimethylaminobenzaldehyde, 1,3-Diazidobenzene, Dimethylbenzylcarbinol + hydrogen peroxide, Epichlorohydrin, Ethyl alcohol + hydrogen peroxide, Ethylene diamine, Ethylene glycol and other glycols, Ethylenimine, Fulminates, hydrogen peroxide, Hydrochloric acid, Hydrofluoric acid, Iodine heptafluoride, Indane + nitric acid, Iron, Isoprene, Lithium silicide, Mercuric nitride, Mesityl oxide, Mercury nitride, Metals (powdered), Nitromethane, Nitric acid + glycerides, p-Nitrotoluene, Pentasilver trihydroxydiaminophosphate, Perchlorates, Perchloric acid, Permanganates + benzene, 1-Phenyl-2-methylpropyl alcohol + hydrogen peroxide, Phosphorus, Phosphorus isocyanate, Picrates, Potassium tert-butoxide, Potassium chlorate, Potassium Permanganate and other permanganates, halogens, amines, Potassium Permanganate + Potassium chloride, Potassium Permanganate + water, Propiolactone (beta)-, Pyridine, Rubidium acetelyene carbide, Silver permanganate, Sodium, Sodium carbonate, sodium hydroxide, Steel, styrene monomer, toluene + nitric acid, Vinyl acetate, Thallium (I) azidodithiocarbonate, Zinc chlorate, Zinc iodide, azides, carbonates, cyanides, sulfides, sulfites, alkali hydrides, carboxylic acid anhydrides, nitriles, olefinic organics, aqueous acids, cyclopentadiene, cyano-alcohols, metal acetylides,

Hydrogen gas is generated by the action of the acid on most metals (i.e. lead, copper, tin, zinc, aluminum, etc.).

Concentrated sulfuric acid oxidizes, dehydrates, or sulfonates most organic compounds.

**Special Remarks on Corrosivity:**

Non-corrosive to lead and mild steel, but dilute acid attacks most metals. Attacks many metals releasing hydrogen. Minor corrosive effect on bronze. No corrosion data on brass or zinc.

**Polymerization:** Will not occur.**Section 11: Toxicological Information****Routes of Entry:** Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.**Toxicity to Animals:**

# ABEINSA EPC

# MOJAVE

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 12 of 73**

**WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 2140 mg/kg [Rat.]. Acute toxicity of the vapor (LC50): 320 mg/m3 2 hours [Mouse].**

**Chronic Effects on Humans:**

**CARCINOGENIC EFFECTS:** Classified 1 (Proven for human.) by IARC, + (Proven.) by OSHA. Classified A2 (Suspected for human.) by ACGIH. May cause damage to the following organs: kidneys, lungs, heart, cardiovascular system, upper respiratory tract, eyes, teeth.

**Other Toxic Effects on Humans:**

Extremely hazardous in case of inhalation (lung corrosive). Very hazardous in case of skin contact (corrosive, irritant, permeator), of eye contact (corrosive), of ingestion, .

**Special Remarks on Toxicity to Animals:** Not available.

**Special Remarks on Chronic Effects on Humans:**

**Mutagenicity:** Cytogenetic Analysis: Hamster, ovary = 4mmol/L **Reproductive effects:** May cause adverse reproductive effects based on animal data. **Developmental abnormalities (musculoskeletal)** in rabbits at a dose of 20 mg/m3 for 7 hrs. (RTECS) **Teratogenicity:** neither embryotoxic, fetotoxic, nor teratogenic in mice or rabbits at inhaled doses producing some maternal toxicity

**Special Remarks on other Toxic Effects on Humans:**

**Acute Potential Health Effects:** Skin: Causes severe skin irritation and burns. Continued contact can cause tissue necrosis. **Eye:** Causes severe eye irritation and burns. May cause irreversible eye injury. **Ingestion:** Harmful if swallowed. May cause permanent damage to the digestive tract. Causes gastrointestinal tract burns. May cause perforation of the stomach, GI bleeding, edema of the glottis, necrosis and scarring, and sudden circulatory collapse(similar to acute inhalation). It may also cause systemic toxicity with acidosis. **Inhalation:** May cause severe irritation of the respiratory tract and mucous membranes with sore throat, coughing, shortness of breath, and delayed lung edema. Causes chemical burns to the respiratory tract. Inhalation may be fatal as a result of spasm, inflammation, edema of the larynx and bronchi, chemical pneumonitis, and pulmonary edema. Cause corrosive action on mucous membranes. May affect cardiovascular system (hypotension, depressed cardiac output, bradycardia). Circulatory collapse with clammy skin, weak and rapid pulse, shallow respiration, and scanty urine may follow. Circulatory shock is often the immediate cause of death. May also affect teeth(changes in teeth and supporting structures - erosion, discoloration). **Chronic Potential Health Effects:** Inhalation: Prolonged or repeated inhalation may affect behavior (muscle contraction or spasticity), urinary system (kidney damage), and cardiovascular system, heart (ischemic heart leisons), and respiratory system/lungs(pulmonary edema, lung damage), teeth (dental discoloration, erosion). **Skin:** Prolonged or repeated skin contact may cause dermatitis, an allergic skin reaction.

**Section 12: Ecological Information**

**Ecotoxicity:** Ecotoxicity in water (LC50): 49 mg/l 48 hours [bluegill/sunfish].

**BOD5 and COD:** Not available.

**Products of Biodegradation:**

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** The products of degradation are less toxic than the product itself.

**Special Remarks on the Products of Biodegradation:** Not available.

**Section 13: Disposal Considerations**

**Waste Disposal:**

Sulfuric acid may be placed in sealed container or absorbed in vermiculite, dry sand, earth, or a similar material. It may also be diluted and neutralized. Be sure to consult with local or regional authorities (waste regulators) prior to any disposal. Waste must be disposed of in accordance with federal, state and local environmental control regulations.

**Section 14: Transport Information**

**DOT Classification:** Class 8: Corrosive material

**Identification:** : Sulfuric acid UNNA: 1830 PG: II

**Special Provisions for Transport:** Not available.

**Section 15: Other Regulatory Information**

**Federal and State Regulations:**

Illinois toxic substances disclosure to employee act: Sulfuric acid New York release reporting list: Sulfuric acid Rhode Island RTK hazardous substances: Sulfuric acid Pennsylvania RTK: Sulfuric acid Minnesota: Sulfuric acid Massachusetts RTK: Sulfuric acid New Jersey: Sulfuric acid California Director's List of Hazardous Substances (8 CCR 339): Sulfuric acid Tennessee RTK: Sulfuric acid TSCA 8(b) inventory: Sulfuric acid SARA 302/304/311/312 extremely hazardous substances: Sulfuric acid SARA 313 toxic chemical notification and release reporting: Sulfuric acid CERCLA: Hazardous substances.: Sulfuric acid: 1000 lbs. (453.6 kg)

**Other Regulations:**

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

**Other Classifications:**

**WHMIS (Canada):**

CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS E: Corrosive liquid.

**DSCL (EEC):**

R35- Causes severe burns. S2- Keep out of the reach of children. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S30- Never add water to this product. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

<b>ABEINSA EPC</b>  <b>MOJAVE</b>	<b>Document:</b>		PEM-0002-01 Annex 02	
	<b>Revision:</b>	01	<b>Date:</b>	03/15/14
	<b>Page: 13 of 73</b>			

<p><b>HMIS (U.S.A.):</b>  <b>Health Hazard:</b> 3  <b>Fire Hazard:</b> 0  <b>Reactivity:</b> 2  <b>Personal Protection:</b>  <b>National Fire Protection Association (U.S.A.):</b>  <b>Health:</b> 3  <b>Flammability:</b> 0  <b>Reactivity:</b> 2  <b>Specific hazard:</b>  <b>Protective Equipment:</b>  Gloves. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Face shield.  <b>Section 16: Other Information</b>  <b>References:</b>  -Material safety data sheet emitted by: la Commission de la Santé et de la Sécurité du Travail du Québec. -The Sigma-Aldrich Library of Chemical Safety Data, Edition II. -Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987.  <b>Other Special Considerations:</b> Not available.  <b>Created:</b> 10/09/2005 11:58 PM  <b>Last Updated:</b> 06/09/2012 12:00 PM</p>
--

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 14 of 73**

## Sodium Hydroxide, 50% MSDS

### Section 1: Chemical Product and Company Identification

**Product Name:** Sodium Hydroxide, 50%

**Catalog Codes:** SLS3127, SLS4549

**CAS#:** Mixture.

**RTECS:** Not applicable.

**TSCA:** TSCA 8(b) inventory: Sodium hydroxide; Water

**CI#:** Not applicable.

**Synonym:** Sodium Hydroxide, 50% Solution

**Chemical Name:** Not applicable.

**Chemical Formula:** Not applicable.

### Section 2: Composition and Information on Ingredients

#### Composition:

#### Name CAS # % by Weight

Sodium hydroxide 1310-73-2 50

Water 7732-18-5 50

**Toxicological Data on Ingredients:** Sodium hydroxide LD50: Not available. LC50: Not available.

### Section 3: Hazards Identification

#### Potential Acute Health Effects:

Very hazardous in case of skin contact (corrosive, irritant, permeator), of eye contact (irritant, corrosive), of ingestion. . Slightly hazardous in case of inhalation (lung sensitizer). Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

#### Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available.

DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to lungs. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

### Section 4: First Aid Measures

#### Eye Contact:

Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Get medical attention immediately. Finish by rinsing thoroughly with running water to avoid a possible infection.

#### Skin Contact:

In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Cold water may be used. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

#### Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

#### Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

#### Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

#### Ingestion:

If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

#### Serious Ingestion:

Not available.

### Section 5: Fire and Explosion Data

**Flammability of the Product:** Non-flammable.

**Auto-Ignition Temperature:** Not applicable.

**Flash Points:** Not applicable.

**Flammable Limits:** Not applicable.

**Products of Combustion:** Not available.

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 15 of 73**

**Fire Hazards in Presence of Various Substances:** Not applicable.

**Explosion Hazards in Presence of Various Substances:** Non-explosive in presence of open flames and sparks, of shocks.

**Fire Fighting Media and Instructions:** Not applicable.

**Special Remarks on Fire Hazards:** Not available.

**Special Remarks on Explosion Hazards:**

Sodium hydroxide reacts to form explosive products with ammonia + silver nitrate. Benzene extract of allyl benzene sulfonate prepared from allyl alcohol, and benzene sulfonyl chloride in presence of aqueous sodium hydroxide, under vacuum distillation, residue darkened and exploded. Sodium Hydroxide + impure tetrahydrofuran, which can contain peroxides, can cause serious explosions. Dry mixtures of sodium hydroxide and sodium tetrahydroborate liberate hydrogen explosively at 230-270 deg. C. Sodium Hydroxide reacts with sodium salt of trichlorophenol + methyl alcohol + trichlorobenzene + heat to cause an explosion. (Sodium hydroxide)

**Section 6: Accidental Release Measures**

**Small Spill:**

Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. If necessary: Neutralize the residue with a dilute solution of acetic acid.

**Large Spill:**

Corrosive liquid. Poisonous liquid. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Neutralize the residue with a dilute solution of acetic acid. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

**Section 7: Handling and Storage**

**Precautions:**

Do not ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, reducing agents, metals, acids, alkalis, moisture.

**Storage:** Keep container tightly closed. Keep container in a cool, well-ventilated area.

**Section 8: Exposure Controls/Personal Protection**

**Engineering Controls:**

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.

**Personal Protection:**

Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.

**Personal Protection in Case of a Large Spill:**

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

**Exposure Limits:**

Sodium hydroxide STEL: 2 (mg/m<sup>3</sup>) from ACGIH (TLV) [United States] TWA: 2 CEIL: 2 (mg/m<sup>3</sup>) from OSHA (PEL) [United States] CEIL: 2 (mg/m<sup>3</sup>) from NIOSH Consult local authorities for acceptable exposure limits.

**Section 9: Physical and Chemical Properties**

**Physical state and appearance:** Liquid.

**Odor:** Odorless.

**Taste:** Alkaline. Bitter. (Strong.)

**Molecular Weight:** Not applicable.

**Color:** Clear Colorless.

**pH (1% soln/water):** Basic.

**Boiling Point:** 140°C (284°F)

**Melting Point:** 12°C (53.6°F)

**Critical Temperature:** Not available.

**Specific Gravity:** 1.53 (Water = 1)

**Vapor Pressure:** The highest known value is 2.3 kPa (@ 20°C) (Water).

**Vapor Density:** The highest known value is 0.62 (Air = 1) (Water).

**Volatility:** Not available.

**Odor Threshold:** Not available.

**Water/Oil Dist. Coeff.:** Not available.

**Ionicity (in Water):** Not available.

**Dispersion Properties:** See solubility in water.

**Solubility:** Easily soluble in cold water.

**Section 10: Stability and Reactivity Data**

**Stability:** The product is stable.

**Instability Temperature:** Not available.

**Conditions of Instability:** Excess heat, incompatible materials, water/moisture

**ABEINSA EPC****MOJAVE****Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 16 of 73****Incompatibility with various substances:**

Reactive with oxidizing agents, reducing agents, metals, acids, alkalis. Slightly reactive with water

**Corrosivity:**

Extremely corrosive in presence of aluminum, brass. Corrosive in presence of copper, of stainless steel(304), of stainless steel(316). Non-corrosive in presence of glass.

**Special Remarks on Reactivity:**

Hygroscopic. Much heat is evolved when solid material is dissolved in water. Therefore cold water and caution must be used for this process. Generates considerable heat when a sodium hydroxide solution is mixed with an acid Sodium hydroxide solution and octanol + diborane during a work-up of a reaction mixture of oxime and diborane in tetrahydrofuran is very exothermic, a mild explosion being noted on one occasion. Reactive with water, acids (mineral, non-oxidizing, e.g. hydrochloric, hydrofluoric acid, muriatic acid, phosphoric), acids (mineral, oxidizing e.g. chromic acid, hypochlorous acid, nitric acid, sulfuric acid), acids (organic e.g. acetic acid, benzoic acid, formic acid, methanoic acid, oxalic acid), aldehydes (e.g. acetaldehyde, acrolein, chloral hydrate, formaldehyde), carbamates (e.g. carbanolate, carbofuran), esters (e.g. butyl acetate, ethyl acetate, propyl formate), halogenated organics (dibromoethane, hexachlorobenzene, methyl chloride, trichloroethylene), isocyanates (e.g. methyl isocyanate), ketones (acetone, acetophenone, MEK, MIBK), acid chlorides, strong bases, strong oxidizing agents, strong reducing agents, flammable liquids, powdered metals and metals (i.e aluminum, tin, zinc, hafnium, rane nickel), metals (alkali and alkaline e.g. cesium, potassium, sodium), metal compounds (toxic e.g. beryllium, lead acetate, nickel carbonyl, tetraethyl lead), nitrides (e.g. potassium nitride, sodium nitride), nitriles (e.g. acetonitrile, methyl cyanide), nitro compounds (organic e.g. nitrobenzene, nitromethane), acetic anhydride, hydroquinone, chlorohydrin, chlorosulfonic acid, ethylene cyanohydrin, glyoxal, hydrosulfuric acid, oleum, propiolactone, acylonitrile, phosphorus pentoxide, chloroethanol, chloroform-methanol, tetrahydroborate, cyanogen azide, 1,2,4,5 tetrachlorobenzene, cinnamaldehyde. Reacts with formaldehyde hydroxide to yield formic acid, and hydrogen. (Sodium hydroxide)

**Special Remarks on Corrosivity:** Very caustic to aluminum and other metals in presence of moisture.**Polymerization:** Will not occur.**Section 11: Toxicological Information****Routes of Entry:** Absorbed through skin. Dermal contact. Eye contact. Inhalation.**Toxicity to Animals:**

LD50: Not available. LC50: Not available.

**Chronic Effects on Humans:** Not available.**Other Toxic Effects on Humans:**

Extremely hazardous in case of inhalation (lung corrosive). Very hazardous in case of skin contact (corrosive, irritant, permeator), of eye contact (corrosive), of ingestion, .

**Special Remarks on Toxicity to Animals:** Not available.**Special Remarks on Chronic Effects on Humans:** Investigation as a mutagen (cytogenetic analysis), but no data available. (Sodium hydroxide)**Special Remarks on other Toxic Effects on Humans:**

Acute Potential Health Effects: Skin: May be harmful if absorbed through skin. Causes severe skin irritation and burns. May cause deep penetrating ulcers of the skin. Eyes: Causes severe eye irritation and burns. May cause chemical conjunctivitis and corneal damage. Inhalation: Harmful if inhaled. Causes severe irritation of the respiratory tract and mucous membranes with coughing, burns, breathing difficulty, and possible coma. Irritation may lead the chemical pneumonitis and pulmonary edema. Causes chemical burns to the respiratory tract and mucous membranes. Ingestion: May be fatal if swallowed. May cause severe and permanent damage to the digestive tract. Causes

**Section 12: Ecological Information****Ecotoxicity:** Not available.**BOD5 and COD:** Not available.**Products of Biodegradation:**

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** The products of degradation are less toxic than the product itself.**Special Remarks on the Products of Biodegradation:** Not available.**Section 13: Disposal Considerations****Waste Disposal:**

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

**Section 14: Transport Information****DOT Classification:** Class 8: Corrosive material**Identification:** : Sodium hydroxide, solution (Sodium hydroxide) UNNA: UN1824 PG: II**Special Provisions for Transport:** Not available.**Section 15: Other Regulatory Information****Federal and State Regulations:**

Illinois toxic substances disclosure to employee act: Sodium hydroxide Illinois chemical safety act: Sodium hydroxide New York release reporting list: Sodium hydroxide Rhode Island RTK hazardous substances: Sodium hydroxide Pennsylvania RTK: Sodium hydroxide Minnesota: Sodium hydroxide Massachusetts RTK: Sodium hydroxide New Jersey: Sodium hydroxide Louisiana spill reporting: Sodium hydroxide TSCA 8(b) inventory: Sodium hydroxide; Water CERCLA: Hazardous substances.: Sodium hydroxide: 1000 lbs. (453.6 kg);

**Other Regulations:** OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).**Other Classifications:**

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 17 of 73**

**WHMIS (Canada):**

CLASS D-2A: Material causing other toxic effects (VERY TOXIC). CLASS E: Corrosive liquid.

**DSCL (EEC):**

**HMIS (U.S.A.):**

**Health Hazard:** 3

**Fire Hazard:** 0

**Reactivity:** 1

**Personal Protection:**

**National Fire Protection Association (U.S.A.):**

**Health:** 3

**Flammability:** 0

**Reactivity:** 1

**Specific hazard:**

**Protective Equipment:**

Gloves. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Face shield.

**Section 16: Other Information**

**References:** Not available.

**Other Special Considerations:** Not available.

**Created:** 10/09/2005 06:32 PM

**Last Updated:** 06/09/2012 12:00 PM

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 18 of 73**

## Ferric Chloride, 41 Be' (40% w/v) MSDS

### Section 1: Chemical Product and Company Identification

**Product Name:** Ferric Chloride, 41 Be' (40% w/v)

**Catalog Codes:** SLF1105

**CAS#:** Mixture.

**RTECS:** Not applicable.

**TSCA:** TSCA 8(b) inventory: Ferric chloride; Water

**CI#:** Not available.

**Synonym:**

**Chemical Name:** Not applicable.

**Chemical Formula:** Not applicable.

### Section 2: Composition and Information on Ingredients

**Composition:**

**Name CAS # % by Weight**

Ferric chloride 7705-08-0 40

Water 7732-18-5 60

**Toxicological Data on Ingredients:** Ferric chloride: ORAL (LD50): Acute: 900 mg/kg [Rat]. 1278 mg/kg [Mouse].

### Section 3: Hazards Identification

**Potential Acute Health Effects:**

Extremely hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Very hazardous in case of skin contact (corrosive). Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

**Potential Chronic Health Effects:**

Extremely hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Very hazardous in case of skin contact (corrosive). Non-sensitizer for skin. Non-permeator by skin. **CARCINOGENIC EFFECTS:** Not available. **MUTAGENIC EFFECTS:** Not available. **TERATOGENIC EFFECTS:** Not available. **DEVELOPMENTAL TOXICITY:** Not available. The substance is toxic to lungs, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated or prolonged inhalation of vapors may lead to chronic respiratory irritation.

### Section 4: First Aid Measures

**Eye Contact:**

Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention.

**Skin Contact:**

If the chemical got onto the clothed portion of the body, remove the contaminated clothes as quickly as possible, protecting your own hands and body. Place the victim under a deluge shower. If the chemical got on the victim's exposed skin, such as the hands: Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cold water may be used. If irritation persists, seek medical attention.

Wash contaminated clothing before reusing.

**Serious Skin Contact:**

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

**Inhalation:** Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

**Serious Inhalation:**

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. **WARNING:** It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

**Ingestion:**

Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

**Serious Ingestion:** Not available.

### Section 5: Fire and Explosion Data

**Flammability of the Product:** Non-flammable.

**Auto-Ignition Temperature:** Not applicable.

**Flash Points:** Not applicable.

**Flammable Limits:** Not applicable.

**Products of Combustion:** Not available.

**Fire Hazards in Presence of Various Substances:** Not applicable.

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 19 of 73**

**Explosion Hazards in Presence of Various Substances:**

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

**Fire Fighting Media and Instructions:** Not applicable.

**Special Remarks on Fire Hazards:** Not available.

**Special Remarks on Explosion Hazards:** Not available.

**Section 6: Accidental Release Measures**

**Small Spill:**

Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. If necessary: Neutralize the residue with a dilute solution of sodium carbonate.

**Large Spill:**

Corrosive liquid. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Neutralize the residue with a dilute solution of sodium carbonate. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

**Section 7: Handling and Storage**

**Precautions:**

Keep container dry. Do not ingest. Do not breathe gas/fumes/ vapour/spray. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes.

**Storage:**

May corrode metallic surfaces. Store in a metallic or coated fiberboard drum using a strong polyethylene inner package. Corrosive materials should be stored in a separate safety storage cabinet or room.

**Section 8: Exposure Controls/Personal Protection**

**Engineering Controls:**

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

**Personal Protection:**

Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.

**Personal Protection in Case of a Large Spill:**

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

**Exposure Limits:**

Ferric chloride TWA: 1 CEIL: 2 (mg/m<sup>3</sup>) Consult local authorities for acceptable exposure limits.

**Section 9: Physical and Chemical Properties**

**Physical state and appearance:** Liquid.

**Odor:** Not available.

**Taste:** Not available.

**Molecular Weight:** Not applicable.

**Color:** Yellowish-brown. (Dark.)

**pH (1% soln/water):** Acidic.

**Boiling Point:** The lowest known value is 100°C (212°F) (Water).

**Melting Point:** Not available.

**Critical Temperature:** Not available.

**Specific Gravity:** 1.394 (Water = 1)

**Vapor Pressure:** The highest known value is 17.535 mm of Hg (@ 20°C) (Water).

**Vapor Density:** The highest known value is 0.62 (Air = 1) (Water).

**Volatility:** Not available.

**Odor Threshold:** Not available.

**Water/Oil Dist. Coeff.:** Not available.

**Ionicity (in Water):** Not available.

**Dispersion Properties:** See solubility in water.

**Solubility:** Easily soluble in cold water, hot water.

**Section 10: Stability and Reactivity Data**

**Stability:** The product is stable.

**Instability Temperature:** Not available.

**Conditions of Instability:** Not available.

**Incompatibility with various substances:** Not available.

**Corrosivity:**

Highly corrosive in presence of copper. Non-corrosive in presence of glass.

**Special Remarks on Reactivity:** Not available.

**Special Remarks on Corrosivity:** Not available.

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 20 of 73**

**Polymerization:** No.

**Section 11: Toxicological Information**

**Routes of Entry:** Eye contact. Inhalation. Ingestion.

**Toxicity to Animals:** Acute oral toxicity (LD50): 2250 mg/kg (Rat) (Calculated value for the mixture).

**Chronic Effects on Humans:** The substance is toxic to lungs, mucous membranes.

**Other Toxic Effects on Humans:**

Extremely hazardous in case of skin contact (irritant), of ingestion, of inhalation. Very hazardous in case of skin contact (corrosive).

**Special Remarks on Toxicity to Animals:** Not available.

**Special Remarks on Chronic Effects on Humans:** Not available.

**Special Remarks on other Toxic Effects on Humans:** Not available.

**Section 12: Ecological Information**

**Ecotoxicity:** Not available.

**BOD5 and COD:** Not available.

**Products of Biodegradation:**

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** The product itself and its products of degradation are not toxic.

**Special Remarks on the Products of Biodegradation:** Not available.

**Section 13: Disposal Considerations**

**Waste Disposal:**

**Section 14: Transport Information**

**DOT Classification:** CLASS 8: Corrosive liquid.

**Identification:** : Ferric chloride, Solution (Ferric chloride) : UN2582 PG: III

**Special Provisions for Transport:** Not available.

**Section 15: Other Regulatory Information**

**Federal and State Regulations:**

Pennsylvania RTK: Ferric chloride Massachusetts RTK: Ferric chloride TSCA 8(b) inventory: Ferric chloride; Water CERCLA:

Hazardous substances.: Ferric chloride;

**Other Regulations:** OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

**Other Classifications:**

**WHMIS (Canada):**

CLASS D-2A: Material causing other toxic effects (VERY TOXIC). CLASS E: Corrosive liquid.

**DSCL (EEC):** R35- Causes severe burns.

**HMIS (U.S.A.):**

**Health Hazard:** 3

**Fire Hazard:** 0

**Reactivity:** 0

**Personal Protection:**

**National Fire Protection Association (U.S.A.):**

**Health:** 3

**Flammability:** 0

**Reactivity:** 0

**Specific hazard:**

**Protective Equipment:**

Gloves. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Face shield.

**Section 16: Other Information**

**References:** Not available.

**Other Special Considerations:** Not available.

**Created:** 10/09/2005 05:32 PM

**Last Updated:** 06/09/2012 12:00 PM

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 21 of 73**

## Magnesium Sulfate Anhydrous MSDS

### Section 1: Chemical Product and Company Identification

**Product Name:** Magnesium sulfate anhydrous

**Catalog Codes:** SLM2992, SLM2227

**CAS#:** 7487-88-9

**RTECS:** OM4500000

**TSCA:** TSCA 8(b) inventory: Magnesium sulfate anhydrous

**CI#:** Not available.

**Synonym:**

**Chemical Formula:** MgSO<sub>4</sub>

**Contact Information:**

**Sciencelab.com, Inc.**

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: [ScienceLab.com](http://ScienceLab.com)

**CHEMTREC (24HR Emergency Telephone), call:**

1-800-424-9300

**International CHEMTREC, call:** 1-703-527-3887

**For non-emergency assistance, call:** 1-281-441-4400

### Section 2: Composition and Information on Ingredients

**Composition:**

**Name CAS # % by Weight**

Magnesium sulfate anhydrous 7487-88-9 100

**Toxicological Data on Ingredients:** Not applicable.

### Section 3: Hazards Identification

**Potential Acute Health Effects:**

Hazardous in case of ingestion. Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of inhalation.

**Potential Chronic Health Effects:**

CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available.

DEVELOPMENTAL TOXICITY: Not available. Repeated or prolonged exposure is not known to aggravate medical condition.

### Section 4: First Aid Measures

**Eye Contact:** Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used.

**Skin Contact:**

After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cold water may be used. Cover the irritated skin with an emollient. If irritation persists, seek medical attention.

**Serious Skin Contact:** Not available.

**Inhalation:** Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

**Serious Inhalation:** Not available.

**Ingestion:**

Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

**Serious Ingestion:** Not available.

### Section 5: Fire and Explosion Data

**Flammability of the Product:** Non-flammable.

**Auto-Ignition Temperature:** Not applicable.

**Flash Points:** Not applicable.

**Flammable Limits:** Not applicable.

**Products of Combustion:** Not available.

**Fire Hazards in Presence of Various Substances:** Not applicable.

**Explosion Hazards in Presence of Various Substances:**

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

**Fire Fighting Media and Instructions:** Not applicable.

**Special Remarks on Fire Hazards:** Not available.

**Special Remarks on Explosion Hazards:** Not available.

### Section 6: Accidental Release Measures

**Small Spill:**

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 22 of 73**

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

**Large Spill:**

Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

**Section 7: Handling and Storage**

**Precautions:** No specific safety phrase has been found applicable for this product.

**Storage:**

No specific storage is required. Use shelves or cabinets sturdy enough to bear the weight of the chemicals. Be sure that it is not necessary to strain to reach materials, and that shelves are not overloaded.

**Section 8: Exposure Controls/Personal Protection**

**Engineering Controls:**

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

**Personal Protection:** Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

**Personal Protection in Case of a Large Spill:**

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

**Exposure Limits:** Not available.

**Section 9: Physical and Chemical Properties**

**Physical state and appearance:** Solid.

**Odor:** Not available.

**Taste:** Not available.

**Molecular Weight:** 120.38 g/mole

**Color:** Not available.

**pH (1% soln/water):** Not available.

**Boiling Point:** Not available.

**Melting Point:** Not available.

**Critical Temperature:** Not available.

**Specific Gravity:** Not available.

**Vapor Pressure:** Not applicable.

**Vapor Density:** Not available.

**Volatility:** Not available.

**Odor Threshold:** Not available.

**Water/Oil Dist. Coeff.:** Not available.

**Ionicity (in Water):** Not available.

**Dispersion Properties:** See solubility in water.

**Solubility:** Easily soluble in cold water.

**Section 10: Stability and Reactivity Data**

**Stability:** The product is stable.

**Instability Temperature:** Not available.

**Conditions of Instability:** Not available.

**Incompatibility with various substances:** Not available.

**Corrosivity:** Non-corrosive in presence of glass.

**Special Remarks on Reactivity:** Not available.

**Special Remarks on Corrosivity:** Not available.

**Polymerization:** No.

**Section 11: Toxicological Information**

**Routes of Entry:** Ingestion.

**Toxicity to Animals:**

LD50: Not available. LC50: Not available.

**Chronic Effects on Humans:** Not available.

**Other Toxic Effects on Humans:**

Hazardous in case of ingestion. Slightly hazardous in case of skin contact (irritant), of inhalation.

**Special Remarks on Toxicity to Animals:** Not available.

**Special Remarks on Chronic Effects on Humans:** Human: passes through the placenta, excreted in maternal milk.

**Special Remarks on other Toxic Effects on Humans:** Not available.

**Section 12: Ecological Information**

**Ecotoxicity:** Not available.

**BOD5 and COD:** Not available.

**Products of Biodegradation:**

<b>ABEINSA EPC</b>  <b>MOJAVE</b>	<b>Document:</b>		PEM-0002-01 Annex 02	
	<b>Revision:</b>	01	<b>Date:</b>	03/15/14
	<b>Page: 23 of 73</b>			

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** The products of degradation are more toxic.

**Special Remarks on the Products of Biodegradation:** Not available.

**Section 13: Disposal Considerations**

**Waste Disposal:**

**Section 14: Transport Information**

**DOT Classification:** Not a DOT controlled material (United States).

**Identification:** Not applicable.

**Special Provisions for Transport:** Not applicable.

**Section 15: Other Regulatory Information**

**Federal and State Regulations:** TSCA 8(b) inventory: Magnesium sulfate anhydrous

**Other Regulations:** Not available..

**Other Classifications:**

**WHMIS (Canada):** Not controlled under WHMIS (Canada).

**DACL (EEC):**  
This product is not classified according to the EU regulations.

**HMIS (U.S.A.):**

**Health Hazard:** 1

**Fire Hazard:** 0

**Reactivity:** 0

**Personal Protection:** E

**National Fire Protection Association (U.S.A.):**

**Health:** 1

**Flammability:** 0

**Reactivity:** 0

**Specific hazard:**

**Protective Equipment:**  
Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Safety glasses.

**Section 16: Other Information**

**References:** Not available.

**Other Special Considerations:** Not available.

**Created:** 10/10/2005 08:22 PM

**Last Updated:** 06/09/2012 12:00 PM

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 24 of 73**

## Dihydroxyaluminum Sodium Carbonate MSDS

### Section 1: Chemical Product and Company Identification

**Product Name:** Dihydroxyaluminum Sodium Carbonate

**Catalog Codes:** SLD2683

**CAS#:** 16482-55-6

**RTECS:** Not available.

**TSCA:** TSCA 8(b) inventory: No products were found.

**CI#:** Not available.

**Synonym:** Rolaid; Aluminum sodium carbonate

hydroxide; Sodium aluminum, hydroxycarbonate;

Aluminate(1-), (carbonato)dihydroxy-, sodium

**Chemical Name:** Dihydroxyaluminum Sodium Carbonate

**Chemical Formula:** NaAl(OH)<sub>2</sub>CO<sub>3</sub>

### Section 2: Composition and Information on Ingredients

**Composition:**

**Name CAS # % by Weight**

Dihydroxyaluminum Sodium Carbonate 16482-55-6 100

**Toxicological Data on Ingredients:** Not applicable.

### Section 3: Hazards Identification

**Potential Acute Health Effects:** Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, or inhalation.

**Potential Chronic Health Effects:**

**CARCINOGENIC EFFECTS:** Classified 4 (No evidence.) by NTP, None. by OSHA, None. by NIOSH. **MUTAGENIC**

**EFFECTS:** Not available. **TERATOGENIC EFFECTS:** Not available. **DEVELOPMENTAL TOXICITY:** Not available. Repeated or prolonged exposure is not known to aggravate medical condition.

### Section 4: First Aid Measures

**Eye Contact:**

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

**Skin Contact:** Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

**Serious Skin Contact:** Not available.

**Inhalation:**

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**Serious Inhalation:** Not available.

**Ingestion:**

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

**Serious Ingestion:** Not available.

### Section 5: Fire and Explosion Data

**Flammability of the Product:** Non-flammable.

**Auto-Ignition Temperature:** Not applicable.

**Flash Points:** Not applicable.

**Flammable Limits:** Not applicable.

**Products of Combustion:** Not available.

**Fire Hazards in Presence of Various Substances:** Not applicable.

**Explosion Hazards in Presence of Various Substances:**

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

**Fire Fighting Media and Instructions:** Not applicable.

**Special Remarks on Fire Hazards:** Not available.

**Special Remarks on Explosion Hazards:** Not available.

### Section 6: Accidental Release Measures

**Small Spill:**

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

**Large Spill:**

Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

### Section 7: Handling and Storage

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 25 of 73**

**Precautions:** Do not breathe dust. Keep away from incompatibles such as acids.

**Storage:** Keep container tightly closed. Keep container in a cool, well-ventilated area.

**Section 8: Exposure Controls/Personal Protection**

**Engineering Controls:**

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

**Personal Protection:** Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

**Personal Protection in Case of a Large Spill:**

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

**Exposure Limits:** Not available.

**Section 9: Physical and Chemical Properties**

**Physical state and appearance:** Solid. (Powdered solid.)

**Odor:** Not available.

**Taste:** Not available.

**Molecular Weight:** 144 g/mole

**Color:** White.

**pH (1% soln/water):** Not applicable.

**Boiling Point:** Not available.

**Melting Point:** Not available.

**Critical Temperature:** Not available.

**Specific Gravity:** 0.8 (Water = 1)

**Vapor Pressure:** Not applicable.

**Vapor Density:** Not available.

**Volatility:** Not available.

**Odor Threshold:** Not available.

**Water/Oil Dist. Coeff.:** Not available.

**Ionicity (in Water):** Not available.

**Dispersion Properties:** Is not dispersed in cold water, hot water.

**Solubility:** Insoluble in cold water, hot water.

**Section 10: Stability and Reactivity Data**

**Stability:** The product is stable.

**Instability Temperature:** Not available.

**Conditions of Instability:** Excess heat, incompatible materials

**Incompatibility with various substances:** Reactive with acids.

**Corrosivity:** Not available.

**Special Remarks on Reactivity:** Not available.

**Special Remarks on Corrosivity:** Not available.

**Polymerization:** Will not occur.

**Section 11: Toxicological Information**

**Routes of Entry:** Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

**Toxicity to Animals:**

LD50: Not available. LC50: Not available.

**Chronic Effects on Humans:** CARCINOGENIC EFFECTS: Classified 4 (No evidence.) by NTP, None. by OSHA, None. By NIOSH.

**Other Toxic Effects on Humans:** Slightly hazardous in case of skin contact (irritant), of ingestion, of inhalation.

**Special Remarks on Toxicity to Animals:** Not available.

**Special Remarks on Chronic Effects on Humans:** Not available.

**Special Remarks on other Toxic Effects on Humans:**

Acute Potential Health Effects: May cause skin irritation and dry skin. Eyes: Causes eye irritation. Inhalation: Excess inhalation may cause local irritation of the throat and respiratory tract. Ingestion: Low toxicity. Low hazard. Approved by FDA for use as an antacid.

**Section 12: Ecological Information**

**Ecotoxicity:** Not available.

**BOD5 and COD:** Not available.

**Products of Biodegradation:**

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** The product itself and its products of degradation are not toxic.

**Special Remarks on the Products of Biodegradation:** Not available.

**Section 13: Disposal Considerations**

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 26 of 73**

**Waste Disposal:**

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

**Section 14: Transport Information**

**DOT Classification:** Not a DOT controlled material (United States).

**Identification:** Not applicable.

**Special Provisions for Transport:** Not applicable.

**Section 15: Other Regulatory Information**

**Federal and State Regulations:** No products were found.

**Other Regulations:** EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

**Other Classifications:**

**WHMIS (Canada):** Not controlled under WHMIS (Canada).

**DSCL (EEC):**

This product is not classified according to the EU regulations. Not applicable.

**HMS (U.S.A.):**

**Health Hazard:** 1

**Fire Hazard:** 0

**Reactivity:** 0

**Personal Protection:** E

**National Fire Protection Association (U.S.A.):**

**Health:** 1

**Flammability:** 0

**Reactivity:** 0

**Specific hazard:**

**Protective Equipment:**

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Safety glasses.

**Section 16: Other Information**

**References:** Not available.

**Other Special Considerations:** Not available.

**Created:** 10/10/2005 01:03 AM

**Last Updated:** 06/09/2012 12:00 PM

## Hydrated lime

### MATERIAL SAFETY DATA SHEET

(Prepared in accordance with Annex II of the REACH Regulation (EC) 1907/2006)

#### 1: Identification of the substance / preparation and of the company / undertaking

##### 1.1: Identification of the substance or preparation

Substance Name **Hydrated lime**

##### Synonyms

Slaked lime, Air slaked lime, Building lime, Fat lime, Chemical lime, Coarse Lime, Finishing lime, Mason's lime, Calcium dihydroxide, Calcium hydroxide, Calcium hydrate, Lime, Lime water, Bulk Hydrate, Hydrated Lime, Milk of Lime, Thick Lime Milk, Lime Putty, Bagged Hydrate, Hydrapure, White Rhino, White Rhino Hydrated Lime.

*Please note that this list may not be exhaustive.*

Chemical Name and Formula **Calcium dihydroxide – Ca(OH)<sub>2</sub>**

Trade Name **Hydrapure, White Rhino Hydrated Lime**

CAS N° 1305-62-0

EINECS N° 215-137-3

Molecular Weight 74,09

##### 1.2: Use of the substance

Building material industry

Chemical industry

Agriculture

Biocidal use

Environmental protection (e.g. flue gas treatment, waste water treatment, sludge treatment)

Drinking water treatment

Feed, food and pharmaceutical industry

Civil engineering

Paper and paint industry

Glass industry

**Hydrated Lime MSDS – Page 2/7**

#### 2: Hazard identification

##### 2.1: Indication of hazard

**Xi Irritant**

##### 2.2: Human health

Risk phrases

**R37 Irritating to respiratory system**

**R38 Irritating to skin**

**R41 Risk of serious damage to eyes**

Warning phrase

In contrast to the powder itself, the product, when diluted with water, can produce severe skin damage in humans, (alkaline burns), especially if prolonged skin contacts takes place.

#### 3: Composition / information on ingredients

##### 3.1: Composition

Calcium dihydroxide, and minor constituents of geological origin, varying from source to source.

#### 4: First-aid measures

##### 4.1: Eyes

Irrigate eyes immediately with plenty of water and seek medical advice.

##### 4.2: Inhalation

Move source of dust or move person to fresh air.

Obtain medical attention immediately.

##### 4.3: Ingestion

Wash mouth with water and drink copious quantities of water. Do not induce vomiting. Seek medical advice immediately.

##### 4.4: Skin

Carefully and gently brush the contaminated body surfaces in order to remove all traces of product. Wash affected area immediately with plenty of water. Remove contaminated clothing. If necessary seek medical advice.

##### 4.5: General advice

No known delayed effects. Consult a physician for all exposures except for minor instances.

#### 5: Fire-fighting measures

##### 5.1: Flammability

The substance is not flammable, and noncombustible,

it inhibits the spread of flame.

**Hydrated Lime MSDS – Page 3/7****5.2: Extinguishing media**

The product does not burn. Use a dry powder, foam or CO2 type of fire extinguishers to fight the surrounding fire.

**5.3: Combustion products**

When heated above 580°C, calcium hydroxide decomposes to produce calcium oxide (CaO) and water (H2O). Calcium oxide reacts with water and generates heat. This may cause risk to flammable material.

**6: Accidental release measures****6.1: Personal precautions**

Avoid contact with skin and eyes, keep dust levels to a minimum, and ensure that sufficient ventilation or suitable respiratory protective equipment is used (section 8).

**6.2: Environmental precautions**

Contain the spillage. Keep the material dry if possible. Cover area if possible to avoid unnecessary dust hazard. Avoid uncontrolled spills to watercourses and drains (pH rising). Any large spillage into watercourses must be alerted to the Environment Agency or other regulatory body.

**6.3: Methods for cleaning up**

Keep the material dry if possible. Pick up the product mechanically in a dry way. Use vacuum suction unit, or shovel into bags.

**7: Handling and storage****7.1: Handling****7.1.1: Precautions for safe handling**

Avoid contact with skin and eyes. Wear protective equipment (see section 8). Keep dust levels to a minimum. Minimize dust generation. Enclose dust sources, use exhaust ventilation (dust collector at handling points). Handling systems should preferably be enclosed. When handling bags usual precautions should be paid to the risks outlined in the Council Directive 90/269/EEC.

**7.2: Storage****7.2.1: Precautions for safe storage**

Store under dry conditions. Minimise contact with air and moisture. Bulk storage should be in purpose –designed silos. Keep away from acids, significant quantities of paper, straw, and nitro compounds. Keep out of reach of children. Do not use aluminium for transport or storage if there is a risk of contact with water.

**Hydrated Lime MSDS – Page 4/7****8: Exposure controls / personal protection****8.1: Exposure limit values**

8.1.1: CAS N° / EINECS N° 1305-62-0 / 215-137-3

8.1.2: Chemical name Calcium dihydroxide

8.1.3: Occupational exposure standard (OES) (OEL) 5mg/m3, (8hr TWA)

**8.2: Exposure controls****8.2.1: Occupational exposure controls**

Handling systems should preferably be enclosed or suitable ventilation installed to maintain atmospheric dust below the OES, if not wear suitable protective equipment.

**8.2.1.1: Respiratory protection**

Use appropriate respiratory protection against particles according to the risk level.

**8.2.1.2: Hand protection**

Use approved nitrile impregnated gloves having CE marks.

**8.2.1.3: Eye protection**

Tight fitting goggles with side shields, or wide vision full goggles. Do not wear contact lenses when handling this product.

It is also advisable to have individualpocket eyewash.

**8.2.1.4: Skin protection**

Use clothing fully covering skin, full length pants, long sleeved overalls, with close fittings at openings.

Footwear resistant to caustics, and avoiding dust penetration.

8.2.1.5: General safety and hygiene measure Wear clean, dry personal protective equipment. Barrier cream can be used if necessary. If heavily exposed daily, employees must shower, and if necessary use a barrier cream to protect exposed skin, particularly neck, face and wrists.

8.2.2: Environmental exposure controls. All ventilation systems should be filtered before discharge to atmosphere.

**9: Physical and chemical properties****9.1: General information**

9.1.1: Appearance White or off white (beige) fine powder.

9.1.2: Odor Slight earthy odor.

**9.2: Important health, safety and environmental information**

pH 12,4 Ca(OH)2 saturated solution at 25°C

Solubility in water

1850 mg/l at 0°C

1650 mg/l at 20°C

770 mg/l at 100°C

**Hydrated Lime MSDS – Page 5/7****9.3: Other information**

Melting point Decomposition at 580°C, to form CaO and H<sub>2</sub>O

Boiling point Not applicable

Specific gravity 2,24 g/cm<sup>3</sup> at 20°C

Bulk density 200 – 800 kg/m<sup>3</sup> at 20°C

Vapour pressure Non volatile

Partition coefficient Not applicable

Flash point Not applicable

Flammability Not flammable

Explosive properties Not flammable

**10: Stability and reactivity****10.1: Conditions to avoid**

Minimise exposure to air and moisture to avoid degradation.

When heated above 580°C, calcium hydroxide decomposes to produce calcium oxide (CaO) and water (H<sub>2</sub>O):  $\text{Ca(OH)}_2 \rightarrow \text{CaO} + \text{H}_2\text{O}$

**10.2: Materials to avoid**

Calcium hydroxide reacts with carbon dioxide to form Calcium carbonate:

$\text{Ca(OH)}_2 + \text{CO}_2 \rightarrow \text{CaCO}_3 + \text{H}_2\text{O}$  Calcium hydroxide reacts with acids to form

Calcium salts. Calcium hydroxide reacts with aluminium and brass in the presence of moisture, under formation (or release) of hydrogen gas:  $\text{Ca(OH)}_2 + 2 \text{Al} + 6 \text{H}_2\text{O} \rightarrow \text{Ca(Al(OH)}_4)_2 + 3 \text{H}_2$

**10.3: Additional remarks**

Calcium dihydroxide absorbs carbon dioxide from air to form calcium carbonate, which is a common material in the nature.

**11: Toxicological information****11.1: Acute effect**

Eye contact Risk of serious damage to eyes. Inhalation Inhalation of dust causes discomfort to the upper respiratory tract.

Irritant to the respiratory tract in high concentration of dust.

Ingestion: Calcium dihydroxide is not toxic, a large amount may cause irritation to the gastrointestinal tract. Skin contact

Irritating to skin in the presence of moisture.

**11.2: Long term exposure**

Eye contact Risk of serious damage to eyes.

Inhalation: Prolonged and repeated inhalation of dust may affect the respiratory tract.

Skin contact

In case of prolonged skin contact, product may cause serious damage to skin in combination with moisture.

**Hydrated Lime MSDS – Page 6/7****12: Ecological information****12.1: Ecotoxicity**

12.1.1: Acute/Prolonged toxicity to fish

On *Gambusia affinis* LC<sub>50</sub> = 160 mg/l for 96 hours, the substance is non-toxic, because LC<sub>50</sub>-value is > 100 mg/l.

12.1.2: Acute/Prolonged toxicity to aquatic invertebrates

No test data

12.1.3: Acute/Prolonged toxicity to aquatic plants

No test data

12.1.4: Toxicity to micro-organisms e.g. bacteria

At high concentration, through the rise of pH, calcium dihydroxide is used for disinfection of sewage sludges.

12.1.5: Chronic toxicity to aquatic organisms No data

12.1.6: Toxicity to soil dwelling organisms No data

12.1.7: Toxicity to terrestrial plants

No data, but calcium dihydroxide is used as a fertilizer.

12.1.8: General effect

Acute pH-effect. Although this product is useful to correct water acidity, an excess of more than 1 g/l may be harmful to aquatic life. pH-value of > 12 will rapidly decrease as result of dilution and carbonation.

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 30 of 73**

**12.2: Mobility**

Calcium dihydroxide reacts and/or carbon dioxide to form calcium carbonate, which is sparingly soluble, and so presents a low mobility in most ground. Moreover this product is used as fertilisers.

**12.3: Persistence and degradability**

Not relevant for inorganic substances.

**12.4: Bioaccumulative potential**

Not relevant for inorganic substances.

**13: Disposal considerations**

Disposal should be in accordance with local and national legislation.

**14: Transport information**

**14.1: Transport consideration**

14.1.1: Classification Not classified as hazardous for transport.

14.1.2: ADR (Road) Not subject to identification

14.1.3: RID (Rail) Not subject to identification

14.1.4: IMDG / GGVSea (Sea) Not subject to identification

14.1.5: IATA-DGR / ICTAO-TI(Air) Not subject to identification

**14.2: Special precaution**

Avoid any release of dust during transportation, by using tight tanks.

**Hydrated Lime MSDS – Page 7/7**

**15: Regulatory information**

**15.1: Labeling according to EEC-directives**

15.1.1: Symbol and classification of the substance according to Directive 67/548/EEC

**Xi Irritant**

15.1.2: Restriction of marketing and employment

None

15.1.3: National regulations Water endangering class 1 (Germany)

**16: Other information**

**16.1: Risk phrases**

**R37 Irritating to respiratory system**

**R38 Irritating to skin**

**R41 Risk of serious damage to eyes**

**16.2: Safety phrases**

S2 Keep out of reach of children

S25 Avoid contact with eyes

S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice

S37 Wear suitable gloves

S39 Wear eye/face protection

**16.3: Further information**

This safety data sheet supplements the technical use instructions without replacing them. The information contained therein is based on the state of our knowledge regarding the product, at the mentioned date. They are provided in good faith. It does not exempt the user from knowing and applying all texts regulating his activity. It will be his sole responsibility to take all necessary precautions when using the product.

**16.4: Guidance and references**

Data sheet prepared in accordance with:  
Annex II of the REACH Regulation (EC) 1907/2006.

References:

1. Council Directive 90/269/EEC

2. Booklet L64 - Safety Signs and Signals. The Health and Safety (Safety Signs and Signals)

Regulations 1996 - Guidance on Regulations (HSE) - ISBN 0 7176 0870 0

3. IUCLID Dataset –2000

4. The Merck Index (Ed. Merck & Co, Rahway, USA)

**16.5: Revision**

The additions or modifications are announced in italic. The present version is a renewed version, in order to be in accordance with the Annex II of the REACH Regulation (EC) 1907/2006. Version November 2008

End of the safety data sheet

## Carbon Dioxide

### Material Safety Data Sheet

#### Section 1. Chemical product

Carbon Dioxide 124-38-9 100 ACGIH TLV (United States, 9/2004).

STEL: 54000 mg/m<sup>3</sup> 15 minute(s). Form: All forms

STEL: 30000 ppm 15 minute(s). Form: All forms

TWA: 9000 mg/m<sup>3</sup> 8 hour(s). Form: All forms

TWA: 5000 ppm 8 hour(s). Form: All forms

**NIOSH REL (United States, 6/2001).**

STEL: 54000 mg/m<sup>3</sup> 15 minute(s). Form: All forms

STEL: 30000 ppm 15 minute(s). Form: All forms

TWA: 9000 mg/m<sup>3</sup> 10 hour(s). Form: All forms

TWA: 5000 ppm 10 hour(s). Form: All forms

**OSHA PEL (United States, 6/1993).**

TWA: 9000 mg/m<sup>3</sup> 8 hour(s). Form: All forms

TWA: 5000 ppm 8 hour(s). Form: All forms

#### Section 2. Composition, Information on Ingredients

**Name CAS number % Volume Exposure limits**

Inhalation, Dermal, Eyes

**Emergency overview**

#### Section 3. Hazards identification

**Routes of entry**

**Potential acute health effects**

Moderately irritating to the respiratory system.

Moderately irritating to the eyes.

Ingestion is not a normal route of exposure for gases

Moderately irritating to the skin.

**Physical state** Gas.

Warning!

CONTENTS UNDER PRESSURE.

CAUSES DAMAGE TO THE FOLLOWING ORGANS: LUNGS, CARDIOVASCULAR SYSTEM, SKIN, EYES, CENTRAL NERVOUS SYSTEM, EYE, LENS OR CORNEA. MAY CAUSE RESPIRATORY TRACT, EYE AND SKIN IRRITATION.

Avoid contact with skin and clothing. Avoid breathing gas. Do not puncture or incinerate container. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling.

Contact with rapidly expanding gas, liquid, or solid can cause frostbite.

Build 1.1 **Page: 1/6**

**Carbon Dioxide**

**See toxicological Information (section 11)**

**CARCINOGENIC EFFECTS:** Not available.

**MUTAGENIC EFFECTS:** Not available.

**TERATOGENIC EFFECTS:** Not available.

**Medical conditions**

**aggravated by overexposure**

Acute or chronic respiratory conditions may be aggravated by overexposure to this gas.

**Potential chronic health**

**effects**

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention if symptoms appear. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately. In case of contact, immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse.

Get medical attention. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

#### Section 4. First aid measures

**Eye contact**

**Skin contact****Inhalation****Ingestion**

No action shall be taken involving any personal risk or without suitable training. If fumes are still suspected to be present, the rescuer should wear an appropriate mask or a self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

**Frostbite** : Try to warm up the frozen tissues and seek medical attention.

Non-flammable.

Use an extinguishing agent suitable for surrounding fires.

**Section 5. Fire fighting measures****Flammability of the product****Fire fighting media and instructions**

If involved in fire, shut off flow immediately if it can be done without risk. Apply water from a safe distance to cool container and protect surrounding area. No specific hazard.

**Special protective****equipment for fire-fighters**

Fire fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full facepiece operated in positive pressure mode. Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (Section 8). Shut off gas supply if this can be done safely.

Isolate area until gas has dispersed.

**Environmental precautions****Section 6. Accidental release measures**

: Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

**Personal precautions :**

Keep container tightly closed. Keep container in a cool, well-ventilated area. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F).

Avoid contact with eyes, skin and clothing. Keep container closed. Use only with adequate ventilation. Do not puncture or incinerate container. Wash thoroughly after handling. High pressure gas. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement. Never allow any unprotected part of the body to touch uninsulated pipes or vessels that contain cryogenic liquids. Prevent entrapment of liquid in closed systems or piping without pressure relief devices. Some materials may become brittle at low temperatures and will easily fracture.

**Section 7. Handling and storage****Handling****Storage**

Build 1.1 **Page: 2/6**

**Carbon Dioxide**

Use only with adequate ventilation. Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits.

**Section 8. Exposure Controls, Personal Protection****Engineering controls**

Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.

Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

**Personal protection****Eyes****Skin****Respiratory**

Consult local authorities for acceptable exposure limits.

**Personal protection in case of a large spill**

: A self-contained breathing apparatus should be used to avoid inhalation of the product. Chemical-resistant, impervious gloves or gauntlets complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

**Hands :**

The applicable standards are (US) 29 CFR 1910.134 and (Canada) Z94.4-93

When working with cryogenic liquids, wear a full face shield.

Insulated gloves suitable for low temperatures

-78.55°C (-109.4°F)

Sublimation temperature: -78.5°C (-109.3°F)

1.53 (Air = 1)

830 psig

30.9°C (87.6°F)

44.01 g/mole

**Boiling/condensation point****Melting/freezing point**

Not available.

**Section 9. Physical and chemical properties****Molecular weight****Critical temperature****Vapor pressure****Vapor density****Physical chemical****comments**

**Molecular formula** CO<sub>2</sub>

**Specific Volume (ft<sup>3</sup>/lb)** : 8.77193

**Gas Density (lb/ft<sup>3</sup>)** : 0.114

The product is stable.

**Section 10. Stability and reactivity**

**Stability and reactivity :**

**Section 11. Toxicological information****Specific effects**

**Carcinogenic effects** No known significant effects or critical hazards.

**Mutagenic effects** No known significant effects or critical hazards.

**Reproduction toxicity** No known significant effects or critical hazards.

No specific information is available in our database regarding the other toxic effects of this material for humans.

Causes damage to the following organs: lungs, cardiovascular system, skin, eyes, central nervous system (CNS), eye, lens or cornea.

**Chronic effects on humans****Other toxic effects on humans****Toxicity data**

**IDLH** : 40000 ppm

These products are carbon oxides (CO, CO<sub>2</sub>).

The product itself and its products of degradation are not toxic.

**Section 12. Ecological information****Toxicity of the products of biodegradation****Products of degradation :**

**Environmental fate** : Not available.

**Environmental hazards** : No known significant effects or critical hazards.

**Toxicity to the environment** : Not available.

**Section 13. Disposal considerations**

Product removed from the cylinder must be disposed of in accordance with appropriate Federal, State, local regulation. Return cylinders with residual product to Airgas, Inc. Do not dispose of locally.

**Section 14. Transport information**

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 34 of 73**

**2.2 Limited quantity**

Yes.

**Packaging instruction**

**Passenger Aircraft** Quantity limitation: 75 kg

**Cargo Aircraft** Quantity limitation: 150 kg

**DOT Classification**

**TDG Classification 2.2**

CARBON DIOXIDE

Carbon dioxide,  
refrigerated liquid

UN1013

UN2187

CARBON DIOXIDE

Carbon dioxide,  
refrigerated liquid

**Regulatory**

**information**

**UN number Proper shipping**

**name**

**Class Packing group Label Additional**

**information**

UN1013

UN2187

**Explosive Limit and Limited Quantity Index** 0.125

**Passenger Carrying Road or Rail Index** 75

**Mexico Classification**

UN1013

UN2187

CARBON DIOXIDE

Carbon dioxide, refrigerated liquid

Not applicable (gas).

**Section 15. Regulatory information**

**U.S. Federal regulations**

Pennsylvania RTK: Carbon Dioxide: (generic environmental hazard)

Massachusetts RTK: Carbon Dioxide

New Jersey: Carbon Dioxide

TSCA 8(b) inventory: Carbon Dioxide

Clean Water Act (CWA) 307: No products were found.

Clean Water Act (CWA) 311: No products were found.

Clean air act (CAA) 112 accidental release prevention: No products were found.

Clean air act (CAA) 112 regulated flammable substances: No products were found.

Clean air act (CAA) 112 regulated toxic substances: No products were found.

**State regulations**

CEPA DSL: Carbon Dioxide

**WHMIS (Canada)** Class A: Compressed gas.

SARA 302/304/311/312 extremely hazardous substances: No products were found.

SARA 302/304 emergency planning and notification: No products were found.

SARA 302/304/311/312 hazardous chemicals: Carbon Dioxide

SARA 311/312 MSDS distribution - chemical inventory - hazard identification: Carbon

Dioxide: Sudden Release of Pressure, Immediate (Acute) Health Hazard, Delayed

(Chronic) Health Hazard

**Canada**

**United States**

**Section 16. Other information**

**Reactivity**

**Personal protection**

CONTENTS UNDER PRESSURE.

CAUSES DAMAGE TO THE FOLLOWING ORGANS: LUNGS, CARDIOVASCULAR

SYSTEM, SKIN, EYES, CENTRAL NERVOUS SYSTEM, EYE, LENS OR CORNEA.

MAY CAUSE RESPIRATORY TRACT, EYE AND SKIN IRRITATION.

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 35 of 73**

**CORTROL OS5607**

**1 Identification**

**Identification of substance or preparation**

CORTROL OS5607

**Product Application Area**

Water based dissolved oxygen scavenger/metal passivator.

**Company/Undertaking Identification**

GE Betz, Inc.

4636 Somerton Road

Treose, PA 19053

T 215 355-3300, F 215 953 5524

**Emergency Telephone**

(800) 877-1940

Prepared by Product Stewardship Group: T 215-355-3300 Prepared on: 25-MAY-2011

**2 Hazard(s) identification**

**EMERGENCY OVERVIEW**

**CAUTION**

May cause slight irritation to the skin. May cause slight irritation to the eyes. Mists/aerosols may cause irritation to upper respiratory tract.

DOT hazard is not applicable

Odor: Slight; Appearance: Colorless To Light Yellow, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: dry chemical, carbon dioxide, foam or water

**POTENTIAL HEALTH EFFECTS**

**ACUTE SKIN EFFECTS:**

Primary route of exposure; May cause slight irritation to the skin.

**ACUTE EYE EFFECTS:**

May cause slight irritation to the eyes.

**ACUTE RESPIRATORY EFFECTS:**

Mists/aerosols may cause irritation to upper respiratory tract.

Substance or Preparation: CORTROL OS5607 Page 1

**INGESTION EFFECTS:**

May cause gastrointestinal irritation.

**TARGET ORGANS:**

No evidence of potential chronic effects.

**MEDICAL CONDITIONS AGGRAVATED:**

Not known.

**SYMPTOMS OF EXPOSURE:**

May cause redness or itching of skin.

**3 Composition / information on ingredients**

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

**HAZARDOUS INGREDIENTS:**

Cas# Chemical Name Range(w/w%)

497-18-7 CARBONIC DIHYDRAZIDE 5-10

Exothermic hydrolysis to hydrazine can occur with high temperature; also occurs by contact with mineral acids, oxidizers, or low grade metals; irritant (skin and eyes)

Aviod contact with low grade metals (LCS, AL, Cu), mineral acids and oxidizers to avoid accelerated actives degradation.

Do not mix with other chemicals. Feed independently to system.

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 36 of 73**

#### **4 First-aid measures**

**SKIN CONTACT:**

Wash thoroughly with soap and water. Remove contaminated clothing. Get medical attention if irritation develops or persists.

**EYE CONTACT:**

Remove contact lenses. Hold eyelids apart. Immediately flush eyes with plenty of low-pressure water for at least 15 minutes. Get medical attention if irritation persists after flushing.

**INHALATION:**

If nasal, throat or lung irritation develops - remove to fresh air and get medical attention.

**INGESTION:**

Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 2-8 fluid ounces (60-240 mL) of milk or water.

**NOTES TO PHYSICIANS:**

No special instructions

#### **5 Fire-fighting measures**

Substance or Preparation: CORTROL OS5607 Page 2

**FIRE FIGHTING INSTRUCTIONS:**

Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

**EXTINGUISHING MEDIA:**

dry chemical, carbon dioxide, foam or water

**HAZARDOUS DECOMPOSITION PRODUCTS:**

oxides of carbon and nitrogen

**FLASH POINT:**

> 200F > 93C P-M(CC)

#### **6 Accidental release measures**

**PROTECTION AND SPILL CONTAINMENT:**

Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.

**DISPOSAL INSTRUCTIONS:**

Water contaminated with this product may be sent to a sanitary sewer treatment facility, in accordance with any local agreement, a permitted waste treatment facility or discharged under a permit. Product as is - Incinerate or land dispose in an approved landfill.

#### **7 Handling and storage**

**HANDLING:**

Contact with oxidizers, peroxide and metal oxide may result in a violent reaction. Contamination with low pH products and low grade metal accelerate decomposition to hydrazine.

**STORAGE:**

Keep containers closed when not in use. Store in a manner that minimizes potential contamination. Store only in vented containers. Protect from freezing. Shelf life 180 days.

#### **8 Exposure controls / personal protection**

**EXPOSURE LIMITS**

**CHEMICAL NAME**

CARBONIC DIHYDRAZIDE

PEL (OSHA): LIMITS HAVE NOT BEEN ESTABLISHED BY US OSHA.

TLV (ACGIH): LIMITS HAVE NOT BEEN ESTABLISHED BY ACGIH.

**ENGINEERING CONTROLS:**

adequate ventilation

**PERSONAL PROTECTIVE EQUIPMENT:**

Use protective equipment in accordance with 29CFR 1910 Subpart I

**RESPIRATORY PROTECTION:**

A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.

USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.

If air-purifying respirator use is appropriate, use a respirator with ammonia/methylamine cartridges.

**SKIN PROTECTION:**

rubber, viton or neoprene gloves -- Wash off after each use.

Substance or Preparation: CORTROL OS5607 Page 3

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 37 of 73**

Replace as necessary.

**EYE PROTECTION:**

splash proof chemical goggles

**9 Physical and chemical properties**

Spec. Grav.(70F,21C) 1.021 Vapor Pressure (mmHG) ~ 18.0

Freeze Point (F) 32 Vapor Density (air=1) < 1.00

Freeze Point (C) 0

Viscosity(cps 70F,21C) 9 % Solubility (water) 100.0

Odor Slight

Appearance Colorless To Light Yellow

Physical State Liquid

Flash Point P-M(CC) > 200F > 93C

pH As Is (approx.) 8.0

Evaporation Rate (Ether=1) < 1.00

Percent VOC: 0.0

NA = not applicable ND = not determined

**10 Stability and reactivity**

**CHEMICAL STABILITY:**

Stable under normal storage conditions.

**POSSIBILITY OF HAZARDOUS REACTIONS:**

Contact with water reactive compounds may cause fire or explosion.

**INCOMPATIBILITIES:**

May react with strong oxidizers.

**DECOMPOSITION PRODUCTS:**

oxides of carbon and nitrogen

**11 Toxicological information**

Oral LD50 RAT: >2,000 mg/kg

NOTE - Value is for testing of similar material.

Dermal LD50 RABBIT: >2,000 mg/kg

NOTE - Value is for testing of similar material.

Skin Irritation Score RABBIT: 0.23

NOTE - Value is for testing of similar material.

Eye Irritation Score RABBIT: 0.33

NOTE - Value is for testing of similar material.

**12 Ecological information**

Substance or Preparation: CORTROL OS5607 Page 4

**AQUATIC TOXICOLOGY**

Ceriodaphnia 48 Hour Static Renewal Bioassay

LC50= 160; 10% Mortality= 96 mg/L

Daphnia magna 48 Hour Static Renewal Bioassay

LC50= 850; No Effect Level= 190 mg/L

Fathead Minnow 96 Hour Static Renewal Bioassay

LC50= 260; 5% Mortality= 96 mg/L

**BIODEGRADATION**

No Data Available.

**13 Disposal considerations**

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :

Not applicable.

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

**14 Transport information**

Transportation Hazard: Not Applicable

DOT: Not Regulated

DOT EMERGENCY RESPONSE GUIDE #: Not applicable

Note: Some containers may be DOT exempt, please check BOL for exact container classification

IATA: Not Regulated

IMDG: Not Regulated

**15 Regulatory information**

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 38 of 73**

**TSCA:**

All components of this product are included on or are in compliance with the U.S. TSCA regulations.

**CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):**

No regulated constituent present at OSHA thresholds

**NSF Registered and/or meets USDA (according to 1998 Guidelines):**

Registration number: Not Registered

**SARA SECTION 312 HAZARD CLASS:**

Immediate(acute)

**SARA SECTION 302 CHEMICALS:**

No regulated constituent present at OSHA thresholds

**SARA SECTION 313 CHEMICALS:**

No regulated constituent present at OSHA thresholds

**CALIFORNIA REGULATORY INFORMATION**

**CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65):**

This product contains one or more ingredients at trace levels known to the state of California to cause cancer and reproductive toxicity.

Substance or Preparation: CORTROL OS5607 Page 5

**MICHIGAN REGULATORY INFORMATION**

No regulated constituent present at OSHA thresholds

**16 Other information**

**HMIS VII CODE TRANSLATION**

Health 1 Slight Hazard

Fire 1 Slight Hazard

Reactivity 0 Minimal Hazard

Special NONE No special Hazard

(1) Protective Equipment B Goggles,Gloves

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 39 of 73**

**FLOGARD MS6209**

**1 Identification**

**Identification of substance or preparation**

FLOGARD MS6209

**Product Application Area**

Water-based corrosion inhibitor.

**Company/Undertaking Identification**

GE Betz, Inc.

4636 Somerton Road

Trevose, PA 19053

T 215 355-3300, F 215 953 5524

**Emergency Telephone**

(800) 877-1940

Prepared by Product Stewardship Group: T 215-355-3300 Prepared on: 03-OCT-2011

**2 Hazard(s) identification**

\*\*\*\*\*

**EMERGENCY OVERVIEW**

**DANGER**

Corrosive to skin. Corrosive to the eyes. Mists/aerosols cause irritation to the upper respiratory tract.

DOT hazard: Corrosive to skin/steel

Odor: Slight; Appearance: Colorless To Yellow, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media:

dry chemical/CO2/foam or water--slippery condition; use sand/grit.

\*\*\*\*\*

**POTENTIAL HEALTH EFFECTS**

**ACUTE SKIN EFFECTS:**

Primary route of exposure; Corrosive to skin.

**ACUTE EYE EFFECTS:**

Corrosive to the eyes.

**ACUTE RESPIRATORY EFFECTS:**

Mists/aerosols cause irritation to the upper respiratory tract.

**INGESTION EFFECTS:**

Substance or Preparation: FLOGARD MS6209 Page 1

May cause severe irritation or burning of mouth, throat, and gastrointestinal tract with severe chest and abdominal pain, nausea, vomiting, diarrhea, lethargy and collapse. Possible death when ingested in very large doses.

**TARGET ORGANS:**

Prolonged or repeated exposures may cause tissue necrosis.

**MEDICAL CONDITIONS AGGRAVATED:**

Not known.

**SYMPTOMS OF EXPOSURE:**

Causes severe irritation, burns or tissue ulceration with subsequent scarring.

**3 Composition / information on ingredients**

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

**HAZARDOUS INGREDIENTS:**

Cas# Chemical Name Range(w/w%)

13598-37-3 PHOSPHORIC ACID, ZINC SALT (2:1) 40-70

Irritant

7664-38-2 PHOSPHORIC ACID 15-40

Corrosive

**4 First-aid measures**

**SKIN CONTACT:**

URGENT! Wash thoroughly with soap and water. Remove contaminated clothing. Get immediate medical attention. Thoroughly wash clothing

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 40 of 73**

before reuse.

**EYE CONTACT:**

URGENT! Immediately flush eyes with plenty of low-pressure water for at least 20 minutes while removing contact lenses. Hold eyelids apart. Get immediate medical attention.

**INHALATION:**

Remove to fresh air. If breathing is difficult, give oxygen. If breathing has stopped, give artificial respiration. Get immediate medical attention.

**INGESTION:**

Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Rinse mouth with plenty of water. Dilute contents of stomach using 4-10 fluid ounces (120-300 mL) of milk or water.

**NOTES TO PHYSICIANS:**

Material is corrosive. It may not be advisable to induce vomiting. Possible mucosal damage may contraindicate the use of gastric lavage.

Substance or Preparation: FLOGARD MS6209 Page 2

**5 Fire-fighting measures**

**FIRE FIGHTING INSTRUCTIONS:**

Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

**EXTINGUISHING MEDIA:**

dry chemical/CO2/foam or water--slippery condition; use sand/grit.

**HAZARDOUS DECOMPOSITION PRODUCTS:**

oxides of phosphorus

**FLASH POINT:**

> 200F > 93C P-M(CC)

**MISCELLANEOUS:**

Corrosive to skin/steel

UN 1805;Emergency Response Guide #154

**6 Accidental release measures**

**PROTECTION AND SPILL CONTAINMENT:**

Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.

**DISPOSAL INSTRUCTIONS:**

Water contaminated with this product may be sent to a sanitary sewer treatment facility, in accordance with any local agreement, a permitted waste treatment facility or discharged under a permit. Product as is - Incinerate or land dispose in an approved landfill.

**7 Handling and storage**

**HANDLING:**

Acidic. Corrosive(Skin/eyes). Do not mix with alkaline material.

**STORAGE:**

Keep containers closed when not in use. Preferably stored between 40-100F (5-38C).

**8 Exposure controls / personal protection**

**EXPOSURE LIMITS**

**CHEMICAL NAME**

PHOSPHORIC ACID, ZINC SALT (2:1)

PEL (OSHA): LIMITS HAVE NOT BEEN ESTABLISHED BY US OSHA.

TLV (ACGIH): LIMITS HAVE NOT BEEN ESTABLISHED BY ACGIH.

PHOSPHORIC ACID

PEL (OSHA): 1 MG/M3

TLV (ACGIH): TWA = 1 MG/M3; STEL = 3 MG/M3

MISC: NIOSH REL = 1 MG/M3; NIOSH STEL = 3 MG/M3; NIOSH IDLH = 1000 MG/M3

**ENGINEERING CONTROLS:**

Adequate ventilation to maintain air contaminants below exposure limits.

**PERSONAL PROTECTIVE EQUIPMENT:**

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 41 of 73**

Use protective equipment in accordance with 29CFR 1910 Subpart I

Substance or Preparation: FLOGARD MS6209 Page 3

**RESPIRATORY PROTECTION:**

A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE. USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.

If air-purifying respirator use is appropriate, use any of the following particulate respirators: N95, N99, N100, R95, R99, R100, P95, P99 or P100.

**SKIN PROTECTION:**

gauntlet-type rubber, butyl or neoprene gloves, chemical resistant apron -- Wash off after each use. Replace as necessary.

**EYE PROTECTION:**

splash proof chemical goggles, face shield

**9 Physical and chemical properties**

Spec. Grav.(70F,21C) 1.711 Vapor Pressure (mmHG) ~ 15.0

Freeze Point (F) < -30 Vapor Density (air=1) < 1.00

Freeze Point (C) < -34

Viscosity(cps 70F,21C) 70 % Solubility (water) 100.0

Odor Slight

Appearance Colorless To Yellow

Physical State Liquid

Flash Point P-M(CC) > 200F > 93C

pH As Is (approx.) < 1.0

Evaporation Rate (Ether=1) < 1.00

Percent VOC: 0.0

NA = not applicable ND = not determined

**10 Stability and reactivity**

**CHEMICAL STABILITY:**

Stable under normal storage conditions.

**POSSIBILITY OF HAZARDOUS REACTIONS:**

Contact with strong bases may cause a violent reaction releasing heat.

**INCOMPATIBILITIES:**

May react with bases or strong oxidizers.

**DECOMPOSITION PRODUCTS:**

oxides of phosphorus

**11 Toxicological information**

Oral LD50 RAT: 2830 mg/kg

NOTE - Calculated value according to GHS additivity formula

Dermal LD50 RABBIT: 3890 mg/kg

NOTE - Calculated value according to GHS additivity formula

Skin Irritation Score RABBIT: CORROSIVE

NOTE - EPA Category I

Eye Irritation Score RABBIT: CORROSIVE

NOTE - Estimated value

Substance or Preparation: FLOGARD MS6209 Page 4

**12 Ecological information**

**AQUATIC TOXICOLOGY**

Ceriodaphnia 48 Hour Static Renewal Bioassay

LC50= 1.5; No Effect Level= .63 mg/L

Ceriodaphnia 7 Day Static Renewal Bioassay

IC25 = 1.9 mg/L

Daphnia magna 48 Hour Static Renewal Bioassay

LC50= 12; No Effect Level= 1.5 mg/L

Fathead Minnow 7 Day Static Renewal Bioassay

IC25 = 5 mg/L

Fathead Minnow 96 Hour Static Renewal Bioassay

LC50= 14; No Effect Level= 2.5 mg/L

Rainbow Trout 96 Hour Static Renewal Bioassay

LC50= 4.9; No Effect Level= 1.6 mg/L

**BIODEGRADATION**

Product contains only inorganics that are not subject to typical biological degradation. Assimilation by microbes may occur in

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 42 of 73**

waste treatment or the environment.

### 13 Disposal considerations

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :  
D002=Corrosive (pH,steel); D006=Cadmium; D008=Lead.  
Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

### 14 Transport information

Transportation Hazard: Corrosive to skin/steel  
DOT: PHOSPHORIC ACID SOLUTION  
8, UN 1805, PG III, RQ  
DOT EMERGENCY RESPONSE GUIDE #: 154  
Note: Some containers may be DOT exempt, please check BOL for exact container classification  
IATA: PHOSPHORIC ACID SOLUTION  
8, UN 1805, PG III  
IMDG: PHOSPHORIC ACID SOLUTION  
8, UN 1805, PG III

### 15 Regulatory information

#### TSCA:

All components of this product are included on or are in compliance with the U.S. TSCA regulations.

#### CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):

1,962 gallons due to PHOSPHORIC ACID;

#### FOOD AND DRUG ADMINISTRATION:

Substance or Preparation: FLOGARD MS6209 Page 5  
21 CFR 176.170 (components of paper and paperboard in contact with aqueous and fatty foods)

#### NSF Registered and/or meets USDA (according to 1998 Guidelines):

Registration number: 140901

Category Code(s):

#### SARA SECTION 312 HAZARD CLASS:

Immediate(acute);Delayed(Chronic)

#### SARA SECTION 302 CHEMICALS:

No regulated constituent present at OSHA thresholds

#### SARA SECTION 313 CHEMICALS:

CAS# CHEMICAL NAME RANGE  
13598-37-3 PHOSPHORIC ACID, ZINC SALT (2:1) 41.0-50.0%

#### CALIFORNIA REGULATORY INFORMATION

#### CALIFORNIA SAFE DRINKING WATER AND TOXIC

#### ENFORCEMENT ACT (PROPOSITION 65):

This product contains one or more ingredients at trace levels known to the state of California to cause cancer and reproductive toxicity.

#### MICHIGAN REGULATORY INFORMATION

No regulated constituent present at OSHA thresholds

### 16 Other information

#### HMIS VII CODE TRANSLATION

Health 3 Serious Hazard

Fire 0 Minimal Hazard

Reactivity 0 Minimal Hazard

Special CORR DOT corrosive

(1) Protective Equipment D Goggles,Face Shield,Gloves,Apron

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

### 1 Identification

#### Identification of substance or preparation

GENGARD GN8004

#### Product Application Area

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 43 of 73**

Corrosion inhibitor

**Company/Undertaking Identification**

GE Betz, Inc.  
4636 Somerton Road  
Trevose, PA 19053  
T 215 355-3300, F 215 953 5524

**Emergency Telephone**

(800) 877-1940

Prepared by Product Stewardship Group: T 215-355-3300 Prepared on: 30-MAR-2012

**2 Hazard(s) identification**

**EMERGENCY OVERVIEW**

**CAUTION**

May cause slight irritation to the skin. May cause slight irritation to the eyes. Not expected to cause respiratory tract irritation.

DOT hazard is not applicable

Odor: Mild; Appearance: Amber, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: dry chemical, carbon dioxide, foam or water

**POTENTIAL HEALTH EFFECTS**

**ACUTE SKIN EFFECTS:**

Primary route of exposure; May cause slight irritation to the skin.

**ACUTE EYE EFFECTS:**

May cause slight irritation to the eyes.

**ACUTE RESPIRATORY EFFECTS:**

Not expected to cause respiratory tract irritation.

Substance or Preparation: GENGARD GN8004 Page 1

**INGESTION EFFECTS:**

May cause gastrointestinal irritation with possible nausea, vomiting, abdominal discomfort and diarrhea.

**TARGET ORGANS:**

Repeated skin contact may cause sensitization.

**MEDICAL CONDITIONS AGGRAVATED:**

Not known.

**SYMPTOMS OF EXPOSURE:**

May cause redness or itching of skin.

**3 Composition / information on ingredients**

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

**HAZARDOUS INGREDIENTS:**

This product is not hazardous as defined by OSHA regulations. No component is considered to be a carcinogen by the National Toxicology Program, the International Agency for Research on Cancer, or the Occupational Safety and Health Administration at OSHA thresholds for carcinogens.

**4 First-aid measures**

**SKIN CONTACT:**

Wash thoroughly with soap and water. Remove contaminated clothing. Get medical attention if irritation develops or persists.

**EYE CONTACT:**

Remove contact lenses. Hold eyelids apart. Immediately flush eyes with plenty of low-pressure water for at least 15 minutes. Get medical attention if irritation persists after flushing.

**INHALATION:**

If nasal, throat or lung irritation develops - remove to fresh air and get medical attention.

**INGESTION:**

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 44 of 73**

Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 2-8 fluid ounces (60-240 mL) of milk or water.

**NOTES TO PHYSICIANS:**

No special instructions

**5 Fire-fighting measures**

Substance or Preparation: GENGARD GN8004 Page 2

**FIRE FIGHTING INSTRUCTIONS:**

Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

**EXTINGUISHING MEDIA:**

dry chemical, carbon dioxide, foam or water

**HAZARDOUS DECOMPOSITION PRODUCTS:**

oxides of carbon

**FLASH POINT:**

> 213F > 101C P-M(CC)

**6 Accidental release measures**

**PROTECTION AND SPILL CONTAINMENT:**

Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.

**DISPOSAL INSTRUCTIONS:**

Water contaminated with this product may be sent to a sanitary sewer treatment facility, in accordance with any local agreement, a permitted waste treatment facility or discharged under a permit. Product as is - Incinerate or land dispose in an approved landfill.

**7 Handling and storage**

**HANDLING:**

Normal chemical handling.

**STORAGE:**

Keep containers closed when not in use. Store in cool ventilated location. Store away from oxidizers. Shelf life 360 days.

**8 Exposure controls / personal protection**

**EXPOSURE LIMITS**

This product is not hazardous as defined by OSHA regulations.

**ENGINEERING CONTROLS:**

adequate ventilation

**PERSONAL PROTECTIVE EQUIPMENT:**

Use protective equipment in accordance with 29CFR 1910 Subpart I

**RESPIRATORY PROTECTION:**

A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.

USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.

If air-purifying respirator use is appropriate, use any of the following particulate respirators: N95, N99, N100, R95, R99, R100, P95, P99 or P100.

**SKIN PROTECTION:**

rubber, butyl, viton or neoprene gloves -- Wash off after each use. Replace as necessary.

**EYE PROTECTION:**

splash proof chemical goggles

Substance or Preparation: GENGARD GN8004 Page 3

**9 Physical and chemical properties**

Spec. Grav.(70F,21C) 1.134 Vapor Pressure (mmHG) ~ 18.0

Freeze Point (F) 25 Vapor Density (air=1) < 1.00

Freeze Point (C) -4

Viscosity(cps 70F,21C) 44 % Solubility (water) 100.0

Odor Mild

Appearance Amber

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 45 of 73**

Physical State Liquid

Flash Point P-M(CC) > 213F > 101C

pH As Is (approx.) 5.0

Evaporation Rate (Ether=1) < 1.00

Percent VOC: 0.0

**NA = not applicable ND = not determined**

## 10 Stability and reactivity

### CHEMICAL STABILITY:

Stable under normal storage conditions.

### POSSIBILITY OF HAZARDOUS REACTIONS:

Contact with water reactive compounds may cause fire or explosion.

### INCOMPATIBILITIES:

May react with strong oxidizers.

### DECOMPOSITION PRODUCTS:

oxides of carbon

## 11 Toxicological information

Oral LD50 RAT: >5000 mg/kg

NOTE - Calculated value according to GHS additivity formula

Dermal LD50 RABBIT: >5000 mg/kg

NOTE - Calculated value according to GHS additivity formula

## 12 Ecological information

### AQUATIC TOXICOLOGY

Ceriodaphnia 48 Hour Static Acute Bioassay

LC50= 1707.6; No Effect Level= 1250 mg/L

Daphnia magna 48 Hour Static Acute Bioassay

LC50= 3677; No Effect Level= 2500 mg/L

Fathead Minnow 96 Hour Static Acute Bioassay

LC50= 2367; No Effect Level= 1250 mg/L

Rainbow Trout 96 Hour Static Acute Bioassay

LC50= 1894; No Effect Level= 1250 mg/L

### BIODEGRADATION

BOD-28 (mg/g): 24

BOD-5 (mg/g): 0

COD (mg/g): 385

TOC (mg/g): 109

## 13 Disposal considerations

Substance or Preparation: GENGARD GN8004 Page 4

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :

Not applicable.

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

## 14 Transport information

Transportation Hazard: Not Applicable

DOT: Not Regulated

DOT EMERGENCY RESPONSE GUIDE #: Not applicable

Note: Some containers may be DOT exempt, please check BOL for exact container classification

IATA: Not Regulated

IMDG: Not Regulated

## 15 Regulatory information

### TSCA:

All components of this product are included on or are in compliance with the U.S. TSCA regulations.

### CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):

No regulated constituent present at OSHA thresholds

### NSF Registered and/or meets USDA (according to 1998 Guidelines):

Registration number: Not Registered

### SARA SECTION 312 HAZARD CLASS:

Delayed(Chronic)

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 46 of 73**

**SARA SECTION 302 CHEMICALS:**

No regulated constituent present at OSHA thresholds

**SARA SECTION 313 CHEMICALS:**

No regulated constituent present at OSHA thresholds

**CALIFORNIA REGULATORY INFORMATION**

**CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65):**

This product contains one or more ingredients at trace levels known to the state of California to cause cancer.

**MICHIGAN REGULATORY INFORMATION**

No regulated constituent present at OSHA thresholds

**16 Other information**

**HMIS VII CODE TRANSLATION**

Health 1 Slight Hazard

Fire 1 Slight Hazard

Reactivity 0 Minimal Hazard

Special NONE No special Hazard

(1) Protective Equipment B Goggles, Gloves

Substance or Preparation: GENGARD GN8004 Page 5

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 47 of 73**

**OPTISPERSE HP3100**

**1 Identification**

**Identification of substance or preparation**

OPTISPERSE HP3100

**Product Application Area**

Water based internal boiler treatment chemical.

**Company/Undertaking Identification**

GE Betz, Inc.

4636 Somerton Road

Trevose, PA 19053

T 215 355-3300, F 215 953 5524

**Emergency Telephone**

(800) 877-1940

Prepared by Product Stewardship Group: T 215-355-3300 Prepared on: 03-FEB-2012

**2 Hazard(s) identification**

**EMERGENCY OVERVIEW**

**DANGER**

Corrosive to skin. Corrosive to the eyes. Mists/aerosols may cause irritation to upper respiratory tract.

DOT hazard: Corrosive to skin

Odor: None; Appearance: Colorless To Light Yellow, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media:

dry chemical, carbon dioxide, foam or water

**POTENTIAL HEALTH EFFECTS**

**ACUTE SKIN EFFECTS:**

Primary route of exposure; Corrosive to skin.

**ACUTE EYE EFFECTS:**

Corrosive to the eyes.

**ACUTE RESPIRATORY EFFECTS:**

Mists/aerosols may cause irritation to upper respiratory tract.

**INGESTION EFFECTS:**

Substance or Preparation: OPTISPERSE HP3100 Page 1

May cause gastrointestinal irritation.

**TARGET ORGANS:**

No evidence of potential chronic effects.

**MEDICAL CONDITIONS AGGRAVATED:**

Not known.

**SYMPTOMS OF EXPOSURE:**

May cause redness or itching of skin, irritation, and/or tearing of eyes (direct contact).

**3 Composition / information on ingredients**

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

**HAZARDOUS INGREDIENTS:**

Cas# Chemical Name Range(w/w%)

1310-73-2 SODIUM HYDROXIDE 3-7

Corrosive; toxic (by ingestion)

**4 First-aid measures**

**SKIN CONTACT:**

URGENT! Wash thoroughly with soap and water. Remove contaminated clothing. Get immediate medical attention. Thoroughly wash clothing before reuse.

**EYE CONTACT:**

URGENT! Immediately flush eyes with plenty of low-pressure water for at least 20 minutes while removing contact lenses. Hold eyelids apart. Get immediate medical attention.

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 48 of 73**

**INHALATION:**

If nasal, throat or lung irritation develops - remove to fresh air and get medical attention.

**INGESTION:**

Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 2-8 fluid ounces (60-240 mL) of milk or water.

**NOTES TO PHYSICIANS:**

No special instructions

**5 Fire-fighting measures**

**FIRE FIGHTING INSTRUCTIONS:**

Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

**EXTINGUISHING MEDIA:**

dry chemical, carbon dioxide, foam or water

**HAZARDOUS DECOMPOSITION PRODUCTS:**

oxides of phosphorus

Substance or Preparation: OPTISPERSE HP3100 Page 2

**FLASH POINT:**

> 200F > 93C P-M(CC)

**MISCELLANEOUS:**

Corrosive to skin

UN 3266;Emergency Response Guide #154

**6 Accidental release measures**

**PROTECTION AND SPILL CONTAINMENT:**

Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.

**DISPOSAL INSTRUCTIONS:**

Water contaminated with this product may be sent to a sanitary sewer treatment facility, in accordance with any local agreement, a permitted waste treatment facility or discharged under a permit. Product as is - Incinerate or land dispose in an approved landfill.

**7 Handling and storage**

**HANDLING:**

Alkaline. Corrosive(Eyes). Do not mix with acidic material.

**STORAGE:**

Shelf life = 180 days. Keep containers closed when not in use. Protect from freezing. If frozen, thaw and mix completely prior to use. Store below 100F (38C).

**8 Exposure controls / personal protection**

**EXPOSURE LIMITS**

**CHEMICAL NAME**

SODIUM HYDROXIDE

PEL (OSHA): 2 MG/M3

TLV (ACGIH): TWA (Ceiling) = 2 MG/M3

**ENGINEERING CONTROLS:**

Adequate ventilation to maintain air contaminants below exposure limits.

**PERSONAL PROTECTIVE EQUIPMENT:**

Use protective equipment in accordance with 29CFR 1910 Subpart I

**RESPIRATORY PROTECTION:**

A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.

USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.

If air-purifying respirator use is appropriate, use any of the following particulate respirators: N95, N99, N100, R95, R99, R100, P95, P99 or P100.

**SKIN PROTECTION:**

gauntlet-type rubber, butyl or neoprene gloves, chemical

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 49 of 73**

resistant apron -- Wash off after each use. Replace as necessary.

**EYE PROTECTION:**

splash proof chemical goggles, face shield

Substance or Preparation: OPTISPERSE HP3100 Page 3

**9 Physical and chemical properties**

Spec. Grav.(70F,21C) 1.113 Vapor Pressure (mmHG) ~ 18.0

Freeze Point (F) 21 Vapor Density (air=1) < 1.00

Freeze Point (C) -6

Viscosity(cps 70F,21C) 12 % Solubility (water) 100.0

Odor None

Appearance Colorless To Light Yellow

Physical State Liquid

Flash Point P-M(CC) > 200F > 93C

pH As Is (approx.) > 13.0

Evaporation Rate (Ether=1) < 1.00

Percent VOC: 0.0

NA = not applicable ND = not determined

**10 Stability and reactivity**

**CHEMICAL STABILITY:**

Stable under normal storage conditions.

**POSSIBILITY OF HAZARDOUS REACTIONS:**

Contact with strong acids may cause a violent reaction releasing heat.

**INCOMPATIBILITIES:**

May react with acids or strong oxidizers.

**DECOMPOSITION PRODUCTS:**

oxides of phosphorus

**11 Toxicological information**

Oral LD50 RAT: 2800 mg/kg

NOTE - Calculated value according to GHS additivity formula

Dermal LD50 RABBIT: >5000 mg/kg

NOTE - Calculated value according to GHS additivity formula

**12 Ecological information**

**AQUATIC TOXICOLOGY**

Daphnia magna 48 Hour Static Renewal Bioassay (pH adjusted)

LC50= 3300; No Effect Level= 1250 mg/L

Fathead Minnow 96 Hour Static Renewal Bioassay (pH adjusted)

LC50= 5020; No Effect Level= 2750 mg/L

**BIODEGRADATION**

Product contains only inorganics that are not subject to typical biological degradation. Assimilation by microbes may occur in waste treatment or the environment.

**13 Disposal considerations**

Substance or Preparation: OPTISPERSE HP3100 Page 4

If this undiluted product is discarded as a waste, the US RCRA

hazardous waste identification number is :

D002=Corrosive(pH).

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

**14 Transport information**

Transportation Hazard: Corrosive to skin

DOT: CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S.(SODIUM HYDROXIDE SOLUTION) 8, UN3266, PG III, RQ DOT EMERGENCY RESPONSE GUIDE #: 154

Note: Some containers may be DOT exempt, please check BOL for

exact container classification IATA: CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S.(SODIUM HYDROXIDE SOLUTION) 8, UN3266, PG III

IMDG: CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S.(SODIUM HYDROXIDE SOLUTION)8, UN3266, PG III

**15 Regulatory information**

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 50 of 73**

**TSCA:**

All components of this product are included on or are in compliance with the U.S. TSCA regulations.

**CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):**

2,158 gallons due to SODIUM HYDROXIDE;

**FOOD AND DRUG ADMINISTRATION:**

ALL ingredients in this product are authorized in 21CFR173.310 for use as boiler water additives where the steam may contact food.

**NSF Registered and/or meets USDA (according to 1998 Guidelines):**

Registration number: Not Registered

This product is composed of ingredients previously approved by USDA to meet the G6 classification and may be used in boilers or steamlines where the steam produced may contact edible products.

**SARA SECTION 312 HAZARD CLASS:**

Immediate(acute)

**SARA SECTION 302 CHEMICALS:**

No regulated constituent present at OSHA thresholds

**SARA SECTION 313 CHEMICALS:**

No regulated constituent present at OSHA thresholds

**CALIFORNIA REGULATORY INFORMATION**

**CALIFORNIA SAFE DRINKING WATER AND TOXIC**

**ENFORCEMENT ACT (PROPOSITION 65):**

No regulated constituents present

**MICHIGAN REGULATORY INFORMATION**

No regulated constituent present at OSHA thresholds

Substance or Preparation: OPTISPERSE HP3100 Page 5

**16 Other information**

Fire 0 Minimal Hazard

Reactivity 0 Minimal Hazard

Special CORR DOT corrosive

(1)

**HMIS vII CODE TRANSLATION**

Health 3 Serious Hazard

Protective Equipment D Goggles,Face Shield,Gloves,Apron

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 51 of 73**

## SPECTRUS BD1500

### 1 Identification

**Identification of substance or preparation**

SPECTRUS BD1500

**Product Application Area**

Water-based deposit control agent.

**Company/Undertaking Identification**

GE Betz, Inc.

4636 Somerton Road

Trevese, PA 19053

T 215 355-3300, F 215 953 5524

**Emergency Telephone**

(800) 877-1940

Prepared by Product Stewardship Group: T 215-355-3300 Prepared on: 27-MAY-2011

### 2 Hazard(s) identification

\*\*\*\*\*  
**EMERGENCY OVERVIEW**

**CAUTION**

May cause slight irritation to the skin. May cause moderate irritation to the eyes. Mists/aerosols may cause irritation to upper respiratory tract.

DOT hazard is not applicable

Odor: Slight; Appearance: Colorless, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type). Proper fire-extinguishing media: dry chemical, carbon dioxide, foam or water

\*\*\*\*\*  
**POTENTIAL HEALTH EFFECTS**

**ACUTE SKIN EFFECTS:**

Primary route of exposure; May cause slight irritation to the skin.

**ACUTE EYE EFFECTS:**

May cause moderate irritation to the eyes.

**ACUTE RESPIRATORY EFFECTS:**

Mists/aerosols may cause irritation to upper respiratory tract.

Substance or Preparation: SPECTRUS BD1500 Page 1

**INGESTION EFFECTS:**

May cause slight gastrointestinal irritation.

**TARGET ORGANS:**

No evidence of potential chronic effects.

**MEDICAL CONDITIONS AGGRAVATED:**

Not known.

**SYMPTOMS OF EXPOSURE:**

May cause redness or itching of skin.

### 3 Composition / information on ingredients

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

**HAZARDOUS INGREDIENTS:**

This product is not hazardous as defined by OSHA regulations. No component is considered to be a carcinogen by the National Toxicology Program, the International Agency for Research on Cancer, or the Occupational Safety and Health Administration at OSHA thresholds for carcinogens.

### 4 First-aid measures

**SKIN CONTACT:**

Wash thoroughly with soap and water. Remove contaminated clothing. Get medical attention if irritation develops or persists.

**EYE CONTACT:**

Remove contact lenses. Hold eyelids apart. Immediately flush eyes with plenty of low-pressure water for at least 15 minutes. Get

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 52 of 73**

immediate medical attention.

**INHALATION:**

If nasal, throat or lung irritation develops - remove to fresh air and get medical attention.

**INGESTION:**

Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 2-8 fluid ounces (60-240 mL) of milk or water.

**NOTES TO PHYSICIANS:**

No special instructions

**5 Fire-fighting measures**

Substance or Preparation: SPECTRUS BD1500 Page 2

**FIRE FIGHTING INSTRUCTIONS:**

Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

**EXTINGUISHING MEDIA:**

dry chemical, carbon dioxide, foam or water

**HAZARDOUS DECOMPOSITION PRODUCTS:**

oxides of carbon

**FLASH POINT:**

> 200F > 93C SETA(CC)

**6 Accidental release measures**

**PROTECTION AND SPILL CONTAINMENT:**

Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.

**DISPOSAL INSTRUCTIONS:**

Water contaminated with this product may be sent to a sanitary sewer treatment facility in accordance with any local agreement, a permitted waste treatment facility or discharged under a permit. Product as is - Incinerate or land dispose in an approved landfill.

**7 Handling and storage**

**HANDLING:**

Alkaline. Do not mix with acidic material.

**STORAGE:**

Keep containers closed when not in use. Reasonable and safe chemical storage. Store away from acids.

**8 Exposure controls / personal protection**

**EXPOSURE LIMITS**

This product is not hazardous as defined by OSHA regulations.

**ENGINEERING CONTROLS:**

adequate ventilation

**PERSONAL PROTECTIVE EQUIPMENT:**

Use protective equipment in accordance with 29CFR 1910 Subpart I

**RESPIRATORY PROTECTION:**

A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.

USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.

If air-purifying respirator use is appropriate, use any of the following particulate respirators: N95, N99, N100, R95, R99, R100, P95, P99 or P100.

**SKIN PROTECTION:**

rubber, butyl or viton gloves -- Wash off after each use.

Replace as necessary.

**EYE PROTECTION:**

splash proof chemical goggles

Substance or Preparation: SPECTRUS BD1500 Page 3

**9 Physical and chemical properties**

Spec. Grav.(70F,21C) 1.020 Vapor Pressure (mmHG) ~ 18.0

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 53 of 73**

Freeze Point (F) 31 Vapor Density (air=1) < 1.00  
Freeze Point (C) -1  
Viscosity(cps 70F,21C) 30 % Solubility (water) 100.0  
Odor Slight  
Appearance Colorless  
Physical State Liquid  
Flash Point SETA(CC) > 200F > 93C  
pH As Is (approx.) 12.5  
Evaporation Rate (Ether=1) < 1.00  
Percent VOC: 0.0

**NA = not applicable ND = not determined**

## **10 Stability and reactivity**

### **CHEMICAL STABILITY:**

Stable under normal storage conditions.

### **POSSIBILITY OF HAZARDOUS REACTIONS:**

Contact with strong acids may cause a violent reaction releasing heat. Contact with water reactive compounds may cause fire or explosion.

### **INCOMPATIBILITIES:**

May react with strong oxidizers.

### **DECOMPOSITION PRODUCTS:**

Oxides of carbon

## **11 Toxicological information**

Oral LD50 RAT: >5000 mg/kg

NOTE - Calculated value according to GHS additivity formula

Dermal LD50 RABBIT: >5000 mg/kg

NOTE - Calculated value according to GHS additivity formula

## **12 Ecological information**

### **AQUATIC TOXICOLOGY**

Ceriodaphnia 48 Hour Static Renewal Bioassay

LC50 Greater Than= 3000 mg/L

Ceriodaphnia 7 Day Static Renewal Bioassay

IC25 = 652 mg/L

Daphnia magna 48 Hour Static Acute Bioassay

0% Mortality= 2000 mg/L

Fathead Minnow 7 Day Static Renewal Bioassay

IC25 = 3000; LC50 Greater Than= 3000 mg/L

Fathead Minnow 96 Hour Static Bioassay with 48-Hour Renewal

0% Mortality= 2000 mg/L

Menidia beryllina (Silversides) 96 Hour Static Acute Bioassay

0% Mortality= 5000 mg/L

Mysid Shrimp 96 Hour Static Acute Bioassay

25% Mortality= 5000; No Effect Level= 2500 mg/L

Rainbow Trout 96 Hour Static Renewal Bioassay

Substance or Preparation: SPECTRUS BD1500 Page 4

No Effect Level= 3000 mg/L

No Data Available.

### **BIODEGRADATION**

BOD-28 (mg/g): 5

BOD-5 (mg/g): 4

COD (mg/g): 341

TOC (mg/g): 80

## **13 Disposal considerations**

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :

D002=Corrosive(pH).

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

## **14 Transport information**

Transportation Hazard: Not Applicable

DOT: Not Regulated

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 54 of 73**

DOT EMERGENCY RESPONSE GUIDE #: Not applicable

Note: Some containers may be DOT exempt, please check BOL for exact container classification

IATA: Not Regulated

IMDG: Not Regulated

## 15 Regulatory information

### TSCA:

All components of this product are included on or are in compliance with the U.S. TSCA regulations.

### CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):

No regulated constituent present at OSHA thresholds

### FOOD AND DRUG ADMINISTRATION:

21 CFR 176.170 (components of paper and paperboard in contact with aqueous and fatty foods)

### NSF Registered and/or meets USDA (according to 1998 Guidelines):

Registration number: 141059

Category Code(s): G5 Cooling and retort water treatment products - all food processing areas G7 Boiler treatment products - all food processing areas/nonfood contact

### SARA SECTION 312 HAZARD CLASS:

Product is non-hazardous under Section 311/312

### SARA SECTION 302 CHEMICALS:

No regulated constituent present at OSHA thresholds

### SARA SECTION 313 CHEMICALS:

No regulated constituent present at OSHA thresholds

### CALIFORNIA REGULATORY INFORMATION

Substance or Preparation: SPECTRUS BD1500 Page 5

### CALIFORNIA SAFE DRINKING WATER AND TOXIC

### ENFORCEMENT ACT (PROPOSITION 65):

This product contains one or more ingredients at trace levels known to the state of California to cause cancer and reproductive toxicity.

### MICHIGAN REGULATORY INFORMATION

No regulated constituent present at OSHA thresholds

## 16 Other information

### HMIS VII CODE TRANSLATION

Health 1 Slight Hazard

Fire 0 Minimal Hazard

Reactivity 0 Minimal Hazard

Special ALK pH above 12.0

(1) Protective Equipment B Goggles, Gloves

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 55 of 73**

## SPECTRUS DT1404

### 1 Identification

**Identification of substance or preparation**

SPECTRUS DT1404

**Product Application Area**

Chemical cleaning compound.

**Company/Undertaking Identification**

GE Betz, Inc.

4636 Somerton Road

Treose, PA 19053

T 215 355-3300, F 215 953 5524

**Emergency Telephone**

(800) 877-1940

Prepared by Product Stewardship Group: T 215-355-3300 Prepared on: 17-FEB-2012

### 2 Hazard(s) identification

\*\*\*\*\*  
**EMERGENCY OVERVIEW**

**CAUTION**

May cause slight irritation to the skin. May cause slight irritation to the eyes. Dusts or mists are irritating to mucous membranes. Repeated exposure may result in respiratory sensitization.

DOT hazard: Corrosive to steel

Odor: Mild; Appearance: Colorless To Yellow, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: dry chemical, carbon dioxide, foam or water

\*\*\*\*\*  
**POTENTIAL HEALTH EFFECTS**

**ACUTE SKIN EFFECTS:**

Primary route of exposure; May cause slight irritation to the skin.

**ACUTE EYE EFFECTS:**

May cause slight irritation to the eyes.

**ACUTE RESPIRATORY EFFECTS:**

Dusts or mists are irritating to mucous membranes. Repeated Substance or Preparation: SPECTRUS DT1404 Page 1 exposure may result in respiratory sensitization.

**INGESTION EFFECTS:**

May cause gastrointestinal irritation. Very large doses may cause diarrhea, depression, colic and death. May also cause severe allergic reactions in sensitive individuals.

**TARGET ORGANS:**

Prolonged or repeated exposures may cause primary irritant dermatitis, skin sensitization, and/or allergic respiratory reactions.

**MEDICAL CONDITIONS AGGRAVATED:**

Asthma.

**SYMPTOMS OF EXPOSURE:**

Inhalation may cause eye, nose, throat and lung irritation and possible respiratory sensitization or asthma. Skin contact may cause moderate irritation to severe burns and sensitization.

### 3 Composition / information on ingredients

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

**HAZARDOUS INGREDIENTS:**

Cas# Chemical Name Range(w/w%)

7631-90-5 SODIUM BISULFITE 30-60

may generate SO2 IARC=3 (carcinogen status not classifiable)

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 56 of 73**

#### **4 First-aid measures**

**SKIN CONTACT:**

Wash thoroughly with soap and water. Remove contaminated clothing. Thoroughly wash clothing before reuse. Immediately contact a physician.

**EYE CONTACT:**

Remove contact lenses. Hold eyelids apart. Immediately flush eyes with plenty of low-pressure water for at least 15 minutes. Get immediate medical attention.

**INHALATION:**

If nasal, throat or lung irritation develops - remove to fresh air and get medical attention.

**INGESTION:**

Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 2-8 fluid ounces (60-240 mL) of milk or water.

**NOTES TO PHYSICIANS:**

No special instructions

Substance or Preparation: SPECTRUS DT1404 Page 2

#### **5 Fire-fighting measures**

**FIRE FIGHTING INSTRUCTIONS:**

Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

**EXTINGUISHING MEDIA:**

dry chemical, carbon dioxide, foam or water

**HAZARDOUS DECOMPOSITION PRODUCTS:**

oxides of sulfur

**FLASH POINT:**

> 200F > 93C P-M(CC)

**MISCELLANEOUS:**

Corrosive to steel

UN 2693;Emergency Response Guide #154

#### **6 Accidental release measures**

**PROTECTION AND SPILL CONTAINMENT:**

Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.

**DISPOSAL INSTRUCTIONS:**

Water contaminated with this product may be sent to a sanitary sewer treatment facility, in accordance with any local agreement, a permitted waste treatment facility or discharged under a permit. Product as is - Incinerate or land dispose in an approved landfill.

#### **7 Handling and storage**

**HANDLING:**

Vent carefully before opening. Sulfur dioxide can be formed during the normal use and handling of this product.

**STORAGE:**

Keep containers closed when not in use. Protect from freezing. If frozen, thaw and mix completely prior to use. Shelf life 270 days.

#### **8 Exposure controls / personal protection**

**EXPOSURE LIMITS**

**CHEMICAL NAME**

SODIUM BISULFITE

PEL (OSHA): LIMITS HAVE NOT BEEN ESTABLISHED BY US OSHA.

TLV (ACGIH): TWA = 5 MG/M3; A4

**ENGINEERING CONTROLS:**

Adequate ventilation to maintain air contaminants below exposure limits.

**PERSONAL PROTECTIVE EQUIPMENT:**

Use protective equipment in accordance with 29CFR 1910 Subpart I

**RESPIRATORY PROTECTION:**

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 57 of 73**

A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.

USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED

Substance or Preparation: SPECTRUS DT1404 Page 3

WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.

If air-purifying respirator use is appropriate, use a respirator with acid gas cartridges and any of the following particulate respirators: N95, N99, N100, R95, R99, R100, P95, P99 or P100.

**SKIN PROTECTION:**

rubber, butyl, viton or neoprene gloves -- Wash off after each use. Replace as necessary.

**EYE PROTECTION:**

splash proof chemical goggles

**9 Physical and chemical properties**

Spec. Grav.(70F,21C) 1.360 Vapor Pressure (mmHG) ~ 18.0

Freeze Point (F) 27 Vapor Density (air=1) < 1.00

Freeze Point (C) -3

Viscosity(cps 70F,21C) 20 % Solubility (water) 100.0

Odor Mild

Appearance Colorless To Yellow

Physical State Liquid

Flash Point P-M(CC) > 200F > 93C

pH As Is (approx.) 3.8

Evaporation Rate (Ether=1) < 1.00

Percent VOC: 0.0

NA = not applicable ND = not determined

**10 Stability and reactivity**

**CHEMICAL STABILITY:**

Stable under normal storage conditions.

**POSSIBILITY OF HAZARDOUS REACTIONS:**

No known hazardous reactions.

**INCOMPATIBILITIES:**

May react with strong oxidizers and amines.

**DECOMPOSITION PRODUCTS:**

oxides of sulfur

**11 Toxicological information**

Oral LD50 RAT: 2,000 mg/kg

Dermal LD50 RABBIT: >2,000 mg/kg

NOTE - Estimated value

**12 Ecological information**

**AQUATIC TOXICOLOGY**

Daphnia magna 48 Hour Static Renewal Bioassay

LC50= 175; No Effect Level= 125 mg/L

Fathead Minnow 96 Hour Static Renewal Bioassay

LC50= 175; No Effect Level= 125 mg/L

Rainbow Trout 96 Hour Static Renewal Bioassay (pH adjusted)

Substance or Preparation: SPECTRUS DT1404 Page 4

LC50= 330; No Effect Level= 125 mg/L

**BIODEGRADATION**

Product contains only inorganics that are not subject to typical biological degradation. Assimilation by microbes may occur in waste treatment or the environment.

**13 Disposal considerations**

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :

D002=Corrosive(steel).

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 58 of 73**

## 14 Transport information

Transportation Hazard: Corrosive to steel

DOT: BISULFITES, AQUEOUS SOLUTIONS, N.O.S.(SODIUM BISULFITE SOLUTION)

8, UN2693, PG III, RQ

DOT EMERGENCY RESPONSE GUIDE #: 154

Note: Some containers may be DOT exempt, please check BOL for exact container classification

IATA: BISULPHITES, AQUEOUS SOLUTIONS, N.O.S.(SODIUM BISULFITE SOLUTION)

8, UN2693, PG III

IMDG: BISULPHITES, AQUEOUS SOLUTION, N.O.S.(SODIUM BISULPHITE SOLUTION)

8, UN2693, PG III

## 15 Regulatory information

**TSCA:**

All components of this product are included on or are in compliance with the U.S. TSCA regulations.

**CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):**

1,104 gallons due to SODIUM BISULFITE;

**NSF Registered and/or meets USDA (according to 1998 Guidelines):**

Registration number: Not Registered

**SARA SECTION 312 HAZARD CLASS:**

Immediate(acute);Delayed(Chronic)

**SARA SECTION 302 CHEMICALS:**

No regulated constituent present at OSHA thresholds

**SARA SECTION 313 CHEMICALS:**

No regulated constituent present at OSHA thresholds

**CALIFORNIA REGULATORY INFORMATION  
CALIFORNIA SAFE DRINKING WATER AND TOXIC  
ENFORCEMENT ACT (PROPOSITION 65):**

No regulated constituents present

Substance or Preparation: SPECTRUS DT1404 Page 5

**MICHIGAN REGULATORY INFORMATION**

No regulated constituent present at OSHA thresholds

## 16 Other information

**HMIS VII CODE TRANSLATION**

Health 1 Slight Hazard

Fire 0 Minimal Hazard

Reactivity 0 Minimal Hazard

Special NONE No special Hazard

(1) Protective Equipment B Goggles,Gloves

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

**CHANGE LOG**

EFFECTIVE

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 59 of 73**

## STEAMATE NA1324

### 1 Identification

#### Identification of substance or preparation

STEAMATE NA1324

#### Product Application Area

Steam condensate treatment.

#### Company/Undertaking Identification

GE Betz, Inc.

4636 Somerton Road

Trevoose, PA 19053

T 215 355-3300, F 215 953 5524

#### Emergency Telephone

(800) 877-1940

Prepared by Product Stewardship Group: T 215-355-3300 Prepared on: 30-NOV-2011

### 2 Hazard(s) identification

#### EMERGENCY OVERVIEW

##### DANGER

Corrosive. Absorbed by skin. Corrosive to the eyes. Vapors, gases, mists and/or aerosols cause irritation to the upper respiratory tract.

DOT hazard: Corrosive to skin

Odor: Strong Ammonia; Appearance: Colorless, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type). Proper fire-extinguishing media: dry chemical, carbon dioxide, foam or water

#### POTENTIAL HEALTH EFFECTS

##### ACUTE SKIN EFFECTS:

Primary route of exposure; Corrosive. Absorbed by skin.

##### ACUTE EYE EFFECTS:

Corrosive to the eyes.

##### ACUTE RESPIRATORY EFFECTS:

Primary route of exposure; Vapors, gases, mists and/or aerosols cause irritation to the upper respiratory tract.

Substance or Preparation: STEAMATE NA1324 Page 1

##### INGESTION EFFECTS:

May cause severe irritation or burning of mouth, throat, and gastrointestinal tract with severe chest and abdominal pain, nausea, vomiting, diarrhea, lethargy and collapse. Possible death when ingested in very large doses.

##### TARGET ORGANS:

Prolonged or exposures may cause primary irritant dermatitis, tissue necrosis, and/or toxicity to the liver and kidney.

##### MEDICAL CONDITIONS AGGRAVATED:

Pre-existing skin disorders and chronic respiratory disease.

##### SYMPTOMS OF EXPOSURE:

Symptoms range from headache, eye irritation, chest pain, nausea and vomiting to severe coughing, difficulty in breathing, pulmonary edema and production of pink frothy sputum.

### 3 Composition / information on ingredients

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

#### HAZARDOUS INGREDIENTS:

Cas# Chemical Name Range(w/w%)

1336-21-6 AMMONIUM HYDROXIDE 30-60

Corrosive; toxic (by ingestion)

141-43-5 MONOETHANOLAMINE 3-7

Combustible; corrosive; irritant; CNS depressant; may cause liver and kidney toxicity; fetotoxic and

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 60 of 73**

developmental toxin in laboratory animals

#### **4 First-aid measures**

**SKIN CONTACT:**

URGENT! Wash thoroughly with soap and water. Remove contaminated clothing. Get immediate medical attention. Thoroughly wash clothing before reuse.

**EYE CONTACT:**

URGENT! Immediately flush eyes with plenty of low-pressure water for at least 20 minutes while removing contact lenses. Hold eyelids apart. Get immediate medical attention.

**INHALATION:**

If nasal, throat or lung irritation develops - remove to fresh air and get medical attention.

**INGESTION:**

Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Rinse mouth with plenty of water. Dilute contents of stomach using 4-10 fluid ounces (120-300 mL) of milk or water.

Substance or Preparation: STEAMATE NA1324 Page 2

**NOTES TO PHYSICIANS:**

Material is corrosive. It may not be advisable to induce vomiting. Possible mucosal damage may contraindicate the use of gastric lavage.

#### **5 Fire-fighting measures**

**FIRE FIGHTING INSTRUCTIONS:**

Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

**EXTINGUISHING MEDIA:**

dry chemical, carbon dioxide, foam or water

**HAZARDOUS DECOMPOSITION PRODUCTS:**

oxides of carbon and nitrogen, ammonia and volatile amines

**FLASH POINT:**

> 213F > 101C P-M(CC)

**MISCELLANEOUS:**

Corrosive to skin

UN 2672;Emergency Response Guide #154

#### **6 Accidental release measures**

**PROTECTION AND SPILL CONTAINMENT:**

Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.

**DISPOSAL INSTRUCTIONS:**

Water contaminated with this product may be sent to a sanitary sewer treatment facility, in accordance with any local agreement, a permitted waste treatment facility or discharged under a permit. Product as is - Incinerate or land dispose in an approved landfill.

#### **7 Handling and storage**

**HANDLING:**

Alkaline. Corrosive(Skin/eyes). Do not mix with acidic material.

**STORAGE:**

Keep containers closed when not in use. Store in cool, well ventilated area. Protect from freezing. If frozen, thaw completely and mix thoroughly prior to use. Store away from acids.

#### **8 Exposure controls / personal protection**

**EXPOSURE LIMITS**

**CHEMICAL NAME**

AMMONIUM HYDROXIDE

PEL (OSHA): 50 PPM(35PPM-STEL)

TLV (ACGIH): 25 PPM(35PPM-STEL)

MONOETHANOLAMINE

PEL (OSHA): 3 PPM (6 MG/M3)

TLV (ACGIH): TWA = 3 PPM; STEL = 6 PPM

MISC: NIOSH REL = 3 PPM (8 MG/M3); NIOSH STEL = 6 PPM (15 MG/M3);

NIOSH IDLH = 30 PPM

Substance or Preparation: STEAMATE NA1324 Page 3

**ENGINEERING CONTROLS:**

Adequate ventilation to maintain air contaminants below exposure

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 61 of 73**

limits.

**PERSONAL PROTECTIVE EQUIPMENT:**

Use protective equipment in accordance with 29CFR 1910 Subpart I

**RESPIRATORY PROTECTION:**

A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE. USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.

If air-purifying respirator use is appropriate, use a respirator with ammonia/methylamine cartridges.

**SKIN PROTECTION:**

gauntlet-type butyl or neoprene gloves, chemical resistant apron -- Wash off after each use. Replace as necessary.

**EYE PROTECTION:**

splash proof chemical goggles, face shield

**9 Physical and chemical properties**

Spec. Grav.(70F,21C) 0.936 Vapor Pressure (mmHG) ~ 240.0

Freeze Point (F) -24 Vapor Density (air=1) < 1.00

Freeze Point (C) -31

Viscosity(cps 70F,21C) 6 % Solubility (water) 100.0

Odor Strong Ammonia

Appearance Colorless

Physical State Liquid

Flash Point P-M(CC) > 213F > 101C

pH As Is (approx.) 13.0

Evaporation Rate (Ether=1) < 1.00

Percent VOC: 4.0

NA = not applicable ND = not determined

**10 Stability and reactivity**

**CHEMICAL STABILITY:**

Stable under normal storage conditions.

**POSSIBILITY OF HAZARDOUS REACTIONS:**

Contact with strong acids may cause a violent reaction releasing heat.

**INCOMPATIBILITIES:**

May react with acids.

**DECOMPOSITION PRODUCTS:**

oxides of carbon and nitrogen, ammonia and volatile amines

**11 Toxicological information**

Oral LD50 RAT: 960 mg/kg

NOTE - Calculated value according to GHS additivity formula

Dermal LD50 RABBIT: >5000 mg/kg

NOTE - Calculated value according to GHS additivity formula

Substance or Preparation: STEAMATE NA1324 Page 4

**12 Ecological information**

**AQUATIC TOXICOLOGY**

Daphnia magna 48 Hour Static Acute Bioassay (Estimated)

LC50= 277; 100% Mortality= 165 mg/L

Fathead Minnow 96 Hour Static Acute Bioassay (Estimated)

LC50= 120; No Effect Level= 86 mg/L

**BIODEGRADATION**

BOD-28 (mg/g): 27

BOD-5 (mg/g): 28

COD (mg/g): 62

TOC (mg/g): 17

**13 Disposal considerations**

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is : D002=Corrosive(pH). Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

**14 Transport information**

Transportation Hazard: Corrosive to skin

DOT: AMMONIA SOLUTION

8, UN2672, PG III, RQ

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 62 of 73**

DOT EMERGENCY RESPONSE GUIDE #: 154

Note: Some containers may be DOT exempt, please check BOL for exact container classification

IATA: AMMONIA SOLUTION

8, UN2672, PG III

IMDG: AMMONIA SOLUTION

8, UN2672, PG III

## 15 Regulatory information

### TSCA:

All components of this product are included on or are in compliance with the U.S. TSCA regulations.

### CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):

363 gallons due to AMMONIUM HYDROXIDE;

### NSF Registered and/or meets USDA (according to 1998 Guidelines):

Registration number: Not Registered

### SARA SECTION 312 HAZARD CLASS:

Immediate(acute);Delayed(Chronic)

### SARA SECTION 302 CHEMICALS:

No regulated constituent present at OSHA thresholds

### SARA SECTION 313 CHEMICALS:

CAS# CHEMICAL NAME RANGE

1336-21-6 AMMONIUM HYDROXIDE 31.0-40.0%

### CALIFORNIA REGULATORY INFORMATION

Substance or Preparation: STEAMATE NA1324 Page 5

### CALIFORNIA SAFE DRINKING WATER AND TOXIC

### ENFORCEMENT ACT (PROPOSITION 65):

This product contains one or more ingredients at trace levels known to the state of California to cause cancer and reproductive toxicity.

### MICHIGAN REGULATORY INFORMATION

No regulated constituent present at OSHA thresholds

## 16 Other information

### HMIS vII CODE TRANSLATION

Health 3 Serious Hazard

Fire 0 Minimal Hazard

Reactivity 0 Minimal Hazard

Special CORR DOT corrosive

(1) Protective Equipment D Goggles,Face Shield,Gloves,Apron

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 63 of 73**

## THERMINOL® VP1 Heat transfer fluid

### Material Safety Data Sheet

Product name: THERMINOL® VP1 Heat transfer fluid

Reference Number: 00000000211 Date: 05/18/2012

Company Information:

#### United States: Canada:

Solutia Inc. Solutia Canada Inc.

575 Maryville Center Drive, P.O. Box 66760 7475 Boul Newman Suite 301

St. Louis MO 63166-6760 LaSalle, QC H8N 1X3

Emergency telephone: Chemtrec: 1-800-424-9300 Emergency telephone: CANUTEC: 1-613-996-6666

International Emergency telephone: Chemtrec: 703-527-3887

Non-Emergency telephone: 1-314-674-6661

Non-Emergency telephone: 1-314-674-6661

#### Mexico: Brazil:

Solutia MEXICO, S. DE R.L. DE C.V. Solutia Brazil Ltd.

Prof. Paseo de la Reforma 2654 Local 501, Piso-5

Avenue Carlos Marcondes, 1200 CEP: 12241-420-São José dos Campos/SP-Brazil

Col. Lomas Altas 11950 Mexico, D.F.

Emergency telephone: SETIQ: (in Mexico) 01-800-002-1400

Non-Emergency telephone: (in Mexico) 01-55-5259-6800

Emergency telephone: 55 12 3932 7100 (PABX)

Non-Emergency telephone: 55 11 3365 1800 (PABX)

## 2. HAZARDS IDENTIFICATION

### EMERGENCY OVERVIEW

Form: liquid

Color: clear to colorless

Odor: characteristic

### WARNING STATEMENTS

#### WARNING!

Causes eye irritation

Causes skin irritation

Causes respiratory tract irritation

Contains material which can cause liver and nerve damage

### POTENTIAL HEALTH EFFECTS

Product name: THERMINOL® VP1 Heat transfer fluid Page 2 / 8

Solutia Inc. Material Safety Data Sheet Date: 05/18/2012

Reference Number: 00000000211 Version 5.4/E

Likely routes of exposure:

eye and skin contact

inhalation

Eye contact: Highly irritating to eyes. Skin contact: Highly irritating to skin. Prolonged or repeated skin contact may result in irritant dermatitis. Inhalation: Severely irritating if inhaled. No more than slightly toxic if inhaled. Significant adverse health effects are not expected to develop under normal conditions of exposure. Ingestion: No more than slightly toxic if swallowed. Significant adverse health effects are not expected to develop if only small amounts (less than a mouthful) are swallowed.

Signs and symptoms of overexposure: headache fatigue nausea/vomiting indigestion abdominal pain tremors

Target organs/systems: May cause liver damage. May cause nerve damage. Refer to Section 11 for toxicological information.

## 3. COMPOSITION/INFORMATION ON INGREDIENTS

Components CAS No. Average range

Units

diphenyl ether 101-84-8 73.5 % biphenyl 92-52-4 26.5 %

## 4. FIRST AID MEASURES

If in eyes: Immediately flush with plenty of water for at least 15 minutes.

If easy to do, remove any contact lenses.

Get medical attention.

Remove material from skin and clothing.

If on skin: Immediately flush the area with plenty of water.

Remove contaminated clothing.

Wash skin gently with soap as soon as it is available.

Get medical attention.

Wash clothing before reuse.

If inhaled: Remove patient to fresh air.

If not breathing, give artificial respiration.

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 64 of 73**

If breathing is difficult give oxygen.

Remove material from eyes, skin and clothing.

Product name: THERMINOL® VP1 Heat transfer fluid Page 3 / 8

Solutia Inc. Material Safety Data Sheet Date: 05/18/2012

Reference Number: 00000000211 Version 5.4/E

If swallowed: Immediate first aid is not likely to be required.

A physician or Poison Control Center can be contacted for advice.

Wash heavily contaminated clothing before reuse.

## 5. FIRE FIGHTING MEASURES

Fire point:

127 C

Hazardous products of combustion:

carbon monoxide (CO); carbon dioxide; hydrocarbons

Extinguishing media:

Water spray, foam, dry chemical, or carbon dioxide

Unusual fire and explosion hazards:

None known

Fire fighting equipment:

Firefighters, and others exposed, wear self-contained breathing apparatus.

Equipment should be thoroughly decontaminated after use.

Miscellaneous advice: This product is not classified as a fire-resistant heat transfer fluid.

Precautions to avoid sources of ignitions should be taken.

## 6. ACCIDENTAL RELEASE MEASURES

Personal precautions:

Use personal protection recommended in section 8.

Environmental

precautions:

Keep out of drains and water courses.

Methods for cleaning up:

Contain large spills with dikes and transfer the material to appropriate containers for reclamation or disposal. Absorb remaining material or small spills with an inert material and then place in a chemical waste container. Flush spill area with water.

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

## 7. HANDLING AND STORAGE

Handling

Avoid contact with eyes, skin and clothing.

Avoid breathing vapor or mist.

Keep container closed.

Use with adequate ventilation.

Wash thoroughly after handling.

Precautions against ignitions and fire should be taken with this product.

Heat transfer fluids are intended for INDIRECT heating purposes ONLY.

This product has not been approved for food grade use. Emptied containers retain vapor and product residue. Observe all recommended safety precautions until container is cleaned, reconditioned or destroyed. Do not cut, drill, grind or weld on or near this container. 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 this material safety data sheet. Storage

General: Stable under normal conditions of handling and storage.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Product name: THERMINOL® VP1 Heat transfer fluid Page 4 / 8

Solutia Inc. Material Safety Data Sheet Date: 05/18/2012

Reference Number: 00000000211 Version 5.4/E

Airborne exposure limits: (ml/m3 = ppm)

THERMINOL® VP1

No specific occupational exposure limit has been established.

biphenyl

ACGIH TLV: 0.2 ml/m3 ; mist ; 8-hr TWA

OSHA PEL: 0.2 ml/m3 ; 1.0 mg/m3 ; ; 8-hr TWA

Mexican OEL: 0.2 ml/m3 ; 1.5 mg/m3 ; ; 8-hr TWA

Mexican OEL: 0.6 ml/m3 ; 4 mg/m3 ; ; 15-min STEL

diphenyl ether

ACGIH TLV: 1 ml/m3 ; ; 8-hr TWA

ACGIH TLV: 2 ml/m3 ; ; 15-min STEL

OSHA PEL: 1 ml/m3 ; 7 mg/m3 ; ; 8-hr TWA

Mexican OEL: 1 ml/m3 ; 7 mg/m3 ; ; 8-hr TWA

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 65 of 73**

Mexican OEL: 2 ml/m<sup>3</sup> ; 14 mg/m<sup>3</sup> ; ; 15-min STEL

Eye protection: Wear safety goggles. Have eye flushing equipment available. Hand protection: Wear chemical resistant gloves. Consult the glove/clothing manufacturer to determine the appropriate type glove/clothing for a given application. See Solutia Glove Facts for permeation data. Body protection: Wear suitable protective clothing. Consult the glove/clothing manufacturer to determine the appropriate type glove/clothing for a given application. Wear full protective clothing if exposed to splashes. Wash contaminated skin promptly. Launder contaminated clothing and clean protective equipment before reuse. Wash thoroughly after handling. Have safety shower available at locations where skin contact can occur. Respiratory protection: Avoid breathing vapour or mist. Use approved respiratory protection equipment (full face piece recommended) when airborne exposure limits are exceeded. If used, full facepiece replaces the need for face shield and/or chemical goggles. Consult the respirator manufacturer to determine the appropriate type of equipment for a given application. Observe respirator use limitations specified by the manufacturer. Ventilation: Provide natural or mechanical ventilation to control exposure levels below airborne exposure limits. If practical, use local mechanical exhaust ventilation at sources of air contamination such as processing equipment. Components referred to herein may be regulated by specific Canadian provincial legislation. Please refer to exposure limits legislated for the province in which the substance will be used.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

Flash point: 110 C Pensky-Martens closed tester

124 C Cleveland Open Cup

Product name: THERMINOL® VP1 Heat transfer fluid Page 5 / 8

Solutia Inc. Material Safety Data Sheet Date: 05/18/2012

Reference Number: 00000000211 Version 5.4/E

Autoignition temperature: 612 C ASTM D-2155

Density: 1.06 g/cm<sup>3</sup> @ 25 C

Boiling point : 257 C

Crystallising point : 12 C

Water solubility: ~25 mg/l

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

Conditions to avoid: All sources of ignition.

Materials to avoid: Contact with strong oxidizing agents.

Hazardous reactions: Hazardous polymerization does not occur.

Hazardous decomposition

products:

None known;

## 11. TOXICOLOGICAL INFORMATION

This product has been tested for toxicity. Results from Solutia sponsored studies or from the available public literature are described below.

Acute animal toxicity data

Oral: LD50 , rat, 2,050 mg/kg , No more than slightly toxic

Dermal: LD50 , rabbit, > 5,010 mg/kg , Practically nontoxic after skin application in animal studies.

Inhalation: LC50 , rat, 2.66 mg/l , 4 h, Toxic based on animal inhalation exposure studies.

Skin irritation: rabbit , Slightly irritating to skin., 24 h

Repeat dose toxicity: rat, , inhalation, 13 weeks, , Produced effects on body weight, serum enzymes and/or organ weights in repeat dose studies.

Repeat dose toxicity: rat, , gavage, 26 weeks, , Produced effects on body weight, serum enzymes

and/or organ weights in repeat dose studies. Effects only observed at very high dose levels. Target organs affected kidneys, liver, spleen. Repeat dose toxicity: rat, , diet, subchronic, , Repeated oral exposure produced liver and kidney

changes in animal models. Target organs affected liver, kidneys Developmental toxicity: rat, gavage, , No effects on offspring observed in laboratory animals in the presence of maternal toxicity. Product name: THERMINOL® VP1 Heat transfer fluid

Page 6.

Solutia Inc. Material Safety Data Sheet Date: 05/18/2012

Reference Number: 00000000211 Version 5.4/E

Mutagenicity: No genetic effects were observed in standard tests using bacterial and animal cells.

Components Data from Solutia studies and/or the available scientific literature on the components of this material which have been identified as hazardous chemicals under the criteria of the OSHA Hazard Communication Standard (29 CFR

1910.1200) or the Canadian Hazardous Products Act are discussed below. Biphenyl Chronic exposure has been reported to

cause headache, fatigue, nausea, indigestion, abdominal pain, tremor, central and peripheral nerve damage and liver injury. Slightly toxic following oral administration.

Practically nontoxic after skin application in animal studies.

Practically non irritating to skin (rabbit).

Slightly irritating to eyes (rabbit). No mortality or signs of toxicity at the highest level achievable.

Irritating to respiratory system in animal models. Produced effects on body weight, serum enzymes and/or organ weights in repeat dose studies.

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 66 of 73**

Produced no dermal sensitization (guinea pigs). No effects on offspring observed in laboratory animals in the presence of maternal toxicity.

No genetic effects were observed in standard tests using bacterial and animal cells.

diphenyl ether. Predictive patch testing on human volunteers did not produce irritation or sensitization.

Slightly toxic following oral administration.

Practically nontoxic after skin application in animal studies.

Slightly irritating to eyes (rabbit).

Slightly irritating to skin (rabbit).

Repeated exposure produced respiratory tract irritation in animal models.

Repeated exposure produced eye irritation in animal models.

No genetic effects were observed in standard tests using bacterial and animal cells.

## 12. ECOLOGICAL INFORMATION

Environmental Toxicity Invertebrates 48 h, EC50 Water flea (*Daphnia magna*) 2.4 mg/l Fish: 96 h, LC50 Rainbow trout (*Oncorhynchus mykiss*) 7.6 mg/l 96 h, LC50 Fathead minnow (*Pimephales promelas*) 24 mg/l

Algae: 96 h, EC50 Algae (*Selenastrum capricornutum*) 1.3 mg/l Biodegradation Modified SCAS (OECD 302A) Primary degradation 99 %

## 13. DISPOSAL CONSIDERATIONS

US EPA RCRA Status: This material when discarded may be a hazardous waste as that term is defined by the Resource Conservation and Recovery Act (RCRA), 40 CFR 261.24, due to its toxicity characteristic. This material should be analyzed in accordance with Method 1311 for the compound(s) below.

US EPA RCRA D018 Compound/Characteristic: BENZENE

Product name: THERMINOL® VP1 Heat transfer fluid Page 7 / 8

Solutia Inc. Material Safety Data Sheet Date: 05/18/2012

Reference Number: 00000000211 Version 5.4/E

hazardous waste number:

Disposal considerations:

Incineration

Miscellaneous advice:

This product meets the criteria for a synthetic used oil under the U.S. EPA Standards for the Management of Used Oil (40 CFR 279). Those standards govern recycling and disposal in lieu of 40 CFR 260 -272 of the Federal hazardous waste program in states that have adopted these used oil regulations. Consult your attorney or appropriate regulatory official to be sure these standards have been adopted in your state. Recycle or burn in accordance with the applicable standards.

Solutia operates a used fluid return program for certain fluids under these used oil standards. Contact your Sales Representative for details. 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

Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.

*biphenyl*

Hazard Class: 9

Hazard Identification number: UN3082

Packing Group: Packing Group III

Transport label: Class 9

Special provisions: This material meets the definition of a marine pollutant. Other: Applies ONLY to containers with an RQ or for shipments in bulk via water transportation. Canadian TDG Other: Not regulated for transport. Reportable Quantity/Limit

US DOT RQ 100 lb *biphenyl* Package size containing reportable amount: 377 lb

ICAO/IATA Class Other: See DOT Information

## 15. REGULATORY INFORMATION

All components are in compliance with the following inventories:

U.S. TSCA, EU EINECS, Canadian DSL, Australian AICS, Korean,

Japanese ENCS, Phillipine PICCS, Chinese

Canadian WHMIS classification:

D2(A) - Materials Causing Other Toxic Effects

D2(B) - Materials Causing Other Toxic Effects

SARA Hazard Notification:

Hazard Categories Under Title III

Rules (40 CFR 370):

Immediate

Delayed

Product name: THERMINOL® VP1 Heat transfer fluid Page 8 / 8

**ABEINSA EPC**

**MOJAVE**

**Document:**

PEM-0002-01 Annex 02

**Revision:**

01

**Date:**

03/15/14

**Page: 67 of 73**

Solutia Inc. Material Safety Data Sheet Date: 05/18/2012

Reference Number: 00000000211 Version 5.4/E

Section 302 Extremely Hazardous

Substances:

Not applicable

Section 313 Toxic Chemical(s):

biphenyl

CERCLA Reportable Quantity:

100 lbs biphenyl

For this/these chemicals, release of more than the Reportable Quantity to the environment in a 24 hour period requires notification to the National Response Center (800-424-8802 or 202-426-2675). This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulation and the MSDS contains all the information required by the Canadian Controlled Products Regulation. Refer to Section 11 for OSHA/HPA Hazardous Chemical(s) and Section 13 for RCRA classification. Safety data sheet also created in accordance with Brazilian law NBR 14725

## 16. OTHER INFORMATION

Product use: Heat transferring agents

Reason for revision: Routine review and update

Health Fire Reactivity Additional Information

Suggested NFPA Rating 2 1 0

Suggested HMIS Rating: 2 1 0 G

Prepared by the Solutia Hazard Communication Group. Please consult Solutia @ 314-674-6661 if further information is needed.

TM, ® is a registered trademark of Solutia Inc.

SOLUTIA is a trademark of Solutia Inc.

Responsible Care® is a registered trademark of the American Chemistry Council. Although the information and recommendations set forth herein (hereinafter "Information") are presented in good faith and believed to be correct as of the date hereof, Solutia Inc. makes no representations as to the completeness or accuracy thereof. Information is supplied upon the condition that the persons receiving same will make their own determination as to its suitability for their purposes prior to use. In no event will Solutia Inc. be responsible for damages of any nature whatsoever resulting from the use of or reliance upon Information. NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OF ANY OTHER NATURE ARE MADE HEREUNDER WITH RESPECT TO INFORMATION OR THE PRODUCT TO WHICH INFORMATION REFERS.

<b>ABEINSA EPC</b>  <b>MOJAVE</b>	<b>Document:</b>		PEM-0002-01 Annex 02	
	<b>Revision:</b>	01	<b>Date:</b>	03/15/14
	<b>Page: 68 of 73</b>			

## Material Safety Data Sheet

### Section 1. Chemical product and company identification

#### Hydrogen

#### Supplier

1-866-734-3438

**Synonym :** Dihydrogen; o-Hydrogen; p-Hydrogen; Molecular hydrogen; H<sub>2</sub>; UN 1049; UN 1966;  
Liquid hydrogen

#### Emergency overview

### Section 2. Hazards identification

#### Routes of entry

#### Potential acute health effects

Acts as a simple asphyxiant.

Contact with rapidly expanding gas may cause burns or frostbite. Contact with cryogenic liquid can cause frostbite and cryogenic burns.

Ingestion is not a normal route of exposure for gases Contact with cryogenic liquid can cause frostbite and cryogenic burns.

Contact with rapidly expanding gas may cause burns or frostbite. Contact with cryogenic liquid can cause frostbite and cryogenic burns.

#### Eyes

#### Skin

#### Inhalation

#### Ingestion

**Physical state** Gas or Liquid.

See toxicological information (Section 11)

**WARNING!**

**GAS:**

CONTENTS UNDER PRESURE.

Extremely flammable

Do not puncture or incinerate container.

Can cause rapid suffocation.

May cause severe frostbite.

**LIQUID:**

Extremely flammable

Extremely cold liquid and gas under pressure.

Can cause rapid suffocation.

May cause severe frostbite.

Do not puncture or incinerate container. May cause target organ damage, based on animal data.

#### Medical conditions

#### aggravated by overexposure

Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

:

Contact with rapidly expanding gases or liquids can cause frostbite.

**Target organs :** May cause damage to the following organs: lungs.

<b>ABEINSA EPC</b>  <b>MOJAVE</b>	<b>Document:</b>		PEM-0002-01 Annex 02	
	<b>Revision:</b>	01	<b>Date:</b>	03/15/14
	<b>Page: 69 of 73</b>			

**Potential chronic health effects**

Chronic effects : May cause target organ damage, based on animal data.

Target organs : May cause damage to the following organs: lungs.

Build 1.1 *Page: 1/6*

*Hydrogen*

Hydrogen 1333-74-0 100 Oxygen Depletion [Asphyxiant]

**Section 3. Composition, Information on Ingredients**

**Name CAS number % Volume Exposure limits**

As this product is a gas, refer to the inhalation section.

Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.

In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.

Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel.

Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

**Section 4. First aid measures**

Eye contact

Skin contact

Inhalation

Ingestion

No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present,

the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person

providing aid to give mouth-to-mouth resuscitation.

**Frostbite** : Try to warm up the frozen tissues and seek medical attention.

500 to 571°C (932 to 1059.8°F)

Flammable.

No specific data.

Lower: 4% Upper: 76%

Use an extinguishing agent suitable for the surrounding fire.

Extremely flammable in the presence of the following materials or conditions: oxidizing materials.

**Section 5. Fire-fighting measures**

Flammability of the product

Auto-ignition temperature

Flammable limits

Products of combustion

Fire hazards in the presence of various substances

Fire-fighting media and instructions

Apply water from a safe distance to cool container and protect surrounding area. If involved in fire, shut off flow immediately if it can be done without risk.

Contains gas under pressure. In a fire or if heated, a pressure increase will occur and the container may burst or explode.

<b>ABEINSA EPC</b>  <b>MOJAVE</b>	<b>Document:</b>		PEM-0002-01 Annex 02	
	<b>Revision:</b>	01	<b>Date:</b>	03/15/14
	<b>Page: 70 of 73</b>			

**Special protective equipment for fire-fighters**

Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (section 8). Shut off gas supply if this can be done safely. Isolate area until gas has dispersed.

Immediately contact emergency personnel. Stop leak if without risk. Note: see section 1 for emergency contact information and section 13 for waste disposal.

**Environmental precautions**

**Section 6. Accidental release measures**

: Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

**Personal precautions :**

**Methods for cleaning up :**

High pressure gas. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.

Never allow any unprotected part of the body to touch uninsulated pipes or vessels that contain cryogenic liquids. Prevent entrapment of liquid in closed systems or piping without pressure relief devices. Some materials may become brittle at low temperatures and will easily fracture.

**Section 7. Handling and storage**

**Handling :**

Build 1.1 *Page: 2/6*

**Hydrogen**

Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F).

For additional information concerning storage and handling refer to Compressed Gas Association pamphlets P-1 Safe Handling of Compressed Gases in Containers and P-12 Safe Handling of Cryogenic Liquids available from the Compressed Gas Association, Inc.

**Storage :**

Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

hydrogen Oxygen Depletion [Asphyxiant]

**Section 8. Exposure controls/personal protection**

**Engineering controls**

**Product name**

Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.

Personal protective equipment for the body should be selected based on the task being

<b>ABEINSA EPC</b>  <b>MOJAVE</b>	<b>Document:</b>		PEM-0002-01 Annex 02	
	<b>Revision:</b>	01	<b>Date:</b>	03/15/14
	<b>Page: 71 of 73</b>			

performed and the risks involved and should be approved by a specialist before handling this product.

\

Personal protection

Eyes

Skin

Respiratory

Consult local authorities for acceptable exposure limits.

**Personal protection in case of a large spill**

Self-contained breathing apparatus (SCBA) should be used to avoid inhalation of the product.

Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

**Hands :**

The applicable standards are (US) 29 CFR 1910.134 and (Canada) Z94.4-93

When working with cryogenic liquids, wear a full face shield.

Insulated gloves suitable for low temperatures

-253°C (-423.4°F)

-259.15°C (-434.5°F)

0.07 (Air = 1) Liquid Density@BP: 4.43 lb/ft<sup>3</sup> (70.96 kg/m<sup>3</sup>)

-240.15°C (-400.3°F)

2.02 g/mole

**Boiling/condensation point**

**Melting/freezing point**

**Section 9. Physical and chemical properties**

**Molecular weight**

**Critical temperature**

**Vapor density**

**Molecular formula H<sub>2</sub>**

**Specific Volume (ft<sup>3</sup>/lb) : 191.9386**

**Gas Density (lb/ft<sup>3</sup>) : 0.00521**

The product is stable.

Extremely reactive or incompatible with the following materials: oxidizing materials.

Under normal conditions of storage and use, hazardous polymerization will not occur.

Under normal conditions of storage and use, hazardous decomposition products should not be produced.

**Section 10. Stability and reactivity**

**Stability and reactivity**

**Incompatibility with various substances**

**Hazardous decomposition products**

**Hazardous polymerization**

**Section 11. Toxicological information**

**Specific effects**

**Carcinogenic effects** No known significant effects or critical hazards.

**Mutagenic effects** No known significant effects or critical hazards.

<b>ABEINSA EPC</b>  <b>MOJAVE</b>	<b>Document:</b>		PEM-0002-01 Annex 02	
	<b>Revision:</b>	01	<b>Date:</b>	03/15/14
	<b>Page: 72 of 73</b>			

Reproduction toxicity No known significant effects or critical hazards.  
 No specific information is available in our database regarding the other toxic effects of this material to humans.

Chronic effects on humans May cause damage to the following organs: lungs.

Other toxic effects on humans

Toxicity data

Section 12. Ecological information

Environmental fate : Not available.

Environmental hazards : No known significant effects or critical hazards.

Toxicity to the environment : Not available.

Aquatic ecotoxicity

Not available.

Section 13. Disposal considerations

Product removed from the cylinder must be disposed of in accordance with appropriate Federal, State, local regulation. Return cylinders with residual product to Airgas, Inc. Do not dispose of locally.

Section 14. Transport information

2.1 Limited quantity Yes.

Packaging instruction

Passenger aircraft Quantity limitation: Forbidden.

Cargo aircraft Quantity limitation: 150 kg

DOT Classification

TDG Classification 2.1

HYDROGEN, COMPRESSED Hydrogen, refrigerated liquid

UN1049 UN1966

HYDROGEN, COMPRESSED Hydrogen, refrigerated liquid

Regulatory information

UN number Proper shipping name

Class Packing group Label Additional

Information UN1049 UN1966

Explosive Limit and Limited Quantity

Index

0.125

ERAP Index

3000

Passenger Carrying Ship Index Forbidden

Not applicable (gas).

Not applicable (gas).

Passenger

Carrying Road or Rail Index Forbidden

Mexico Classification

UN1049

UN1966

HYDROGEN,

COMPRESSED

Hydrogen,

refrigerated liquid

2.1 Not applicable (gas). -

"Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product."

Section 15. Regulatory information

<b>ABEINSA EPC</b>  <b>MOJAVE</b>	<b>Document:</b>		PEM-0002-01 Annex 02	
	<b>Revision:</b>	01	<b>Date:</b>	03/15/14
	<b>Page: 73 of 73</b>			

U.S. Federal regulations

.Class B-1: Flammable gas.

SARA 302/304/311/312 extremely hazardous substances: No products were found.

SARA 302/304 emergency planning and notification: No products were found.

SARA 302/304/311/312 hazardous chemicals: hydrogen

SARA 311/312 MSDS distribution - chemical inventory - hazard identification:

hydrogen: Fire hazard, Sudden release of pressure

Canada

United States

Hydrogen

Clean Air Act (CAA) 112 accidental release prevention - Flammable Substances:

Section 16. Other information

3

4

0

0

4

Health 3

Special

Instability

Flammability

Health

Fire hazard

Reactivity

Personal protection

GAS:

CONTENTS UNDER PRESURE.

Extremely flammable

Do not puncture or incinerate container.

Can cause rapid suffocation.

May cause severe frostbite.

LIQUID:

Extremely flammable

Extremely cold liquid and gas under pressure.

Can cause rapid suffocation.

May cause severe frostbite.

Label requirements : Class A: Compressed gas.

Class B-1: Flammable gas.

United States Canada

0

4

0

National Fire Protection Association (U.S.A.)

0

4

0

Health

Flammability

Physical hazards

# MOJAVE SOLAR LLC

ASI Operations

## [ Emergency Response Plan ]

<b>Title:</b> Emergency Response and Preparedness Plan
<b>Process:</b> 4.4 Implementation Requirements
<b>Sub process:</b> 4.4.7 Establish an OH&S Emergency Management Process

<b>Document:</b>	
<b>Revision:</b>	01
<b>Date:</b>	02/26/2014

<b>Prepared by:</b>	
Bruce Asaro – Health and Safety Superintendent	Electronic Signature
Kirk Anderson – Environmental Engineer	Electronic Signature

<b>Concurred by:</b>	
Larry Davis – Health and Safety Manager	Electronic Signature
Steve Pochmara – Permitting Manager	Electronic Signature
Efrain Perez – Quality Manager	Electronic Signature

<b>Approved by:</b>	
Nicolás Gallo Massa – Project Sub-Director	Electronic Signature
Pablo Enrique Schenone Laborde– Project Director	Electronic Signature

This document is property of Mojave Solar LLC. Total or partial reproduction by any means is prohibited, as well as the distribution to third parties, without the express written consent of Mojave Solar LLC.

If for any exceptional reasons due to specificities of project (e.g.: confidential project information, legal or regulatory requirements of local level and/or contractual requirements of the client), there was the need to modify these requirements, the changes must be documented in the quality, environment and prevention of occupational risks of the project plan, prior authorization by the Department of Central Services Management Systems

The original of this document is electronically signed and filed in the document manager Mojave Solar LLC.

<b>Abengoa Solar LLC</b> <b>ASI Operations</b>	Document:			
	Revision:	01	Date:	02/26/14
	Page: 2 of 30			

**Revisions Control Sheet**

Rev.	Date	Cause for Revision	Prepared By	Concurred By	Approved By
00	02/06/14	Document created	BA - KIA		

Changes from the original content to the next revision will be identified by underlines for quick identification of changes.

<b>Abengoa Solar LLC</b> <b>ASI Operations</b>	Document:			
	Revision:	01	Date:	02/26/14
	Page: 3 of 30			

## Table of Contents

1.0	Objectives .....	4
2.0	Definitions.....	4
3.0	Purpose and Scope of Application .....	5
4.0	Applicable Documentation .....	6
5.0	Emergency Phone Numbers .....	6
	5.1 Agency Phone Numbers .....	6
	5.2 Site Emergency Contacts .....	6
6.0	Responsibilities .....	6
	6.1 All Mojave Solar LLC Personnel .....	7
	6.2 Mojave Solar LLC H&S Department .....	7
	6.3 Emergency Response Coordinators .....	7
	6.4 Mojave Solar LLC Activity Managers.....	8
	6.5 Subcontractors .....	8
7.0	Procedures .....	8
	7.1 Evacuations .....	8
	7.2 Personal Injury or Illness .....	10
	7.3 Security Threat .....	11
	7.4 Fires .....	12
	7.5 Severe Weather .....	12
	7.6 Earthquakes .....	13
	7.7 Hazardous Chemical Spills Leaks.....	14
	7.7.1 Spill Containment:.....	14
	7.7.2 Record .....	15
8.0	Public Relations .....	15
	8.1 Media Inquiry Procedure .....	15
9.0	Communication of Emergencies .....	15
10.0	Occupational Risk Prevention Policy.....	16
11.0	Herbicide Best Management Practices.....	17-19

<b>Abengoa Solar LLC</b> <b>ASI Operations</b>	Document:			
	Revision:	01	Date:	02/26/14
	Page: 4 of 30			

12.0 Heat Transfer Fluid (HTF) Spill Prevention Plan.....20-30

Attachment A - HTF Spill Relocation - Alpha

Attachment B - HTF Spill Relocation - Beta

Attachment C- Evacuation Routes & Assembly Area

## 1.0 Objective

To provide an effective Emergency Response Plan for the Mojave Solar Site. Ensuring adequate guidelines that provide direction for site personnel to effectively respond with immediate initial response, emergency actions, and notification of contacts and follow up actions in the event of, but not limited to the following:

- Evacuation
- Personnel Injury or Illness
- Security Threat
- Fire
- Severe Weather
- Earthquake
- Hazardous Chemical Spills

These procedures shall be adhered to and used in conjunction with the Mojave Solar Project Health and Safety Plan to ensure the protection of personnel, equipment and material.

## 2.0 Definitions

### Assembly Areas and Muster Points

Assembly areas are evacuation locations designated for site personnel, visitors and contractors as a safeguard during an emergency. Muster points are located at the assembly areas for the Incident Commander (IC) to facilitate emergency action, evacuation and response. Emergency Response Team Members report to the Muster Point for direction from the IC.

### ERPP

Emergency Response and Preparedness Program.

### Emergency Response Coordinator (ERC)

An Area (Alpha or Beta) designated trained and qualified person that is responsible for the overall development, training, implementation and management of the site's

<b>Abengoa Solar LLC</b> <b>ASI Operations</b>	Document:			
	Revision:	01	Date:	02/26/14
	Page: 5 of 30			

emergency response program. The ERC may assume the role of Facility Emergency Coordinator (FEC) or Incident Commander (IC) during an emergency or drill.

Facility Emergency Coordinator (FEC)

A trained and qualified person responsible for the overall site wide development, training, implementation and management of the emergency response program and is the person-in-charge over all emergency situations. The FEC will be the point person for coordinating with responding outside emergency services and the Incident Commanders (IC).

Incident Commander (IC)

Trained and qualified person responsible for the management of an onsite emergency situation, evacuation and/or drill; stationed at one of the three preselected site muster points.

Safety Data Sheet SDS (MSDS)

A document required for all hazardous chemicals located onsite that explains the characteristics of a chemical, the hazards that it possesses, how to contain those hazards and emergency responses. The document also explains the use and storage of said chemical.

Shelter-in-place

A shelter designated by the Facility Emergency Coordinator or Incident Commander to provide protection from hazardous elements and or weather conditions. The shelter will be selected based on emergency conditions and the need for protection (i.e. flood, fire, chemical spill, etc.). Practices may include closing windows and doors, and moving occupants away from perimeter windows and doors to a safer interior location and or relocating.

Landing Area

Location designated and reserved for air support and rescue/medi-evac.

**3.0 Purpose and Scope of Application**

This section applies to all personnel performing work on the site or inside any subsidiary facilities.

The recent history experienced at Mojave for response times of medical/emergency team arrival to this site has been approximately 20 to 30 minutes. The response of all site personnel to an emergency situation should be serious and immediate.

An individual should not endanger themselves or co-workers by indecision, delay, or an attempt to save property or equipment. Individuals should be familiar with emergency procedures applicable to their normal working areas so that proper and prompt action can be taken in each emergency situation. If visiting another site area, follow the

<b>Abengoa Solar LLC</b> <b>ASI Operations</b>	Document:			
	Revision:	01	Date:	02/26/14
	Page: 6 of 30			

emergency procedures for that area by following the example of local personnel and asking for guidance.

#### 4.0 Applicable Documentation

- ISO 9001:2008, Quality Management Systems-requirements
- ISO 14001: 2004, Environmental Management System-requirements
- Cal/OSHA Title 8 California Code of Regulations (T8CCR)
- OSHA 29 CFR 1926 – Standard for Construction Industry

#### 5.0 Emergency Phone Numbers

For many emergencies, the first appropriate action to be taken is to summon competent assistance.

##### 5.1 Agency Phone Numbers

Emergency (police, fire, and ambulance), call 911  
 Hospital (760) 256-1761  
 Police (non-emergency) (760) 256-4838  
 Fire Department (non-emergency) (760) 245-5312  
 Poison Control Center: 800-222-1222  
 Hazardous Waste, Chemical Spills Fire department: (760) 253-7704. If no answer, call 911. If a chemical spill reaches or may reach navigable waterways, call (760) 241-6583 Lahontan Regional Water Quality Control Board.

##### 5.2 Site Emergency Contacts

Reference the current Emergency Phone List posted in the control rooms and SHE Boards.

Once help has arrived, assist them according to your knowledge and training or as directed.

**Attention:**

**In the event of any emergency requiring the notification of emergency response agencies, Site management or on-call supervision shall be notified only after the emergency service has been notified and is on the way.**

#### 6.0 Responsibilities

<b>Abengoa Solar LLC</b> <b>ASI Operations</b>	Document:			
	Revision:	01	Date:	02/26/14
	Page: 7 of 30			

The duties and responsibilities of specific individuals or groups are further outlined below.

### 6.1 All Personnel Working On Site

- Read, understand, and comply with the requirements set forth in this plan.
- Report emergencies as specified in their specific section within this plan.
- Participate in and complete all required training.
- Participate in all emergency response drills.

### 6.2 HSE Department

Site Orientation will include an explanation of the site emergency response and preparedness plan and procedures. The main site emergency contacts are posted in the control rooms and SHE Boards.

The HSE Program Manager, or designee, shall furnish information regarding site-related emergency and evacuation measures. The following items are the responsibility of the HSE Department:

1. Develop and maintain all elements of the ERPP.
2. Develop and coordinate all training required by the ERPP.
3. Ensure the ERPP meets or exceeds all regulatory requirements.
4. Ensure the ERPP remains current.
5. Develop and coordinate emergency response drills.
6. Act as the liaison with Community Emergency Response Organizations (i.e. Fire Dept., Police Dept., etc.).
7. Serve as the Facility Emergency Coordinator, Emergency Response Coordinator or Incident Commander(s) in emergency situations.
8. Provide an overview of the information contained in this plan to all project personnel via site orientation.

### 6.3 Emergency Response Coordinators

Initially the Emergency Response Coordinator (ERC) for **Alpha** is the Control Room Supervisor who will set up the incident command post and place responsibilities within the team. The ERC is responsible for coordination of response activities, including contacting outside agencies, notification of management, and containment of hazard (if safely possible) and initiation of personnel evacuation if needed. The Emergency Response Team assigned ERC will assume this role upon arrival and receive a proper briefing prior to the arrival of emergency services. The ERC may report to an outside Emergency Agency's Response Coordinator if an agency takes over (i.e. the Fire Department). The Control Room Supervisor will assume the role of Incident Commander (IC) for an emergency evacuation and shall report to the Alpha muster point to direct emergency activities.

<b>Abengoa Solar LLC</b> <b>ASI Operations</b>	Document:			
	Revision:	01	Date:	02/26/14
	Page: 8 of 30			

Initially the Emergency Response Coordinator (ERC) for **Beta** is the Control Room Supervisor who will set up the incident command post and place responsibilities within the team. The ERC is responsible for coordination of response activities, including contacting outside agencies, notification of management, and containment of hazard (if safely possible) and initiation of personnel evacuation. The Emergency Response Team assigned ERC will assume this role upon arrival and receive a proper briefing prior to the arrival of emergency services. The ERC may report to an outside Emergency Agency's Response Coordinator if an agency takes over (i.e. the Fire Department). The Control Room Supervisor will assume the role of Incident Commander (IC) for an emergency evacuation and shall report to the Beta muster point to direct emergency activities.

#### 6.4 Managers and Supervisors

All managers and supervisors are required to assist personnel in the event of an emergency as well as perform various other duties with regard to this Emergency Response and Preparedness Program. Managers and supervisors will complete pre-assigned emergency response duties and lead all immediate search efforts and report emergency issues to the Incident Commander.

#### 6.5 Contractors

Each Contractor shall obtain a copy of the site health & safety and environmental requirements applicable to their work.

The contractor will be responsible for ensuring each employee receives and comprehends the information in this plan prior to beginning work on site. The contractor shall keep records indicating who has been given the information.

In the event there is a change of personnel in the contractor's work force, the contractor is responsible for providing any new employees with this information and maintaining all necessary records.

### 7.0 Procedures

#### 7.1 Evacuations

When an evacuation is deemed necessary, there shall be no hesitation in requiring personnel to immediately vacate the area affected. Emergency exits and other means of egress from all areas have been identified and posted, and is an integral part of the Emergency Response and Preparedness Plan. An emergency phone list is provided in the control rooms and SHE Boards. Assembly areas are pre-determined and have been identified with maps. Once out of the affected area, workers will not be allowed to return until the

<b>Abengoa Solar LLC</b> <b>ASI Operations</b>	Document:			
	Revision:	01	Date:	02/26/14
	Page: 9 of 30			

emergency (or Evacuation Drill) is formally declared over by the Emergency Response Coordinator.

Localized area evacuations will be identified by the location affected.

The following Local Area Evacuation Identification(s) will be communicated when only a limited area or multiple areas are required to evacuate:

:

Alpha Offices, Alpha Power Block (APB), Alpha West, Alpha East, Beta West, Beta Offices, Beta Power Block (BPB), Beta East (West of BPB), Beta East (East of BPB).

If an Evacuation is required, per announcement by HSE Program Manager or Emergency Response Coordinator:

1. The Emergency Response Coordinator will sound the evacuation alarm with verbal, phones, electronic devices and radio alerts, to notify all affected personnel to evacuate to the appropriate Assembly Area. For the annual evacuation drill, an announcement: "This is an Evacuation Drill" will precede all communications.
2. Managers and supervisors will instruct all employees, in the area affected, to move to the nearest Assembly Area in an orderly manner. Appointed evacuation team leaders will ensure shut down of HVAC/air handling systems, electrical, lights, external generators, etc. and that windows and doors are closed. Everyone in the affected area is to evacuate. Report to the Emergency Response Coordinator or Incident Commander that: "All affected areas, offices, bathrooms and lunch rooms, etc. are clear of personnel."
3. Non-emergency vehicle traffic shall be curtailed into the affected area and account for all delivery vehicles leaving. An unobstructed entry into the site will be maintained for emergency vehicle access. Designated ERT members shall meet arriving emergency responder vehicles at the intersection of Harper Lake and Lockhart Road and provide an escort to the affected area.
4. Managers and Supervisors will inform and account for their assigned Contractors and their employees to ensure that all have left the work areas affected and proceeded to the assigned assembly area. Each contractor must assign a point person who will be responsible for acting as their warden.
5. Each Assembly Area Emergency Response Coordinator and/or Incident Commander shall account for all personnel. If a person is missing from the roster, it will be up to the Emergency Response Coordinator and/or Incident Commander to decide next steps.

<b>Abengoa Solar LLC</b> <b>ASI Operations</b>	Document:			
	Revision:	01	Date:	02/26/14
	Page: 10 of 30			

6. In the absence of designated ERC or IC; managers and remaining supervisors or emergency response team leaders will fill in for any missing ERT personnel and cover the evacuation duties accordingly.
7. If needed, emergency response search teams will provide area "sweeps" in order to assist in accounting for all personnel. Areas will only be searched if it is determined to be safe. If the decision is made to initiate a search, emergency response search teams will be assigned to "sweep" designated areas in all affected site locations where employees and contractors are known to be working, (e.g. offices, conference rooms, restrooms, electrical/electronic rooms and lunch rooms, etc.). Each search team will be assigned a leader, who will record and supply the names of all team members and the area to be searched to the ERC and/or IC. The search team leader is responsible for assuring that his/her team members complete their "sweep" safely and do not stray from their specific assigned search area and report directly back to the ERC/IC muster point.
8. Emergency Response Team Members (ERT) shall report any issues encountered to the Emergency Response Coordinator and/or Incident Commander. Possible issues include:
  - Any person who did not evacuate to the Assembly Area;
  - Any person who became injured and was unable to evacuate; and
  - Any disabled person who was unable to evacuate.
  - Location and type of problem and/or damage.
9. Managers, supervisors and ERT members shall remain at the Muster Point to assist in completing a head count for the Emergency Response Coordinator or Incident Commander. Security will use current sign-in sheets and the card scanning system for Mojave Solar LLC employees and subcontractors to account for all employees to ensure that they have left their work areas and evacuated to the assigned assembly area.
10. Everyone is to remain at the Assembly Area until notice is given by the Site Emergency Coordinator, IC or his designee as to the disposition of the evacuation, and whether to return to the building/work site or not.

**The all clear process will include communication via verbal, phone, electronic devices, and radio.**

**Note - If a person refuses to evacuate in an emergency, ERT personnel should not argue with the person, but merely inform him that they will be reported for failure to comply to the Incident Commander and to his/her Supervisor.**

## 7.2 Personal Injury or Illness

<b>Abengoa Solar LLC</b> <b>ASI Operations</b>	Document:			
	Revision:	01	Date:	02/26/14
	Page: 11 of 30			

Report - all injuries to the Health and Safety Department immediately upon discovery.

Evaluate - the area surrounding the injured employee for unsafe conditions. Quickly assess the extent of the injury and inform the H&S Department if any assistance is required.

If the injury or illness is deemed serious, call 911 for assistance. Be sure to give them your:

- Name
- Exact Location: **Mojave Solar Project: 42134 Harper Lake Road, Hinkley CA 92347**
- Nature of the Emergency (include as much detail about the ill person as known)
- Remain on the line until 911 has all the necessary information.
- Maintain a clear pathway for outside Emergency Medical Service personnel.
- Air rescue landing coordinates are:
  - o Lat 35d 00'41.12771 N
  - o Long 117d 18'23.24321 W

If the injury is minor and offsite medical attention is warranted, transport the employee to designated hospital. In the event of electrical shock, ensure the circuit is de-energized before touching victim. Administer emergency first aid only if safe to do so, using the below guidelines:

- If the victim is conscious, ensure you have permission to help.
- If victim has stopped breathing, perform CPR and use the AED if necessary.
- Stop bleeding by applying pressure directly to wound.
- Single use, disposable gloves such as surgical or examination gloves shall be used for procedures involving contact with patient's bodily fluids.
- Do not attempt to move victim unless there is an imminent danger.
- Keep victim warm to help reduce the potential of shock until ambulance arrives.
- Send any available individual to meet ambulance at the front gate and direct them to accident scene.

### 7.3 Security Threat

**Do Not Attempt to Locate or Handle any Suspicious Device.**

**The person receiving the threat:**

- Remain calm
- Keep the caller on line as long as possible to obtain the most information you can. Document the conversation.

**Report** – Security threats should immediately be reported to the Emergency Response Coordinator (ERC). If the ERC determines a threat; they will take command of the situation and direct the following steps:

<b>Abengoa Solar LLC</b> <b>ASI Operations</b>	Document:			
	Revision:	01	Date:	02/26/14
	Page: 12 of 30			

1. Notify local law enforcement via (760) 256-1796 or if no answer call 911.
2. Determine the course of action in conjunction with local authorities.
3. If an evacuation is required; initiate evacuation procedures. Do not discuss that a security threat has been declared.
4. During an evacuation, report any unusual packages or containers that seems out of place to the ERC and/or IC.

#### 7.4 Fires

Ensure personnel have been drilled in the proper procedure to follow in a fire emergency; to react swiftly and safely to minimize the dangers to themselves and their fellow employees. Initiate the following steps:

**Report** - Fires discovered on site shall be immediately reported to the Emergency Response Coordinator and control room supervisor.

**Evaluate** - If the fire is small enough so as not to endanger personnel, determine the appropriate fire extinguisher and attempt to extinguish the fire.

If the fire is beyond the person's capability to safely extinguish, the Emergency Response Coordinator shall be notified:

**Initiate** - The Emergency Response Coordinator or Control Room Supervisor will then, sound the alarm with electronic devices and/or radio alerts, to notify all personnel of the problem. Alert the Fire Department via (760) 253-7704. If there is no answer then use 911.

The Emergency Response Coordinator will direct an ERT member to meet emergency responders at the intersection of Harper Lake and Lockhart Road and provide an escort to the affected area. An available ERT member will also be directed to meet the Fire Department at the gate to direct and escort them to the fire scene and the water tanks. The entrance gates shall be kept unobstructed to allow emergency vehicle access. If the condition warrants, the ERT and/or IC shall remove all unnecessary personnel from the affected area and if necessary, initiate an evacuation.

#### 7.5 Severe Weather

Warnings of electrical storms, high winds, flooding, and freezing that have the potential to impact the safety of a community are typically distributed by the local government emergency organization via radio and television stations. In the event any employee becomes aware of a severe weather warning, the Facility Emergency Coordinator and Health and Safety Department must be notified.

**Report** - Announce to on site personnel the severe weather condition, and determine if the offices provide shelter or if evacuation of site personnel is necessary or if it is safe for everyone to be sent home for the remainder of the

<b>Abengoa Solar LLC</b> <b>ASI Operations</b>	Document:			
	Revision:	01	Date:	02/26/14
	Page: 13 of 30			

shift. The ERC and/or IC will also determine what other precautions will be taken to ensure the safety of personnel and reduce property loss.

**Evaluate** - During the severe weather occurrence, all on site personnel shall assess the safety of their work location immediately. The following examples of this assessment:

- High winds – have the potential to dislodge and lift heavy objects and reduce visibility.
- Flooding – areas inundated with flowing water should not be crossed.
- Lightning – stay clear of power lines, metal fences, and other conductive structures. During Lightning activity close to the site, all crane and high lift activity shall be stopped.
- Freezing – outside floor areas, ladders, and walkways may be slippery from ice.

**Initiate** – It may become necessary to seek shelter, evacuate the site, administer first aid, call in emergency assistance, initiate a site shutdown and send everyone home or modify site operations. The ERC and/or IC will announce changes to site work activities as conditions warrant. Warning: Do not restart equipment that tripped offline until the specific cause of the trip is known and addressed.

## 7.6 Earthquakes

In the case of an earthquake large enough to either have caused damage or thought to have the potential of causing damage:

**Report:** – Report to the Operations Manager or direct supervisor immediately after the event. If you are indoors, stay indoors. Lie to the side of a solid piece of furniture, such as a desk or table. Stay clear of windows, mirrors, bookshelves, and file cabinets. If you are outside, inform employees to get out into the open, away from equipment, buildings, mirrors and power lines. If safe; stay in your vehicle and move only to get away from danger. Please await further instructions. This message shall be communicated via verbal, electrical devices, phone and radio.

**Evaluate** – Following the earthquake, and if deemed safe to do so by the Emergency Response Coordinator, Incident Commander and/or HSE Program Manager. If safe, conduct a thorough site inspection to determine:

- Injured, missing, or trapped personnel (site personnel and contractors)
- Safety hazards caused by the earthquake, such as fires, downed power lines, damaged equipment, etc.

If the decision is made to initiate a search, teams must be assigned to designated areas for search. Each search team will be assigned a leader, and the names recorded. The search team leader is responsible for assuring that his/her team members stay in their specific area.

<b>Abengoa Solar LLC</b> <b>ASI Operations</b>	Document:			
	Revision:	01	Date:	02/26/14
	Page: 14 of 30			

**Initiate** – Following thorough site inspections, it may become necessary to evacuate the site, administer first aid, call in emergency assistance, and initiate a site shutdown. The Facility Emergency Coordinator will announce changes to site work activities as conditions warrant. Warning: Do not restart equipment that tripped offline during the earthquake until the specific cause of the trip is known and addressed.

## 7.7 Hazardous Chemical Spills Leaks

Even in a well-planned and executed program, the possibility exists that an accident will occur and an emergency spill or toxic chemical release will take place. Recognition of this possibility requires emergency procedures be communicated to all affected personnel. Immediately consider the potential implications resulting from an emergency spill or a toxic chemical release and identify, eliminate, isolate, or control the potential hazard. If not able to identify a liquid and its chemical properties, vacate the area, keep other personnel away from the area and contact the supervisor. Regardless of the type of spill and magnitude the person who detects the spill must remain calm and follow this procedure in an orderly manner.

### 7.7.1 Spill Containment:

- A. Identify spill source and assess hazard
  - Ensure all persons in the area are safe.
  - Assess hazards from the spill.
  - Read the Safety Data Sheet (SDS) for the spilled material and follow all safety measures.
  - Check for fire and explosion risk
  - Extinguish all ignition sources in the area
  - Move machinery only if safe to do so or shut down.
  - Isolate all running equipment to prevent sparks.
- B. If applicable, the isolation of the spill area shall be attempted
  - Ensure that necessary safety equipment is worn.
  - Stop the source
  - Attempt to contain the spill
- C. Authorities to contact to report a spill
  - Foreman
  - Supervisor
  - Operations Manager
  - Health & Safety Department and HSE Program Manager.
- D. Location to go in case of a spill:
  - If required or unsure of what to do; go directly to your nearest Assembly Area or where the ERC and/or IC, or designate.

<b>Abengoa Solar LLC</b> <b>ASI Operations</b>	Document:			
	Revision:	01	Date:	02/26/14
	Page: 15 of 30			

### 7.7.2 Record

A "Spill Reporting Form" must be completed anytime there is a spill larger than 5 gallons. Blank forms are available from the HSE Supervisor and the H&S Department. Spill Reporting Forms will be used as a record to track all significant spills. Any spill that results in a release of materials equal to or greater than the "Reportable Quantity", as specified in the Safety Data Sheet, must also be reported immediately to the local regulatory agency (San Bernardino County Fire Department), General Partnership and record of notification kept by the HSE Program Manager. Corrective actions will be implemented by management based on information contained on the Spill Reports.

## 8.0 Public Relations

A central spokesperson shall ensure that only informed and consistent information is made public regarding the activities. Additional details should follow to be clear on this communication.

### 8.1 Media Inquiry Procedure

All inquiries or requests for interviews from the news media (broadcast or print) shall be referred directly to the Mojave Site Official Contact. Any personnel receiving calls from reporters, regardless of the nature of their inquiry, should respond with the following statement:

***"I appreciate your interest and would like to get you the information you need. All public information is handled from our home office. Please leave me your telephone number and I can have someone get back with you as soon as possible."***

Personnel receiving media inquiries shall notify the Mojave Site Official Contact immediately. Personnel should not provide a "no comment" statement, nor should they ask the reporter if they can make an "off the record" statement. "No comment" is normally interpreted as an admission of guilt, and all statements personnel make to the media is considered authorized information.

## 9.0 Communication of Emergencies

1. A combination of radio devices, cell phones, and/or electronic devices will be used to alert personnel on the project of an emergency situation.
2. Once notified, the emergency response teams will perform required task.

<b>Abengoa Solar LLC</b> <b>ASI Operations</b>	Document:			
	Revision:	01	Date:	02/26/14
	Page: 16 of 30			

3. ERT members will proceed to their designated locations to disseminate appropriate communication up to and including initial and final area "sweeps" to ensure all personnel have been notified to the emergency.
4. ERC, IC and ERT members will collaborate and provide clear direction including the **"all clear"** by verbal, phone, radio, and electronic devices.

<b>Abengoa Solar LLC</b> <b>ASI Operations</b>	Document:			
	Revision:	01	Date:	02/26/14
	Page: 17 of 30			

## 10.0 Occupational Risk Prevention Policy

### ABENGOA SOLAR

#### Occupational Risk Prevention Policy

As the Solar Power Business Group of Abengoa, Abengoa Solar focuses its activities on the technology development, design, promotion and operation of power plants that harness the sun as the primary energy source. The company has the know-how and technology for industrial process heat, photovoltaic, and concentration solar power plants.

In the course of its activities, Abengoa Solar is committed to giving top priority and maximum support to the Prevention of Occupational Risks as a means to protect the health and well-being of its staff.

Risk-Prevention forms an integral part of its business at all levels of the Company's organization and its activities are conducted safely and responsibly, on the basis of the principles set-out in the Abengoa Prevention Policy.

For the achievement of this goal, Abengoa Solar has established a series of guidelines:

- ✓ Compliance with the legal and regulatory provisions and other requirements in force that may be applicable to the products, activities and/or services engaged in by the Company.
- ✓ Active and responsible engagement of all employees through the provision of adequate training to facilitate their performance.
- ✓ Minimization, reduction or elimination of the most prominent risks in its activity, so far as feasibly possible, to ensure safety in the workplace.
- ✓ Establishment of effective channels of communication and participation with interested parties to understand needs and expectations.
- ✓ Provision of the necessary human and material resources for the achievement of the goals and targets set for the Prevention of Occupational Risks.
- ✓ Execution of regular inspections of industrial facilities and sites to verify compliance with legal requirements as well as internal procedures and safety management.
- ✓ The commitment to prevent damage and deterioration of health, and the continuous improvement of the Occupational-Risk Prevention Management System so as to facilitate effectively and efficiently the development of the Business Unit's activities.
- ✓ Implementation and application of an Occupational-Risk Prevention Plan allowing the effective integration of Occupational Risk Prevention into the Company's management system.

The present Policy is available to employees and other interested parties.

Seville, March 30<sup>th</sup>, 2012

  
Santiago Sedge

CEO Abengoa Solar

<b>Abengoa Solar LLC</b> <b>ASI Operations</b>	Document:			
	Revision:	01	Date:	02/26/14
	Page: 18 of 30			

## 11.0 Herbicide Best Management Practices

### Herbicide Best Management Practices (BMP)

Herbicides are used extensively for the destruction of unwanted plants. Whether herbicides are used on a large scale or on a small scale application, safe handling, application and use is required to prevent injury or illness from accidental exposures.

Herbicides are usually handled safely, however they can be dangerous if handled incorrectly. Training is required before handling any hazardous chemical, as such; follow all safe handling instructions and safety precautions when using herbicides.

#### Safety Precautions

Mixing and pouring are components of the herbicide process that require special attention and care. Before mixing, chemicals are in their most concentrated state. Exposure and toxicity levels are highest while handling the container during mixing and pouring tasks. Specific safety precautions for handling, using and storing herbicides must be adhered to for preventing potential hazardous incidents or exposures.

- All herbicides come with specific instructions that require familiarization with before handling. These instructions include safe mixing instructions, and safe methods for application. Always follow safety instructions.
- Always handle herbicides with care during mixing, handling, use and storage.
- When using any herbicide protect all exposed skin. PPE can be made of various materials such as barrier laminates, PVC, and rubber; all which are waterproof. Consult the SDS/MSDS for proper selection.
- At a minimum: long-sleeve shirt, pants, recommended chemical-resistant butyl rubber or neoprene rubber gloves that are at least 8 mills thick and safety goggles should be worn during application.
- Avoid wearing anything leather when working with pesticides. Leather products can absorb pesticides and hold them close to the skin.
- Never place bare hands in herbicides or mixtures. Caution should be taken to avoid exposure from cuts and open sores. Abrasions or breaks of the skin can provide openings where pesticides may be absorbed into the body.

<b>Abengoa Solar LLC</b> <b>ASI Operations</b>	Document:			
	Revision:	01	Date:	02/26/14
	Page: 19 of 30			

- Never spray herbicide on a windy day. Select a clear, calm day for spraying, with no forecast of rain. Wind caused drift during application is not likely to occur with wind speeds below 10 miles per hour.
- To prevent accidental ingestion while handling herbicides, a respirator mask should be worn over the face and nose.

Not all herbicide applications require the same equipment, so be sure to check the label before starting any task involving herbicides.

Any equipment used for spraying or applying herbicides should be used for the herbicides only. Residue is difficult to remove from the sprayers, and remnants can be harmful if sprayers are used for other purposes.

Always insure herbicides are stored in a safe and secure manner, in sealed containers with proper labeling for avoidance of any potential hazardous incidents or exposures.

#### Toxicity

Although many herbicides are toxic, most herbicides do not carry the long-term environmental effects that many pesticides do. The greatest danger in terms of the toxic nature of herbicides comes primarily from chronic ingestion. Because of the risk involved, follow all manufacturers' specific safety instructions when handling or using herbicides.

Herbicides are rated by the EPA for safety using a one-word system posted on the product's label. The purpose of signal words is to alert the user to the level of toxicity of the product. These safety levels are, in rising order of risk for ingestion for an average 140lb to 170lb person:

- |           |                      |                 |
|-----------|----------------------|-----------------|
| • Caution | Practically nontoxic | 5 to 15 gm/kg   |
| • Warning | Slightly toxic       | 0.5 to 5 gm/kg  |
| • Danger  | Moderately toxic     | 50 to 500 mg/kg |
|           | To Highly toxic      | 1 to 50 mg/kg   |

Specific safety concerns can be found on product material safety data sheets (SDS/MSDS) released by manufacturers. The sheets may also be found online in the National SDS/MSDS Repository shown in the Resources section.

#### Herbicide Spills/Leaks

<b>Abengoa Solar LLC</b> <b>ASI Operations</b>	Document:			
	Revision:	01	Date:	02/26/14
	Page: 20 of 30			

Report all spills or leaks immediately and follow site SPCC spill notification and response procedures.

#### Emergency First Aid Procedures

All herbicides should be treated with caution. During application there is usually more risk of incurring hazardous inhalation exposure.

If inhaled:

- Move to an area with fresh air.
- If breathing difficulty continues; contact a physician immediately.

For exposure to skin or clothing:

- Contaminated clothing should be removed and affected skin rinsed with water for 15-20 minutes.
- If available, scrub the skin where the herbicide made contact with soapy water.
- If there are any signs of irritation, contact a physician.

For eye contact:

- Rinse eyes for 15-20 minutes. If wearing contacts, rinse for five minutes before removing the lens and then continue rinsing. If pain or irritation persists, contact a physician.

If herbicide is swallowed:

- Give the victim water or milk immediately.
- Call the National Poison Control Center **1-800-222-1222** for treatment advice immediately.
- Transport to Hospital.

<b>Abengoa Solar LLC</b> <b>ASI Operations</b>	Document:			
	Revision:	01	Date:	02/26/14
	Page: 21 of 30			

**12.0 Heat Transfer Fluid (HTF) Spill Procedure**

**General Procedure**

<b>Title:</b>	
Heat Transfer Fluid (HTF) Spill Procedure	

<b>Document:</b>	
<b>Revision:</b>	
<b>Date:</b>	02/10/2014

<b>Produced by:</b>		
Bruce Asaro		Electronic Signature

<b>Reviewed by:</b>		
Larry Davis		Electronic Signature
Steve Pochmara		

<b>Approved by:</b>		
Steve Pochmara		Electronic Signature

Proprietary Notice
This document and the information contained within this document are confidential and proprietary to Mojave Solar, LLC. This information shall not be used, released, or disclosed in whole or in part without written permission from Mojave Solar LLC.

<b>Abengoa Solar LLC</b> <b>ASI Operations</b>	Document:			
	Revision:	01	Date:	02/26/14
	Page: 22 of 30			

### Revision Control Sheet

Revision	Date	Reason for the Revision
00		Initial Release

<b>Abengoa Solar LLC</b> <b>ASI Operations</b>	Document:			
	Revision:	01	Date:	02/26/14
	Page: 23 of 30			

## Objective/Purpose

The primary objective of the Heat Transfer Fluid (HTF) Spill Procedure is to help ensure that any spill involving HTF is handled promptly per SPCC requirements.

## Scope

The HTF Spill Procedure details the steps needed to ensure that remediated soil complies with regulatory plan requirements and ISO 14001 Environmental Management System standards.

## Definitions

**Absorbent Material**- a clay mineral composed of a complex magnesium silicate, with high porosity and absorptivity it is used in cat litter and to absorb oil spills.

**Bioremediation Process** - is a waste management technique that involves the use of organisms to remove or neutralize pollutants from a contaminated site

**Bioremediation Area** – is the designated area for the bioremediation process. Contaminated soil is to be removed to this area for testing and treatment

**CMMS** – Computerized Maintenance Management System

**Contained area** – Area surrounded by low walls capable of containing a possible spill, which, by means of a specific drainage system, is channeled to a collection sink

**Facility** – Technical unit inside an establishment where hazardous substances are produced, used, handled, transformed or stored

**Equipment** – Any machine, apparatus or instrument which forms part of a facility

**HTF** – Heat Transfer Fluid

**Incident** – Any undesired or uncontrolled event which does not represent a situation of immediate or deferred risk for people, goods and the environment but which, if it had evolved differently, could have given rise to an accident.

**Non-contained area** – Areas which do not have elements for the containment of spills

**Operations Log** – PI system (The Abengoa Solar preferred real-time data acquisition software) or other operations and performance data log.

**SPCC** – Spill Prevention, Containment, Countermeasures and Control Plan

**HTF Reportable Spill** – minimum 20 gallons

<b>Abengoa Solar LLC</b> <b>ASI Operations</b>	Document:			
	Revision:	01	Date:	02/26/14
	Page: 24 of 30			

## Execution

### Initial Response

#### Assess the Situation

Upon discovery of an HTF spill, it is imperative that a preliminary assessment of the situation be made to determine any immediate threats to personnel safety and environmental contamination. Authorized personnel should congregate to a location determined by the initial assessment to be a safe distance from any risks of exposure to contamination or other safety hazards. Take care that vehicles or other equipment does not block access to the scene in the event emergency responders and/or equipment is required. Determine if there are any injured parties and if they may be safely assisted away from the scene or area considered as potentially hazardous. It is critical that employees do not rush into an unsafe scene, without proper consideration of risks, proper training, or without proper equipment.

#### Notification

The control room operator responsible for the area must then be notified immediately by radio, phone or in person. The control room operator will then immediately notify the shift supervisor, plant manager and ASI's HSE Department and initiate SPCC procedures and obtain the following information from the scene of an HTF spill:

- The precise location of the spill
- Estimated quantity of fluid
- Indicate if there is a fire or if the spill represents a fire risk
- The current status of the spill
- Origin of the spill
- Identification of the cause, if it can be safely determined at that initial time

#### Eliminate the Source of the Spill

All spills must be contained as quickly and safely as possible and if determined to be safe the identification and isolation of the source of the spill should be effected in order to limit any potential collateral damage and minimize the volumetric losses and the associated replacement and possible environmental cleanup consequences.

Before entering the area of the incident, the appropriate protective equipment must be used to prevent or minimize personnel exposure

<b>Abengoa Solar LLC</b> <b>ASI Operations</b>	Document:			
	Revision:	01	Date:	02/26/14
	Page: 25 of 30			

to vapors or the direct contact of contaminated fluids with skin or eyes or breathing equipment as deemed necessary, (chemical protection boots, chemical protection overall and gloves).

#### Identification of the Cause of Spill

In the event that the cause of the spill could not be determined during the assessment, it is imperative that all best efforts are made to verify the exact cause to aid in efforts to prevent or minimize similar spill incidents in the future.

This information must be recorded on the HTF Spill Report.

In certain cases further investigation may be required by analyzing operational data or by other specialty forensic analysis.

#### HTF Spill Report

Fill out the HTF spill report and return to a supervisor for review. A batch number will be assigned to the report.

Batch number format = MMDDYYYY

MM – 2 digit month

DD – 2 digit day

YYYY – 4 digit year

### Cleanup

#### Contained Areas

##### Small spills, cleanup with absorbent materials

If the volume of the spill permits, the cleanup team may use absorbents, blankets, absorbent materials to collect the HTF. If there is danger of an active leak reaching a rainwater drainage area or dry well, it must be contained with, absorbent pillows, or other appropriate inert material until the leak has been stopped. The waste generated (contaminated absorbents) shall be stored in containers identified by means of the corresponding waste label, and these will be stored in the hazardous waste storage area.

##### Large spills or other spills requiring vacuum equipment

If the volume of the spill is too large to be handled with absorbent blankets, or accumulated in a containment sump or other low point within a containment, the spill must be

<b>Abengoa Solar LLC</b> <b>ASI Operations</b>	Document:			
	Revision:	01	Date:	02/26/14
	Page: 26 of 30			

cleaned using a vacuum pump. If it is pumped, it will be put into a used HTF container labeled as HTF contaminated liquid waste. Once the pumping has been completed, the affected area will be cleaned with absorbent materials, allowing time for it to act before removing it. This material will be removed as contaminated absorbent in a container adequately labeled as such, and subsequently transferred to the hazardous waste staging area to await transport and disposal off-site.

**Note:** Any sand or soil used to create a temporary containment berm shall be transported to the bioremediation facility – and not disposed of as solid waste. Reference the bioremediation manual for disposal limits.

#### Fluid recovery for reuse

Where ever feasible, containment barrels with compression roller-type ringer fixtures will be used to extract fluid volume from pillow type absorbent materials or barriers. This effort is intended to reduce the weight of hazardous materials requiring disposal and yield reusable HTF product which may be filtered and re-injected into the plant HTF system.

**Note:** Once any fluid that may be feasibly extracted from pillow-type absorbents, those used materials as well as any contaminated granular absorbents shall be placed in a container appropriately labeled as HTF contaminated solid waste and transferred to the hazardous waste staging area to await transport and disposal off-site.

#### Non-contained Areas

In the case of a HTF spill in non-contained, permeable areas, the greatest priority is to contain and cordon off the spills by means of basins and barriers composed of absorbents or soil. This will prevent the leak from spreading to larger areas permeable to HTF.

**Note:** If HTF is at risk of contaminating a dry well, notify the HSE department immediately.

#### Soil Collection

Contaminated soil is so be gathered using appropriate digging equipment and placed in an assigned bin for transport to the bioremediation facility. Soil will be removed to the depth reached by the filtration of the contaminant (until the characteristic smell of HTF can no longer be detected). New soil that has not begun the

<b>Abengoa Solar LLC</b> <b>ASI Operations</b>	Document:			
	Revision:	01	Date:	02/26/14
	Page: 27 of 30			

bioremediation process must be placed in a section of the bioremediation staging facility that does not contain any other soil.

#### Hazardous Work Permit

A hazardous work permit is required before any large areas of soil are removed, and when excavation may be deeper than three feet, or the spill location is in an area that is difficult to access or near potential hazards such as rotating equipment, relief vents, or high voltage electrical equipment is located.

#### Excavation Preparation

Available drawings must be checked to determine the location of any underground pipes or electrical lines. Use of an underground cable locator should be available as a precaution against drawing errors or omissions. For excavations near sensitive equipment, electrical or instrumentation or communication cabling, pot holing and verification of such equipment lines, or cabling must be made. In such areas, vacuum-assisted excavation is recommended.

Protection against cave-ins must be used at any time the depth of excavation exceeds 4 feet. Shoring equipment, side sloping, etc. should be used as applicable.

#### Transportation of Soil

HTF-Contaminated soil should be transported in the bucket of a front-end loader, dump truck or in the appropriately labeled and covered waster hoppers, depending on the distance of transport or other logistic considerations. Care must be taken in loading and transport not to spill any material. Any spills of contaminated soil during transportation shall be addressed immediately.

#### Completion of Cleanup

Sign off on the hazardous work permit indicating that the work has been completed. Enter appropriated information on the spill report form and forward completed spill report form to the Environment Health and Safety Department.

#### Initial Testing

For contaminated soil, initial samples will be taken and submitted for testing prior to the start of bioremediation.

<b>Abengoa Solar LLC</b> <b>ASI Operations</b>	Document:			
	Revision:	01	Date:	02/26/14
	Page: 28 of 30			

## Bioremediation

### Design

The bioremediation process uses normal precipitation to enhance the biodegradation process by adding moisture to the soil. Concrete barriers are used to ensure that batches of soil remain separated for monitoring purposes.

### Soil Limits

Limits are to be set on the amount of soil that can be placed in the bioremediation facility in order to ensure that any natural precipitation will be contained within the facility.

### Precipitation

All soil microorganisms require moisture for cell growth and function. Availability of water affects diffusion of water and soluble nutrients into and out of microorganism cells. However, excess moisture, such as in saturated soil, is undesirable because it reduces the amount of available oxygen for aerobic respiration and in turn slows the rate of biodegradation. Soil moisture content "between 45 and 85 percent of the water-holding capacity (field capacity) of the soil or about 12 percent to 30 percent by weight" is optimal for petroleum hydrocarbon degradation. Every effort will be made to prevent standing water as a result of operations.

### Unauthorized Materials

Materials added to the bioremediation facility are restricted to site soils impacted by the release of HTF. No unauthorized organic solvents or hazardous substances shall be discharged to the facility.

### Maintenance

Weekly tilling of the soil will be scheduled through the plant CMMS.

If damage is identified that could cause or contribute to discharge from the facility, repairs shall be promptly performed. Routine inspections of the facility shall be scheduled through the CMMS.

## Monitoring

### Testing Facilities

Only appropriately licensed laboratories shall be used for soil testing.

### Testing

Soil samples from batches in the process of bioremediation shall be tested for the following constituents:

<b>Abengoa Solar LLC</b> <b>ASI Operations</b>	Document:			
	Revision:	01	Date:	02/26/14
	Page: 29 of 30			

- Total Petroleum Hydrocarbons
- BTEX (for benzene)
- Biphenyl

#### Clean Soil

The bioremediation process will continue until test results are returned that show the soil contamination has fallen below contamination limits as defined in the bioremediation manual. Once acceptable levels have been reached, the soil may be removed from the bioremediation facility using an approved bin and staged or used as fill dirt when needed. A report of soil relocation will be submitted to the HSE department for their records.

## Health Safety and Environment

### Minimum Protective Equipment

There are many work activities that require specific or special protection, but most work activities require basic minimum equipment. This equipment is required for all outdoor work areas.

- Long sleeved shirt
- Hard hats
- Safety glasses with side shields
- Steel toed shoes with hard oil resistant soles and smooth leather or other hard nonabsorbent uppers

### Procedure Specific Safety Equipment

- Respirators (if needed)
- Rubber boots
- Rubber gloves
- Protective outerwear
- Face Shield

### Responsibilities

The Plant Manager and the Plant Maintenance Manager are directly responsible for ensuring that all HTF spills are cleaned up in a timely manner, that all required inspections and maintenance are performed, and no alert and/or performance levels are exceeded. All employees who work within the solar field must be familiar with the proper protocol for handling an HTF spill. Management is responsible for the scheduling of all routine and emergency inspections and maintenance. The HSE

<b>Abengoa Solar LLC</b> <b>ASI Operations</b>	Document:			
	Revision:	01	Date:	02/26/14
	Page: 30 of 30			

department and the Operations Manager are responsible for communicating all spill information. The HSE department is responsible for maintaining records of testing and spill reports.

## Records

### Record Keeping

All routine inspections and maintenance shall be planned in the CMMS. All work orders resulting from inspections shall be linked to the original work order. All data resulting from routine inspections and information shall be recorded in the Operations Log. Records in the CMMS and Operations Log shall be stored for a minimum of ten years. Hard copies of inspection forms or spill reports shall be retained on site for one year. Any information not recorded in the CMMS or Operations Log shall be scanned and sent to the HSE Department.

The HSE department will retain all spill reporting, laboratory testing results, and soil relocation reports for the life of the project. Spills of 20 gallons or more of HTF fluid shall be reported to CEC within 48 hours.

# ABENGOA SOLAR

Mojave Solar LLC

## Attachment A HTF Spill Soil Relocation - Alpha

Facility:	Date of Relocation:	Batch #:
Relocation Area:		
Quadrant:      NE      NW      SE      SW	Approx. Rows:	
Estimated Relocated Soil (Cubic Yards):		
See Relocation Map on next page		
<b>Name</b>	<b>Title</b>	<b>Date</b>
Supervisor:		
Reviewed By:	Environmental Health & Safety	

Deliver this completed form along with any backup information to the HSE Department. Retain one copy for files



# ABENGOA SOLAR

Mojave Solar LLC

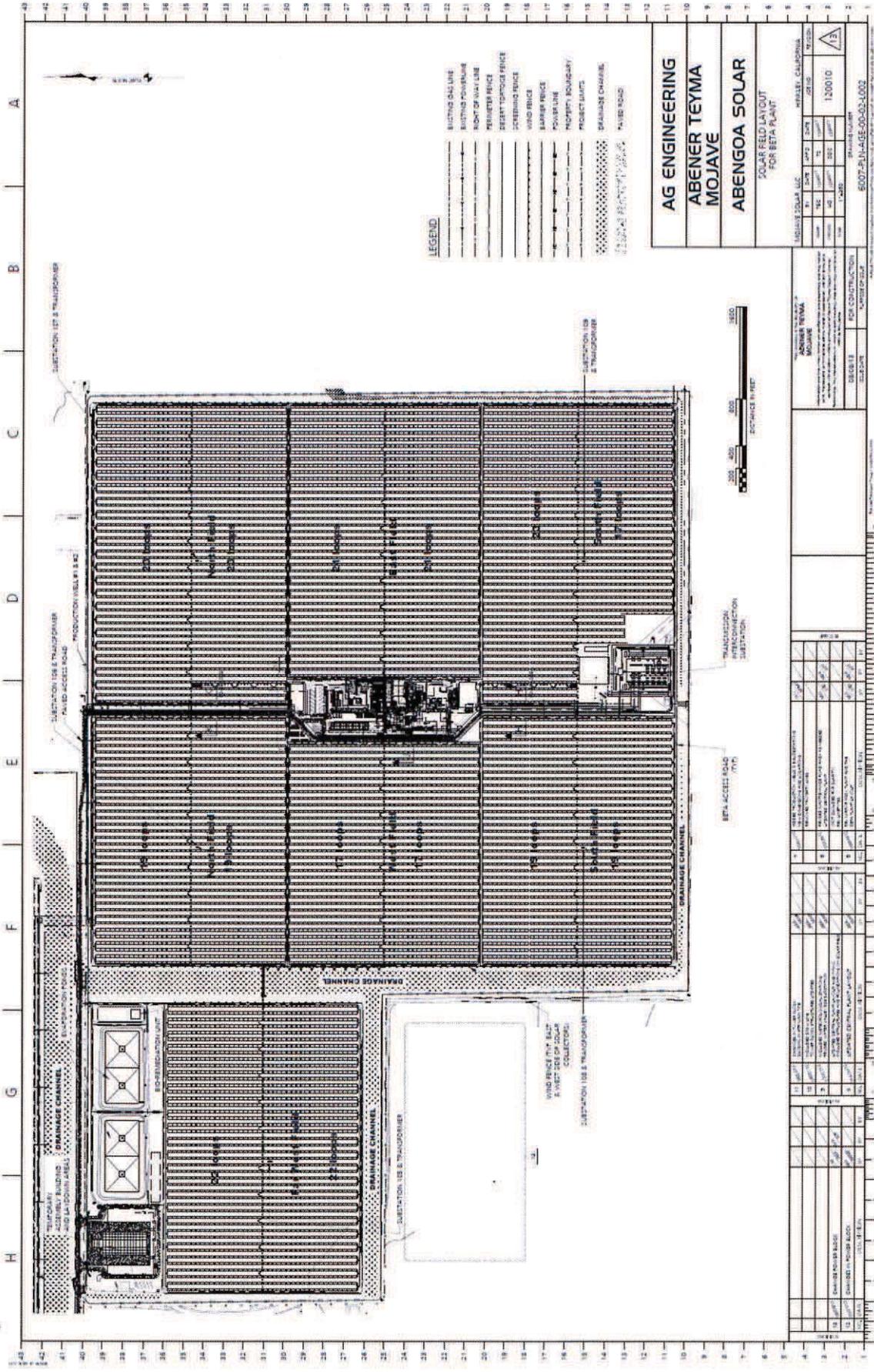
## Attachment B HTF Spill Soil Relocation - Beta

Facility:	Date of Relocation:	Batch #:
Relocation Area:		
Quadrant:      NE      NW      SE      SW	Approx. Rows:	
Estimated Relocated Soil (Cubic Yards):		
See Relocation Map on next page.		
<b>Name</b>	<b>Title</b>	<b>Date</b>
Supervisor:		
Reviewed By:	Environmental Health & Safety	

Deliver this completed form along with any backup information to the HSE Department. Retain one copy for files.

# ABENGOA SOLAR

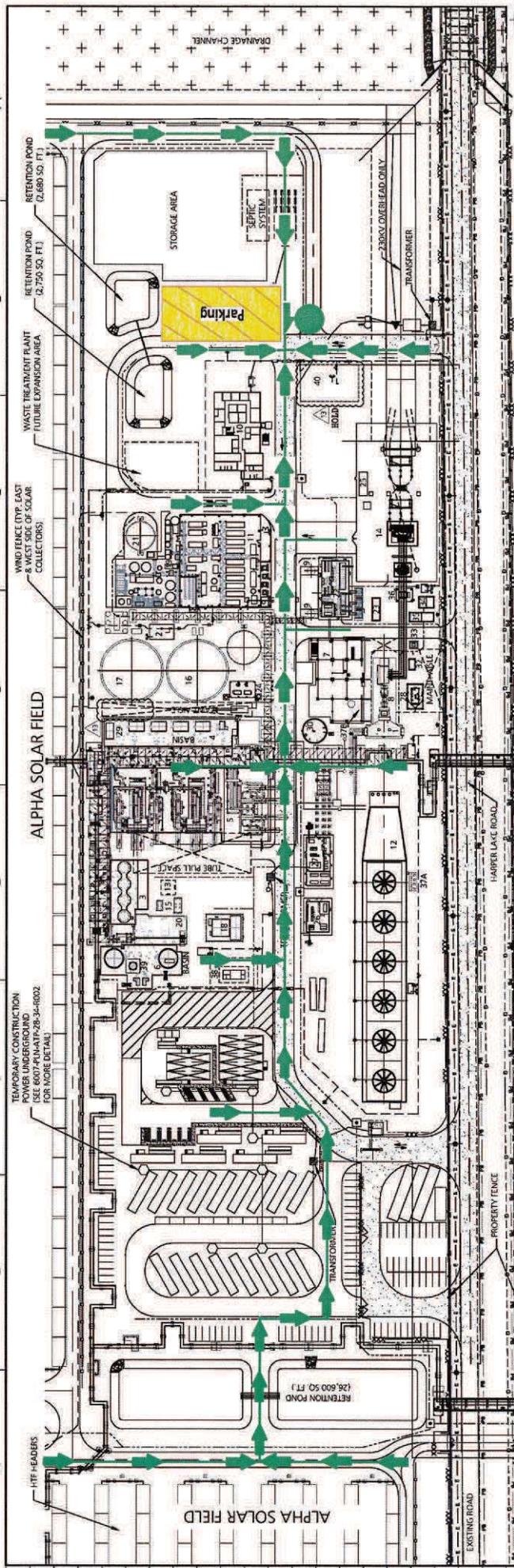
Mojave Solar LLC



Rev. 01/17/2014

HTF Soil Relocation

Attachment C



**MOJAVE SOLAR LLC**  
Mojave Solar Plant

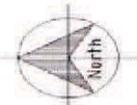
**LEGEND**

 Parking

 Assembly Area

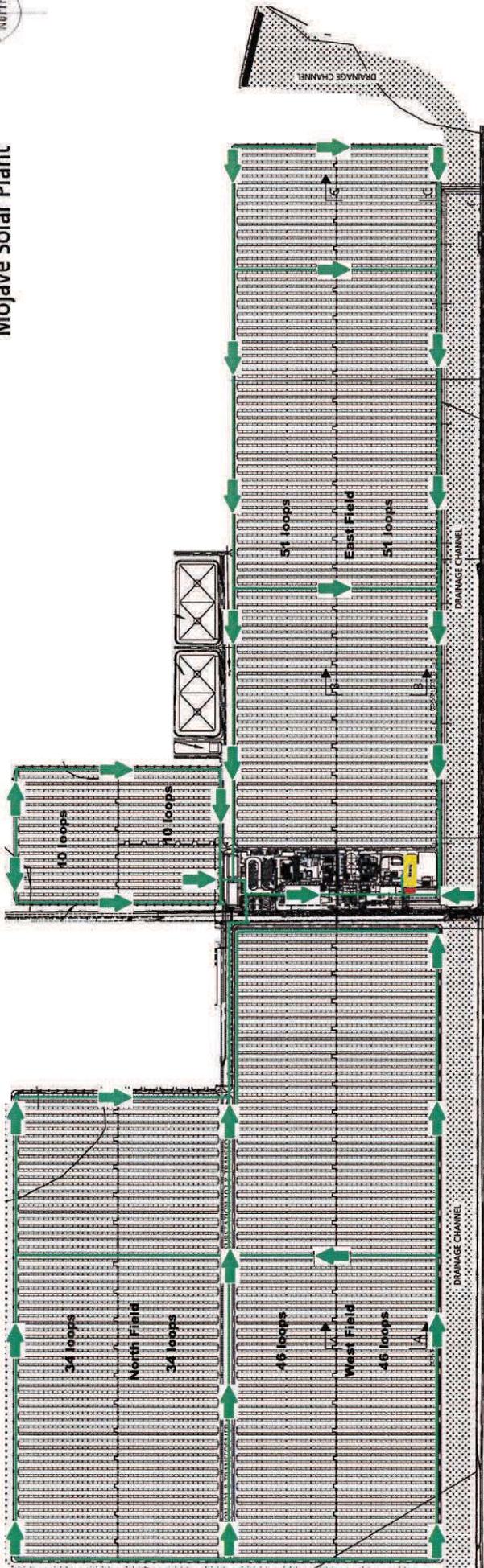
 Muster Point (ERT)

**Alpha Power Block  
Evacuation Routes & Assembly Area**

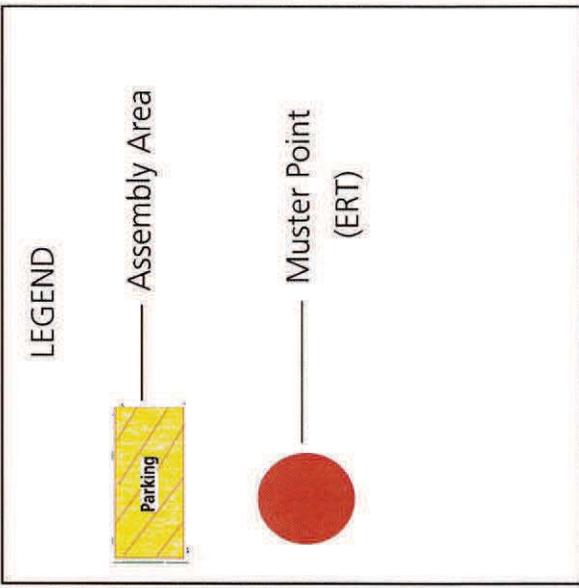


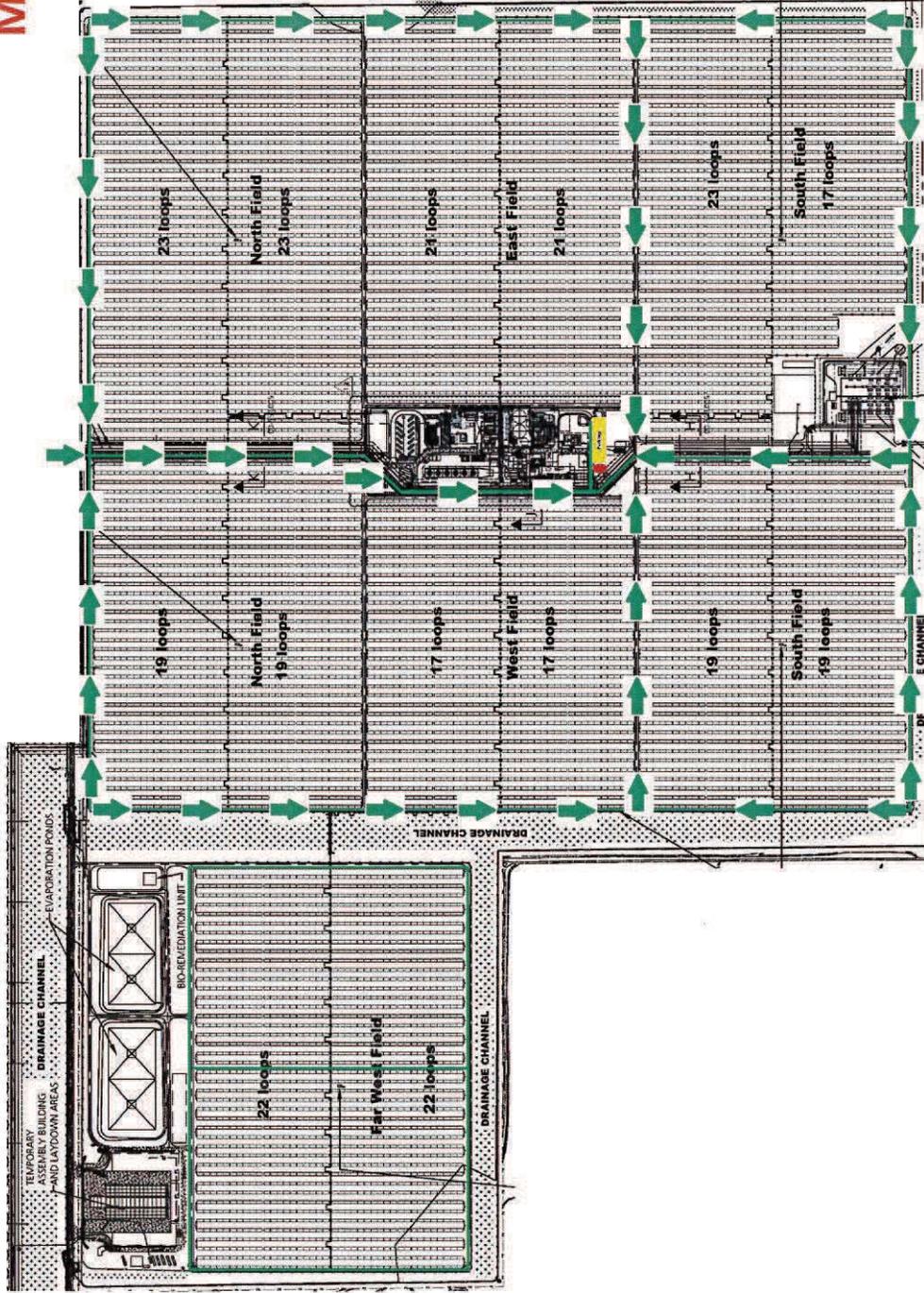
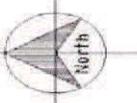
# MOJAVE SOLAR LLC

Mojave Solar Plant



## Alpha Solar Field Evacuation Routes & Assembly Area





Legend



Assembly Area



Muster Point  
(ERT)

**Beta Solar Field & Power Block  
Evacuation Routes & Assembly Area**



**"Rundquist, Dale@Energy"**

04/16/2014 03:25 PM

Send To	"Steven.Pochmara@abeinsaepc.abengoa.com" <Steven.Pochmara@abeinsaepc.abengoa.com>
cc	"holmes.bassette@solar.abengoa.com" <holmes.bassette@solar.abengoa.com>, "Kathleen.Sullivan@solar.abengoa.com" <Kathleen.Sullivan@solar.abengoa.com>, "vernon.leeming@abeinsaepc.abengoa.com" <vernon.leeming@abeinsaepc.abengoa.com>
bcc	
Subject	RE: HMBP

Hi Steven,

Staff has reviewed and approved the submittal for **HAZ-2-03-00, the REVISED HMBP** for Abengoa Mojave Solar Project.

Thank you,

Dale R.

**From:** Steven.Pochmara@abeinsaepc.abengoa.com [mailto:Steven.Pochmara@abeinsaepc.abengoa.com]

**Sent:** Wednesday, April 16, 2014 2:42 PM

**To:** Rundquist, Dale@Energy

**Cc:** holmes.bassette@solar.abengoa.com; Kathleen.Sullivan@solar.abengoa.com;  
vernon.leeming@abeinsaepc.abengoa.com; william.grisolia@solar.abengoa.com

**Subject:** RE: HMBP

Thanks Dale.

Regards,

Steven Pochmara - Permit Manager

## **ABEINSA EPC**

13911 Park Avenue, Suite 208  
Victorville, CA 92392  
Cell: +14802871419

[Steven.Pochmara@teyma.abengoa.com](mailto:Steven.Pochmara@teyma.abengoa.com)

[www.teyma.com](http://www.teyma.com)

 Eco-Tip: Printing e-mails is usually a waste.

**"Rundquist, Dale@Energy"**

04/16/2014 02:37 PM

Send  
d "Steven.Pochmara@abeinsaepc.abengoa.com" <Steven.Pochmara@abeinsaepc.abengoa.com>

To:  
cc: "holmes.bassette@solar.abengoa.com" <holmes.bassette@solar.abengoa.com>, "vernon.leeming@abeinsaepc.abengoa.com" <vernon.leeming@abeinsaepc.abengoa.com>, "Kathleen.Sullivan@solar.abengoa.com" <Kathleen.Sullivan@solar.abengoa.com>, "william.grisolia@solar.abengoa.com" <william.grisolia@solar.abengoa.com>

Subject: RE: HMBP

ject

Hi Steven,  
Staff is in the process of reviewing the document as we speak.  
Hope to have approval by tomorrow.  
Thank you,  
Dale R.

**From:** [Steven.Pochmara@abeinsaepc.abengoa.com](mailto:Steven.Pochmara@abeinsaepc.abengoa.com) [<mailto:Steven.Pochmara@abeinsaepc.abengoa.com>]

**Sent:** Wednesday, April 16, 2014 2:20 PM

**To:** Rundquist, Dale@Energy

**Cc:** [holmes.bassette@solar.abengoa.com](mailto:holmes.bassette@solar.abengoa.com); [vernon.leeming@abeinsaepc.abengoa.com](mailto:vernon.leeming@abeinsaepc.abengoa.com);  
[Kathleen.Sullivan@solar.abengoa.com](mailto:Kathleen.Sullivan@solar.abengoa.com); [william.grisolia@solar.abengoa.com](mailto:william.grisolia@solar.abengoa.com)

**Subject:** HMBP

Good Afternoon Dale,  
I am following up on the status of the revised HMBP submittal provided to you on March 25, 2014, please let me know at your earliest convenience, thanks.

Regards,

Steven Pochmara - Permit Manager

## **ABEINSA EPC**

13911 Park Avenue, Suite 208  
Victorville, CA 92392

Cell: +14802871419

[Steven.Pochmara@teyma.abengoa.com](mailto:Steven.Pochmara@teyma.abengoa.com)

[www.teyma.com](http://www.teyma.com)

 Eco-Tip: Printing e-mails is usually a waste.

\*\*\*\*\*Internet Email Confidentiality Footer\*\*\*\*\*

This email and any files transmitted with it are confidential and intended solely for the use of the organization or individual to whom they are addressed. It is expressly forbidden to retransmit or copy email and/or this attached files without our permission. If you are not the addressee indicated in this message (or responsible for delivery of the message to such person), you may not copy or deliver this message to anyone. In such case, you should destroy this message and kindly notify the sender by reply email. Please advise immediately if you or your employer does not consent to Internet email for messages of this kind. Opinions, conclusions and other information in this message that do not relate to the official business of my firm shall be understood as neither given nor endorsed by it.

\*\*\*\*\* Confidencialidad de Correo electr?nico de Internet \*\*\*\*\*

Este correo electr?nico y cualquier archivo transmitido con el, es confidencial y destinado exclusivamente para el empleo de la organizaci?n o el individuo a quien esta dirigido. Esta expresamente prohibido su reenvio o copia del correo electr?nico y/o de los archivos anexados sin permiso del remitente. El contenido esta protegido seg?n la

regulaci?n sobre la Protecci?n de Datos e Informaci?n Personal. Si usted no es el destinatario indicado en este mensaje (o responsable de la entrega del mensaje a tal persona), no puede copiar, reenviar o entregar este mensaje. En tal caso, usted debe destruir este mensaje y notificar al remitente por el correo electr?nico de respuesta. Puede notificar igualmente si no desea recibir correos electr?nicos de esta clase. Las opiniones, conclusiones y otra informaci?n en este mensaje que no se relaciona con la actividad de la compa??a ni ser?n entendidas como autorizadas por ?sta.

\*\*\*\*\*|Internet Email Confidentiality Footer\*\*\*\*\*

This email and any files transmitted with it are confidential and intended solely for the use of the organization or individual to whom they are addressed. It is expressly forbidden to retransmit or copy email and/or this attached files without our permission. If you are not the addressee indicated in this message (or responsible for delivery of the message to such person), you may not copy or deliver this message to anyone. In such case, you should destroy this message and kindly notify the sender by reply email. Please advise immediately if you or your employer does not consent to Internet email for messages of this kind. Opinions, conclusions and other information in this message that do not relate to the official business of my firm shall be understood as neither given nor endorsed by it.

\*\*\*\*\* Confidencialidad de Correo electr?nico de Internet \*\*\*\*\*

Este correo electr?nico y cualquier archivo transmitido con el, es confidencial y destinado exclusivamente para el empleo de la organizaci?n o el individuo a quien esta dirigido. Esta expresamente prohibido su reenvio o copia del correo electr?nico y/o de los archivos anexados sin permiso del remitente. El contenido esta protegido seg?n la regulaci?n sobre la Protecci?n de Datos e Informaci?n Personal. Si usted no es el destinatario indicado en este mensaje (o responsable de la entrega del mensaje a tal persona), no puede copiar, reenviar o entregar este mensaje. En tal caso, usted debe destruir este mensaje y notificar al remitente por el correo electr?nico de respuesta. Puede notificar igualmente si no desea recibir correos electr?nicos de esta clase. Las opiniones, conclusiones y otra informaci?n en este mensaje que no se relaciona con la actividad de la compa??a ni ser?n entendidas como autorizadas por ?sta.

# ABENER TEYMA MOJAVE

## LETTER OF TRANSMITTAL

**Date:** April 23, 2014  
**Subject:** Mojave Solar Project  
**Condition Number:** HAZ-2  
**Reference:** Mojave Chemical Pipe Cleaning proposal  
**To:** Mr. Dale Rundquist, CPM  
California Energy Commission

### WE ARE SENDING YOU

Attached       Under separate cover via \_\_\_\_\_ the following items:

Shop Drawings     Prints                       Plans                       Samples     Specifications  
 Copy of Letter     Change Order   

COPIES	DATE	NO.	DESCRIPTION
1	4/23/14	1	Cover Letter to CEC
1	9/10/13	1	6007-ESP-ATM-00-70-0003 Chemical Cleaning Instructions
1	4/23/14	1	6007-PPM-ATM-00-70-0002 Chemical Cleaning Procedure
1	4/16/14	1	Solana Chemical Profile
1	4/23/14	1	MSDS for chemical cleaning agents

THESE ARE TRANSMITTED as checked below:

For Approval                       Approved as submitted  
 For your use                       Approved as noted  
 As requested                       Returned for corrections  
 For review                       For review and comment

REMARKS \_\_\_\_\_

COPY TO: File                      SIGNED BY: \_\_\_\_\_



Steven Pochmara  
**ABEINSA EPC**

---

**Subject:** Mojave Solar Project (09-AFC-5C)  
**Condition No.:** HAZ-2  
**Description:** Chemical Pipe Cleaning  
**Submittal No.:** HAZ2-05-00

---

April 23, 2014

Mr. Dale Rundquist, CPM  
California Energy Commission  
1516 Ninth Street (MS-2000)  
Sacramento, CA 95814  
[drundqui@energy.state.ca.us](mailto:drundqui@energy.state.ca.us)

Dear Mr. Rundquist,

The Mojave Solar project respectfully requests approval of the proposed chemical pipe cleaning, included as part of Condition of Certification HAZ-2. The intent is to start the proposed procedure on May 5, 2014 for a period of 2 weeks. A summary of the process is included as 6007-ESP-ATM-00-70-0003, Instruction for Chemical Cleaning Activities. The following is a list (for each power block) of items covered by the chemical cleaning:

1. a 650 HP boiler with dimensions of 8'W x 48' L.
2. a 6,500 Gallon propane tank with dimensions of 8' W x 40' L.
3. a 2,500 Gallon propane trailer with dimensions of 8'W x 30' L.
4. 3- 1,000 Gallon propane tanks with dimensions of 14'W x 30'L total.
5. 2- 6,500 Gallon poly tanks with dimensions of 12' diameter that sit on a 12' x 50' berm.

The chemicals to be used are the following: citric acid at 50% FG, ammonium hydroxide 26 BE, surfactant NP 95, sodium nitrite FF, Henkel Bonderite S-AD Rodine, and sodium hydroxide 50% brenntag. Each chemical's MSDS is provided. Additionally, a sample was obtained and tested for the same process at Solana solar facility. The results are attached for your review. Once the chemical cleaning is complete, the water will be flushed out and conveyed to a series of 20,000 gallon baker tanks located on the west side of Harper Lake Road. The water will then be used for dust control as approved by the CEC on February 12, 2014.

Should you have any questions or need any additional information, please do not hesitate to contact me.

**ABENER TEYMA  
MOJAVE**

13911 Park Ave, Suite 208  
Victorville, CA 92392  
Phone: 480-287-1419

Sincerely,

A handwritten signature in black ink, appearing to read "Steven Pochmara". The signature is fluid and cursive, with a large initial "S" and "P".

Steven Pochmara  
**ABEINSA EPC**  
13911 Park Ave, Suite 208  
Victorville, CA 92392  
Cell: (480) 287-1419

# Scope of Cleaning Activities

## **Hydromechanical Cleaning**

- Condenser (Follow Section 6 Pag1 6007-MOM-SPX-17-51-0018 for inspection and cleaning)
- Condensate Pump Upstream Pipe
- Deareator Water Tank
- BFW pumps Upstream Pipe

## **Chemical Cleaning**

- Deareator Water Tank
- Main Condensate Line
- Through Heaters MX-316, MX-330, MX-340, MX-325, MX-320
- Through Preheaters MX-302A/B, Evaporators MX 305 (AABB), Drums MB310A/B, Superheaters MX-315A/B
- Through temporary piping to upstream Condensate Pumps.
- Receiver tank & pumps system (TBD)

## **Boiling out (Steam Generator)**

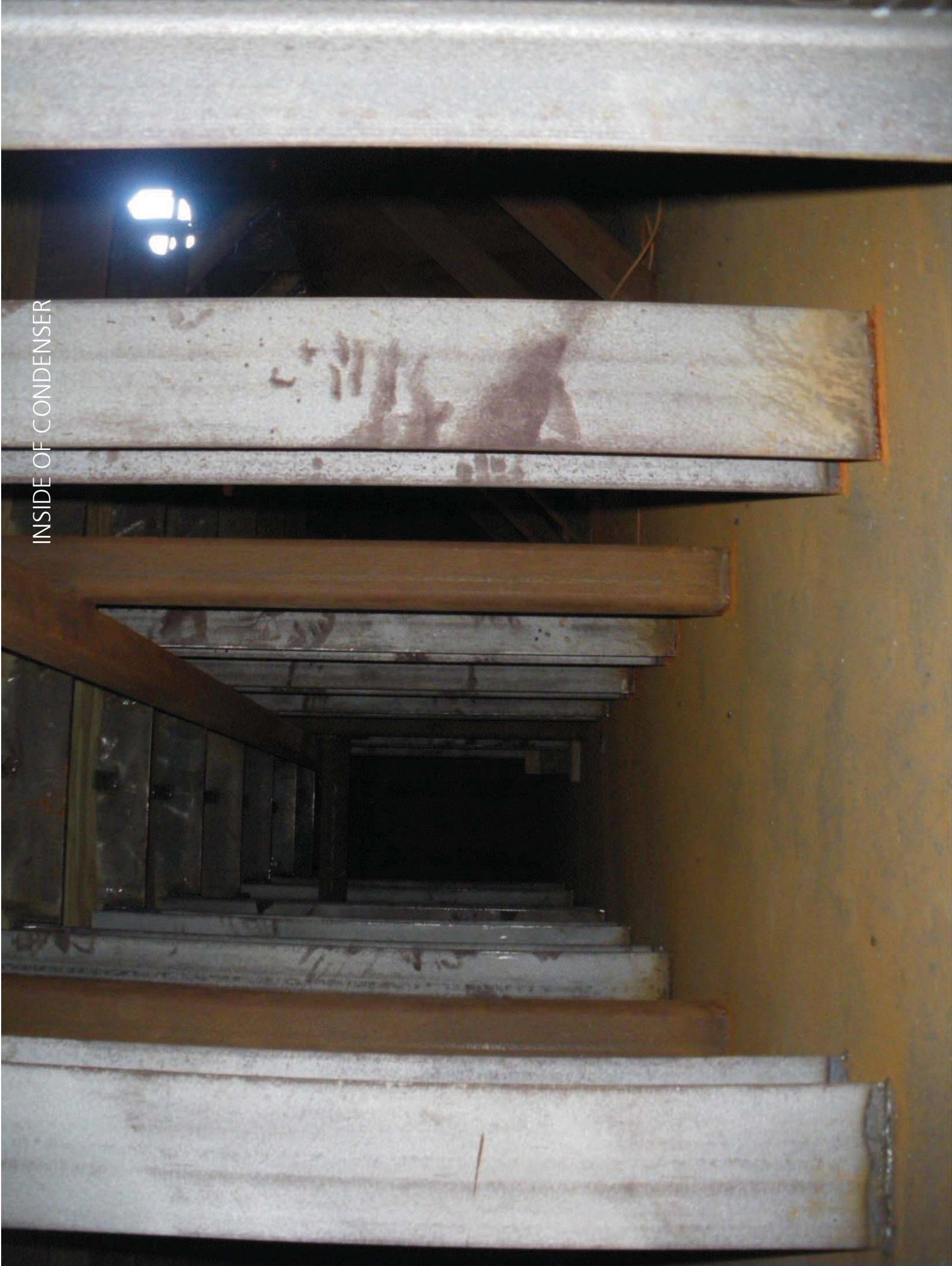
- Preheaters MX-302A/B, Evaporators MX 305 (AABB), Drums MB310A/B, Superheaters MX-315A/B



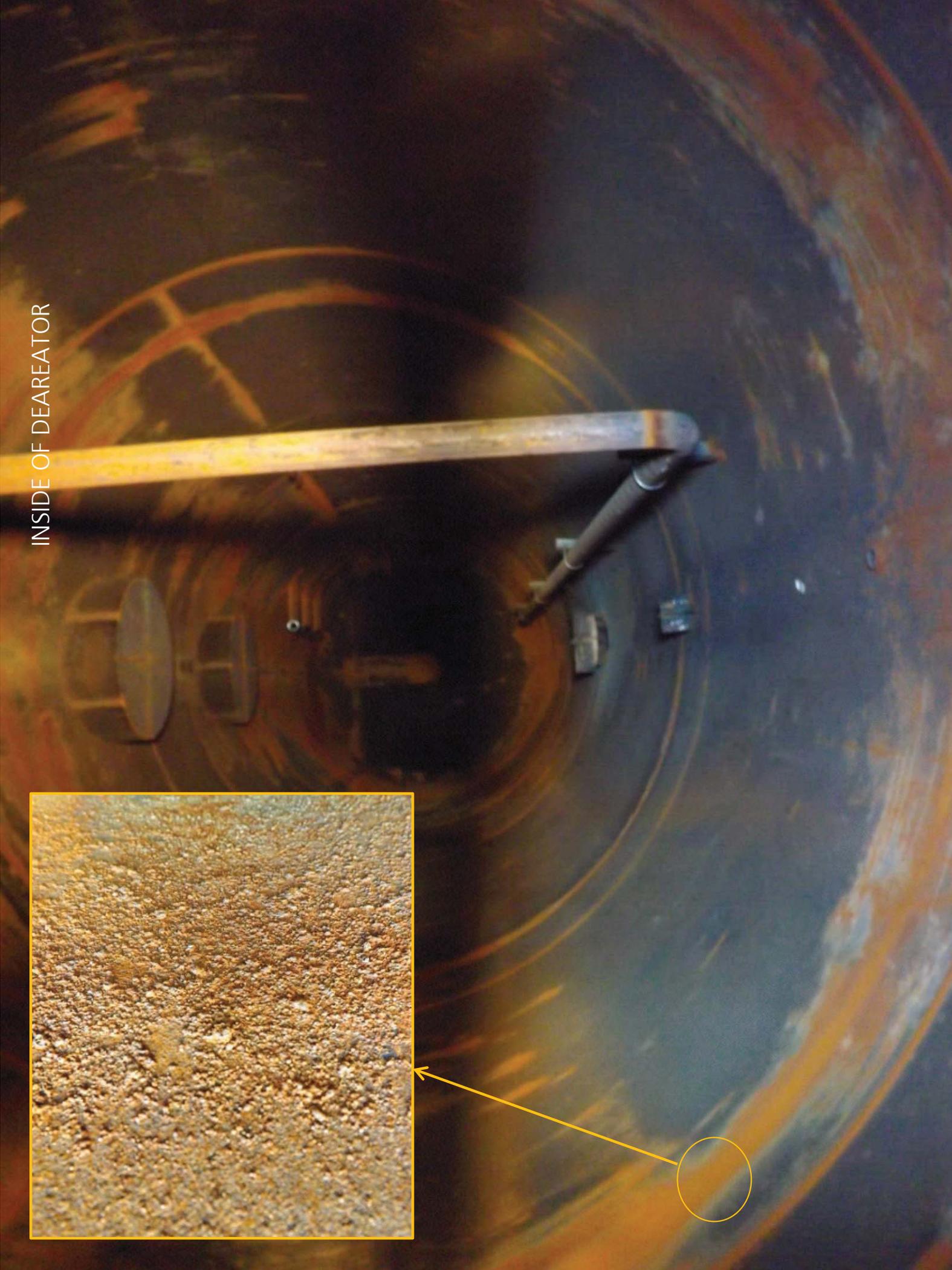
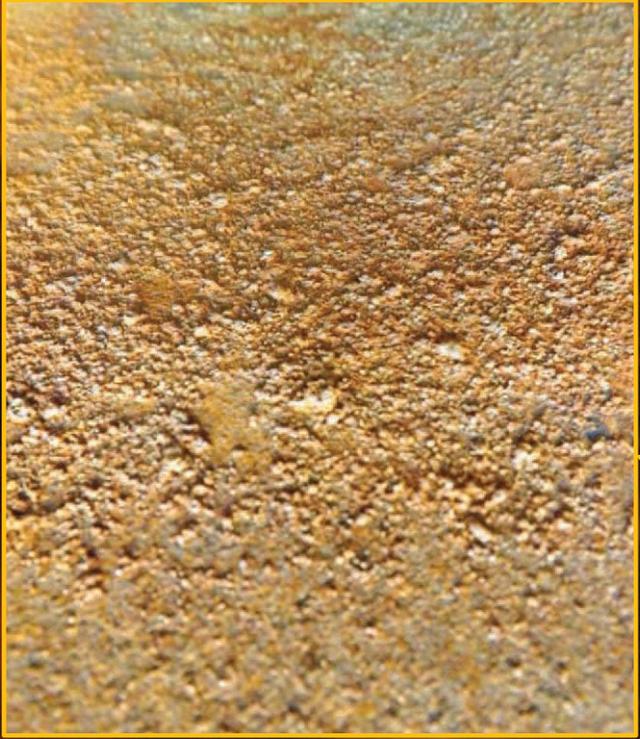
INSIDE OF CONDENSER



INSIDE OF CONDENSER



INSIDE OF DEAREATOR



# Chemical Cleaning

- Isolation of the system and line-up all the valves according to document 6007-PPM-ATM-00-70-0002 - Lineup
- Remove spool from check to gate valve downstream MP-306B pump and install temporary piping as shown under document 6007-PLN-ATM-52-11-001
- Disconnect MX-304 and install temporary spool instead
- Remove spool between check valve and FT-33019 in 321C-BWF-02-CS77-10" and install temporary strainer
- Install temporary strainers upstream BFW pumps MP-302A/B/C
- Connect feed chemical piping to BFW pumps upstream vents
- Remove FE-X30221A/B (or temporary spool) and connect a temporary bypass with strainer up to chemical cleaning dedicated 4" flange.
- Connect blind flange to protect control valve LV X30221
- Connect hoses from each downcomer drain in both trains to temporary piping system
- Remove demisters from the horizontal separator in the boilers
- Isolate instrumentation according to document 6007-PPM-ATM-00-70-0002 - Lineup
- Make sure all venting points are open to remove air from the system
- Isolate heaters MX-316, MX-330, MX-340, MX-325, MX-320 in order to first recirculate water through bypasses
- Fill Tank MT-453 with demi water and make sure pumps MP-453A/B are ready to work
- Fill the system by establishing circulation through the condenser and condensate pumps once it's been hydro mechanically cleaned, and steam generator. Run the system.
- Run pumps MP-302A/B/C at minimum flow operation and recirculate through deareator until temporary filters don't clog up
- Run pumps MP-302A/B/C at maximum flow operation and control vessel levels (startup refrigeration system for pumps)
- Heat up the water up to 185F – 194F and keep the system under this range of temperature all the time
- Solvent injection at the BFW pumps suction (entails chemical Cleaning, Neutralization and Passivation)
- Monitoring of the chemical process (Control PH, Temperature, Pressure, Fe<sup>2+</sup> + Fe<sup>3+</sup>, amine, conductivity, TSS)
- After 1.5 hours, make the solvent flow through all heaters MX-316, MX-330, MX-340, MX-325, MX-320 by shutting down their bypasses
- Intermittent blow down solvent to ensure removal of waste and prevention from clogging
- Run the circulation until changing temporary strainers is not needed. Minimum of 24h
- Before draining the system, shut down the heat source and wait for the solution cool down. Drain the system completely. Dump spent cleaning solution to disposal
- Fill the system with potable water and establish circulation for 1 hour. Prepare to drain
- Fill the system with demi water and heat to 200F. Recirculation for 2 hours and after that prepare to drain using N2...
- Use second rinsing water for Beta
- Open equipment boiler and deareator for inspection and elimination of possible sediments



## Steam Generation Total Volumen

<b><u>Volumen</u></b>	<b><u>Train 1</u></b>	
Preheater Piping	222.740	gal
Preheater	5177.508	gal
Drum	12022.372	gal
Downcomers	1309.231	gal
Risers	1345.248	gal
Evap 1&2	8409.005	gal
Sat Steam Pipe	904.300	gal
Superheater	5177.508	gal
Main Steam Piping	396.086	gal
Total Volume Train1	34963.997	gal
Total Volumen SG Train1 + Train 2	69927.99	gal

Estimated volumes

## Equipment

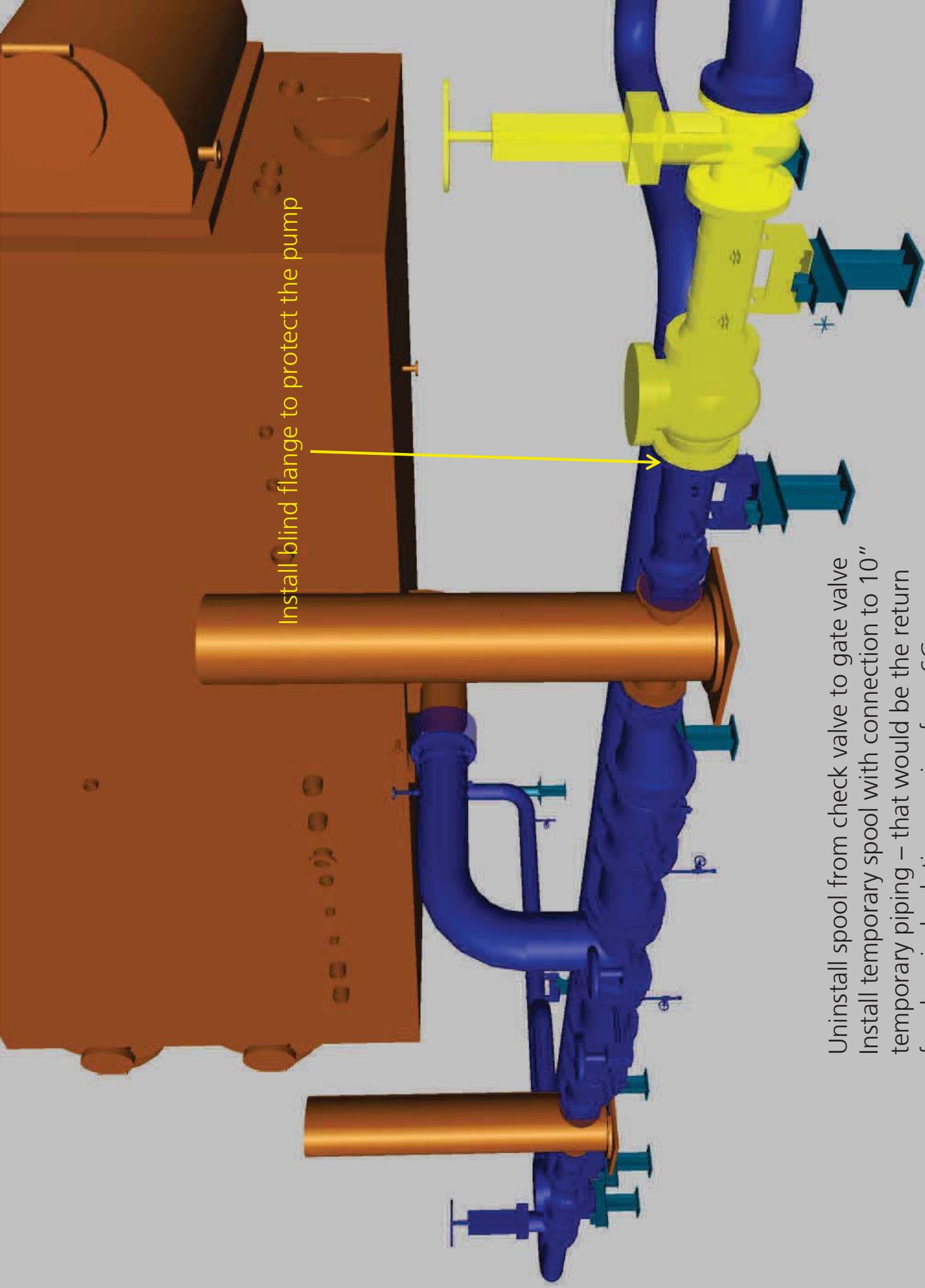
Heater #1	MX-320	1259.45
Heater #2	MX-325	2248.88
Deareator	MX-360	29349.711
Heater #4	MX-340	2123.98
Heater #5	MX-330	1727.64
Heater #3	MX-316	2912.8

## Power Block & Rack2

Pipe	Type	L (in)	D	Sch.	Thck (in)	Vol (gal)
/312A-BFW-03-CS93-20"-PB	CS93	787.40	20	STD	0.375	1031.08
/312A-BFW-08-CS77-12"-PB	CS77	1456.69	12	STD	0.375	669.32
/312A-BFW-06-CS77-12"-PB	CS77	1259.84	12	STD	0.375	578.87
/312A-BFW-07-CS77-12"-PB	CS77	314.96	12	STD	0.375	144.72
/324A-BFW-03-CS78-12"-R2	CS78	0.00	12	140	1.125	
/324A-BFW-03-CS78-12"-PB	CS78	7637.80	12	140	1.125	3071.17
/324A-BFW-04-CS78-12"-PB	CS78	0.00	12	140	1.125	
/324A-BFW-02-CS78-12"-PB	CS78	0.00	12	140	1.125	
/324A-BFW-01-CS78-12"-PB	CS78	629.92	12	140	1.125	253.29
/323A-BFW-07-CS78-12"-PB	CS78	1968.50	12	140	1.125	791.54
/323A-BFS-03-CS72-12"-PB	CS72	433.07	12	STD	0.375	198.99
/315A-BFW-01-CS77-12"-PB	CS77	590.55	12	STD	0.375	271.34
/316A-BFW-01-CS77-12"-PB	CS77	669.29	12	STD	0.375	307.52
/323A-BFS-02-CS72-12"-PB	CS72	433.07	12	STD	0.375	198.99
/323A-BFS-01-CS72-12"-PB	CS72	905.51	12	STD	0.375	416.06
/321A-BFW-02-CS77-10"-PB	CS77	866.14	10	STD	0.365	273.38
/312A-BFW-01-CS77-10"-PB	CS77	826.77	10	STD	0.365	260.96
/327A-BFW-06-CS77-10"-PB	CS77	196.85	10	STD	0.365	62.13
/327A-BFW-05-CS77-10"-PB	CS77	787.40	10	STD	0.365	248.53
/317A-BFW-01-CS77-10"-PB	CS77	196.85	10	STD	0.365	62.13
/317A-BFW-02-CS77-10"-PB	CS77	511.81	10	STD	0.365	161.54
/321A-BFW-03-CS77-10"-PB	CS77	236.22	10	STD	0.365	74.56
/321A-BFW-01-CS77-10"-PB	CS77	393.70	10	STD	0.365	124.26
/323A-BFW-01-CS78-8"-PB	CS78	787.40	8	120	0.719	141.92
/323A-BFW-02-CS78-8"-PB	CS78	314.96	8	120	0.719	56.77
/323A-BFW-03-CS78-8"-PB	CS78	314.96	8	120	0.719	56.77
/324A-BFW-05-CS78-8"-R2	CS78	826.77	8	120	0.719	149.02
/324A-BFW-04-CS78-8"-R2	CS78	1968.50	8	120	0.719	354.81
322C-BFS-01-CS72-16"	CS72					150
323C-BFS-01-CS72-12"	CS72					50
323C-BFS-02-CS72-12"	CS72					50
323C-BFS-03-CS72-12"	CS72					50

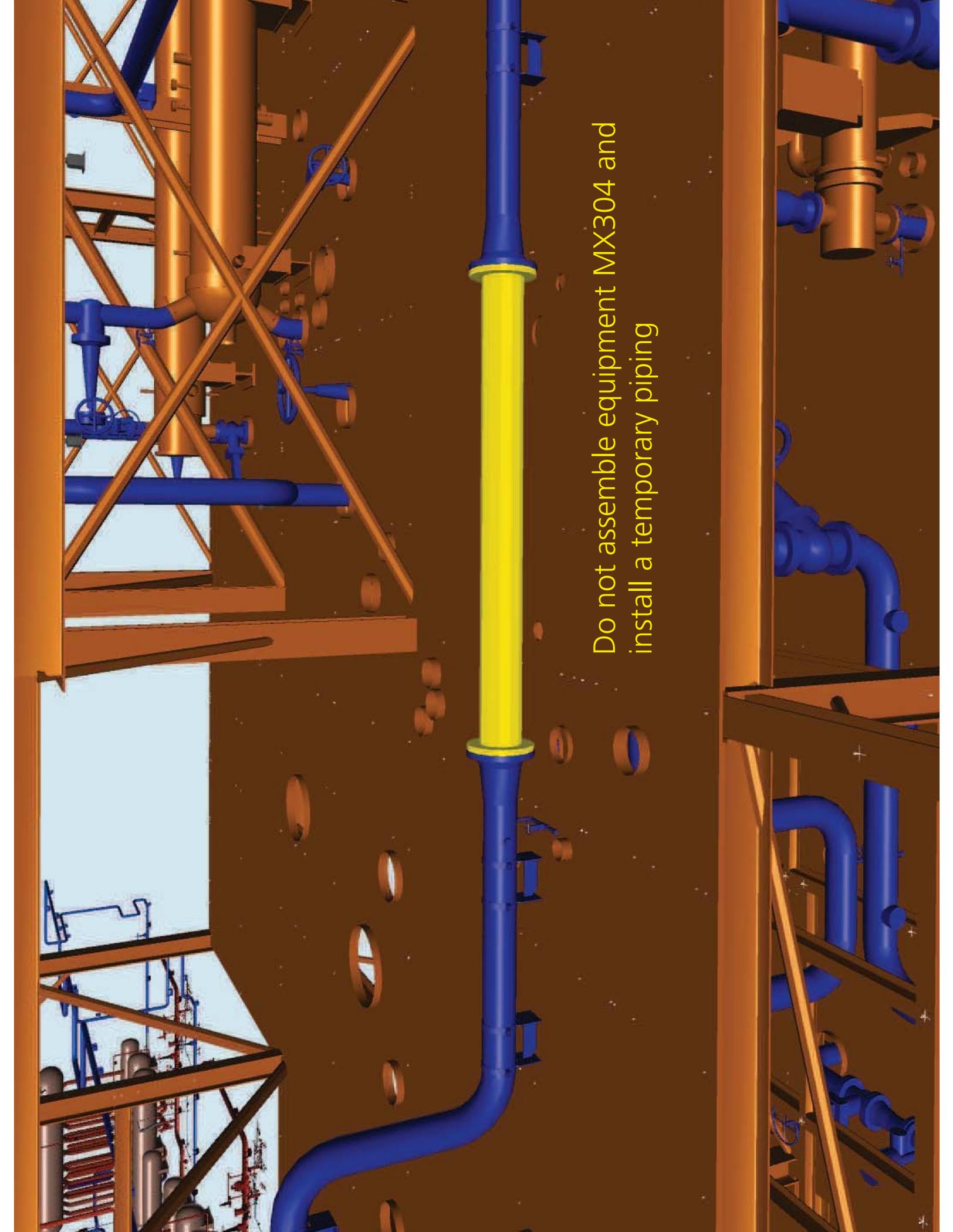
**Total Volume Power Block + Rack 2 piping**

**49882.15 Gal**



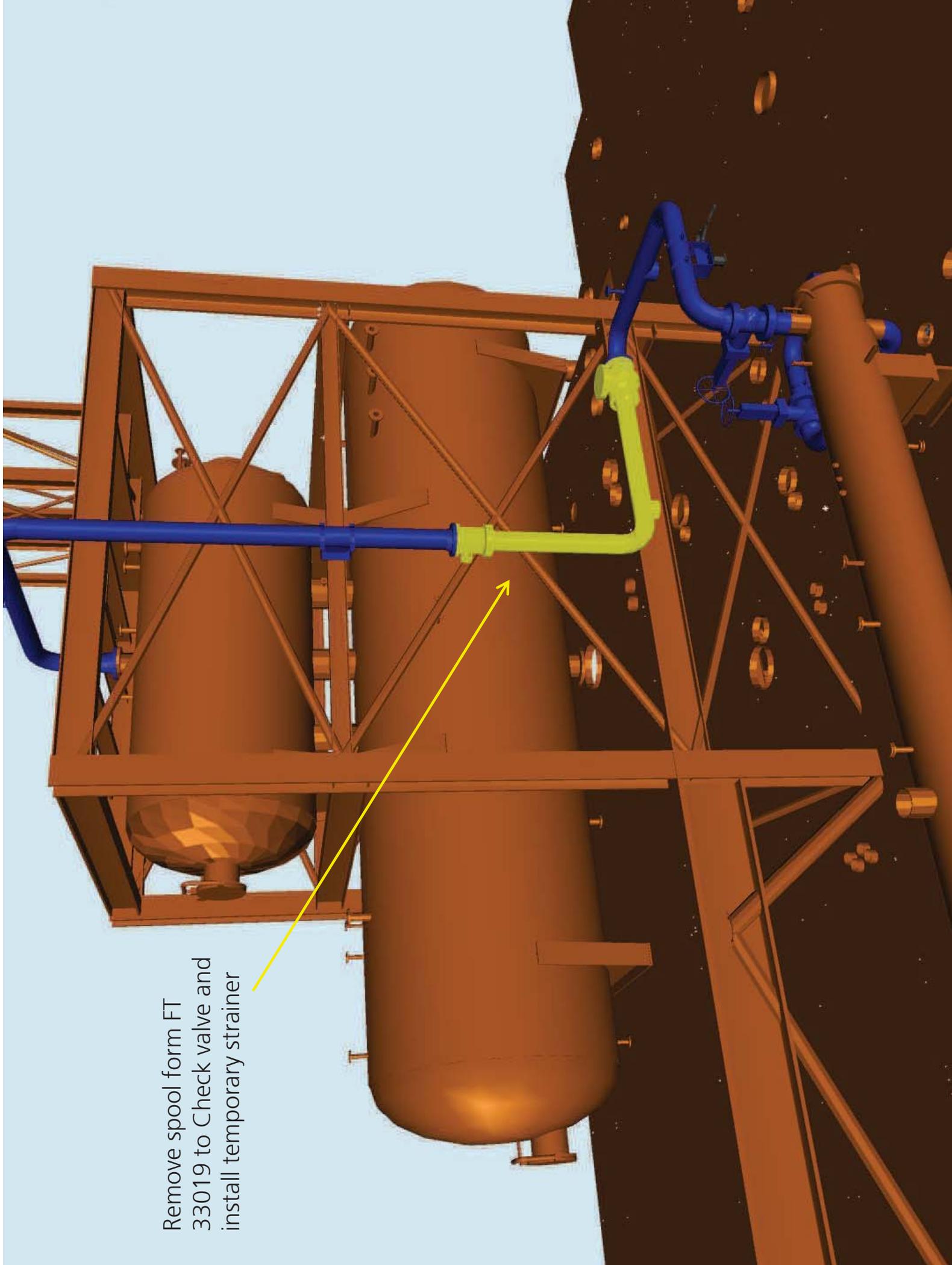
Install blind flange to protect the pump

Uninstall spool from check valve to gate valve  
Install temporary spool with connection to 10"  
temporary piping – that would be the return  
for chemical solution coming from SG

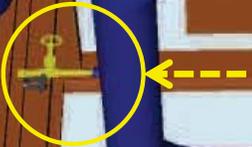
A 3D CAD rendering of an industrial piping system. The scene is set against a dark, textured background. The piping is primarily blue, with a central vertical section highlighted in bright yellow. This yellow section is flanked by blue pipe segments. The system includes various fittings, elbows, and valves. In the background, there are structural steel beams and other piping components, some of which are partially obscured. The lighting is dramatic, highlighting the metallic surfaces of the pipes and the structural elements.

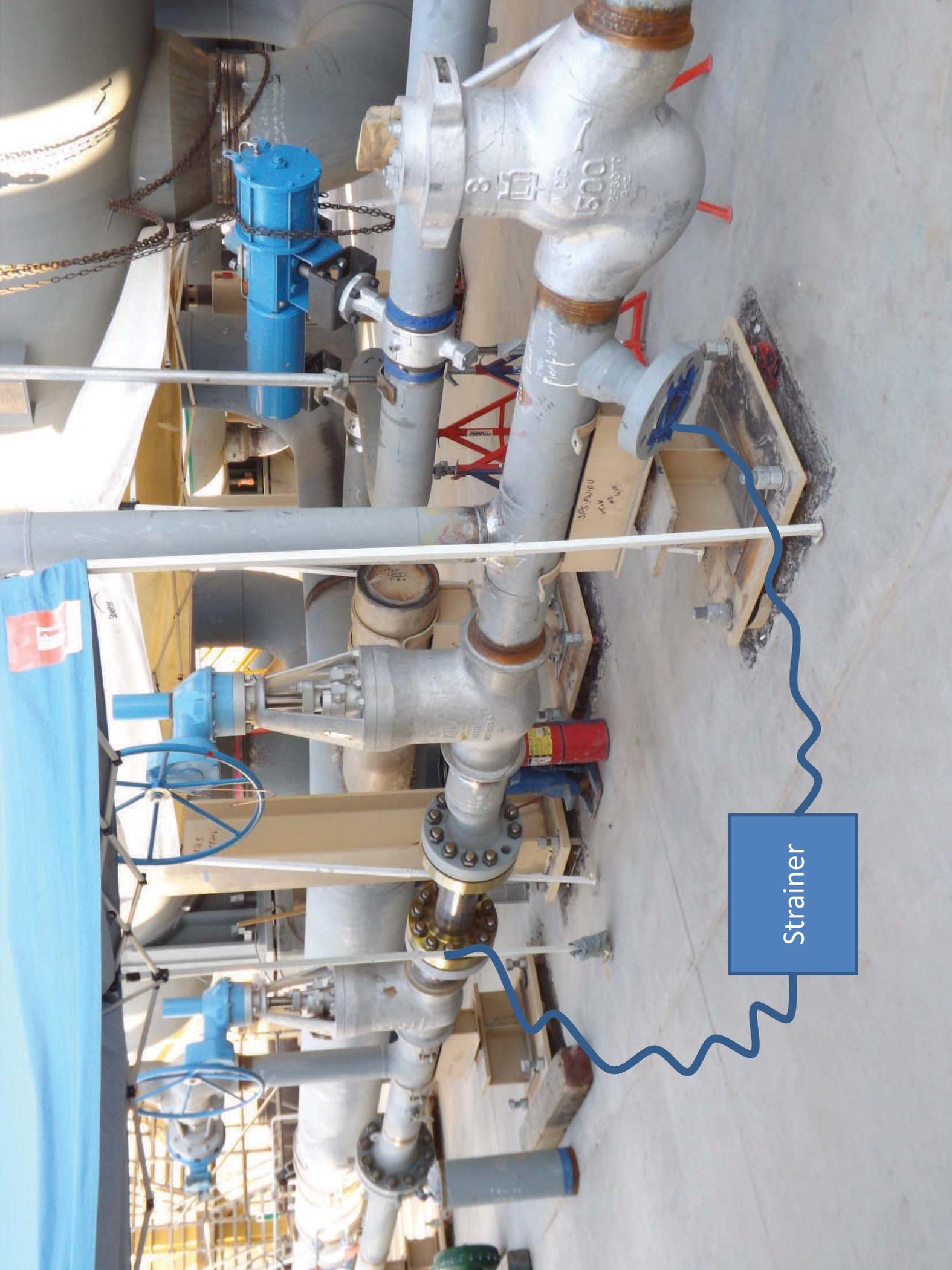
Do not assemble equipment MX304 and  
install a temporary piping

Remove spool form FT  
33019 to Check valve and  
install temporary strainer

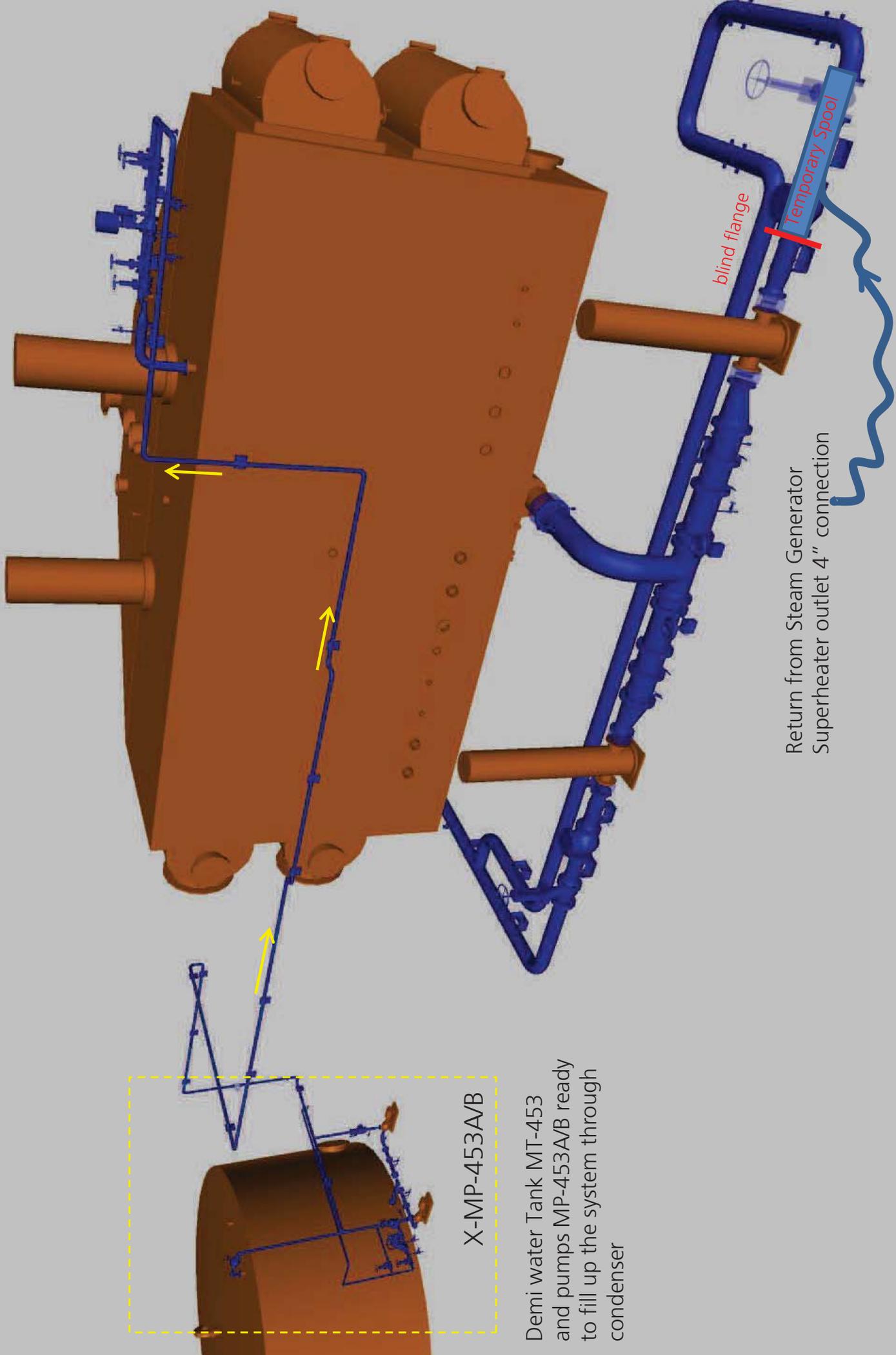


Chemical Solvent Injection through  
upstream BFW pumps vents





Strainer



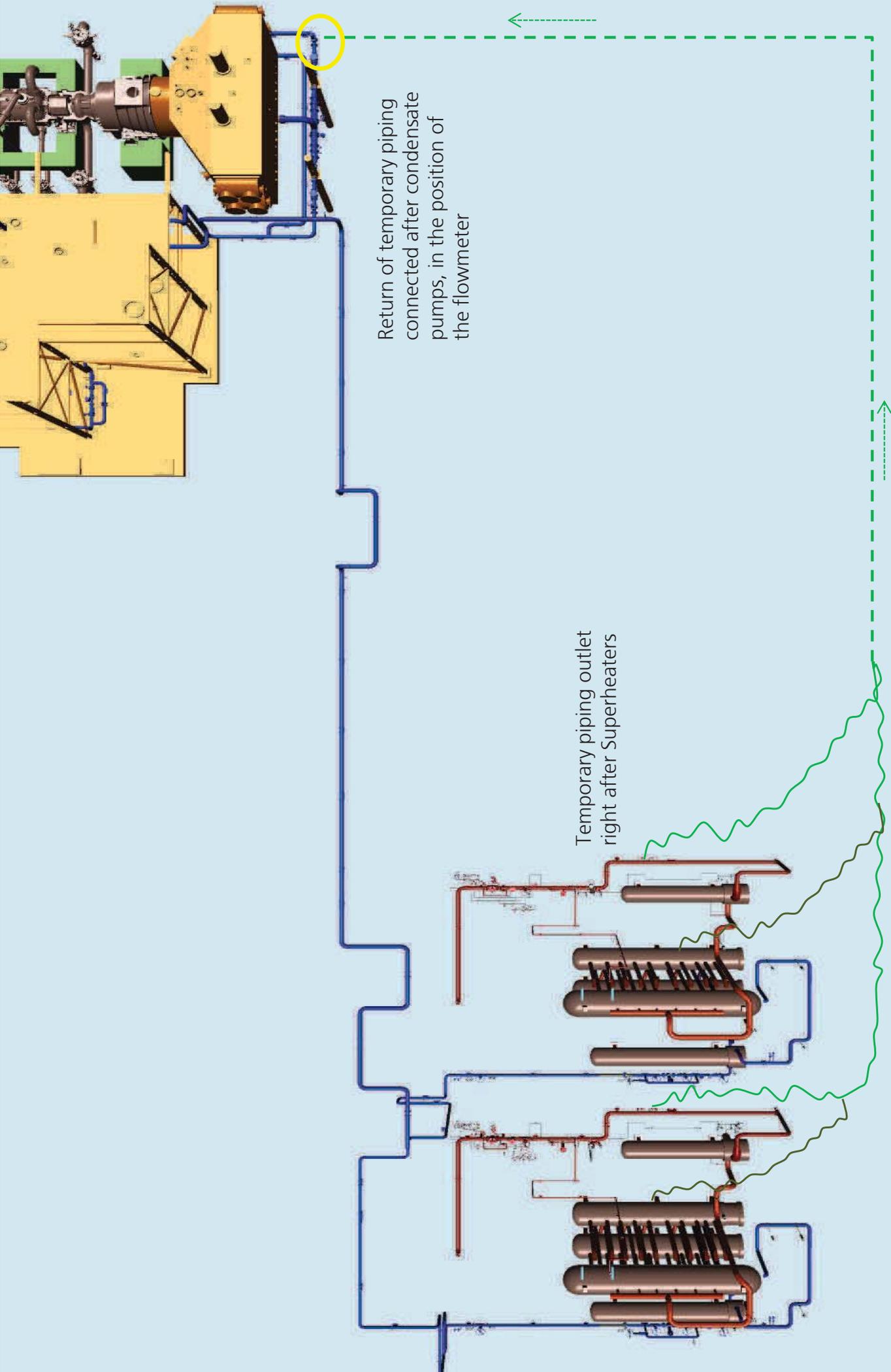
X-MP-453AB

Demi water Tank MT-453 and pumps MP-453AB ready to fill up the system through condenser

Return from Steam Generator Superheater outlet 4" connection

blind flange

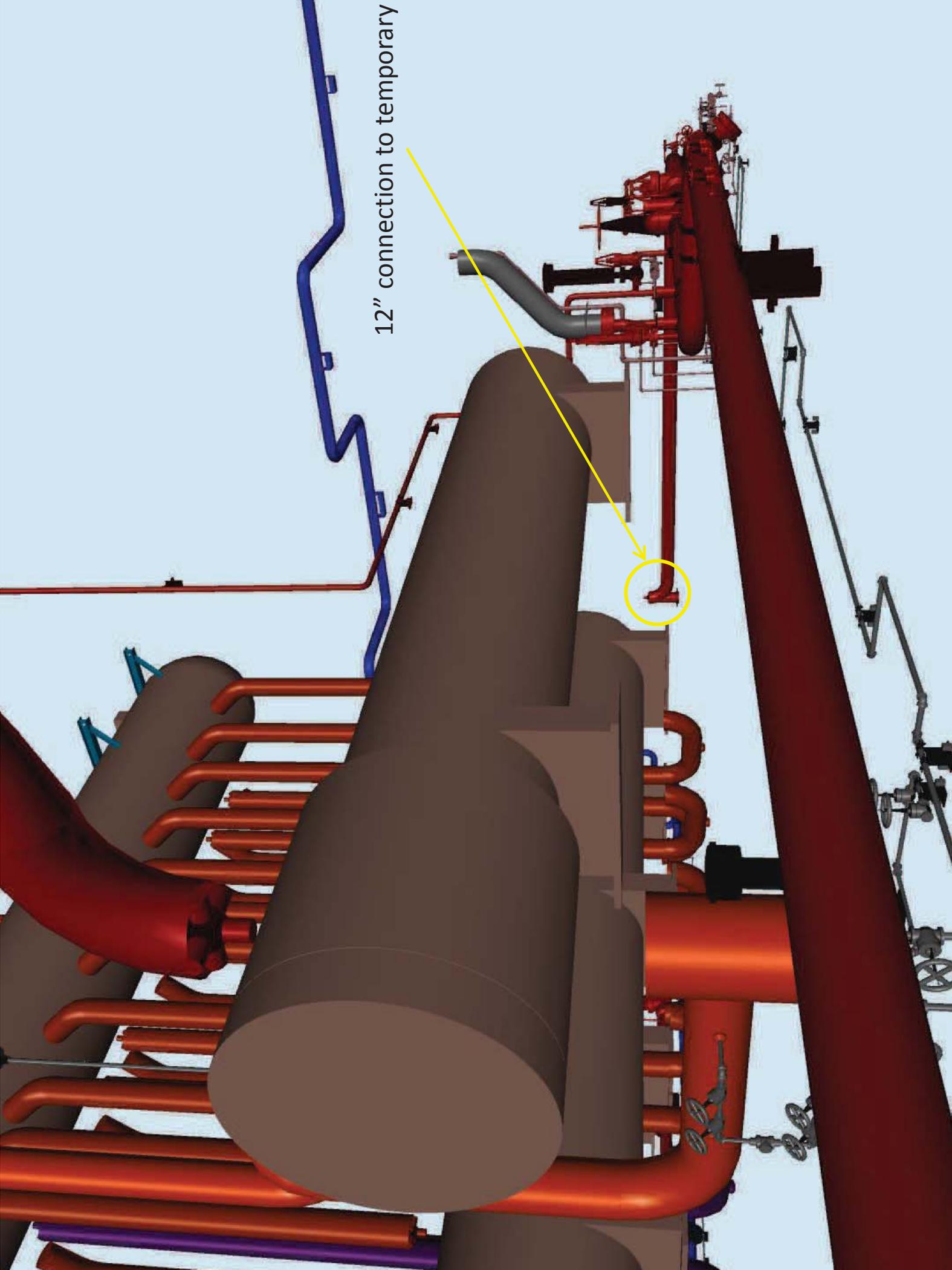
Temporary Spool



Return of temporary piping connected after condensate pumps, in the position of the flowmeter

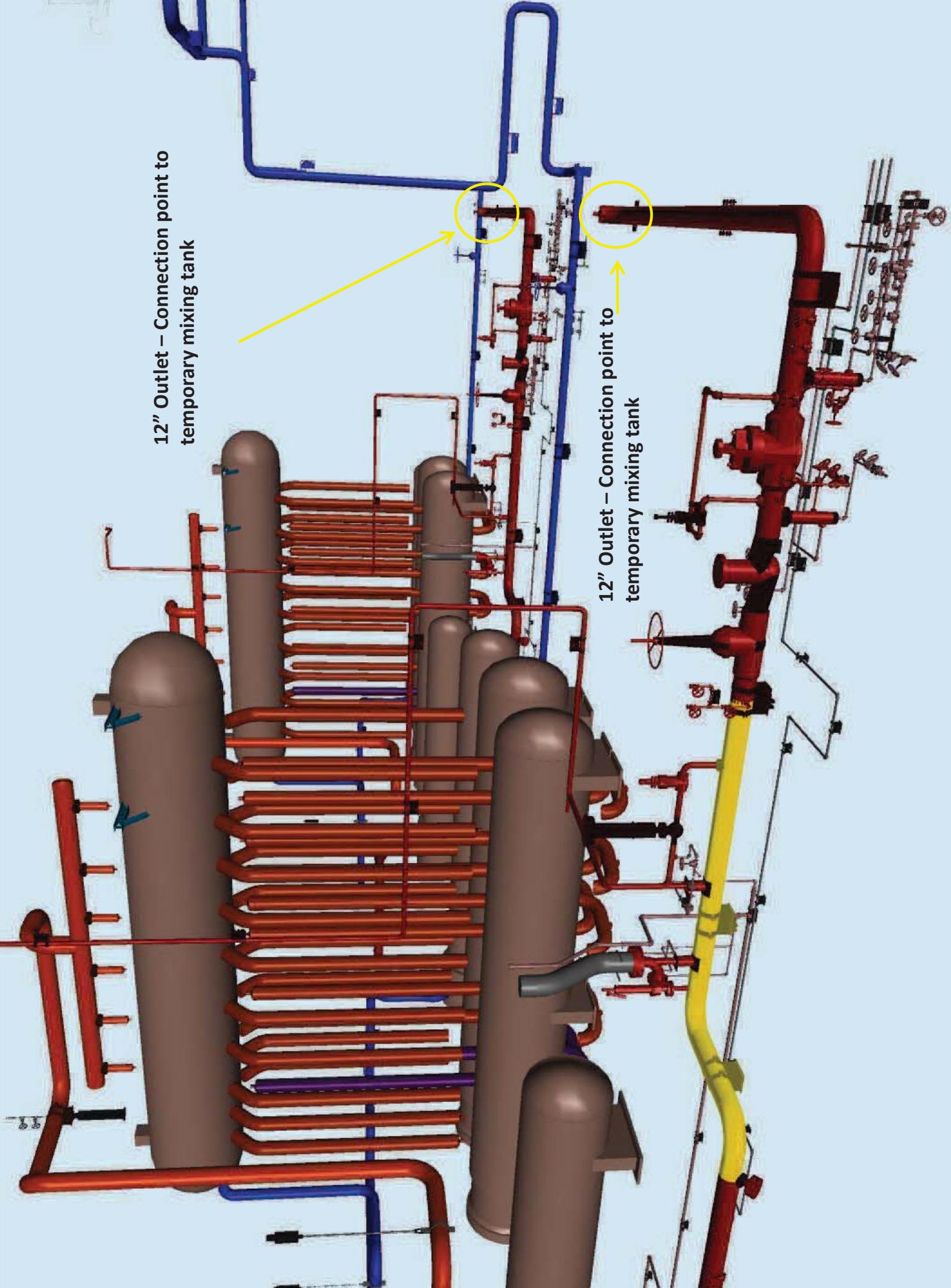
Temporary piping outlet right after Superheaters

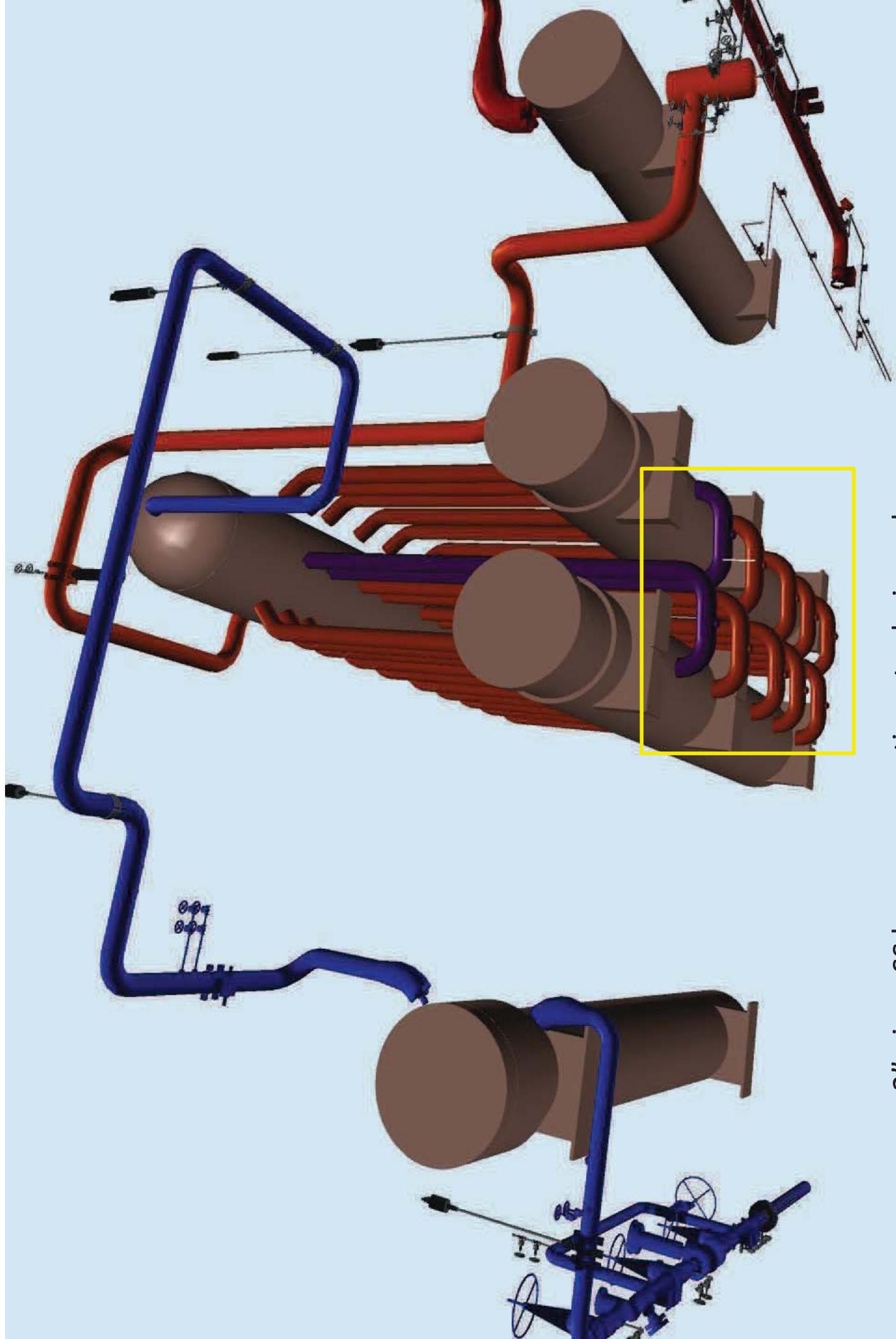
12" connection to temporary



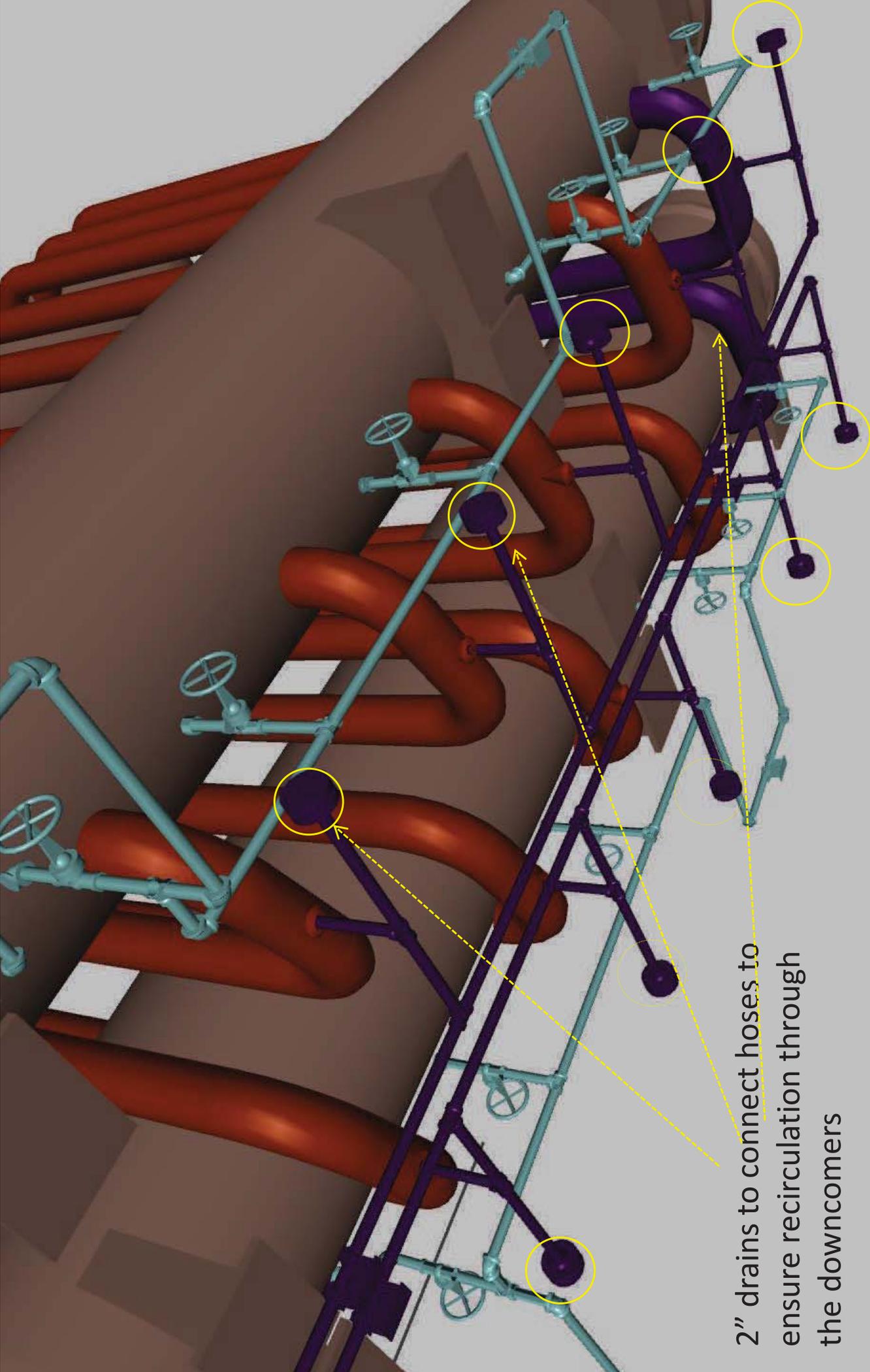
12" Outlet - Connection point to temporary mixing tank

12" Outlet - Connection point to temporary mixing tank





2" pipes SS hoses connections to drain and ensure recirculation through each downcomer



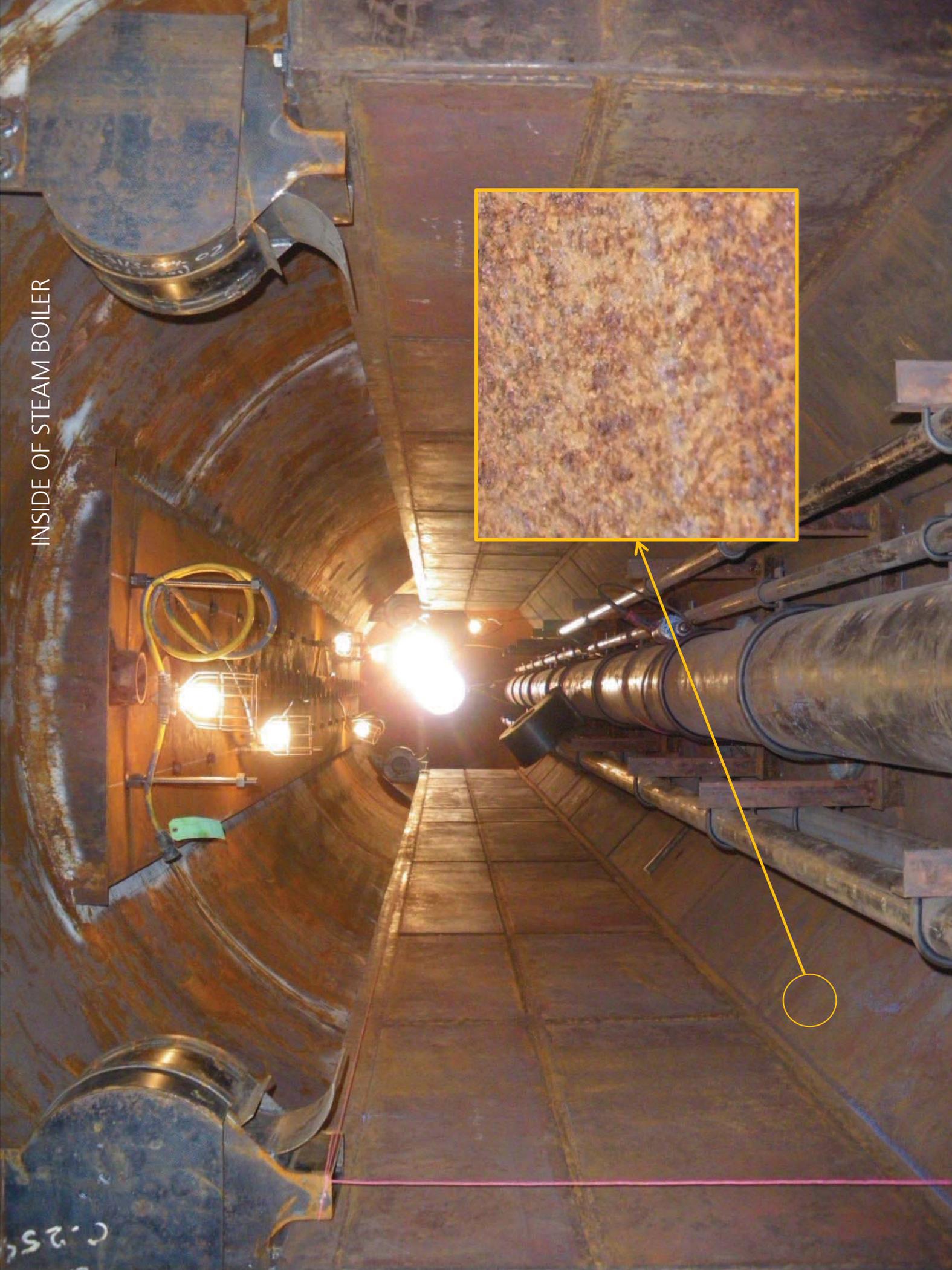
2" drains to connect hoses to  
ensure recirculation through  
the downcomers





Recirculation through all 2" drains to  
ensure velocity > 0

INSIDE OF STEAM BOILER





BOILER DOWNCOMER INLET

Check all boiler downcomers  
inlet to ensure they are not  
clogged





Air/N2 injection point

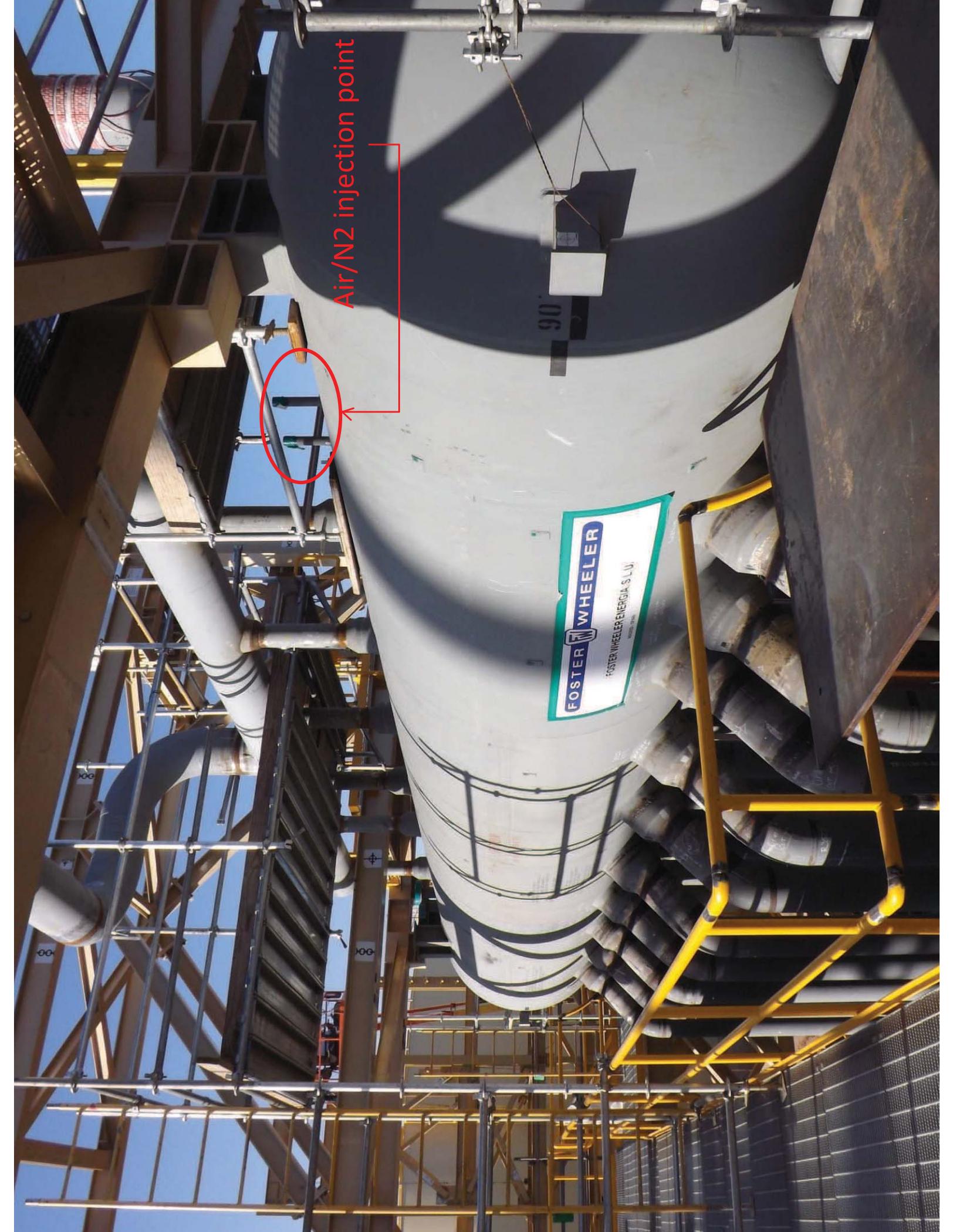


**FOSTER WHEELER**  
FOSTER WHEELER ENERGIA S.L.U.  
MADE IN ITALY

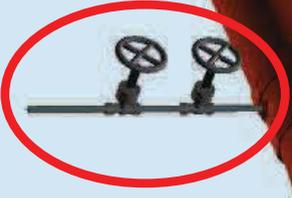
90°

00

00



Venting Point



Venting Point



W 126  
ID 7950  
16.00-120  
SEC.1 RT

Fit up work  
FIN CAP





Venting Point



PREHEATER TUBES



EVAPORATORS TUBES

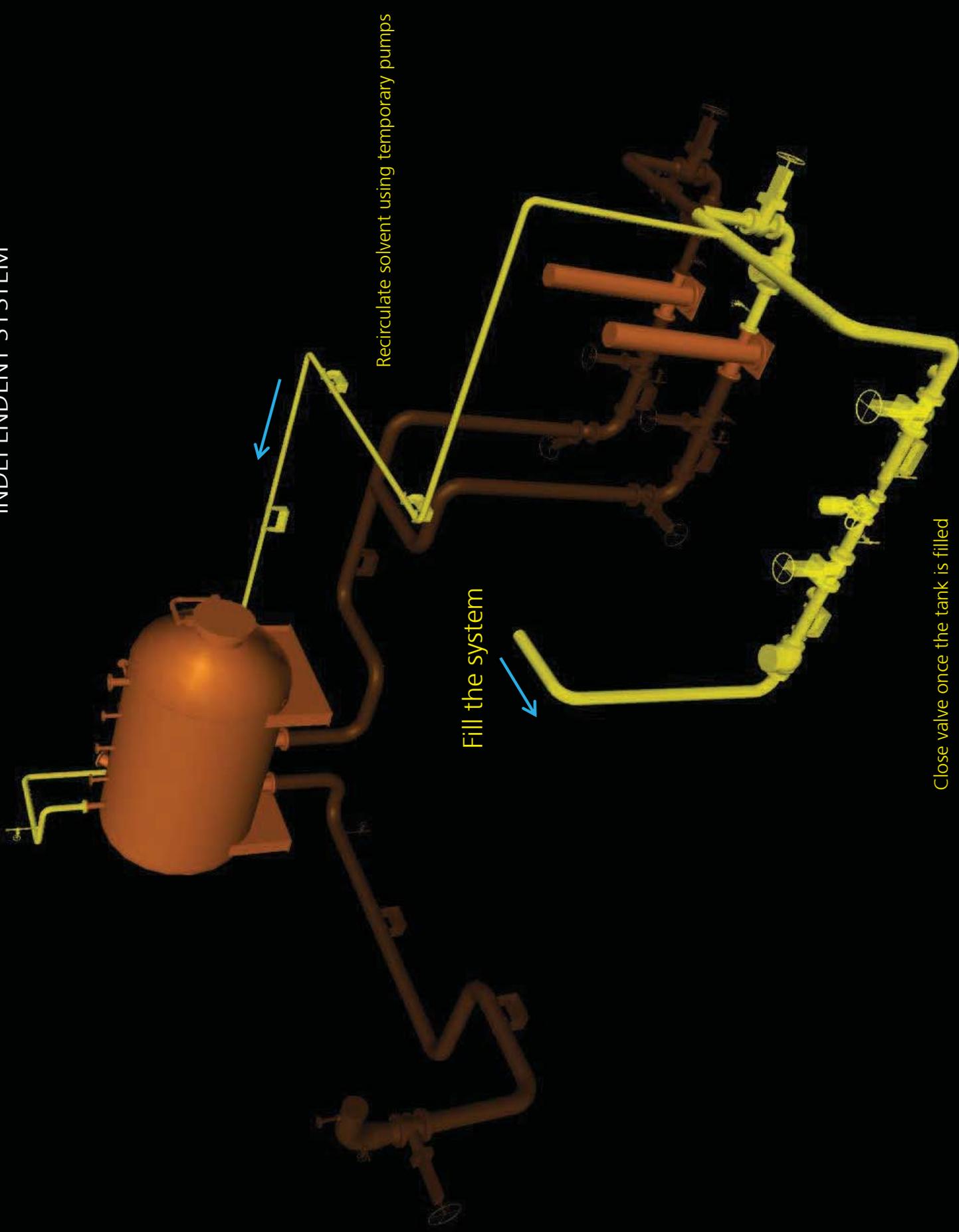


# INDEPENDENT SYSTEM

Remove spool 317-C-04-CS72-8" and 317-C-06-CS77-6" and connect a temporary pumps towards the tank



# INDEPENDENT SYSTEM



Recirculate solvent using temporary pumps

Fill the system

Close valve once the tank is filled

## **Boiling out (Steam Generator)**

- Preheaters MX-302A/B, Evaporators MX 305 (AABB), Drums MB310A/B, Superheaters MX-315A/B

This system will be affected by the Alkaline Boilout

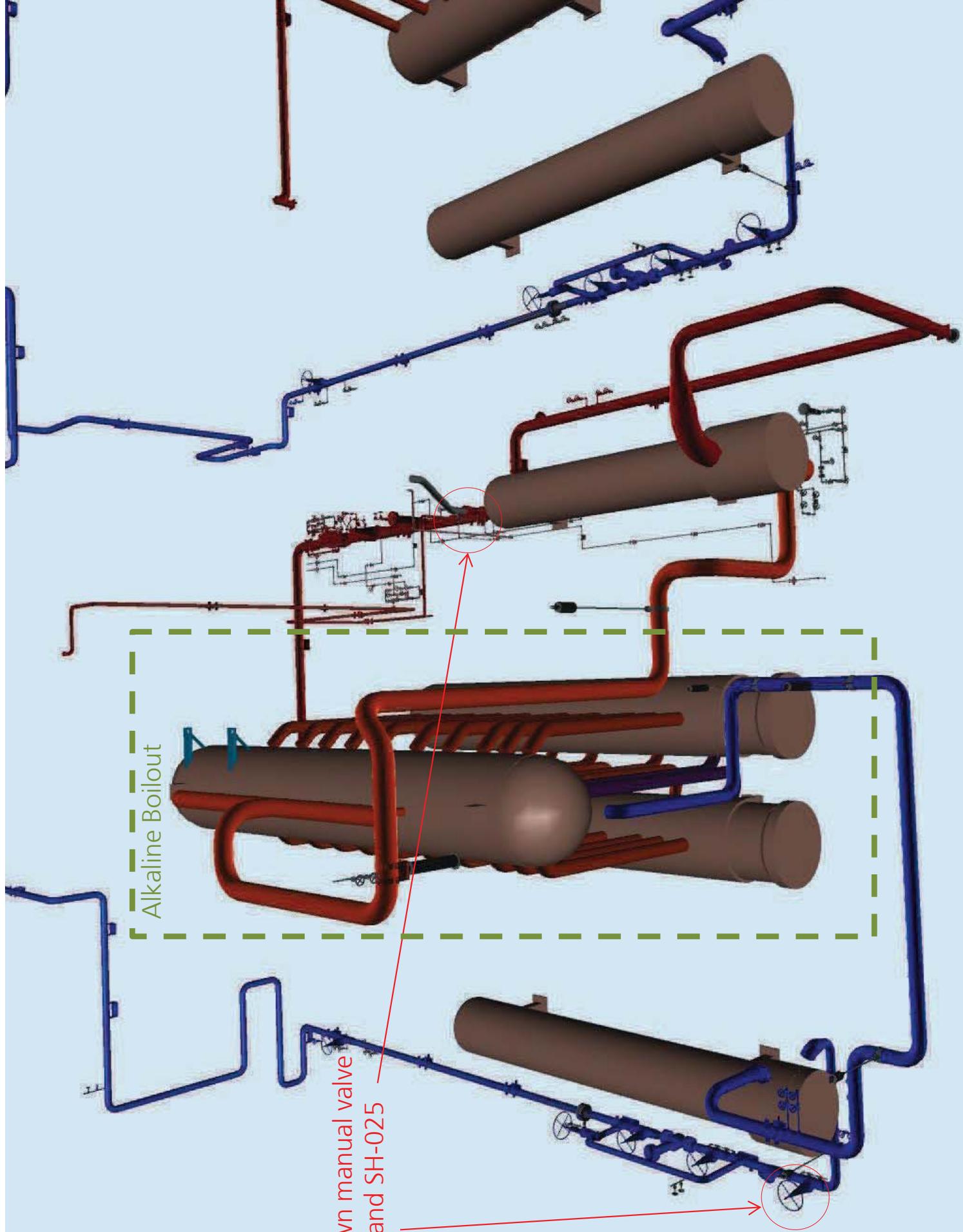


# Alkaline Boilout

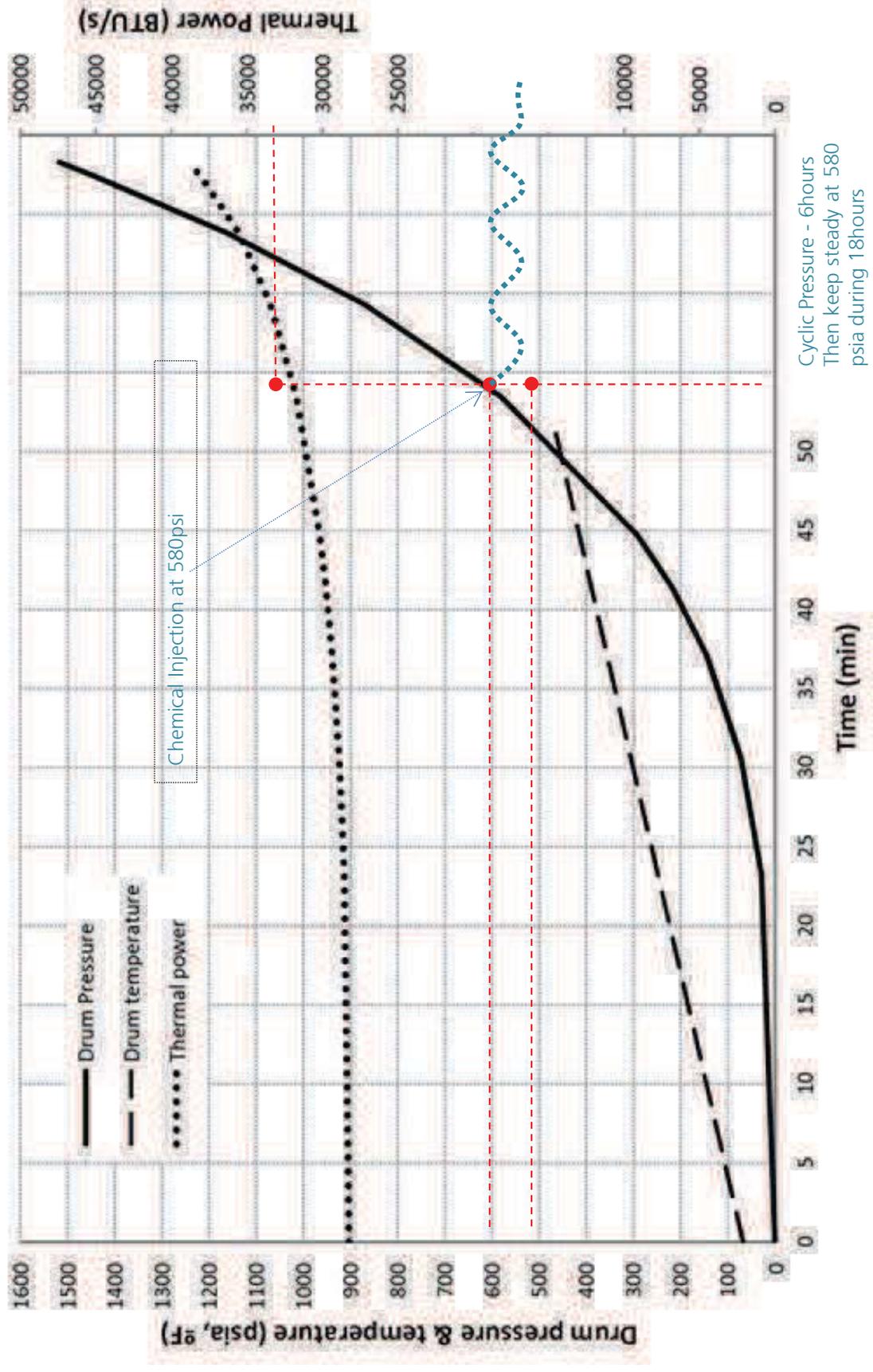
- After the chemical cleaning procedure, drain the steam generator up to its operational level. The superheater MX-315A/B will be completely drained.
- Shut down the gate valve FW-172 located upstream of the reheater X-MX-302A/B and the gate valve SH-0.25 downstream superheater MX-315A/B
- Add dedicated chemicals
- Rise pressure up to 580 psi. Follow 6007-HDD-FWE-21-61-0003 - Steam Generator Startup Curves
- When the pressure reaches its maximum value, reduce HTF flow to decrease steam pressure 100 psi. From this point on, start a cyclic process pressure control from 500 psi to 580 psi for the next 6 hours
- During this time, drains shall be open 30 seconds every 30 minutes. This period will depend on the solid in suspension concentration monitoring results. It is also considerable to maintain the continuous blowdown drain 20% open most of the time. In this case, water must be added not to lose level in the drum
- After 6 hours of cyclic process keep the steam generator bottle up for the next 18 hrs at the constant pressure of 580 psi.
- Drain the whole system by using downcomer drains and evaporators and boiler drains.
- Inspection

Alkaline Boilout

Shut down manual valve  
FW-172 and SH-025

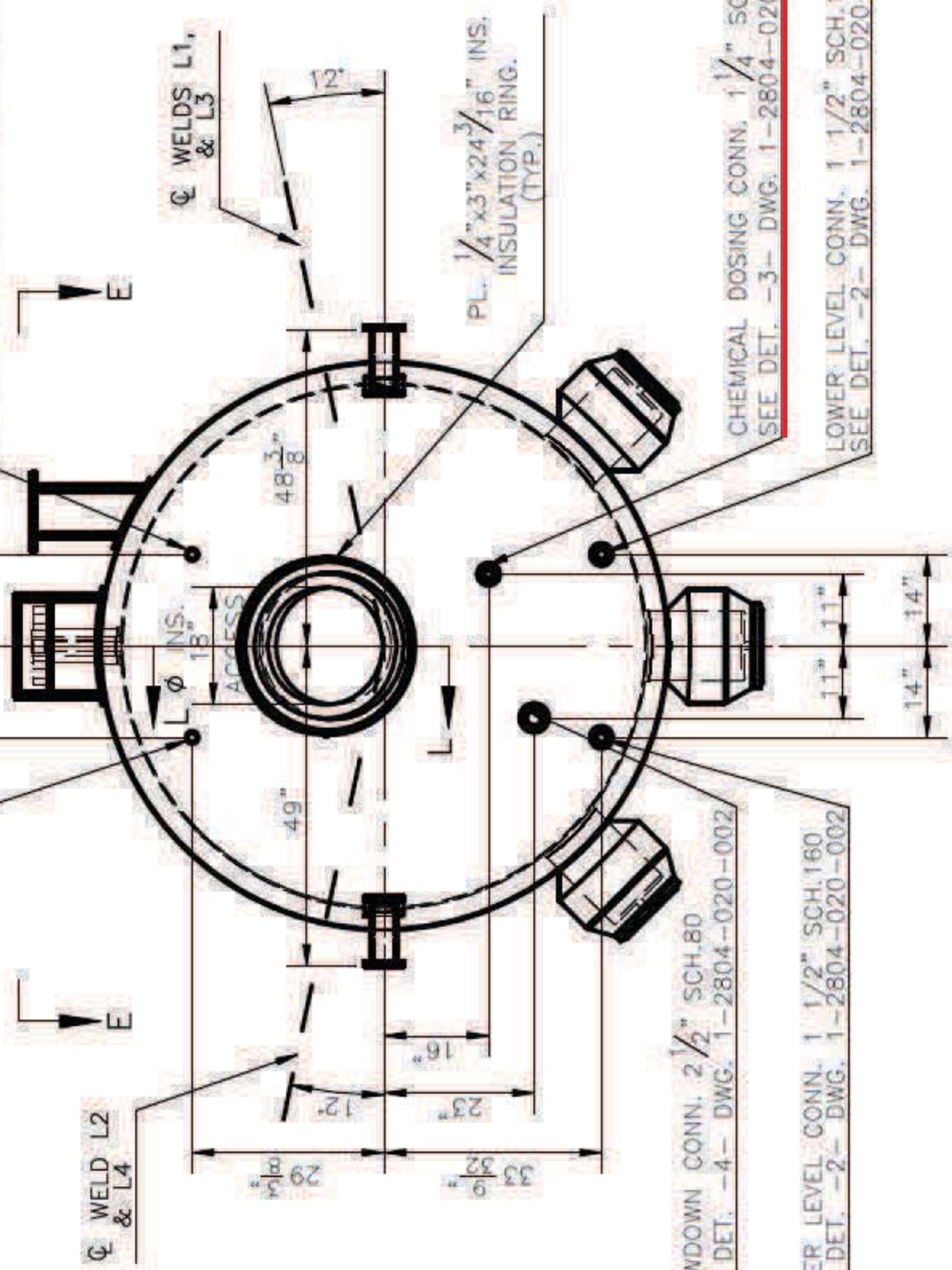


# Alkaline Boilout – Start up



UPPER LEVEL CONN. 1 1/2" SCH.160  
SEE DET. -1- DWG. 1-2804-020-002

UPPER LEVEL CONN. 1 1/2" SCH.160  
SEE DET. -1- DWG. 1-2804-020-002



WELD L2 & L4

WELDS L1, & L3

PL. 1/4" x 3" x 24 3/16" INS.  
INSULATION RING.  
(TYP.)

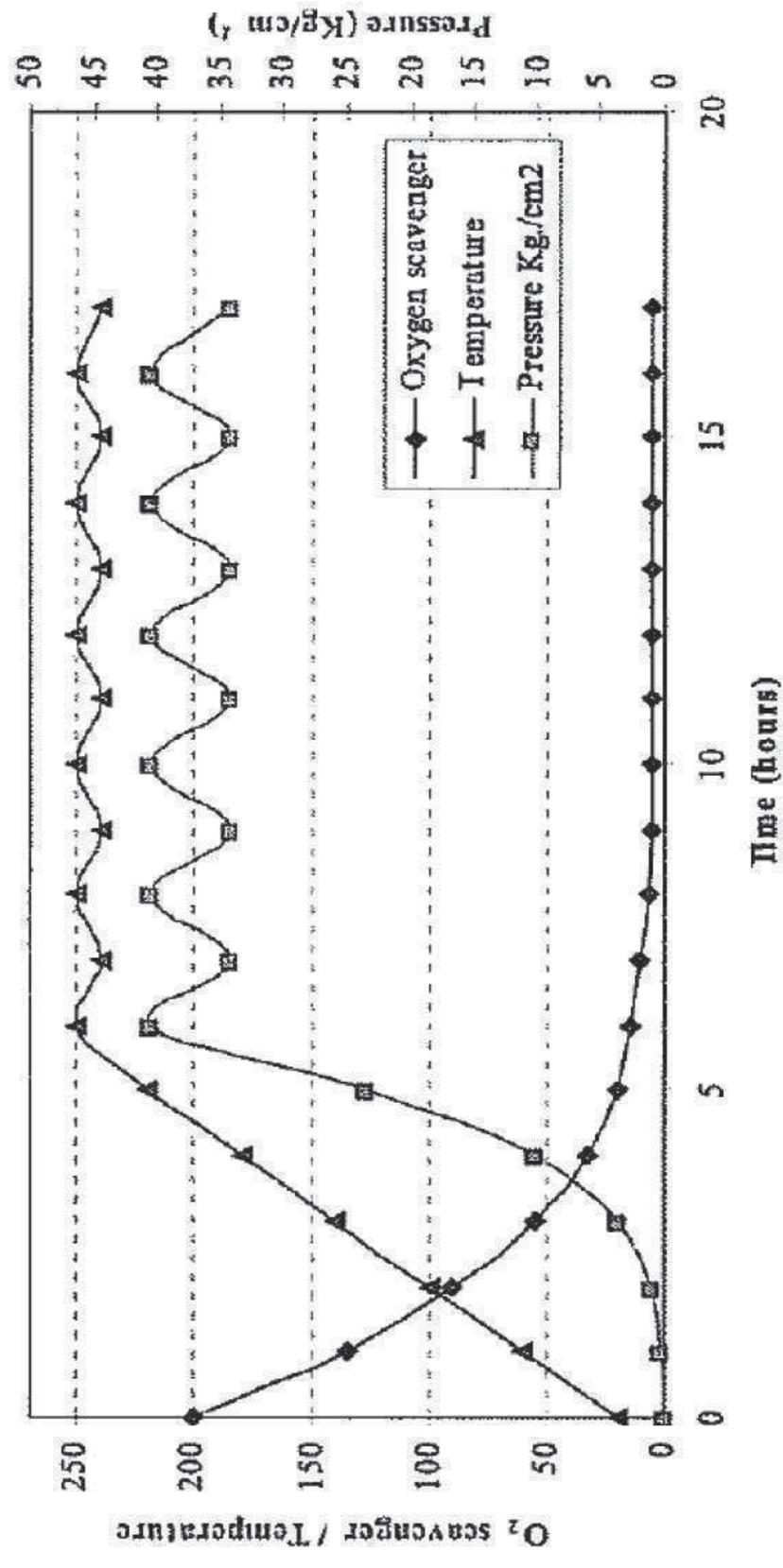
BLOWDOWN CONN. 2 1/2" SCH.80  
SEE DET. -4- DWG. 1-2804-020-002

CHEMICAL DOSING CONN. 1 1/4" SCH.160  
SEE DET. -3- DWG. 1-2804-020-002

LOWER LEVEL CONN. 1 1/2" SCH.160  
SEE DET. -2- DWG. 1-2804-020-002

LOWER LEVEL CONN. 1 1/2" SCH.160  
SEE DET. -2- DWG. 1-2804-020-002

# MAGNETITE FILM FORMATION



# ABENER TEYMA

## MOJAVE SOLAR PROJECT

Instruction For Chemical Cleaning Activities	Document No:	6007-ESP-ATM-00-70-0003	
	Job No.:	No. Req'd.:	
	Project:	Mojave	
	Ref.:	Issue:	Dated :

Instructions:

1. Initialing (By/Chk'd/App'd) required on cover sheet only. All other title block information must be included on all pages.
2. Revisions are identified in the body of the Specification.

Rev.	No.	Date	By	Chk'd	App'd	Description of Revision Including Page Numbers
	0	10 SEP 2013	ARP			Issued for Approval

# ABENER TEYMA

## MOJAVE SOLAR PROJECT

Instruction For Chemical Cleaning Activities	Document No:	6007-ESP-ATM-00-70-0003
	Job No.:	No. Req'd.:
	Project:	Mojave
	Ref.:	Issue:                      Dated :

### Technical Instruction for Chemical Cleaning Procedure

1. Isolation of the system and line-up all the valves according to document 6007-PPM-ATM-00-70-0002 – Lineup.
2. Remove spool from check valve to gate valve downstream of MP-306B pump and install temporary piping as shown under document 6007-PLN-ATM-52-11-001.
3. Disconnect MX-304 and install temporary spool.
4. Remove spool between check valve and FT-33019 in 321C-BWF-02-CS77-10" and install temporary strainer.
5. Install temporary strainers upstream of BFW pumps MP-302A/B/C.
6. Connect feed chemical piping to BFW pumps upstream vents.
7. Remove FE-X30221A/B (or temporary spool) and connect a temporary bypass with strainer up to chemical cleaning dedicated 4" flange. Connect blind flange to protect control valve LV X30221.
8. Connect hoses from each downcomer drain in both trains to temporary piping system.
9. Remove demisters from the horizontal separator in the boilers.
10. Isolate instrumentation according to document 6007-PPM-ATM-00-70-0002 – Lineup.
11. Make sure all venting points are open to remove air from the system.
12. Isolate heaters MX-316, MX-330, MX-340, MX-325, MX-320 in order to first recirculate water through bypasses.
13. Fill Tank MT-453 with demineralized water and make sure pumps MP-453A/B are ready to work.
14. Fill the system by establishing circulation through the condenser and condensate pumps once it's been hydro-cleaned, and through the steam generator. Run the system.
15. Run pumps MP-302A/B/C at minimum flow operation and recirculate through deareator so temporary filters don't clog up.
16. Run pumps MP-302A/B/C at maximum flow operation and control vessel levels (startup refrigeration system for pumps).
17. Heat up the water up to 185F – 194F and keep the system under this range of temperature all the time.
18. Solvent injection at the BFW pumps suction (entails chemical Cleaning, Neutralization and Passivation).
19. Monitoring of the chemical process (Control PH, Temperature, Pressure, Fe<sup>2+</sup> Fe<sup>3+</sup>, amine, conductivity, TSS).

# ABENER TEYMA

## MOJAVE SOLAR PROJECT

Instruction For Chemical Cleaning Activities	Document No:	6007-ESP-ATM-00-70-0003
	Job No.:	No. Req'd.:
	Project:	Mojave
	Ref.:	Issue: Dated :

20. After 1.5 hours, convey the solvent flow through all heaters MX-316, MX-330, MX-340, MX-325, MX-320 by shutting down their bypasses.
21. Intermittent blow down solvent to ensure removal of waste and prevention from clogging.
22. Run the circulation until changing temporary strainers is not needed. Minimum of 24 hours.
23. Drain the system completely. Dump spent cleaning solution to disposal.
24. Rinsing and flushing with demineralized water.
25. Use rinsing water for Beta.
26. Open equipment boiler and deareator for inspection and elimination of possible sediments.

# ABENER TEYMA

## MOJAVE SOLAR PROJECT

Instruction For Chemical Cleaning Activities	Document No:	6007-ESP-ATM-00-70-0003
	Job No.:	No. Req'd.:
	Project:	Mojave
	Ref.:	Issue: Dated :

### Technical Instruction for Alkaline Boilout Procedure

1. After the chemical cleaning procedure, drain the steam generator up to its operational level. The superheater MX-315A/B will be completely drained.
2. Shut down the gate valve FW-172 located upstream of the reheater X-MX-302A/B and the gate valve SH-0.25 downstream superheater MX-315A/B.
3. Add dedicated chemicals.
4. Raise pressure up to 580 psi. Follow 6007-HDD-FWE-21-61-0003 - Steam Generator Startup Curves.
5. When the pressure reaches its maximum value, reduce HTF flow to decrease steam pressure by 100 psi. From this point on, start a cyclic process pressure control from 500 psi to 580 psi for the next 6 hours
6. During this time, drains shall be open for 30 seconds every 30 minutes. This period will depend on the solid in suspension concentration monitoring results. It is also necessary to keep the continuous blowdown drain 20%. Additionally, water must to be added not to lose level in the drum.
7. After 6 hours of cyclic process keep the steam generator closed for the next 18 hours at the constant pressure of 580 psi.
8. Drain the whole system by using downcomer drains and evaporators and boiler drains.
9. Inspection.

Because we have to purge every 30 min for 1 hour, additional chemicals need to be added. To do so we need to use pumps to overcome the pressure in the bolier.

# ABENER TEYMA

## MOJAVE SOLAR PROJECT

Instruction For Chemical Cleaning Activities	Document No:	6007-ESP-ATM-00-70-0003
	Job No.:	No. Req'd.:
	Project:	Mojave
	Ref.:	Issue:          Dated :

### Steam Generator Volumes

<u>Volume</u>	<u>Train 1</u>	
Preheater Piping	222.740	gal
Preheater	5177.508	gal
Drum	12022.372	gal
Downcomers	1309.231	gal
Risers	1345.248	gal
Evap 1&2	8409.005	gal
Sat Steam Pipe	904.300	gal
Superheater	5177.508	gal
Main Steam Piping	396.086	gal
<b>Total Volume Train1 (per power block)</b>	<b>34963.997</b>	<b>gal</b>
<b>Total Volume SG Train1 + Train 2 (Alpha &amp; Beta combined)</b>	<b>69927.99</b>	<b>gal</b>

### BOP Equipment Volumes

Heater #1	MX-320	1259.45 gal
Heater #2	MX-325	2248.88 gal
Deareator	MX-360	29349.711 gal
Heater #4	MX-340	2123.98 gal
Heater #5	MX-330	1727.64 gal
Heater #3	MX-316	2912.8 gal

<b>Total Volume Power Block + piping + Rack2 piping (Alpha &amp; Beta Combined)</b>	<b>49882.15 Gal</b>
---	---------------------

**Total Volume Required for Chemical Cleaning (Alpha & Beta Combined) 119,810.14 Gal**

**Enviro - Chem, Inc.**

**1214 E. Lexington Avenue, Pomona, CA 91766 Tel (909) 590-5905 Fax (909) 590-5907**

Date: April 16, 2014

Mr. Mike Gurnee  
Environmental & Chemical Consulting, Inc.  
P.O. Box 3264  
Crestline, CA 92325  
Tel(909)771-4842 Email:Mike@ECCInc.US

Project: **Mojave Solar**  
Lab I.D.: **140415-22**

Dear Mr. Gurnee:

The **analytical results (Fish Bioassay Pending)**, for the liquid sample, received by our lab on April 15, 2014, are attached. The sample was received chilled, intact and accompanying chain of custody record.

Enviro-Chem appreciates the opportunity to provide you and your company this and other services. Please do not hesitate to call us if you have any questions.

Sincerely,



Curtis Desilets  
Vice President/Program Manager



Andy Wang  
Laboratory Manager

**LABORATORY REPORT**

CUSTOMER: Environmental & Chemical Consulting, Inc.  
P.O. Box 3264  
Crestline, CA 92325  
Tel(909)771-4842 Email:Mike@ECCInc.US

PROJECT: **Mojave Solar**  
SAMPLING DATE: 04/15/14  
MATRIX: LIQUID  
REPORT TO: MR. MIKE GURNEE

DATE RECEIVED: 04/15/14  
DATE ANALYZED: 04/15/14  
DATE REPORTED: 04/16/14

SAMPLE I.D.: **Pipe Cleaning**

LAB I.D.: 140415-22

PARAMETER	UNIT	SAMPLE RESULT	METHOD
pH	pH UNITS	9.28	EPA 9040B

DATA REVIEWED AND APPROVED BY: \_\_\_\_\_  
CAL-DHS ELAP CERTIFICATE No.: 1555

Enviro-Chem, Inc.  
 1214 E. Lexington Avenue, Pomona, CA 91766  
 Tel (909)590-5905 Fax (909)590-5907

Matrix: Water/Liquid

### QA/QC Report

Analysis	Units	Date Analyzed	Sample I.D.	S.R.	Duplicate	% RPD	ACP %RPD
Alkalinity	mg/L	2/26/2013	131226-5	723	741	2.46%	0-20
Residual Chlorine	mg/L					0.00%	0-20
Density	g/mL					0.00%	0-20
EC/SC	umhos/cm	2/17/2013	131217-18	462	465	0.65%	0-20
pH	pH units	4/15/2014	140415-21	7.29	7.31	0.27%	0-20
TDS	mg/L	1/22/2014	140122-1	594	593	0.17%	0-20
TSS	mg/L	1/23/2014	140122-1	7	7	0.00%	0-20
Turbidity	mg/L	1/22/2014	140122-42	5.37	5.40	0.56%	0-20
OIL & GREASE 413.1	mg/L					0.00%	0-20
SANILITY	%					0.00%	0-20
Settleable Solid	mL/L/hr					0.00%	0-20
Resistivity	ohms					0.00%	0-20
anzotriazole	mg/L					0.00%	0-20

%RPD = Relative Percent Difference      ACP %RPD = Acceptable Relative Percent Difference

Analysis	Units	Date Analyzed	Sample I.D.	Spk Conc	S.R.	ACP %RPD	MS	MS %RC	MSD	MSD %RC	% RPD
Acidity	mg/L					0-20					
Ammonia as N	mg/L	1/17/2014	131218-38	5.00	0.09	0-20	4.95	97%	5.21	102%	5.2%
Chloride	mg/L	1/22/2014	LCS1/2	20.0	0.00	0-20	18.00	90%	16.50	83%	7.5%
COD	mg/L	1/23/2014	140122-1	500	7.33	0-20	482	95%	448	88%	6.8%
CR VI	mg/L				0.00	0-20					#VALUE!
Cyanide	mg/L	2/6/2014	LCS1/2	0.2	0.00	0-20	0.181	91%	0.174	87%	3.5%
Fluoride	mg/L	1/17/2014	LCS1/2	1.0	0.00	0-20	1.08	108%	1.14	114%	6.0%
MBAS	mg/L				0.00	0-20					
Nitrate as N	mg/L	2/20/2013	LCS3/4	0.4	0.00	0-20	0.341	85%	0.346	87%	1.2%
Nitrite as N	mg/L	2/20/2013	LCS3/4	0.4	0.00	0-20	0.377	94%	0.373	93%	1.0%
EPA 1664A	mg/L	1/30/2014	LCS1/2	4.0	0.00	0-20	3.7	93%	3.3	83%	10.0%
OIL & GREASE 413.2	mg/L	2/6/2014	LCS1/2	20	0.00	0-20	16.4	82%	16.3	82%	0.5%
Phenolics	mg/L	1/17/2014	LCS1/2	0.5	0.00	0-20	0.443	88%	0.452	90%	1.8%
Sulfate	mg/L	1/22/2014	LCS1/2	20.0	0.00	0-20	16.4	82%	17.3	87%	4.5%
Dissolved Sulfide	mg/L	1/22/2014	140122-1	0.300	0.00	0-20	0.266	89%	0.256	85%	3.3%
TRPH	mg/L	1/22/2014	LCS1/2	20.0	0.00	0-20	19.2	96%	19.2	96%	0.0%
PHOSPHATE	mg/L	1/15/2013	LCS1/2	10.0	0.00	0-20	9.83	98%	10.2	102%	3.7%

S.R. = Sample Results      %RC = Percent Recovery      ACP %RC = Acceptable Percent Recovery      Spk Conc = Spike Concentration

Analyst Signature: WJP

Final Reviewer: [Signature]

**Enviro - Chem, Inc.**

1214 E. Lexington Avenue, Pomona, CA 91766 Tel (909) 590-5905 Fax (909) 590-5907

**LABORATORY REPORT**

CUSTOMER: Environmental & Chemical Consulting, Inc.  
P.O. Box 3264  
Crestline, CA 92325  
Tel (909) 771-4842 Email: Mike@ECCInc.US

PROJECT: Mojave Solar  
SAMPLING DATE: 04/15/14  
MATRIX: LIQUID  
REPORT TO: MR. MIKE GURNEE

DATE RECEIVED: 04/15/14  
DATE EXTRACTED: 04/16/14  
DATE ANALYZED: 04/16/14  
DATE REPORTED: 04/16/14

**TOTAL PETROLEUM HYDROCARBONS (TPH) - CARBON CHAIN ANALYSIS**

METHOD: EPA 8015B

UNIT: mg/Kg = MILLIGRAM PER KILOGRAM = PPM

SAMPLE I.D.	LAB I.D.	C4-C10	C11-C22	C23-C35	DF
Pipe Cleaning	140415-22	97.9^	23.5*	ND	2
METHOD BLANK		ND	ND	ND	1
	PQL	10	10	50	

**COMMENTS**

C4-C10 = GASOLINE RANGE

C11-C22 = DIESEL RANGE

C23-C35 = MOTOR OIL RANGE

DF = DILUTION FACTOR

PQL = PRACTICAL QUANTITATION LIMIT

ACTUAL DETECTION LIMIT = DF X PQL

ND = NON-DETECTED OR BELOW THE ACTUAL DETECTION LIMIT

^ = PEAKS IN GASOLINE RANGE BUT CHROMATOGRAM DOES NOT MATCH THAT OF GASOLINE STANDARD

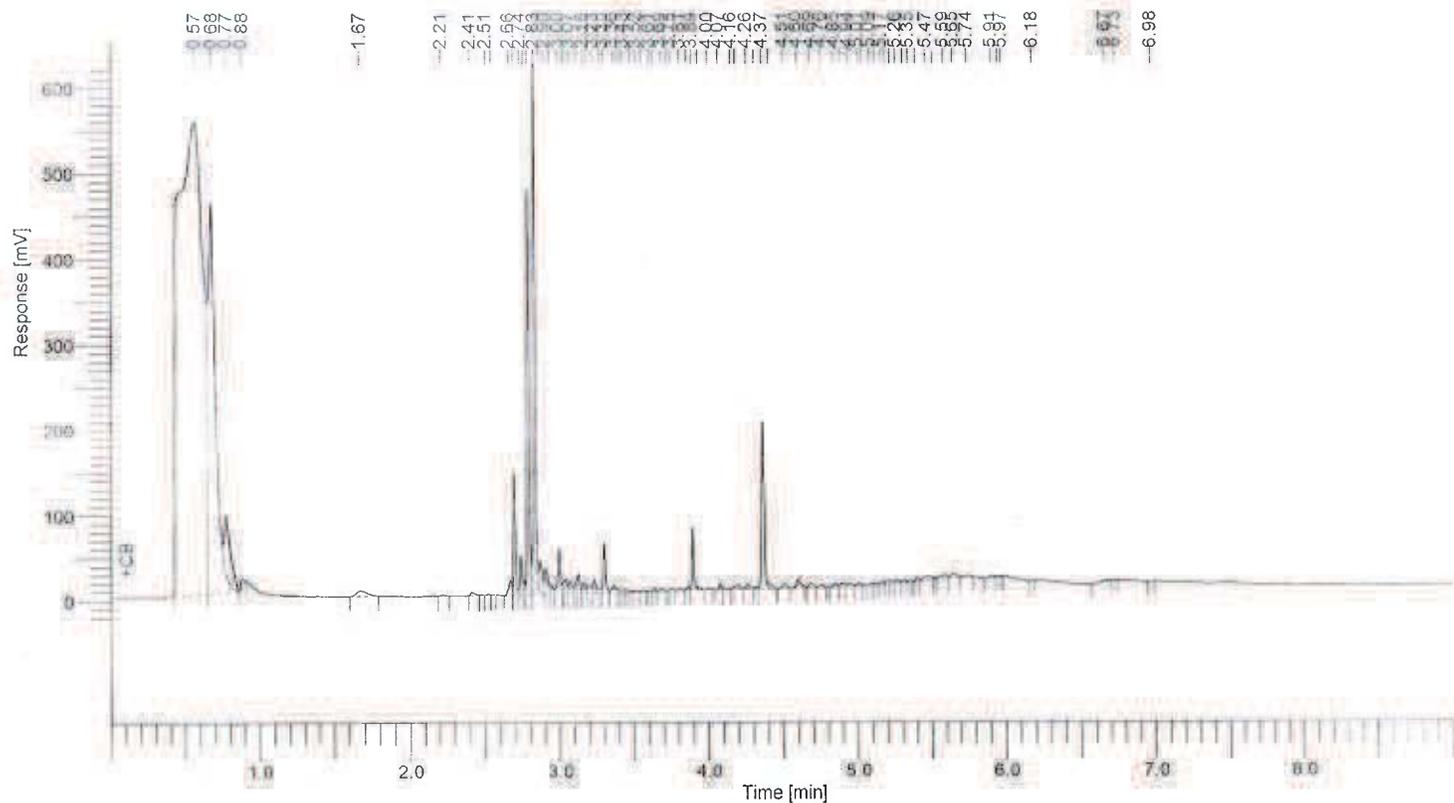
\* = PEAKS IN DIESEL RANGE BUT CHROMATOGRAM DOES NOT MATCH THAT OF DIESEL STANDARD

Data Reviewed and Approved by:   
CAL-DHS ELAP CERTIFICATE No.: 1555

Software Version : 6.3.2.0646  
 Sample Name : 140415-22 20/4 RE  
 Instrument Name : GC-1  
 Rack/Vial : 0/15  
 Sample Amount : 1.000000  
 Cycle : 1

Date : 4/16/2014 1:56:11 PM  
 Data Acquisition Time : 4/16/2014 1:41:01 PM  
 Channel : A  
 Operator : manager  
 Dilution Factor : 1.000000

Result File : D:\GC DATA\GC-IN02014\1404\140416\140416A019.rst  
 Sequence File : D:\GC DATA\GC-IN02014\1404\140416\140416.seq



8015 Results

Component Name	Area [ $\mu\text{V}\cdot\text{sec}$ ]	Adjusted Amount
C4-C10	1446734	489.5
C11-C22	796125	117.7
C23-C35	135684	233.0
	2378543	840.2

Enviro Chem, Inc

1214 E. Lexington Avenue, Pomona, CA 91766 Tel (909)590-5905 Fax (909)590-5907

# 8015B QA/QC Report

Date Analyzed: 4/16/2014

Units: mg/Kg (ppm)

Matrix: Soil/Solid/Sludge/Liquid

Matrix Spike (MS)/Matrix Spike Duplicate (MSD)

Spiked Sample Lab I.D.: **140415-1 MS/MSD**

Analyte	SR	spk conc	MS	%MS	MSD	%MSD	%RPD	ACP %MS	ACP RPD
C11~C22 Range	0	200	246	123%	234	117%	5%	75-125	0-20%

### LCS STD RECOVERY:

Analyte	spk conc	LCS	% REC	ACP
C11~C22 Range	200	177	89%	75-125

Analyzed and Reviewed By: AU

Final Reviewer: Q

**Enviro - Chem, Inc.**

1214 E. Lexington Avenue, Pomona, CA 91766 Tel (909) 590-5905 Fax (909) 590-5907

**LABORATORY REPORT**

CUSTOMER: Environmental & Chemical Consulting, Inc.  
P.O. Box 3264  
Crestline, CA 92325  
Tel (909) 771-4842 Email: Mike@ECCInc.US

PROJECT: Mojave Solar

SAMPLING DATE: 04/15/14

MATRIX: LIQUID

REPORT TO: MR. MIKE GURNEE

DATE RECEIVED: 04/15/14

DATE ANALYZED: 04/16/14

DATE REPORTED: 04/16/14

SAMPLE I.D.: Pipe Cleaning

LAB I.D.: 140415-22

**TOTAL THRESHOLD LIMIT CONCENTRATION (TTL) ANALYSIS**

UNIT: mg/Kg = MILLIGRAM PER KILOGRAM = PPM

ELEMENT ANALYZED	SAMPLE RESULT	PQL	DF	TTL LIMIT	STLC LIMIT	EPA METHOD
Antimony (Sb)	ND	0.40	1	500	15	6010B
Arsenic (As)	ND	0.20	1	500	5.0	6010B
Barium (Ba)	ND	2.00	1	10,000	100	6010B
Beryllium (Be)	ND	0.20	1	75	0.75	6010B
Cadmium (Cd)	ND	0.20	1	100	1.0	6010B
Chromium (Cr), Total	3.71	0.20	1	2,500	560/500	6010B
Chromium VI (Cr6)	--	0.01	1	500	5.0	7196A
Cobalt (Co)	ND	0.40	1	8,000	80	6010B
Copper (Cu)	ND	0.40	1	2,500	25	6010B
Lead (Pb)	ND	0.20	1	1,000	5.0	6010B
Mercury (Hg)	ND	0.002	1	20	0.2	7470A
Molybdenum (Mo)	ND	2.00	1	3,500	350	6010B
Nickel (Ni)	4.00	1.00	1	2,000	20	6010B
Selenium (Se)	ND	0.40	1	100	1.0	6010B
Silver (Ag)	ND	0.40	1	500	5.0	6010B
Thallium (Tl)	ND	0.40	1	700	7.0	6010B
Vanadium (V)	ND	2.00	1	2,400	24	6010B
Zinc (Zn)	15.4	0.20	1	5,000	250	6010B

**COMMENTS:**

DF = Dilution Factor

PQL = Practical Quantitation Limit

Actual Detection Limit = PQL X DF

ND = Below the Actual Detection Limit or non-detected

TTL = Total Threshold Limit Concentration

STLC = Soluble Threshold Limit Concentration

@ = Must meet both the STLC Limit at 560 and EPA-TCLP Limit at 5

\* = STLC analysis for the metal recommended (if marked)

\*\* = Additional Analysis required, please call to discuss (if marked)

\*\*\* = The concentration exceeds the TTL Limit, and the sample is defined as hazardous waste as per CCR-TITLE 22 (if marked)

-- = Not analyzed/not requested

Data Reviewed and Approved by: 

CAL-DHS ELAP CERTIFICATE No.: 1555

**METHOD BLANK REPORT**

CUSTOMER: Environmental & Chemical Consulting, Inc.  
 P.O. Box 3264  
 Crestline, CA 92325  
 Tel (909) 771-4842 Email: Mike@ECCInc.US

PROJECT: Mojave Solar  
 SAMPLING DATE: 04/15/14  
 MATRIX: LIQUID  
 REPORT TO: MR. MIKE GURNEE

DATE RECEIVED: 04/15/14  
 DATE ANALYZED: 04/16/14  
 DATE REPORTED: 04/16/14

METHOD BLANK FOR LAB I.D.: 140415-22

TOTAL THRESHOLD LIMIT CONCENTRATION (TTLC) ANALYSIS  
 UNIT: mg/Kg = MILLIGRAM PER KILOGRAM = PPM

ELEMENT ANALYZED	SAMPLE RESULT	PQL	DF	TTLC LIMIT	STLC LIMIT	EPA METHOD
Antimony (Sb)	ND	0.40	1	500	15	6010B
Arsenic (As)	ND	0.20	1	500	5.0	6010B
Barium (Ba)	ND	2.00	1	10,000	100	6010B
Beryllium (Be)	ND	0.20	1	75	0.75	6010B
Cadmium (Cd)	ND	0.20	1	100	1.0	6010B
Chromium (Cr), Total	ND	0.20	1	2,500	560/50	6010B
Chromium VI (Cr6)	--	0.01	1	500	5.0	7196A
Cobalt (Co)	ND	0.40	1	8,000	80	6010B
Copper (Cu)	ND	0.40	1	2,500	25	6010B
Lead (Pb)	ND	0.20	1	1,000	5.0	6010B
Mercury (Hg)	ND	0.002	1	20	0.2	7470A
Molybdenum (Mo)	ND	2.00	1	3,500	350	6010B
Nickel (Ni)	ND	1.00	1	2,000	20	6010B
Selenium (Se)	ND	0.40	1	100	1.0	6010B
Silver (Ag)	ND	0.40	1	500	5.0	6010B
Thallium (Tl)	ND	0.40	1	700	7.0	6010B
Vanadium (V)	ND	2.00	1	2,400	24	6010B
Zinc (Zn)	ND	0.20	1	5,000	250	6010B

COMMENTS:

- DF = Dilution Factor
- PQL = Practical Quantitation Limit
- Actual Detection Limit = PQL X DF
- ND = Below the Actual Detection Limit or non-detected
- TTLC = Total Threshold Limit Concentration
- STLC = Soluble Threshold Limit Concentration
- @ = Must meet both the STLC Limit at 560 and EPA-TCLP Limit at 5
- \* = STLC analysis for the metal recommended (if marked)
- \*\* = Additional Analysis required, please call to discuss (if marked)
- \*\*\* = The concentration exceeds the TTLC Limit, and the sample is defined as hazardous waste as per CCR-TITLE 22 (if marked)
- = Not analyzed/not requested

Data Reviewed and Approved by:   
 CAL-DHS ELAP CERTIFICATE No.: 1555

# QA/QC for Metals Analysis -- TTLC -- LIQ/SLUDGE MATRIX

## Matrix Spike/ Matrix Spike Duplicate/ LCS :

ANALYSIS DATE: 4/16/2014

Unit : mg/Kg(ppm)

Analysis	Spk. Sample ID	LCS CONC.	LCS %Rec.	LCS STATUS	Sample Result	Spike Conc.	MS	% Rec MS	MSD	% Rec MSD	% RPD
Arsenic(As)	140415-7	20.0	100	PASS	0	20.0	20.2	101%	20.0	100%	1%
Chromium(Cr)	140415-7	20.0	101	PASS	0	20.0	20.3	102%	20.1	101%	1%
Lead(Pb)	140415-7	20.0	99	PASS	0.333	20.0	19.6	96%	19.5	96%	1%

ANALYSIS DATE: 4/16/2014

Analysis	Spk. Sample ID	LCS CONC.	LCS %Rec.	LCS STATUS	Sample Result	Spike Conc.	MS	% Rec MS	MSD	% Rec MSD	% RPD
Mercury (Hg)	140415-21	0.0250	94	PASS	0	0.0250	0.0220	88%	0.0210	84%	5%

## MS/MSD Status:

Analysis	%MS	%MSD	%LCS	%RPD
Arsenic(As)	PASS	PASS	PASS	PASS
Chromium(Cr)	PASS	PASS	PASS	PASS
Lead(Pb)	PASS	PASS	PASS	PASS
Mercury (Hg)	PASS	PASS	PASS	PASS
<b>Accepted Range</b>	75 ~ 125	75 ~ 125	85 ~ 115	0 ~ 20

ANALYST: \_\_\_\_\_

FINAL REVIEWER: \_\_\_\_\_

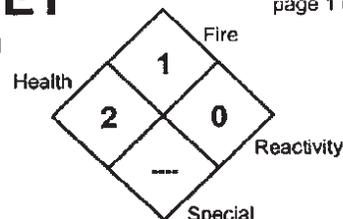


# MATERIAL SAFETY DATA SHEET

**BRENNTAG**

NFPA 704 DESIGNATION  
HAZARD RATING

4=Extreme  
3=High  
2=Moderate  
1=Slight  
0=Insignificant



Brenntag MSDS #:	BPI-00180
MSDS Revision/Issue Date:	07/26/07
Supersedes Revision Date:	New

## 1. CHEMICAL PRODUCT IDENTIFICATION & COMPANY IDENTIFICATION

**PRODUCT IDENTIFIER:** Citric Acid 50% Solution (All Grades)

**GENERAL USE:** Used as an acidulant in beverages, to adjust the pH of foods, as synergistic antioxidant in processing cheese, as a foam inhibitor, and as a sequestering agent to remove trace metals.

**PRODUCT DESCRIPTION:** An aqueous solution of an aliphatic acid. Synonyms include: beta-hydroxytricarboxylic acid, and 2-hydroxy-1,2,3-propanetricarboxylic acid.

**INFORMATION PROVIDED BY:** Brenntag Pacific, Inc.  
5700 N.W. Front Avenue  
Portland, OR 97210

### EMERGENCY PHONE NUMBERS

**BRENNTAG:** 503-699-7055  
**CHEMTREC:** 800-424-9300  
**CANUTEC:** 613-996-6666

For MSDS call: PHONE: 503-242-0200

## 2. COMPOSITION & INFORMATION ON INGREDIENTS

COMPONENT	CAS #	OSHA HAZARD	WT %	ACGIH		OSHA	
				TLV <sub>(TWA)</sub>	STEL	PEL <sub>(TWA)</sub>	STEL
Citric Acid	77-92-9	Severe Eye & Respiratory Irritant; Skin Irritant	50 ± 2	None	None	None	None

NDA = No Data Available N/A = Not Applicable

## 3. HAZARDS IDENTIFICATION

**EMERGENCY OVERVIEW:** A clear, colorless to light yellow, strongly acidic liquid having no characteristic odor. This product can cause severe irritation or burns to the eyes. It may cause moderate to severe irritation to the skin and respiratory tract.

### POTENTIAL HEALTH EFFECTS

**INHALATION:** Inhalation of mists or aerosols may cause severe irritation to the nose, mouth, throat, mucous membranes and lungs. Symptoms of exposure may include sneezing, coughing, chest discomfort or pain and shortness of breath. Inhalation of high mist concentrations may result in permanent lung damage.

**EYE CONTACT:** Exposure to the mists or liquid can cause severe eye irritation. Symptoms of exposure may include tearing, redness, swelling and a painful burning sensation. Corneal damage with impairment of vision may result from direct contact with the liquid, unless promptly treated.

**SKIN CONTACT:** Exposure to the mists or liquid may cause moderate to severe skin irritation. Symptoms of exposure may include redness, swelling, a stinging sensation and/or pain. No published reports indicate this product is absorbed through the skin.

**INGESTION:** Ingestion may cause moderate to severe irritation to the mouth, throat and the entire gastrointestinal tract, including the stomach and intestines, characterized by nausea, vomiting, diarrhea, abdominal pain, possible bleeding and/or tissue ulceration.

**CHRONIC:** The chronic health effects of exposure to this product are expected to be the same as for acute exposure.

PRODUCT IDENTIFIER: Citric Acid 50% Solution (All Grades)

page 2 of 6

**4. FIRST AID MEASURES**

- INHALATION:** If inhaled, immediately move to fresh air. If not breathing, give artificial respiration. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; use the Holger Nielsen method (back pressure-arm lift) or proper respiratory device. If breathing is difficult, give oxygen. Call a physician.
- EYE CONTACT:** In case of contact, immediately flush eyes with plenty of clean running water for at least 15 minutes, lifting the upper and lower lids occasionally. Remove contact lenses, if worn. Get medical attention immediately.
- SKIN CONTACT:** In case of contact, immediately flush skin with plenty of clean running water for at least 15 minutes, while removing contaminated clothing and shoes. Then wash with soap and water. If burn or irritation occurs, call a physician.
- INGESTION:** If swallowed, DO NOT induce vomiting. Get medical attention immediately. If victim is fully conscious, give plenty of water to drink. Never give anything by mouth to an unconscious person.
- NOTE TO PHYSICIANS:** Treat exposure symptomatically.

**5. FIRE FIGHTING MEASURES**

- Flashpoint and Method:** This product does not flash.
- Flammable Limits (in air, % by volume) Lower:** Not applicable **Upper:** Not applicable
- Autoignition Temperature:** Not applicable
- GENERAL HAZARD:** This product is an aqueous solution of a non-volatile organic acid having no characteristic odor. The Uniform Fire Code health hazard classification for this product is: **Irritant**. When in contact with some soft metals (i.e. Aluminum), this product can corrode the metal, liberating flammable / explosive Hydrogen gas. This product may produce hazardous mists or hazardous decomposition products.
- FIRE FIGHTING INSTRUCTIONS:** **EXTINGUISHING MEDIA:** Water fog, CO<sub>2</sub> foam or dry chemicals.  
Use the extinguishing media that is appropriate to the surrounding fire.
- FIRE FIGHTING EQUIPMENT:** Fire fighters should wear full protective equipment, including self-contained breathing apparatus.
- HAZARDOUS COMBUSTION PRODUCTS:** When heated to dryness and decomposition, it emits toxic carbon monoxide and carbon dioxide plus dense, irritating smoke.

**6. ACCIDENTAL RELEASE MEASURES**

- LAND SPILL:** Wearing recommended protective equipment and clothing, dike spill using soil, sand or compatible commercial absorbent. Pick up bulk of liquid using pumps or vacuum truck or absorb liquid in sand or commercial absorbent. Place in approved containers for recovery, disposal or satellite accumulation. Neutralize the acidity using soda ash, lime or a suitable agent appropriate for neutralizing acidic liquids. Flush the spill area with water; collect rinsates for disposal or sewer, as appropriate.
- WATER SPILL:** Wear recommended protective equipment and clothing if contact with hazardous material can occur. Stop or divert water flow. Dike contaminated water and remove for disposal and/or treatment. As appropriate, notify all downstream users of possible contamination.

PRODUCT IDENTIFIER: Citric Acid 50% Solution (All Grades)

page 3 of 6

**7. HANDLING AND STORAGE****STORAGE TEMPERATURE:** Ambient**STORAGE PRESSURE:** Ambient

**GENERAL:** Store in a cool, dry, well-ventilated area away from incompatible materials and products. Avoid getting this product in eyes, on skin or on clothing. Wear the recommended personnel protective equipment. Avoid breathing mists or aerosols. Use with adequate ventilation. Keep the container tightly closed when not in use. Wash thoroughly after handling this product.

**8. EXPOSURE CONTROLS / PERSONAL PROTECTION**

**CONTROL MEASURES:** Use a local or general, mechanical exhaust ventilation system capable of maintaining mist levels, in the work area, below any level, which may be irritating.

**RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT**

**RESPIRATOR:** If use causes an irritating mist, wear a NIOSH-approved respirator equipped with a good mist / particulate cartridge or supplied air.

**EYES:** Wear chemical goggles (recommended by ANSI Z87.1-1979).

**GLOVES:** Wear Nitrile, Neoprene, Butyl Rubber, Viton or Natural Rubber gloves.

**CLOTHING & EQUIPMENT:** Wear a Nitrile, Neoprene, Butyl Rubber or Natural Rubber apron when handling this product. An eye wash station and safety shower should be available in the work area.

**FOOTWEAR:** Wear Nitrile, Neoprene, Butyl Rubber or Natural Rubber boots, if contact is likely.

**9. PHYSICAL AND CHEMICAL PROPERTIES**

<b>Appearance:</b>	Clear, colorless to light yellow	<b>Bulk Density (pounds/ft<sup>3</sup>):</b>	Not applicable
<b>Physical State:</b>	Liquid	<b>Vapor Pressure:</b>	No data available
<b>Odor:</b>	No characteristic	<b>Vapor Density (air=1):</b>	No data available
<b>Odor Threshold:</b>	No data available	<b>Evaporation Rate (n-Butyl Acetate=1):</b>	No data available
<b>Molecular Formula:</b>	C <sub>6</sub> H <sub>8</sub> O <sub>7</sub> (in water)	<b>VOC Content:</b>	Not applicable
<b>Molecular Weight:</b>	192.14 (in water)	<b>% Volatile:</b>	Approximately 50
<b>Boiling Point:</b>	Approximately 104° C. (219° F.)	<b>Solubility in H<sub>2</sub>O:</b>	Complete
<b>Freezing/Melting Point:</b>	Less than 0° C. (32° F.)	<b>Octanol/Water Partition Coefficient:</b>	No data available
<b>Specific Gravity:</b>	Approximately 1.22 @ 20° C.	<b>pH (as is):</b>	1.5 – 2.0
<b>Density (pounds/gallon):</b>	Approximately 10.2	<b>pH (1% solution):</b>	2.0 – 2.5

**10. STABILITY AND REACTIVITY**

**GENERAL:** This product is stable and hazardous polymerization will not occur.

**CONDITIONS TO AVOID:** Hot storage.

**INCOMPATIBLE MATERIAL:** Strong oxidizers, caustics & alkali, chlorine releasers, sulfides, sulfites, cyanides, Aluminum, Magnesium, Zinc and alloys of these metals.

**HAZARDOUS DECOMPOSITION PRODUCTS:** When heated to dryness and decomposition, it emits toxic oxides of carbon plus dense, irritating smoke.

**SENSITIVITY TO MECHANICAL IMPACT:** This product is not sensitive to mechanical impact.

**SENSITIVITY TO STATIC DISCHARGE:** This product is not sensitive to static discharge.

PRODUCT IDENTIFIER: Citric Acid 50% Solution (All Grades)

page 4 of 6

**11. TOXICOLOGICAL INFORMATION**

**Components:** Citric Acid  
**Eye Contact:** Rabbit: 750 ug/24 Hours; Severe  
**Skin Contact:** Rabbit: 500 mg/24 Hours; Moderate  
**Oral Rat LD<sub>50</sub>:** 3 gm/kg  
**Dermal Rabbit LD<sub>50</sub>:** No data available  
**Inhalation Rat LC<sub>50</sub>:** No data available  
**Human Data:** No data available  
**Other Toxicological Data:** Intravenous Mouse LD<sub>50</sub>: 42 mg/kg  
**Carcinogenicity:** No data available  
**Teratogenicity:** No data available  
**Mutagenicity:** No data available  
**Synergistic Products:** None reported  
**Target Organs:** Eyes, Skin, Mucous membranes, Lungs & Teeth  
**Medical Conditions Aggravated By Exposure:** Skin or Respiratory disorders

**12. ECOLOGICAL INFORMATION****ENVIRONMENTAL FATE:**

The environmental fate of this product is expected to be: **Land:** biodegradation with some leaching into the groundwater. **Water:** biodegradation. **Air:** not expected to volatilize due to low vapor pressure. This product is not expected to bioaccumulate.

**ENVIRONMENTAL CONSIDERATIONS:**

The aquatic toxicity of this product has not been determined. However the aquatic toxicity of pure Citric Acid is: Goldfish LD<sub>50</sub>: 625 mg/liter, longtime exposure in hard water. Goldfish LD<sub>100</sub>: 894 mg/liter, longtime exposure in hard water.

**13. DISPOSAL CONSIDERATIONS**

**RCRA 40 CFR 261 CLASSIFICATION:** Corrosive Waste

**U.S. EPA WASTE NUMBER/DESCRIPTION:** D002

If this product is disposed of as shipped, it meets the criteria of a hazardous waste as defined under 40 CFR 261 due to its corrosivity. If this product becomes a waste, it will be a hazardous waste which is subject to the Land Disposal Restrictions under 40 CFR 268 and must be managed accordingly. As a hazardous liquid waste, it must be disposed of in accordance with local, state and federal regulations in a permitted hazardous waste treatment, storage and disposal facility.

**14. TRANSPORTATION INFORMATION**

**DOT PROPER SHIPPING NAME:** Not Restricted (See Other Shipping Information)

**Hazard Class:** Not applicable **UN Number:** Not applicable **Packing Group:** Not applicable

**Primary Label:** None Required **Subsidiary Label(s):** None Required

**Primary/Subsidiary Placards:** None Required

**DOT Reportable Quantity (RQ):** Not listed **RQ for Product:** Not applicable

**Marine Pollutant:** No

**2004 North American Emergency Response Guidebook No.:** Not applicable (in U.S.); 154 (Outside U.S.)

**TDG PROPER SHIPPING NAME:** CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. (Contains Citric Acid)

**Hazard Class:** 8 **UN Number:** UN3265 **Packing Group:** III

**Primary Label:** Corrosive **Subsidiary Label(s):** None Required

**Primary/Subsidiary Placards:** Corrosive

**TDG Reportable Quantity (RQ): #** At least 5 kg or 5 liters.

**TDG Schedule XII:** Not listed

**Regulated Limit (RL): ##** Not listed **RL for Product:** Not applicable

**Other Shipping Information:** DOT exception taken for materials only corrosive to Aluminum and mild steel; 49 CFR 173.154 (d) (1) and (2), when shipped by ground.

# Canadian Transportation of Dangerous Goods Regulations (TDGR), Part IX, Table I, Quantities or levels for immediate reporting: releases of reportable quantities, RQ, that meet the definition of a "dangerous occurrence" (a threat to life, health, property, or the environment) must be reported to the appropriate authorities as outlined in TDGR 9.13(1) and 9.14(1).

## Reporting to Environment Canada is required for any releases exceeding the regulated limits, RL, of 9.2 materials (primary or secondary). The regulated limits are found in Schedule XIII of the TDGR.

PRODUCT IDENTIFIER: Citric Acid 50% Solution (All Grades)

page 5 of 6

**15. REGULATORY INFORMATION**

**COMPONENTS:** Citric Acid  
**OSHA Target Organs:** Eyes, Skin, Mucous membranes, Lungs & Teeth

**Carcinogenic Potential:**  
Regulated by OSHA: No  
Listed on NTP Report: No  
Listed by IARC: No  
IARC Group: Not applicable  
ACGIH Appendix A:  
A1 Confirmed Human: Not applicable  
A2 Suspected Human: Not applicable

**U.S. EPA Requirements**

**Release Reporting**  
**CERCLA (40 CFR 302)**  
Listed Substance: Not listed  
Reportable Quantity: Not applicable  
Category: Not applicable  
RCRA Waste No.: Not applicable  
**Unlisted Substance:** Yes  
Reportable Quantity: 100 pounds  
Characteristic: Corrosivity  
RCRA Waste No.: D002

**SARA TITLE III**

**Section 302 & 303 (40 CFR 355):**  
Listed Substance: Not listed  
Reportable Quantity: Not applicable  
Planning Threshold: Not applicable  
**Section 311 & 312 (40 CFR 370):**  
Hazard Categories (product): Fire: N Sudden Release of Pressure: N Reactive: N Acute Health: Y Chronic Health: N  
Planning threshold: 10,000 pounds  
**Section 313 (40 CFR 372):**  
Listed Toxic Chemical: Not listed  
Reporting Threshold: Not applicable

**U.S. TSCA Status**

Listed (40 CFR 710): Yes

**State Regulations**

**State of California: Safe Drinking Water and Toxins Enforcement Act, 1986 (Proposition 65):**  
Carcinogen: No  
Reproductive Toxin: No

**Other Regulations**

**State Right To Know Laws:** None known

**Canadian Regulations**

**Product Information:**  
Controlled Product: Yes  
WHMIS Hazard Symbols: Corrosive Material  
WHMIS Class & Division: E

**Ingredient Information:**  
IDL Substance: Yes  
DSL or NDSL Lists: DSL

PRODUCT IDENTIFIER: **Citric Acid 50% Solution (All Grades)**

page 6 of 6

**16. OTHER INFORMATION**

**EPA Registration number:** Not applicable

**Approved Product Uses:** Not applicable

**Special Notes:**

This product does not contain any material, which the State of California has found to cause cancer and/or birth defects or other reproductive harm.

**Special Instructions:**

When making solutions, always add this product to water with adequate mixing to ensure a uniform solution.

Do not mix this product with strong caustic or alkaline solutions as violent boiling or spattering may result.

Do not add Citric Acid 50% Solution to hypochlorite bleaches, chlorine sanitizers or chlorinated cleaners as this liberates toxic, corrosive Chlorine gas.

**MSDS Revision Information:** Information Revised This Issue Date: **New MSDS format with additional information.**

Form Revision made 2/03/06

MSDS Distributed by: Brenntag Pacific, Inc.

NW Environmental Department

Phone: 503-242-0200 FAX: 503-412-3390

**Prepared By:** Edward Doheny

**Date Prepared:** July 26, 2007

This Material Safety Data Sheet is provided as an information resource only. It should not be taken as a warranty or representation for which Brenntag Pacific, Inc. assumes legal responsibility. While Brenntag Pacific, Inc. believes the information contained herein is accurate and compiled from sources believed to be reliable, it is the responsibility of the user to investigate and verify its validity. The buyer assumes all responsibility of using and handling the product in accordance with applicable federal, state, and local regulations.

# Material Safety Data Sheet

MSDS Revision Date: 12/17/2007  
Page 1 of 7



## 1. Product Identification

**Product Identity:** Ammonium Hydroxide Solutions (10%-30%)

**Molecular Weight:** 35.05 (NH<sub>4</sub>OH)

**Chemical Formula:** NH<sub>4</sub>OH + H<sub>2</sub>O

**Technical Information:** 270-830-1200

**Emergency Number:** 800-424-9300

(CHEMTREC)

**Synonyms:** Aqua Ammonia greater than 10% and less than 30%; Aqua ammonia 15.8 to 26°Be.(all grades)

### Distributed By Brenntag

Brenntag Great Lakes LLC.  
4420 N. Harley Davidson Ave  
Wauwatosa, WI 53225

Brenntag Mid-South Inc.  
1405 Hwy 136 W  
Henderson, KY 42420

Brenntag Northeast, Inc.  
81 West Huller Lane  
Reading, PA 19605

Brenntag Southeast, Inc.  
2000 East Pettigrew Street  
Durham, NC 27703

Brenntag Southwest, Inc.  
610 Fisher Road  
Longview, TX 75604

Brenntag Pacific, Inc.  
10747 Patterson Place  
Santa Fe Springs, CA 90670

## 2. Hazards Identification

### Emergency Overview

**DANGER!**

**POISON! DANGER! CORROSIVE, ALKALINE SOLUTION. CAUSES BURNS TO ANY AREA OF CONTACT. HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN.**

### Potential Health Effects

**Inhalation:**

Exposure by inhalation can cause irritation of the nose, throat, and mucous membranes. Exposure to high concentrations of ammonia vapor (above approximately 2500ppm) is life threatening, causing severe damage to the respiratory tract and resulting in bronchitis Chemical pneumonitis, and pulmonary edema, which can be fatal. Chronic exposure to ammonia can cause respiratory irritation and damage

**Ingestion:**

Ingestion of ammonium hydroxide burns the mouth, throat, and gastrointestinal tract and can lead to severe abdominal pain, nausea, vomiting, and collapse. Ingestion of as little as 3-4 ml of ammonium hydroxide may be fatal.

# Material Safety Data Sheet

MSDS Revision Date: 12/17/2007  
Page 2 of 7



## Skin Contact:

Skin contact can result in severe irritation, blister formation and burns; contact with the liquid results in cryogenic burns as well.

## Eye Contact:

Eye contact with ammonia vapor is severely irritating, and exposure of the eyes to ammonium hydroxide can result in serious damage and may cause permanent eye injury and blindness. Tearing or edema may occur.

## 3. Composition/Information on Ingredients

CAS#	Chemical Name	Percent by Weight
1336-21-6	Ammonium Hydroxide	10-30%
7732-18-5	Water	70-90

## 4. First Aid Measures

### Inhalation:

If a person breathes in chemical, remove exposed person promptly to fresh air. If breathing has stopped, perform artificial respiration. Oxygen should be provided for a person having difficulty breathing (but only administered by an authorized individual) until the person is able to breath easily by themselves. Keep the affected person warm and at rest. Get medical attention as soon as possible.

### Ingestion:

If conscious, give large amounts of water. DO NOT induce vomiting. Get medical attention immediately. If vomiting occurs spontaneously, keep head below hips. May drink orange juice or diluted vinger (1: 4) to counteract ammonia.

### Skin Contact:

Promptly wash the contaminated skin using soap or mild detergent and water. If chemical, or solution containing chemical, soaks through clothing, remove the clothing promptly and wash the skin using soap or mild detergent and water. Medical attention should be given as soon as possible for all burns, regardless of how minor they seem.

### Eye Contact:

# Material Safety Data Sheet

MSDS Revision Date: 12/17/2007  
Page 3 of 7



Flush eyes with large amounts of water, lifting the upper and lower lids at periodic intervals to insure contact of water with all accessible tissue of the eyes and lids. Medical attention should be given as soon as possible, preferably an eye specialist.

## 5. Fire Fighting Measures

**Go to Section 9 for Flammable Properties.**

### Fire:

Not considered to be a fire hazard. The mixture will not burn, but escaping ammonia gas can burn in the range of 16-25% in air.

LEL / UEL = 15 – 28%

### Explosion:

Not considered to be an explosion hazard. When heated, will give off ammonia gas. Ammonia increases the fire hazards from other combustible materials, including oil. Flammable limits are broadened by increasing temperature. Ammonia vapor in the range of 16 - 25% in air can explode on contact with ignition sources. Closed containers exposed to extreme heat may build up pressure and rupture violently. Combustion of released ammonia may form nitrogen oxides.

### Fire Extinguishing Media:

Use any means suitable for extinguishing surrounding fire. Water spray or fog may be used for escaping ammonia gas and to cool ammonia containers.

### Special Considerations:

Firefighters should avoid all bodily contact; wear full protective clothing and self-contained breathing apparatus in positive pressure mode. When this product is heated to combustion it will release ammonia which could form nitrogen oxides.

## 6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment. Pick up and place in a suitable container for reclamation or disposal, using a method that does not generate fumes. Use copious amounts of water spray or fog to absorb the evolved gas. Stay upwind when containers are threatened. Contain spill and runoff from entering drains, sewers, and water systems by utilizing methods such as diking, containment, and absorption. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

# Material Safety Data Sheet

MSDS Revision Date: 12/17/2007  
Page 4 of 7



## 7. Handling and Storage

Keep containers tightly closed. Store in a cool, dry place. Use only with adequate ventilation, dust mask or self-contained breathing apparatus. Protective clothing should always be worn. Avoid contact with eyes, skin, and clothing. Keep container closed when not in use. Avoid breathing mist. Do not get on skin, clothing, or in eyes. Wash off with water. Do not take internally. Open container slowly in case of pressure build-up. Ammonia hydroxide will react exothermically with acid.

## 8. Exposure Controls/Personal Protection

OSHA Permissible Exposure Limit (PEL): 35 ppm (STEL)

ACGIH Threshold Limit Value (TLV): 25 PPM (TLV) 35 PPM (STEL)

### Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, a Manual of Recommended Practices*, most recent edition, for details. Personal Respirators (NIOSH Approved): If the exposure limit is exceeded and engineering controls are not feasible, a full-face piece particulate respirator (NIOSH type NI00 filters) may be worn for exposure limit, or the maximum use concentration specified by the appropriate regulatory agency, or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. **WARNING:** Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

### Skin Protection:

Impervious rubber or neoprene gloves should be worn. Protective, impervious clothing should be worn in presence to prevent contact with skin (coveralls, boots, etc.).

### Eye Protection:

Splash-proof goggles and full face shield should be worn when there is danger of splash from solution containing chemical. Protection against splash or mist from solution containing chemical with 8-inch minimum face shield is recommended. Eye protection should be worn in presence of solution containing chemical, at all times. Maintain eye wash fountain and quick-drench facilities in work area.

# Material Safety Data Sheet

MSDS Revision Date: 12/17/2007  
Page 5 of 7



## 9. Physical and Chemical Properties

Appearance:	Clear colorless liquid
Odor:	strong pungent (ammonia) odor
Physical State:	liquid
PH of water solutions:	13+
Melting Point:	N/A
Boiling Point:	27.8 - 59.5 °C (82-139F)
Flash Point:	N/A
Upper Explosive Limit:	N/A
Lower Explosive Limit:	N/A
Vapor Pressure:	(60F) 420 – 475 FOR 29.7% NH <sub>3</sub>
Vapor Density:	0.596
Specific Gravity:	0.89-0.96
Solubility in Water:	100% Soluble in Water

## 10. Stability and Reactivity

**Chemical Stability:** Stable under normal conditions of use and storage.

**Conditions to Avoid:** Heat, exposure to high temperature should be minimized. This material should avoid direct sunlight.

**Incompatible Materials:** Contact with strong acids and alkalis, chlorine bleach, halogens, strong hydroxide, iron, reactive metals, mercury, gold, silver and strong oxidizers.

**Hazardous Decomposition Products:** Hydrogen and nitrogen gases. Gaseous ammonia upon heating.

## 11. Toxicological Information

LD50 Inhalation Rat: 2000 ppm/4hr

LD50 Oral Rat: 350 mg/kg

LD50 Oral mouse: 4837mg/kg

**Acute:** POISON! DANGER! CORROSIVE, ALKALINE SOLUTION. CAUSES BURNS TO ANY AREA OF CONTACT. HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN.

# Material Safety Data Sheet

MSDS Revision Date: 12/17/2007  
Page 6 of 7



Exposure by inhalation can cause irritation of the nose, throat, and mucous membranes. Exposure to high concentrations of ammonia vapor (above approximately 2500ppm) is life threatening, causing severe damage to the respiratory tract and resulting in bronchitis, chemical pneumonitis, and pulmonary edema, which can be fatal. Chronic exposure to ammonia can cause respiratory irritation and damage. Ingestion of ammonium hydroxide burns the mouth, throat, and gastrointestinal tract and can lead to severe abdominal pain, nausea, vomiting, and collapse. Ingestion of as little as 3-4 ml of ammonium hydroxide may be fatal. Skin contact can result in severe irritation and burns; contact with the liquid results in cryogenic burns as well. Eye contact with ammonia vapor is severely irritating, and exposure of the eyes to ammonium hydroxide can result in serious damage and may cause permanent eye injury and blindness.

**Chronic:** Ingestion of as little as 3-4 ml of ammonia hydroxide may be fatal. Investigated as a tumorigen and mutagen.

## 12. Ecological Information

**ENVIRONMENTAL FATE:** No data found

**ENVIRONMENTAL TOXICITY:** LC50 Daphnia magna 0.66 mg/l/48 hr 22°C; LC50 Perch 0.29 mg/l/7days/un-ionized NH<sub>3</sub>; LC50 Salmon gairdnerli 8 ug/ml NH<sub>3</sub>/24 hr

## 13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

## 14. Transport Information

### US DOT (ground)

Proper Shipping Name: Ammonia Solution  
Hazard Class: 8  
UN/NA: UN2672  
Packing Group: III  
Marine Pollutant: No  
RQ Amount: 1,000 lbs

### IMDG (water)

Proper Shipping Name: Ammonia Solution

**Material Safety Data Sheet**MSDS Revision Date: 12/17/2007  
Page 7 of 7

Hazard Class: 8  
 UN/NA: UN2672  
 Packing Group: III  
 Marine Pollutant: No  
 RQ Amount: 1,000 lbs

**15. Regulatory Information**

**SARA 302**  
 Not Listed

**SARA 304**  
 Not Listed

**SARA 313**  
 Not Listed

**CERCLA**  
 Listed 1,000lbs

**TSCA Inventory**  
 Yes

**California Proposition 65**  
 Not Listed

**16. Other Information**

This MSDS is provided as an information resource only. It should not be taken as a warranty or representation for which Brenntag assumes legal liability. While Brenntag believes the information contained herein is accurate and compiled from sources believed to be reliable, it is the responsibility of the user to investigate and verify its identity. The buyer assumes all responsibility for using and handling the product in accordance with applicable federal, state, and local regulations.

**Distributed By Brenntag**

Brenntag Great Lakes LLC.  
 4420 N. Harley Davidson Ave  
 Wauwatosa, WI 53225

Brenntag Mid-South Inc.  
 1405 Hwy 136 W  
 Henderson, KY 42420

Brenntag Northeast, Inc.  
 81 West Huller Lane  
 Reading, PA 19605

Brenntag Southeast, Inc.  
 2000 East Pettigrew Street  
 Durham, NC 27703

Brenntag Southwest, Inc.  
 610 Fisher Road  
 Longview, TX 75604

Brenntag Pacific, Inc.  
 10747 Patterson Place  
 Santa Fe Springs, CA  
 90670

**SOLUTION-SPECIFIC PHYSICAL DATA**

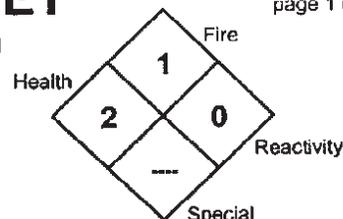
	<b>20.5° Baume</b>	<b>25° Baume</b>	<b>26° Baume</b>
<b>AMMONIA %</b>	18.5-19.5%	26.5-27.5%	29.0-29.9%
<b>WATER %</b>	81.5-80.5%	73.5-72.5%	71.0-70.1%
<b>SPECIFIC GRAVITY</b>	0.9341-09276 @60F	0.9061-9032@60F	0.8974-0.8960@60F
<b>BOILING POINT</b>	124°F@14.7psis	88°F @14.7psis	84.9°F @14.7psis
<b>VAPOR PRESSURE</b>	3.9 psis @ 60°F	6.9 @ 60°F	9.1 @ 60°F
<b>APPROX. FREEZING POINT</b>	-32°F	-89°F	-110°F

# MATERIAL SAFETY DATA SHEET

**BRENNTAG**

NFPA 704 DESIGNATION  
HAZARD RATING

4=Extreme  
3=High  
2=Moderate  
1=Slight  
0=Insignificant



Brenntag MSDS #:	BPI-00180
MSDS Revision/Issue Date:	07/26/07
Supersedes Revision Date:	New

## 1. CHEMICAL PRODUCT IDENTIFICATION & COMPANY IDENTIFICATION

**PRODUCT IDENTIFIER:** Citric Acid 50% Solution (All Grades)

**GENERAL USE:** Used as an acidulant in beverages, to adjust the pH of foods, as synergistic antioxidant in processing cheese, as a foam inhibitor, and as a sequestering agent to remove trace metals.

**PRODUCT DESCRIPTION:** An aqueous solution of an aliphatic acid. Synonyms include: beta-hydroxytricarboxylic acid, and 2-hydroxy-1,2,3-propanetricarboxylic acid.

**INFORMATION PROVIDED BY:** Brenntag Pacific, Inc.  
5700 N.W. Front Avenue  
Portland, OR 97210

### EMERGENCY PHONE NUMBERS

**BRENNTAG:** 503-699-7055  
**CHEMTREC:** 800-424-9300  
**CANUTEC:** 613-996-6666

For MSDS call: PHONE: 503-242-0200

## 2. COMPOSITION & INFORMATION ON INGREDIENTS

COMPONENT	CAS #	OSHA HAZARD	WT %	ACGIH		OSHA	
				TLV <sub>(TWA)</sub>	STEL	PEL <sub>(TWA)</sub>	STEL
Citric Acid	77-92-9	Severe Eye & Respiratory Irritant; Skin Irritant	50 ± 2	None	None	None	None

NDA = No Data Available N/A = Not Applicable

## 3. HAZARDS IDENTIFICATION

**EMERGENCY OVERVIEW:** A clear, colorless to light yellow, strongly acidic liquid having no characteristic odor. This product can cause severe irritation or burns to the eyes. It may cause moderate to severe irritation to the skin and respiratory tract.

### POTENTIAL HEALTH EFFECTS

**INHALATION:** Inhalation of mists or aerosols may cause severe irritation to the nose, mouth, throat, mucous membranes and lungs. Symptoms of exposure may include sneezing, coughing, chest discomfort or pain and shortness of breath. Inhalation of high mist concentrations may result in permanent lung damage.

**EYE CONTACT:** Exposure to the mists or liquid can cause severe eye irritation. Symptoms of exposure may include tearing, redness, swelling and a painful burning sensation. Corneal damage with impairment of vision may result from direct contact with the liquid, unless promptly treated.

**SKIN CONTACT:** Exposure to the mists or liquid may cause moderate to severe skin irritation. Symptoms of exposure may include redness, swelling, a stinging sensation and/or pain. No published reports indicate this product is absorbed through the skin.

**INGESTION:** Ingestion may cause moderate to severe irritation to the mouth, throat and the entire gastrointestinal tract, including the stomach and intestines, characterized by nausea, vomiting, diarrhea, abdominal pain, possible bleeding and/or tissue ulceration.

**CHRONIC:** The chronic health effects of exposure to this product are expected to be the same as for acute exposure.



Revision Number: 001.1

Issue date: 06/26/2009

**1. PRODUCT AND COMPANY IDENTIFICATION**

**Product name:** BONDERITE S-AD RODINE 2010 ACID INHIBITOR ADDITIVE known as P3  
**Product type:** Corrosion inhibitor  
**Product type:** RODINE 20 10  
**Company address:** Henkel Corporation  
 32100 Stephenson Highway  
 Madison Heights, MI 48071  
**IDH number:** 1314676  
**Region:** United States  
**Contact information:**  
 Telephone: 248.583.9300  
 For Chemical Emergency: Call CHEMTREC at 800.424.9300  
 Internet: www.henkelna.com

**2. HAZARDS IDENTIFICATION**

**EMERGENCY OVERVIEW**

<b>Physical state:</b>	Liquid	<b>HMIS:</b>	
<b>Color:</b>	Light amber	<b>HEALTH:</b>	*2
<b>Odor:</b>	Aromatic	<b>FLAMMABILITY:</b>	0
		<b>PHYSICAL HAZARD:</b>	0
		<b>Personal Protection:</b>	See MSDS Section 8

**WARNING:** CAUSES EYE, SKIN AND RESPIRATORY TRACT IRRITATION.  
 MAY BE HARMFUL OR FATAL IF SWALLOWED.  
 MAY CAUSE ALLERGIC SKIN REACTION.

**Relevant routes of exposure:** Skin, Inhalation, Eyes

**Potential Health Effects**

**Inhalation:** Inhalation of vapors or mists of the product may be irritating to the respiratory system.  
**Skin contact:** Prolonged and/or repeated skin contact with this product may cause irritation/dermatitis. Contact with skin can cause irritation and allergic reaction (sensitization) in some individuals.  
**Eye contact:** Contact with eyes can cause eye irritation. May cause severe eye irritation.  
**Ingestion:** May cause irritation and symptoms similar to ethyl alcohol intoxication. Swallowing large volumes of ethylene glycol can lead to kidney damage.

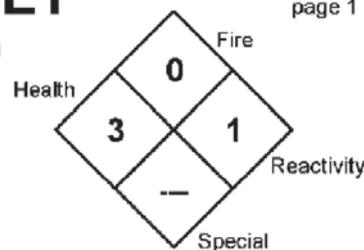
**Existing conditions aggravated by exposure:** Eye, skin and respiratory disorders.

This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

See Section 11 for additional toxicological information.

**3. COMPOSITION / INFORMATION ON INGREDIENTS**

Hazardous components	CAS NUMBER	%
Poly(ethylene glycol)	Proprietary	30 - 60
Ethylene glycol	107-21-1	5 - 10
1,3-Diethyl-2-thiourea	105-55-5	5 - 10
Ethoxylated Propoxylated alcohol	Proprietary	1 - 5
quinolinium chloride	530-64-3	1 - 5

**BRENNTAG**NFPA 704 DESIGNATION  
HAZARD RATING4=Extreme  
3=High  
2=Moderate  
1=Slight  
0=InsignificantBrenntag MSDS #: **BPI-00182**MSDS Revision/Issue Date: **07/31/07**Supersedes Revision Date: **New****1. CHEMICAL PRODUCT IDENTIFICATION & COMPANY IDENTIFICATION****PRODUCT IDENTIFIER: Sodium Hydroxide 50% Solution (All Grades)****GENERAL USE:** Used in industry to neutralize acids; to precipitate alkaloids; in metal finishing; in cleaners; and to precipitate most metals (as hydroxides) from aqueous solutions.**PRODUCT DESCRIPTION:** An aqueous solution of Sodium Hydroxide. Synonyms for Sodium Hydroxide include: caustic soda, lye soda, sodium hydrate and white caustic.**INFORMATION PROVIDED BY:** Brenntag Pacific, Inc.  
5700 N.W. Front Avenue  
Portland, OR 97210**EMERGENCY PHONE NUMBERS****BRENNTAG:** 503-699-7055**CHEMTREC:** 800-424-9300**CANUTEC:** 613-996-6666For MSDS call: **PHONE: 503-242-0200****2. COMPOSITION & INFORMATION ON INGREDIENTS**

COMPONENT	CAS #	OSHA HAZARD	WT %	ACGIH		OSHA	
				TLV <sub>(TWA)</sub>	STEL	PEL <sub>(TWA)</sub>	STEL
Sodium Hydroxide	1310-73-2	Corrosive; Lung Toxin	50 ± 1	None Ceiling: 2 mg/m <sup>3</sup>	None	2 mg/m <sup>3</sup>	None

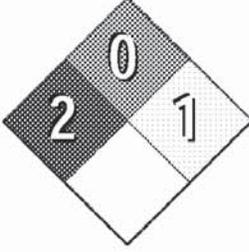
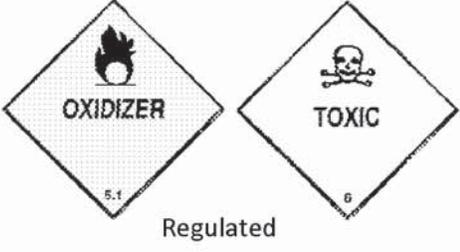
NDA = No Data Available

N/A = Not Applicable

**3. HAZARDS IDENTIFICATION****EMERGENCY OVERVIEW:** A clear to slightly turbid, colorless liquid having no characteristic odor. The mists and liquid are corrosive to all tissues contacted. Inhalation of mists may cause permanent lung damage. This material reacts with water to release a large amount of heat and can react violently with acids and other substances. **The NIOSH I.D.L.H. for Sodium Hydroxide is: 10 mg/m<sup>3</sup>.****POTENTIAL HEALTH EFFECTS****INHALATION:** Inhalation of mists or an aerosol can cause severe irritation or burns to the nose, mouth, throat, mucous membranes and lungs. Symptoms of exposure can include coughing, sneezing, choking, shortness of breath, chest pain and impairment of lung function. Inhalation of a high mist concentration may result in permanent lung damage.**EYE CONTACT:** Exposure to the mists or liquid can cause severe eye irritation and/or burns. Symptoms of exposure can include tearing, redness, swelling, pain and possible mucous discharge. Exposure may cause corneal damage and/or visual impairment even when prompt treatment is provided.**SKIN CONTACT:** Exposure to the mists or liquid can cause severe skin irritation and/or burns. Symptoms of exposure may include redness, swelling, pain and possible ulceration. Prolonged skin exposure to this material may cause destruction of the dermis with impairment of the skin, at site of contact, to regenerate. No published data indicates this material is absorbed through the skin.**INGESTION:** Ingestion can cause severe irritation and/or burns to the entire gastrointestinal tract, including the stomach and intestines characterized by nausea, vomiting, abdominal pain, bleeding, tissue ulceration and possible diarrhea.**CHRONIC:** The chronic health effects of exposure to this material are expected to be the same as for acute exposure.

## MATERIAL SAFETY DATA SHEET



NFPA	HMIS	PPE	Symbol(s)
			
Current Issue Date: May 16, 2013		Revision Number: 0	
<b>1. PRODUCT AND COMPANY IDENTIFICATION</b>			
Product Name:	Sodium Nitrite		
Other/Generic Names:	Nitrous Acid, Sodium Salt, Sodium Nitrite (various grades)		
Recommended Use:	Food preservation, dye manufacturing, corrosion inhibitor		
Manufacturer:	General Chemical, LLC 90 East Halsey Road Parsippany, NJ 07054		
For More Information:	General Chemical Performance Products Ltd. 90 East Halsey Road Parsippany, NJ 07054 Customer Service US ONLY: 800-631-8050 (Monday – Friday 9:00AM – 4:30PM)		
Emergency Telephone Number:	Customer Service CANADA ONLY: 866-543-3896 (Monday – Friday 9:00AM – 4:30PM) US ONLY - CALL CHEMTREC: 800-424-9300 (24 Hours/Day, 7 Days/Week) CANADA ONLY - CALL CANUTEC: 613-996-6666 (24 Hours/Day, 7 Days/Week) OUTSIDE THE US - 703-527-3887		
<b>2. HAZARDS IDENTIFICATION</b>			
<b>EMERGENCY OVERVIEW:</b> White to slightly yellow crystalline solid. Toxic if swallowed or dust is inhaled. Oxidizer: may ignite organic materials and react with other materials. Can decompose if mixed with acids or exposed to fire conditions, releasing toxic nitrogen oxides.			
<b>OSHA Status:</b>	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200)		
<b>Potential Health Affects</b>			
<b>Skin:</b>	May cause skin irritation.		
<b>Eyes:</b>	May strongly irritate or burn the eyes.		
<b>Inhalation:</b>	Product mists may cause irritation to the respiratory tract.		
<b>Ingestion:</b>	May irritate the gastrointestinal tract. Although small quantities are used in food preparation, swallowing moderate amounts of sodium nitrite can result in serious toxic effects including death. Effects include nausea, weakness, cyanosis (blue skin), collapse and coma, possibly leading to death. Sodium nitrite interferes with the blood's ability to transport oxygen.		
<b>Delayed Effects:</b>	None known. If Sodium nitrite is used with amines found in certain cutting fluids, potentially carcinogenic nitrosamine compounds may be formed.		

# Material Safety Data Sheet

## 1. Product and company identification

 Product name : **SURFONIC® N-95**

MSDS # 00033063

Product use : Surfactant

Huntsman Petrochemical Corporation  
 P.O. Box 4980  
 The Woodlands, TX 77387-4980

**TELEPHONE NUMBERS**  
 Transportation Emergency  
 Company: (800) 328-8501  
 CHEMTREC: (800) 424-9300  
 Medical Emergency: (409) 722-9673 (24 Hour)  
 General MSDS Assistance: (281) 719-6000  
 Technical Information: (281) 719-7780  
 E-MAIL: MSDS@huntsman.com

Validation date : 3/4/2009.

### In case of emergency

**Spills Leaks Fire or Exposure Call Chemtrec: (800) 424-9300**  
**Medical Emergency Information: (800) 328-8501**  
**In Mexico: 01 800 00 214 00**  
**In Columbia: 01 800 91 6012**

## 2. Hazards identification

**Physical state** : Liquid. [Liquid.]  
**Odor** : Slight  
**OSHA/HCS status** : While this material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200), this MSDS contains valuable information critical to the safe handling and proper use of the product. This MSDS should be retained and available for employees and other users of this product.  
**Emergency overview** : CAUTION!  
 MAY CAUSE EYE AND SKIN IRRITATION.  
 Slightly irritating to the eyes and skin. Avoid breathing vapor or mist. Avoid contact with eyes. Avoid prolonged or repeated contact with skin. Wash thoroughly after handling.

**GENERAL INFORMATION** : Read the entire MSDS for a more thorough evaluation of the hazards.

## 3. Composition/information on ingredients

<u>Name</u>	<u>CAS number</u>	<u>%</u>
Nonylphenol, ethoxylated	9016-45-9	60 - 100

**SURFONIC® N-95****4 . First aid measures**

<b>Eye contact</b>	: Get medical attention immediately. Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician.
<b>Skin contact</b>	: Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.
<b>Inhalation</b>	: Move exposed person to fresh air. Keep person warm and at rest. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
<b>Ingestion</b>	: Wash out mouth with water. Move exposed person to fresh air. Do not induce vomiting unless directed to do so by medical personnel. Get medical attention if symptoms occur. Never give anything by mouth to an unconscious person.
<b>Notes to physician</b>	: Symptomatic and supportive therapy as needed. Following severe exposure medical follow-up should be monitored for at least 48 hours.

**5 . Fire-fighting measures**

<b>Flash point</b>	: Closed cup: 237.78°C (460°F) [Pensky-Martens.]
<b>Products of combustion</b>	: Decomposition products may include the following materials: carbon dioxide carbon monoxide
<b><u>Extinguishing media</u></b>	
<b>Suitable</b>	: Use an extinguishing agent suitable for the surrounding fire.
<b>Not suitable</b>	: None known.
<b>Special exposure hazards</b>	: In a fire or if heated, a pressure increase will occur and the container may burst. Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.
<b>Special protective equipment for fire-fighters</b>	: Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

**6 . Accidental release measures**

<b>Personal precautions</b>	: No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Put on appropriate personal protective equipment (see section 8).
<b>Environmental precautions</b>	: Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
<b>Methods for cleaning up</b>	: Stop leak if without risk. Move containers from spill area. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Dispose of via a licensed waste disposal contractor. Note: see section 1 for emergency contact information and section 13 for waste disposal.

**SURFONIC® N-95****7 . Handling and storage**

- Handling** : Put on appropriate personal protective equipment (see section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapor or mist. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.
- Storage** : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. 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. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

**8 . Exposure controls/personal protection**

**Consult local authorities for acceptable exposure limits.**

- Preventive Measures** : Conditions of use, adequacy of engineering or other control measures, and actual exposures will dictate the need for specific protective devices at your workplace.
- Engineering controls** : Use local exhaust ventilation to maintain airborne concentrations below the TLV. Suitable respiratory equipment should be used in cases of insufficient ventilation or where operational procedures demand it. For guidance on engineering control measures refer to publications such as the ACGIH current edition of 'Industrial Ventilation, a manual of Recommended Practice.'
- Personal protection**
- Eyes** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.
- Skin** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Respiratory** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.
- Hands** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

**9 . Physical and chemical properties****General information****Appearance**

- Physical state** : Liquid. [Liquid.]
- Color** : Pale color.
- Odor** : Slight
- Odor threshold** : Not available.

**Important health, safety and environmental information**

- pH** : 7
- Boiling point** : Not available.
- Melting point** : 5°C (41°F)
- Flash point** : Closed cup: 237.78°C (460°F) [Pensky-Martens.]

**SURFONIC® N-95****9 . Physical and chemical properties**

Oxidizing properties	: Not available.
Vapor pressure	: <0.13 kPa (<1 mm Hg)
Relative density	: 1.06
Viscosity	: Kinematic: 1.1 cm <sup>2</sup> /s (110 cSt at 100°F)
Vapor density	: Not available.
VOC content	: Not available.

**10 . Stability and reactivity**

Stability and reactivity	: The product is stable.
Incompatibility with various substances	: Reactive or incompatible with the following materials: oxidizing materials, reducing materials and metals.
Hazardous polymerization	: Under normal conditions of storage and use, hazardous polymerization will not occur.
Hazardous decomposition products	: Decomposition products may include the following materials: carbon dioxide carbon monoxide

**11 . Toxicological information**Toxicity dataAcute toxicity

Product/ingredient name	test	Species	Result	Exposure
Nonylphenol, ethoxylated	LD50 Oral	Rat	3310 mg/kg	-
	LD50 Dermal	Rabbit	>2000 mg/kg	-

Potential acute health effects

Ingestion	: No known significant effects or critical hazards.
Inhalation	: No known significant effects or critical hazards.
Eyes	: Slightly irritating to the eyes.
Skin	: Slightly irritating to the skin.

Potential chronic health effects

Target organs	: No known significant effects or critical hazards.
Carcinogenicity	: No known significant effects or critical hazards.
Mutagenicity	: No known significant effects or critical hazards.
Teratogenicity	: No known significant effects or critical hazards.
Fertility effects	: No known significant effects or critical hazards.
Developmental effects	: No known significant effects or critical hazards.

**12 . Ecological information**Aquatic ecotoxicity

Product/ingredient name	test	Result	Species	Exposure
Nonylphenol, ethoxylated	-	Acute LC50 1 to 10 mg/L	Fish	96 hours

Biodegradability

Product/ingredient name	test	Result	Dose	Inoculum
Nonylphenol, ethoxylated	-	60 % - Inherent - 28 days	-	-

<u>Product/ingredient name</u>	<u>Aquatic half-life</u>	<u>Photolysis</u>	<u>Biodegradability</u>
--------------------------------	--------------------------	-------------------	-------------------------

**SURFONIC® N-95****12 . Ecological information**

Nonylphenol, ethoxylated - - Not readily  
**Environmental effects** : Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

**13 . Disposal considerations**

**Waste disposal** : The generation of waste should be avoided or minimized wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

**14 . Transport information**

Transportation Emergency Number 1-800-424-9300 (CHEMTREC).

Regulatory information	UN number	Proper shipping name	Class	PG*	Label	Additional information
DOT Classification	Not regulated.					-
TDG Classification	Not regulated.					-
IMDG Class	Not regulated.		-	-		-
IATA-DGR Class	Not regulated.		-	-		-

PG\* : Packing group

**15 . Regulatory information**United States

**HCS Classification** : Not regulated.  
**U.S. Federal regulations** : **United States inventory (TSCA 8b)**: All components are listed or exempted.

**CERCLA: Hazardous substances.** : No ingredients listed.

This product does not contain nor is it manufactured with ozone depleting substances.

SARA 313

	<u>Product name</u>	<u>CAS number</u>	<u>Concentration</u>
<b>Form R - Reporting requirements</b>	: GLYCOL ETHERS (FRACTION OF PRODUCT MEETING EPA DEFINITION)	Blend	3%

SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

State regulations

**California Prop 65** :

SURFONIC® N-95

## 15 . Regulatory information

**WARNING:** This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

<u>Ingredient name</u>	<u>Cancer</u>	<u>Reproductive</u>	<u>No significant risk level</u>	<u>Maximum acceptable dosage level</u>
Ethylene oxide	Yes.	Yes.	Yes.	Yes.

### Canada

WHMIS (Canada) : Class D-2B: Material causing other toxic effects (Toxic).  
 CEPA (DSL) : DSL: All Ingredients Listed.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

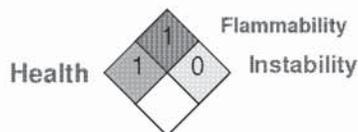
## 16 . Other information

Label requirements : MAY CAUSE EYE AND SKIN IRRITATION.

Hazardous Material Information System (U.S.A.) :

Health	1
Fire hazard	1
Reactivity	0

National Fire Protection Association (U.S.A.) :



Date of printing : 3/5/2009.

Date of issue : 4 March 2009

Date of previous issue : 3/3/2009.

### Notice to reader

*While the information and recommendations in this publication are to the best of our knowledge, information and belief accurate at the date of publication, NOTHING HEREIN IS TO BE CONSTRUED AS A WARRANTY, EXPRESS OR OTHERWISE.*

*IN ALL CASES, IT IS THE RESPONSIBILITY OF THE USER TO DETERMINE THE APPLICABILITY OF SUCH INFORMATION AND RECOMMENDATIONS AND THE SUITABILITY OF ANY PRODUCT FOR ITS OWN PARTICULAR PURPOSE.*

*THE PRODUCT MAY PRESENT HAZARDS AND SHOULD BE USED WITH CAUTION. WHILE CERTAIN HAZARDS ARE DESCRIBED IN THIS PUBLICATION, NO GUARANTEE IS MADE THAT THESE ARE THE ONLY HAZARDS THAT EXIST.*

*Hazards, toxicity and behaviour of the products may differ when used with other materials and are dependent upon the manufacturing circumstances or other processes. Such hazards, toxicity and behaviour should be determined by the user and made known to handlers, processors and end users.*

*NO PERSON OR ORGANIZATION EXCEPT A DULY AUTHORIZED HUNTSMAN EMPLOYEE IS AUTHORIZED TO PROVIDE OR MAKE AVAILABLE DATA SHEETS FOR HUNTSMAN PRODUCTS. DATA SHEETS FROM UNAUTHORIZED SOURCES MAY CONTAIN INFORMATION THAT IS NO LONGER CURRENT OR ACCURATE. NO PART OF THIS DATA SHEET MAY BE REPRODUCED OR TRANSMITTED IN ANY FORM, OR BY ANY MEANS, WITHOUT PERMISSION IN WRITING FROM HUNTSMAN. ALL REQUESTS FOR PERMISSION TO REPRODUCE MATERIAL FROM THIS DATA SHEET SHOULD BE DIRECTED TO HUNTSMAN, MANAGER, PRODUCT SAFETY AT THE ABOVE ADDRESS.*

### Trademarks:

SURFONIC® is a registered trademark of Huntsman Corporation or an affiliate thereof in one or more countries, but not all countries.

*SURFONIC® N-95*

## 16 . Other information

▣ Indicates information that has changed from previously issued version.

## SODIUM NITRITE

3. COMPOSITION/INFORMATION ON INGREDIENTS		
Component	CAS No	Weight %
Sodium nitrite	7632-00-0	>98%
4. FIRST AID MEASURES		
<b>Eye Contact</b>	Immediately flush eyes with water for at least 15 minutes. Get medical attention if irritation persists.	
<b>Skin Contact</b>	Flush with plenty of water, removing contaminated clothing. If irritation develops, get medical attention.	
<b>Inhalation</b>	Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get prompt medical attention.	
<b>Ingestion</b>	Do not induce vomiting. Immediately give large quantities of water. Get medical attention immediately.	
<b>Notes to Physician</b>	Sodium nitrite forms methemoglobin in the blood stream. Treat accordingly.	
5. FIRE-FIGHTING MEASURES		
<u>Flammable Properties</u>		
<b>FLASH POINT:</b>	Not Flammable	
<b>FLASH POINT METHOD:</b>	Not Applicable	
<b>AUTOIGNITION TEMPERATURE:</b>	Not Applicable	
<b>UPPER FLAME LIMIT (VOLUME % IN AIR):</b>	Not Applicable	
<b>LOWER FLAME LIMIT (VOLUME % IN AIR):</b>	Not Applicable	
<b>FLAME PROPAGATION RATE (SOLIDS):</b>	Not Applicable	
<b>OSHA FLAMMABILITY CLASS:</b>	Not Applicable	
<b>SUITABLE EXTINGUISHING MEDIA:</b>	Use flooding amounts of water or other agents.	
<b>UNSUITABLE EXTINGUISHING MEDIA:</b>	Do NOT use dry chemicals containing ammonium phosphate.	
<u>Explosion Limits</u>		
<b>Hazardous Combustion Products</b>	No information available	
<b>Impact sensitivity</b>	No information available	
<b>Sensitivity to static discharge</b>	No information available	
<b>Specific Hazards Arising from the Chemical</b>	Material does not burn but is an oxidizing agent and will support combustion of other materials. Product decomposes above 608 °F releasing toxic nitrogen oxides.	
<b>Protective Equipment and Precautions for Firefighters</b>	Wear self-contained breathing apparatus (SCBA) and full protective equipment.	
6. ACCIDENTAL RELEASE MEASURES		
<b>IN CASE OF SPILL OR OTHER RELEASE</b>	Remove sources of ignition. Ventilate area. Use non-sparking tools and equipment. Sweep or shovel spilled material into containers. Dispose of material according to local, state and federal authorities. Do not allow product or residues to enter waterways and/or any source of drinking water.	
7. HANDLING AND STORAGE		
<b>Handling</b>	Avoid contact with skin and eyes. Do not breathe product dusts. Avoid contact with incompatible, combustible, organic or readily oxidizable materials.	
<b>Storage</b>	Store in a cool, dry, well-ventilated area. Keep containers tightly closed. Do not store on wooden floors. Isolate from combustible materials. Empty containers may contain product residues; observe all warnings and precautions listed for the product.	

## SODIUM NITRITE

8. EXPOSURE CONTROLS/PERSONAL PROTECTION					
Component	ACGIH TLV	OSHA PEL	Ontario TWAEV	Mexico OEL (TWA)	NIOSH IDLH
Sodium Nitrite				TWA: 2 mg/m <sup>3</sup>	
<b>Engineering Measures</b>	Use local exhaust to keep airborne concentrations below the permissible exposure limits.				
<b>Personal Protective Equipment</b>					
<b>Eye/Face Protection</b>	Wear chemical safety goggles. Do not wear contact lenses.				
<b>Skin Protection</b>	Wear appropriate personal protective clothing to prevent skin contact. If prolonged or repeated contact is anticipated, all clothing should be impervious to liquid.				
<b>Respiratory Protection</b>	A respiratory protection program that meets OSHA 1910.134 and ANSI Z88.2 or applicable federal/provincial requirements must be followed whenever workplace conditions warrant respirator use. NIOSH's "Respirator Decision Logic" may be useful in determining the suitability of various types of respirators.				
<b>General Hygiene Considerations</b>	To identify additional Personal Protective Equipment (PPE) requirements, it is recommended that a hazard assessment in accordance with the OSHA PPE Standard (29 CFR 1910.132) be conducted before using this product. Eyewash and safety showers are recommended.				
9. PHYSICAL AND CHEMICAL PROPERTIES					
<b>Appearance</b>	Crystals				
<b>Color</b>	White to slightly yellow				
<b>Chemical Formula</b>	NaNO <sub>2</sub>				
<b>Odor</b>	None				
<b>Odor Threshold</b>	No information available				
<b>Physical State</b>	Solid				
<b>pH</b>	~9.0 (for aqueous solution)				
<b>Flash Point</b>	Not flammable				
<b>Autoignition Temperature</b>	Not applicable				
<b>Boiling Point/Range</b>	Decomposes above 608°F				
<b>Melting Point/Range</b>	520°F				
<b>Flammability Limits in Air</b>	No information available				
<b>Explosive Properties</b>	No information available				
<b>Oxidizing Properties</b>	No information available				
<b>Evaporation Rate</b>	Not determined				
<b>Vapor Pressure</b>	Not applicable				
<b>Vapor Density</b>	Not applicable				
<b>Specific Gravity</b>	2.17				
<b>Partition Coefficient (n-octano/water)</b>	No information available				
<b>Viscosity</b>	No information available				
<b>Molecular Weight</b>	69.0				
<b>Water Solubility</b>	80.8 g/100 g at 68°F				
<b>VOC Content (%)</b>	0				

## SODIUM NITRITE

10. STABILITY AND REACTIVITY				
<b>Chemical Stability</b>	Normally stable.			
<b>Conditions to Avoid</b>	Material slowly oxidizes to sodium nitrate when exposed to air. Avoid heat, flame, ignition sources, shock, friction and incompatibilities.			
<b>Incompatible Products</b>	Hazardous reactions can occur with acids, ammonium compounds, reducing agents (particularly cyanides, thiocyanates and thiosulfates). May ignite organic compounds and other combustible materials.			
<b>Hazardous Decomposition Products</b>	Oxides of nitrogen (toxic and irritating)			
<b>Possibility of Hazardous Reactions</b>	Will not occur.			
11. TOXICOLOGICAL INFORMATION				
<b>Acute Toxicity</b>				
<b>Component Information</b>				
<b>Component</b>	<b>LD50 Oral</b>	<b>LD50 Dermal</b>	<b>LC50 Inhalation</b>	
Sodium nitrite	88 mg/kg (rat)		5.5 mg/m <sup>3</sup> /4hr (rat)	
<b>Irritation</b>	No information available			
<b>Corrosivity</b>	No information available			
<b>Sensitization</b>	No information available			
<b>Chronic Toxicity</b>				
<b>Carcinogenicity</b>	There are no known carcinogenic chemicals in this product.			
<b>Mutagenic Effects</b>	No information available			
<b>Reproductive Effects</b>	No information available			
<b>Developmental Effects</b>	No information available			
<b>Teratogenicty</b>	Multiple reproductive tests indicate that sodium nitrite is not teratogenic.			
<b>Target Organ Effects</b>	No information available			
<b>Other Adverse Effects</b>	Fetal toxicity has been demonstrated in pregnant animals fed toxic doses of sodium nitrite. This is due to the formation of methemoglobin.			
<b>Endocrine Disruptor Information</b>	No information available			
12. ECOLOGICAL INFORMATION				
<b>Ecotoxicity</b>				
Contains no substances known to be hazardous to the environment or not degradable in waste water treatment plants.				
<b>Component</b>	<b>Freshwater Algae</b>	<b>Freshwater Fish</b>	<b>Microtox</b>	<b>Water Flea</b>
Sodium nitrite		LC50 = 0.19 mg/L Oncorhynchus mykiss 96 h		
<b>Persistence and Degradability</b>	No information available			
<b>Bioaccumulation</b>	No information available			
<b>Mobility in Environmental Media</b>	No information available			
<b>Component</b>	<b>Log Pow</b>			
Sodium nitrite	-3.7			
13. DISPOSAL CONSIDERATIONS				
<b>Waste Disposal Methods</b>	Dispose of waste in accordance with all federal, state, and local regulations.			
<b>Contaminated Packaging</b>	Empty containers should be taken for local recycling, recovery or waste disposal.			

## SODIUM NITRITE

14. TRANSPORT INFORMATION				
<b>DOT</b>	Regulated			
Proper Shipping Name	Sodium nitrite			
Hazard Class	5.1			
Subsidiary Hazard Class	6.1			
UN-No	UN1500			
Packing Group	PGIII			
<b>TDG</b>	Regulated			
Hazard Class	5.1			
Subsidiary Hazard Class	6.1			
UN-No	UN1500			
Packing Group	PGIII			
<b>IMDG</b>	Product is a marine pollutant if shipped overseas			
15. REGULATORY INFORMATION				
<b>International Inventories</b>				
TSCA	Yes			
DSL	Yes			
ELINCS	No			
EINECS	Yes			
ENCS	Yes			
CHIINA	Yes			
KECL	Yes			
PICCS	Yes			
AICS	Yes			
<b>U.S. Federal Regulations</b>				
<b>SARA 313</b>				
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains the following chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372:				
<b>Component</b>	<b>CAS-No</b>	<b>Weight %</b>	<b>SARA 13 - Threshold Values</b>	
Sodium nitrite	7632-00-0	>98	1.0	
<b>SARA 311/312 Hazardous Categorization</b>				
Chronic Health Hazard	No			
Acute Health Hazard	Yes			
Fire Hazard	No			
Sudden Release of Pressure Hazard	No			
Reactive Hazard	Yes			
<b>Clean Water Act</b>				
<b>Component</b>	<b>CWA – Reportable Quantities</b>	<b>CWA – Toxic Pollutants</b>	<b>CWA – Priority Pollutants</b>	<b>CWA – Hazardous Substances</b>
Sodium nitrite	100 lb			X
<b>CERCLA</b>				
<b>Component</b>	<b>CERCLA RQ (lb)</b>	<b>SARA TPQ (lb)</b>		
Sodium nitrite	100 lb			
<b>U.S. State Regulations</b>				
<b>California Proposition 65</b>				
This product does not contain any Proposition 65 chemicals.				

## SODIUM NITRITE

<b>State Right-to-Know</b>					
<b>Component</b>	<b>Massachusetts</b>	<b>New Jersey</b>	<b>Pennsylvania</b>	<b>Illinois</b>	<b>Rhode Island</b>
Sodium nitrite	X	X	X		
<b>Other International Regulations</b>					
Mexico	No information available				
Canada	This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.				
<b>WHMIS Hazard Class</b>					
C Oxidizing materials					
D1B Toxic materials					
D2B Toxic materials					
<b>16. OTHER INFORMATION</b>					
Current Issue Date:	May 16, 2013				
Previous Issue Date:	November 26, 2012				
Revision Summary:	Change to section 1				
<b>Disclaimer:</b> <i>All information, statements, data, service and/or recommendations, including, without limitation, those relating to storage, loading/unloading, piping and transportation (collectively referred to herein as "information") are believed to be accurate and reliable. However, no representation or warranty, express or implied, is made as to its completeness, accuracy, fitness for a particular purpose or any other matter, including, without limitation, that the practice or application of any such information is free of patent infringement or other intellectual property misappropriation. General Chemical, LLC is not engaged in the business of providing technical, operational, engineering or safety information for a fee, and therefore; any such information provided herein has been furnished as an accommodation and without charge. All information provided herein is intended for use by persons having requisite knowledge, skill and experience in the chemical industry. General Chemical, LLC shall not be responsible or liable for the use, application or implementation of the information, provided herein, and all such information is to be used at the risk, and in the sole judgment and discretion, of such persons, their employees, advisors and agents.</i>					
End of MSDS					

**4. FIRST AID MEASURES**

- INHALATION:** If inhaled, immediately move to fresh air. If not breathing, give artificial respiration. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; use the Holger Nielsen method (back pressure-arm lift) or proper respiratory device. If breathing is difficult, give oxygen. Call a physician.
- EYE CONTACT:** In case of contact, immediately flush eyes with plenty of clean running water for at least 15 minutes, lifting the upper and lower lids occasionally. Remove contact lenses, if worn. Get medical attention immediately.
- SKIN CONTACT:** In case of contact, immediately flush skin with plenty of clean running water for at least 15 minutes, while removing contaminated clothing and shoes. If burn or irritation occurs, call a physician.
- INGESTION:** If swallowed, DO NOT induce vomiting. Get medical attention immediately. If victim is fully conscious, give plenty of water to drink. Never give anything by mouth to an unconscious person.
- NOTE TO PHYSICIANS:** Sodium Hydroxide has a relatively low oral toxicity, but it can be corrosive to the eyes, skin and mucous membranes. If ingested, consideration should be given to careful endoscopy as stomach or esophageal burns, perforations or strictures may occur. Careful gastric lavage with an endotracheal tube in place should be considered. Treat exposure symptomatically.

**5. FIRE FIGHTING MEASURES**

- Flashpoint and Method:** This material does not flash.
- Flammable Limits (in air, % by volume)**    **Lower:** Not applicable                      **Upper:** Not applicable
- Autoignition Temperature:** Not applicable
- GENERAL HAZARD:** The Uniform Fire Code physical hazard classification for this material is: **Water Reactive, Class I**. Direct contact with water causes an exothermic reaction (generation of heat). The Uniform Fire Code health hazard classification for this material is: **Corrosive (Alkaline)**. This material may generate flammable / explosive Hydrogen gas on contact with some soft metals (i.e. Aluminum). This material may produce hazardous decomposition products.
- FIRE FIGHTING INSTRUCTIONS:**                      **EXTINGUISHING MEDIA:** Foam, CO<sub>2</sub> or dry chemicals.  
If water must be used and it can contact this material, it is best to use a water flood technique.
- FIRE FIGHTING EQUIPMENT:** Fire fighters should wear full protective equipment, including self-contained breathing apparatus.
- HAZARDOUS COMBUSTION PRODUCTS:** When heated to dryness and decomposition, it emits toxic sodium oxide.

**6. ACCIDENTAL RELEASE MEASURES**

- LAND SPILL:** Wearing recommended protective equipment and clothing, dike the spill and pick up the bulk of liquid using pumps or a vacuum truck, or absorb the liquid in sand or a commercial absorbent. Place in approved containers for recovery, disposal, or satellite accumulation. Neutralize the alkalinity, of the remaining liquid, using a dilute acid solution appropriate for neutralizing alkaline liquids. Liberally cover the spill area with sodium bicarbonate. Flush the spill area with water; collect the rinsates for disposal or sewer, as appropriate.
- WATER SPILL:** Wear recommended protective equipment and clothing if contact with hazardous material can occur. Stop or divert water flow. Dike contaminated water and remove for disposal and/or treatment. As appropriate, notify all downstream users of possible contamination.

**7. HANDLING AND STORAGE****STORAGE TEMPERATURE:** Ambient**STORAGE PRESSURE:** Ambient

**GENERAL:** Store in a cool, dry, well-ventilated area away from incompatible materials and products. Do not get this material in eyes, on skin or on clothing. Wear recommended personnel protective equipment. Do not breathe mists or aerosols. Use only with adequate ventilation. Do not take internally. Keep the container tightly closed when not in use. Wash thoroughly after handling.

This material is corrosive to Aluminum, Magnesium, Tin, Zinc and alloys containing these metals, and it will react violently with these metals in powder form.

Considerable heat is generated when this material is mixed with water. Never add water to this material. Always add this material slowly, with constant stirring, to the surface of cool (40 – 50° F.) water. If this material is added too rapidly, or without stirring, and becomes concentrated at the bottom of the mixing vessel, excessive heat may be generated, resulting in dangerous boiling and spattering, and a possible immediate and violent eruption of a highly caustic solution.

**8. EXPOSURE CONTROLS / PERSONAL PROTECTION**

**CONTROL MEASURES:** Use a local or general, mechanical exhaust ventilation system capable of maintaining emissions, in the work area, below the OSHA-PEL or ACGIH Ceiling level.

**RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT**

**RESPIRATOR:** For exposure above the OSHA-PEL or ACGIH-TLV, wear a NIOSH-approved full facepiece or half mask air-purifying cartridge respirator equipped with a good particulate filter cartridge or supplied air. For exposure to Sodium Hydroxide above 10 mg/m<sup>3</sup>, wear a supplied air respirator or a self-contained breathing apparatus (SCBA) operated in the positive pressure mode.

**EYES:** Wear chemical goggles (recommended by ANSI Z87.1-1979), unless a full facepiece respirator is worn.

**GLOVES:** Wear Neoprene, Nitrile, Butyl Rubber or Natural Rubber gloves.

**CLOTHING & EQUIPMENT:** Wear a Neoprene, Nitrile, Butyl Rubber or Natural Rubber apron, or full protective clothing when handling this material. An eye wash station and safety shower should be available in the work area.

**FOOTWEAR:** Wear Neoprene, Nitrile, Butyl Rubber or Natural Rubber boots.

**9. PHYSICAL AND CHEMICAL PROPERTIES**

<b>Appearance:</b>	Clear to slightly turbid, colorless	<b>Bulk Density (pounds/ft<sup>3</sup>):</b>	Not applicable
<b>Physical State:</b>	Liquid	<b>Vapor Pressure:</b>	13 mm Hg @ 60° F.
<b>Odor:</b>	No characteristic	<b>Vapor Density (air=1):</b>	No data available
<b>Odor Threshold:</b>	No data available	<b>Evaporation Rate (n-Butyl Acetate=1):</b>	No data available
<b>Molecular Formula:</b>	NaOH (in water)	<b>VOC Content:</b>	Nil
<b>Molecular Weight:</b>	40.00 (in water)	<b>% Volatile:</b>	49 – 51
<b>Boiling Point:</b>	Approximately 142.2° C. (288° F.)	<b>Solubility in H<sub>2</sub>O:</b>	Complete
<b>Freezing/Melting Point:</b>	Approximately 12.2° C. (54° F.)	<b>Octanol/Water Partition Coefficient:</b>	No data available
<b>Specific Gravity:</b>	Approximately 1.525 @ 20° C.	<b>pH (as is):</b>	14.0
<b>Density (pounds/gallon):</b>	Approximately 12.72	<b>pH (1% solution):</b>	13.0 to 14.0

**10. STABILITY AND REACTIVITY**

**GENERAL:** This product is stable and hazardous polymerization will not occur.

**CONDITIONS TO AVOID:** Avoid contact with small amounts of water.

**INCOMPATIBLE MATERIAL:** Acids and acidic salts, chlorinated or fluorinated hydrocarbons, Acetaldehyde, Acrolein, Chlorine trifluoride, Hydroquinone, Maleic anhydride, Phosphorus pentoxide, Tetrahydrofuran, Aluminum, Magnesium, Tin, Zinc and alloys of these metals.

**HAZARDOUS DECOMPOSITION PRODUCTS:** When heated to decomposition, it emits toxic oxides of sodium.

**SENSITIVITY TO MECHANICAL IMPACT:** This material is not sensitive to mechanical impact.

**SENSITIVITY TO STATIC DISCHARGE:** This material is not sensitive to static discharge.

**11. TOXICOLOGICAL INFORMATION**

<b>Components:</b>	<b>Sodium Hydroxide</b>
<b>Eye Contact:</b>	Rabbit: 50 ug/24 hours; Severe
<b>Skin Contact:</b>	Rabbit: 500 mg/24 hours; Severe
<b>Oral Rat LD<sub>50</sub>:</b>	No data available (Oral Rabbit LD <sub>50</sub> : 500 mg/kg)
<b>Dermal Rabbit LD<sub>50</sub>:</b>	1,350 mg/kg
<b>Inhalation Rat LC<sub>50</sub>:</b>	No data available
<b>Human Data:</b>	No data available
<b>Other Toxicological Data:</b>	Intraperitoneal Mouse LD <sub>50</sub> : 40 mg/kg
<b>Carcinogenicity:</b>	No data available
<b>Teratogenicity:</b>	No data available
<b>Mutagenicity:</b>	Hamster Cytogenetic Analysis; Lung: 10 mmol/Liter
<b>Synergistic Products:</b>	None reported
<b>Target Organs:</b>	Eyes, Skin, Mucous membranes & Lungs
<b>Medical Conditions</b>	
<b>Aggravated By Exposure:</b>	Skin or Respiratory disorders

**12. ECOLOGICAL INFORMATION****ENVIRONMENTAL FATE:**

This material is completely soluble in water and will significantly affect the pH of water. No specific environmental fate information is available.

**ENVIRONMENTAL CONSIDERATIONS:**

The aquatic toxicity for this material has not been determined. The aquatic toxicity for pure Sodium Hydroxide is: *Cyprinus carpio* LC<sub>100</sub> = 180 ppm/24 hours at 25° C.

**13. DISPOSAL CONSIDERATIONS**

**RCRA 40 CFR 261 CLASSIFICATION:** Corrosive Waste

**U.S. EPA WASTE NUMBER/DESCRIPTION:** D002

If this product is disposed of as shipped, it meets the criteria of a hazardous waste as defined under 40 CFR 261 due to its corrosivity. If this product becomes a waste, it will be a hazardous waste, which is subject to the Land Disposal Restrictions under 40 CFR 268 and must be managed accordingly. As a hazardous liquid waste, it must be disposed of in accordance with local, state, and federal regulations in a permitted hazardous waste treatment, storage, and disposal facility.

**14. TRANSPORTATION INFORMATION**

**DOT PROPER SHIPPING NAME:** Sodium hydroxide solution

**Hazard Class:** 8

**UN Number:** UN1824

**Packing Group:** II

**Primary Label:** Corrosive

**Subsidiary Label(s):** None Required

**Primary/Subsidiary Placards:** Corrosive

**DOT Reportable Quantity (RQ):** 1,000 pounds (NaOH)

**RQ for Product:** 2,000 pounds (157.2 gallons)

**Marine Pollutant:** No

**2004 North American Emergency Response Guidebook No.:** 154

**TDG PROPER SHIPPING NAME:** SODIUM HYDROXIDE SOLUTION

**Hazard Class:** 8

**UN Number:** UN1824

**Packing Group:** II

**Primary Label:** Corrosive

**Subsidiary Label(s):** None Required

**Primary/Subsidiary Placards:** Corrosive

**TDG Reportable Quantity (RQ):<sup>#</sup>** At least 5kg or 5 liters.

**TDG Schedule XII:** Not listed

**Regulated Limit (RL):<sup>##</sup>** 50 kg (NaOH)

**RL for Product:** 100 kg (65.6 liters)

**Other Shipping Information:** None

<sup>#</sup> Canadian Transportation of Dangerous Goods Regulations (TDGR), Part IX, Table I, Quantities or levels for Immediate Reporting: releases of reportable quantities, RQ, that meet the definition of a "dangerous occurrence" (a threat to life, health, property, or the environment) must be reported to the appropriate authorities as outlined in TDGR 9.13(1) and 9.14(1).

<sup>##</sup> Reporting to Environment Canada is required for any releases exceeding the regulated limits, RL, of 9.2 materials (primary or secondary). The regulated limits are found in Schedule XIII of the TDGR.

**15. REGULATORY INFORMATION**

**COMPONENTS:** Sodium Hydroxide  
**OSHA Target Organs:** Eyes, Skin, Mucous membranes & Lungs

**Carcinogenic Potential:**

**Regulated by OSHA:** No  
**Listed on NTP Report:** No  
**Listed by IARC:** No  
 IARC Group: Not applicable  
**ACGIH Appendix A:** Not listed  
 A1 Confirmed Human: Not applicable  
 A2 Suspected Human: Not applicable

**U.S. EPA Requirements****Release Reporting****CERCLA (40 CFR 302)**

**Listed Substance:** Yes  
 Reportable Quantity: 1,000 pounds  
 Category: C  
 RCRA Waste No.: None listed  
**Unlisted Substance:** Not applicable  
 Reportable Quantity: Not applicable  
 Characteristic: Not applicable  
 RCRA Waste No.: Not applicable

**SARA TITLE III****Section 302 & 303 (40 CFR 355):**

**Listed Substance:** Not listed  
 Reportable Quantity: Not applicable  
 Planning Threshold: Not applicable

**Section 311 & 312 (40 CFR 370):**

Hazard Categories (product): Fire: N Sudden Release of Pressure: N Reactive: N Acute Health: Y Chronic Health: N  
 Planning threshold: 10,000 pounds

**Section 313 (40 CFR 372):**

**Listed Toxic Chemical:** Not listed  
 Reporting Threshold: Not applicable

**U.S. TSCA Status**

**Listed (40 CFR 710):** Yes

**State Regulations****State of California: Safe Drinking Water and Toxins Enforcement Act, 1986 (Proposition 65):**

Carcinogen: No  
 Reproductive Toxin: No

**Other Regulations**

**State Right To Know Laws:** MA, NJ, PA, CA

**Canadian Regulations****Product Information:**

Controlled Product: **Yes**  
 WHMIS Hazard Symbols: **Corrosive Material**  
 WHMIS Class & Division: **E**

**Ingredient Information:**

IDL Substance: Yes  
 DSL or NDSL Lists: DSL

**16. OTHER INFORMATION**

EPA Registration number: Not applicable

Approved Product Uses: Not applicable

**Special Notes:**

This product does not contain any material, which the State of California has found to cause cancer and/or birth defects or other reproductive harm.

**NOTE:** Deadly carbon monoxide gas can form when this material contacts food soil containing sugars. After cleaning operations are completed, thoroughly ventilate enclosed areas before entering. Always monitor oxygen and carbon monoxide levels when personnel are in enclosed areas. For proper tank entry procedures, see ANSI Z117.1-1977.

**Special Instructions:**

When making solutions, always add this material to cool (40 – 50° F.) water with adequate mixing to prevent overheating and possible spattering of a highly alkaline solution.

Do not allow this product to contact Aluminum, Magnesium, Tin or Zinc surfaces as this causes corrosion of the metal and generation of flammable / explosive Hydrogen gas.

**MSDS Revision Information:** Information Revised This Issue Date: **New product MSDS.**

Form Revision made 2/03/06

MSDS Distributed by: Brenntag Pacific, Inc.

NW Environmental Department

Phone: 503-242-0200 FAX: 503-412-3390

Prepared By: Edward Doheny

Date Prepared: July 31, 2007

This Material Safety Data Sheet is provided as an information resource only. It should not be taken as a warranty or representation for which Brenntag Pacific, Inc. assumes legal responsibility. While Brenntag Pacific, Inc. believes the information contained herein is accurate and compiled from sources believed to be reliable, it is the responsibility of the user to investigate and verify its validity. The buyer assumes all responsibility of using and handling the product in accordance with applicable federal, state, and local regulations.

#### 4. FIRST AID MEASURES

<b>Inhalation:</b>	If mist or vapor of this product is inhaled, remove person immediately to fresh air. Seek medical attention if symptoms develop or persist.
<b>Skin contact:</b>	For skin contact flush with large amounts of water. Obtain medical attention if irritation persists.
<b>Eye contact:</b>	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
<b>Ingestion:</b>	Seek medical advice. DO NOT induce vomiting unless directed to do so by medical personnel.
<b>Notes to physician:</b>	In the treatment of ethylene glycol overdose, ethanol competitively inhibits alcohol dehydrogenase (ADH) and prevents the formation of toxic metabolites. The affinity of ethylene glycol for ADH appears to be similar to ethanol. Ethanol should be administered only by qualified medical personnel.

#### 5. FIRE FIGHTING MEASURES

<b>Flash point:</b>	Not applicable
<b>Flashback:</b>	Not applicable
<b>Flame projection:</b>	Not applicable
<b>Autoignition temperature:</b>	Not determined
<b>Flammable/Explosive limits - lower:</b>	Not determined
<b>Flammable/Explosive limits - upper:</b>	Not determined
<b>Extinguishing media:</b>	Water spray (fog), foam, dry chemical or carbon dioxide.
<b>Special firefighting procedures:</b>	Wear full protective clothing. Wear self-contained breathing apparatus.
<b>Unusual fire or explosion hazards:</b>	This product is an aqueous mixture which will not burn.
<b>Hazardous combustion products:</b>	Irritating and toxic gases or fumes may be released during a fire.

#### 6. ACCIDENTAL RELEASE MEASURES

Use personal protection recommended in Section 8, isolate the hazard area and deny entry to unnecessary and unprotected personnel.

<b>Environmental precautions:</b>	Prevent further leakage or spillage if safe to do so. Wear appropriate protective equipment and clothing during clean-up. Do not allow product to enter sewer or waterways.
<b>Clean-up methods:</b>	Absorb spill with inert material. Shovel material into appropriate container for disposal.

#### 7. HANDLING AND STORAGE

<b>Handling:</b>	Prevent contact with eyes, skin and clothing. Do not breathe vapor and mist. Wash thoroughly after handling. Do not take internally. For industrial use only. Launder work clothes frequently.
<b>Storage:</b>	For safe storage, store between -10 °C (14°F) and 40 °C (104°F) Keep container tightly closed and in a cool, well-ventilated place away from incompatible materials. Thaw and mix thoroughly if frozen.

For information on product shelf life, please review labels on container or check the Technical Data Sheet.

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Employers should complete an assessment of all workplaces to determine the need for, and selection of, proper exposure controls and protective equipment for each task performed.

Hazardous components	ACGIH TLV	OSHA PEL	AIHA WEEL	OTHER
Poly(ethylene glycol)	None	None	10 mg/m <sup>3</sup> TWA Particulate.	None
Ethylene glycol	100 mg/m <sup>3</sup> Ceiling Aerosol.	None	None	None
1,3-Diethyl-2-thiourea	None	None	None	None
Ethoxylated Propoxylated alcohol	None	None	None	None
quinolinium chloride	None	None	0.001 ppm (0.005 mg/m <sup>3</sup> ) TWA (SKIN)	None

<b>Engineering controls:</b>	Provide local and general exhaust ventilation to effectively remove and prevent buildup of any vapors or mists generated from the handling of this product.
<b>Respiratory protection:</b>	If ventilation is not sufficient to effectively prevent buildup of aerosols, mists or vapors, appropriate NIOSH/MSHA respiratory protection must be provided.
<b>Eye/face protection:</b>	Wear chemical goggles; face shield (if splashing is possible).
<b>Skin protection:</b>	Wear impervious gloves for prolonged contact. Use of impervious apron and boots are recommended.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Physical state:</b>	Liquid
<b>Color:</b>	Light amber
<b>Odor:</b>	Aromatic
<b>Odor threshold:</b>	Not available
<b>pH:</b>	3.8 - 4.2 (10% solution)
<b>Vapor pressure:</b>	17 mbar
<b>Boiling point/range:</b>	103.2 °C (217.8 °F)
<b>Melting point/ range:</b>	-20 °C (-4°F)
<b>Specific gravity:</b>	1.09 - 1.11 at 20 °C (68°F)
<b>Vapor density:</b>	Not available
<b>Flash point:</b>	Not applicable
<b>Flashback:</b>	Not applicable
<b>Flame projection:</b>	Not applicable
<b>Flammable/Explosive limits - lower:</b>	Not determined
<b>Flammable/Explosive limits - upper:</b>	Not determined
<b>Autoignition temperature:</b>	Not determined
<b>Evaporation rate:</b>	Not available
<b>Solubility in water:</b>	Complete
<b>Partition coefficient (n-octanol/water):</b>	Not determined
<b>VOC content:</b>	Not available

## 10. STABILITY AND REACTIVITY

<b>Stability:</b>	Stable at normal conditions.
<b>Hazardous reactions:</b>	Will not occur.
<b>Hazardous decomposition products:</b>	Upon decomposition, this product emits carbon monoxide, carbon dioxide and/or low molecular weight hydrocarbons.
<b>Incompatible materials:</b>	This product may react with strong alkalis.
<b>Conditions to avoid:</b>	None identified.

## 11. TOXICOLOGICAL INFORMATION

Hazardous components	NTP Carcinogen	IARC Carcinogen	OSHA Carcinogen (Specifically Regulated)
Poly(ethylene glycol)	No	No	No
Ethylene glycol	No	No	No
1,3-Diethyl-2-thiourea	No	No	No
Ethoxylated Propoxylated alcohol	No	No	No
quinolinium chloride	No	No	No

Hazardous components	Health Effects/Target Organs
Poly(ethylene glycol)	Irritant
Ethylene glycol	Blood, Bone Marrow, Central nervous system, Developmental, Eyes, Irritant, Kidney, Liver, Metabolic
1,3-Diethyl-2-thiourea	Irritant, Allergen
Ethoxylated Propoxylated alcohol	Irritant, Allergen
quinolinium chloride	No Data

## 12. ECOLOGICAL INFORMATION

Ecological information: Not available

## 13. DISPOSAL CONSIDERATIONS

Information provided is for unused product only.

**Recommended method of disposal:** Dispose of according to Federal, State and local governmental regulations.

**Hazardous waste number:** Material, if discarded, is not expected to be a characteristic hazardous waste under RCRA. Wastes must be tested using methods described in 40 CFR Part 261 to determine if it meets applicable definitions of hazardous wastes.

## 14. TRANSPORT INFORMATION

### U.S. Department of Transportation Ground (49 CFR)

**Proper shipping name:** Not regulated  
**Hazard class or division:** None  
**Identification number:** None  
**Packing group:** None

### International Air Transportation (ICAO/IATA)

**Proper shipping name:** Not regulated  
**Hazard class or division:** None  
**Identification number:** None  
**Packing group:** None

### Water Transportation (IMO/IMDG)

**Proper shipping name:** Not regulated  
**Hazard class or division:** None  
**Identification number:** None  
**Packing group:** None

## 15. REGULATORY INFORMATION

### United States Regulatory Information

**TSCA 8 (b) Inventory Status:** All components are listed or are exempt from listing on the Toxic Substances Control Act Inventory.  
**TSCA 12(b) Export Notification:** None above reporting de minimus  
**CERCLA/SARA Section 302 EHS:** None above reporting de minimus  
**CERCLA/SARA Section 311/312:** Immediate Health, Delayed Health

**CERCLA/SARA 313:** This product contains the following toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 (40 CFR 372). Ethylene glycol (CAS# 107-21-1).

**California Proposition 65:** This product contains a chemical known in the State of California to cause cancer. This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

**Canada Regulatory Information**

**CEPA DSL/NDSL Status:** Contains one or more components listed on the Non-Domestic Substances List. All other components are listed on or are exempt from listing on the Domestic Substances List. Components listed on the NDSL must be tracked by all Canadian Importers of Record as required by Environment Canada. They may be imported into Canada in limited quantities. Please contact Regulatory Affairs for additional details.

**WHMIS hazard class:** D.2.A

**16. OTHER INFORMATION**

**This material safety data sheet contains changes from the previous version in sections:** Updated composition in Section 3.

**Prepared by:** John DiCerbo, Regulatory Affairs Specialist

**DISCLAIMER:** The data contained herein are furnished for information only and are believed to be reliable. However, Henkel Corporation does not assume responsibility for any results obtained by persons over whose methods Henkel Corporation has no control. It is the user's responsibility to determine the suitability of Henkel's products or any production methods mentioned herein for a particular purpose, and to adopt such precautions as may be advisable for the protection of property and persons against any hazards that may be involved in the handling and use of any of Henkel Corporation's products. In light of the foregoing, Henkel Corporation specifically disclaims all warranties, express or implied, including warranties of merchantability and fitness for a particular purpose, arising from sale or use of Henkel Corporation's products. Henkel Corporation further disclaims any liability for consequential or incidental damages of any kind, including lost profits.

PRODUCT IDENTIFIER: Citric Acid 50% Solution (All Grades)

page 2 of 6

**4. FIRST AID MEASURES**

- INHALATION:** If inhaled, immediately move to fresh air. If not breathing, give artificial respiration. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; use the Holger Nielsen method (back pressure-arm lift) or proper respiratory device. If breathing is difficult, give oxygen. Call a physician.
- EYE CONTACT:** In case of contact, immediately flush eyes with plenty of clean running water for at least 15 minutes, lifting the upper and lower lids occasionally. Remove contact lenses, if worn. Get medical attention immediately.
- SKIN CONTACT:** In case of contact, immediately flush skin with plenty of clean running water for at least 15 minutes, while removing contaminated clothing and shoes. Then wash with soap and water. If burn or irritation occurs, call a physician.
- INGESTION:** If swallowed, DO NOT induce vomiting. Get medical attention immediately. If victim is fully conscious, give plenty of water to drink. Never give anything by mouth to an unconscious person.
- NOTE TO PHYSICIANS:** Treat exposure symptomatically.

**5. FIRE FIGHTING MEASURES**

- Flashpoint and Method:** This product does not flash.
- Flammable Limits (in air, % by volume) Lower:** Not applicable **Upper:** Not applicable
- Autoignition Temperature:** Not applicable
- GENERAL HAZARD:** This product is an aqueous solution of a non-volatile organic acid having no characteristic odor. The Uniform Fire Code health hazard classification for this product is: **Irritant**. When in contact with some soft metals (i.e. Aluminum), this product can corrode the metal, liberating flammable / explosive Hydrogen gas. This product may produce hazardous mists or hazardous decomposition products.
- FIRE FIGHTING INSTRUCTIONS:** **EXTINGUISHING MEDIA:** Water fog, CO<sub>2</sub> foam or dry chemicals.  
Use the extinguishing media that is appropriate to the surrounding fire.
- FIRE FIGHTING EQUIPMENT:** Fire fighters should wear full protective equipment, including self-contained breathing apparatus.
- HAZARDOUS COMBUSTION PRODUCTS:** When heated to dryness and decomposition, it emits toxic carbon monoxide and carbon dioxide plus dense, irritating smoke.

**6. ACCIDENTAL RELEASE MEASURES**

- LAND SPILL:** Wearing recommended protective equipment and clothing, dike spill using soil, sand or compatible commercial absorbent. Pick up bulk of liquid using pumps or vacuum truck or absorb liquid in sand or commercial absorbent. Place in approved containers for recovery, disposal or satellite accumulation. Neutralize the acidity using soda ash, lime or a suitable agent appropriate for neutralizing acidic liquids. Flush the spill area with water; collect rinsates for disposal or sewer, as appropriate.
- WATER SPILL:** Wear recommended protective equipment and clothing if contact with hazardous material can occur. Stop or divert water flow. Dike contaminated water and remove for disposal and/or treatment. As appropriate, notify all downstream users of possible contamination.

PRODUCT IDENTIFIER: Citric Acid 50% Solution (All Grades)

page 3 of 6

**7. HANDLING AND STORAGE****STORAGE TEMPERATURE:** Ambient**STORAGE PRESSURE:** Ambient

**GENERAL:** Store in a cool, dry, well-ventilated area away from incompatible materials and products. Avoid getting this product in eyes, on skin or on clothing. Wear the recommended personnel protective equipment. Avoid breathing mists or aerosols. Use with adequate ventilation. Keep the container tightly closed when not in use. Wash thoroughly after handling this product.

**8. EXPOSURE CONTROLS / PERSONAL PROTECTION**

**CONTROL MEASURES:** Use a local or general, mechanical exhaust ventilation system capable of maintaining mist levels, in the work area, below any level, which may be irritating.

**RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT**

**RESPIRATOR:** If use causes an irritating mist, wear a NIOSH-approved respirator equipped with a good mist / particulate cartridge or supplied air.

**EYES:** Wear chemical goggles (recommended by ANSI Z87.1-1979).

**GLOVES:** Wear Nitrile, Neoprene, Butyl Rubber, Viton or Natural Rubber gloves.

**CLOTHING & EQUIPMENT:** Wear a Nitrile, Neoprene, Butyl Rubber or Natural Rubber apron when handling this product. An eye wash station and safety shower should be available in the work area.

**FOOTWEAR:** Wear Nitrile, Neoprene, Butyl Rubber or Natural Rubber boots, if contact is likely.

**9. PHYSICAL AND CHEMICAL PROPERTIES**

<b>Appearance:</b>	Clear, colorless to light yellow	<b>Bulk Density (pounds/ft<sup>3</sup>):</b>	Not applicable
<b>Physical State:</b>	Liquid	<b>Vapor Pressure:</b>	No data available
<b>Odor:</b>	No characteristic	<b>Vapor Density (air=1):</b>	No data available
<b>Odor Threshold:</b>	No data available	<b>Evaporation Rate (n-Butyl Acetate=1):</b>	No data available
<b>Molecular Formula:</b>	C <sub>6</sub> H <sub>8</sub> O <sub>7</sub> (in water)	<b>VOC Content:</b>	Not applicable
<b>Molecular Weight:</b>	192.14 (in water)	<b>% Volatile:</b>	Approximately 50
<b>Boiling Point:</b>	Approximately 104° C. (219° F.)	<b>Solubility in H<sub>2</sub>O:</b>	Complete
<b>Freezing/Melting Point:</b>	Less than 0° C. (32° F.)	<b>Octanol/Water Partition Coefficient:</b>	No data available
<b>Specific Gravity:</b>	Approximately 1.22 @ 20° C.	<b>pH (as is):</b>	1.5 – 2.0
<b>Density (pounds/gallon):</b>	Approximately 10.2	<b>pH (1% solution):</b>	2.0 – 2.5

**10. STABILITY AND REACTIVITY**

**GENERAL:** This product is stable and hazardous polymerization will not occur.

**CONDITIONS TO AVOID:** Hot storage.

**INCOMPATIBLE MATERIAL:** Strong oxidizers, caustics & alkali, chlorine releasers, sulfides, sulfites, cyanides, Aluminum, Magnesium, Zinc and alloys of these metals.

**HAZARDOUS DECOMPOSITION PRODUCTS:** When heated to dryness and decomposition, it emits toxic oxides of carbon plus dense, irritating smoke.

**SENSITIVITY TO MECHANICAL IMPACT:** This product is not sensitive to mechanical impact.

**SENSITIVITY TO STATIC DISCHARGE:** This product is not sensitive to static discharge.

PRODUCT IDENTIFIER: Citric Acid 50% Solution (All Grades)

page 4 of 6

**11. TOXICOLOGICAL INFORMATION**

**Components:** Citric Acid  
**Eye Contact:** Rabbit: 750 ug/24 Hours; Severe  
**Skin Contact:** Rabbit: 500 mg/24 Hours; Moderate  
**Oral Rat LD<sub>50</sub>:** 3 gm/kg  
**Dermal Rabbit LD<sub>50</sub>:** No data available  
**Inhalation Rat LC<sub>50</sub>:** No data available  
**Human Data:** No data available  
**Other Toxicological Data:** Intravenous Mouse LD<sub>50</sub>: 42 mg/kg  
**Carcinogenicity:** No data available  
**Teratogenicity:** No data available  
**Mutagenicity:** No data available  
**Synergistic Products:** None reported  
**Target Organs:** Eyes, Skin, Mucous membranes, Lungs & Teeth  
**Medical Conditions Aggravated By Exposure:** Skin or Respiratory disorders

**12. ECOLOGICAL INFORMATION****ENVIRONMENTAL FATE:**

The environmental fate of this product is expected to be: **Land:** biodegradation with some leaching into the groundwater. **Water:** biodegradation. **Air:** not expected to volatilize due to low vapor pressure. This product is not expected to bioaccumulate.

**ENVIRONMENTAL CONSIDERATIONS:**

The aquatic toxicity of this product has not been determined. However the aquatic toxicity of pure Citric Acid is: Goldfish LD<sub>50</sub>: 625 mg/liter, longtime exposure in hard water. Goldfish LD<sub>100</sub>: 894 mg/liter, longtime exposure in hard water.

**13. DISPOSAL CONSIDERATIONS**

**RCRA 40 CFR 261 CLASSIFICATION:** Corrosive Waste

**U.S. EPA WASTE NUMBER/DESCRIPTION:** D002

If this product is disposed of as shipped, it meets the criteria of a hazardous waste as defined under 40 CFR 261 due to its corrosivity. If this product becomes a waste, it will be a hazardous waste which is subject to the Land Disposal Restrictions under 40 CFR 268 and must be managed accordingly. As a hazardous liquid waste, it must be disposed of in accordance with local, state and federal regulations in a permitted hazardous waste treatment, storage and disposal facility.

**14. TRANSPORTATION INFORMATION**

**DOT PROPER SHIPPING NAME:** Not Restricted (See Other Shipping Information)

**Hazard Class:** Not applicable **UN Number:** Not applicable **Packing Group:** Not applicable

**Primary Label:** None Required **Subsidiary Label(s):** None Required

**Primary/Subsidiary Placards:** None Required

**DOT Reportable Quantity (RQ):** Not listed **RQ for Product:** Not applicable

**Marine Pollutant:** No

**2004 North American Emergency Response Guidebook No.:** Not applicable (in U.S.); 154 (Outside U.S.)

**TDG PROPER SHIPPING NAME:** CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. (Contains Citric Acid)

**Hazard Class:** 8 **UN Number:** UN3265 **Packing Group:** III

**Primary Label:** Corrosive **Subsidiary Label(s):** None Required

**Primary/Subsidiary Placards:** Corrosive

**TDG Reportable Quantity (RQ):** # At least 5 kg or 5 liters.

**TDG Schedule XII:** Not listed

**Regulated Limit (RL):** ## Not listed **RL for Product:** Not applicable

**Other Shipping Information:** DOT exception taken for materials only corrosive to Aluminum and mild steel; 49 CFR 173.154 (d) (1) and (2), when shipped by ground.

# Canadian Transportation of Dangerous Goods Regulations (TDGR), Part IX, Table I, Quantities or levels for Immediate Reporting: releases of reportable quantities, RQ, that meet the definition of a "dangerous occurrence" (a threat to life, health, property, or the environment) must be reported to the appropriate authorities as outlined in TDGR 9.13(1) and 9.14(1).

## Reporting to Environment Canada is required for any releases exceeding the regulated limits, RL, of 9.2 materials (primary or secondary). The regulated limits are found in Schedule XIII of the TDGR.

PRODUCT IDENTIFIER: Citric Acid 50% Solution (All Grades)

page 5 of 6

**15. REGULATORY INFORMATION**

**COMPONENTS:** Citric Acid  
**OSHA Target Organs:** Eyes, Skin, Mucous membranes, Lungs & Teeth

**Carcinogenic Potential:**  
Regulated by OSHA: No  
Listed on NTP Report: No  
Listed by IARC: No  
IARC Group: Not applicable  
ACGIH Appendix A:  
A1 Confirmed Human: Not applicable  
A2 Suspected Human: Not applicable

**U.S. EPA Requirements**

**Release Reporting**  
**CERCLA (40 CFR 302)**  
Listed Substance: Not listed  
Reportable Quantity: Not applicable  
Category: Not applicable  
RCRA Waste No.: Not applicable  
**Unlisted Substance:** Yes  
Reportable Quantity: 100 pounds  
Characteristic: Corrosivity  
RCRA Waste No.: D002

**SARA TITLE III**

**Section 302 & 303 (40 CFR 355):**  
Listed Substance: Not listed  
Reportable Quantity: Not applicable  
Planning Threshold: Not applicable  
**Section 311 & 312 (40 CFR 370):**  
Hazard Categories (product): Fire: N Sudden Release of Pressure: N Reactive: N Acute Health: Y Chronic Health: N  
Planning threshold: 10,000 pounds  
**Section 313 (40 CFR 372):**  
Listed Toxic Chemical: Not listed  
Reporting Threshold: Not applicable

**U.S. TSCA Status**

Listed (40 CFR 710): Yes

**State Regulations**

**State of California: Safe Drinking Water and Toxins Enforcement Act, 1986 (Proposition 65):**  
Carcinogen: No  
Reproductive Toxin: No

**Other Regulations**

**State Right To Know Laws:** None known

**Canadian Regulations**

**Product Information:**  
Controlled Product: Yes  
WHMIS Hazard Symbols: Corrosive Material  
WHMIS Class & Division: E

**Ingredient Information:**  
IDL Substance: Yes  
DSL or NDSL Lists: DSL

PRODUCT IDENTIFIER: **Citric Acid 50% Solution (All Grades)**

page 6 of 6

**16. OTHER INFORMATION**

**EPA Registration number:** Not applicable

**Approved Product Uses:** Not applicable

**Special Notes:**

This product does not contain any material, which the State of California has found to cause cancer and/or birth defects or other reproductive harm.

**Special Instructions:**

When making solutions, always add this product to water with adequate mixing to ensure a uniform solution.

Do not mix this product with strong caustic or alkaline solutions as violent boiling or spattering may result.

Do not add Citric Acid 50% Solution to hypochlorite bleaches, chlorine sanitizers or chlorinated cleaners as this liberates toxic, corrosive Chlorine gas.

**MSDS Revision Information:** Information Revised This Issue Date: **New MSDS format with additional information.**

Form Revision made 2/03/06

MSDS Distributed by: Brenntag Pacific, Inc.

NW Environmental Department

Phone: 503-242-0200 FAX: 503-412-3390

**Prepared By:** Edward Doheny

**Date Prepared:** July 26, 2007

This Material Safety Data Sheet is provided as an information resource only. It should not be taken as a warranty or representation for which Brenntag Pacific, Inc. assumes legal responsibility. While Brenntag Pacific, Inc. believes the information contained herein is accurate and compiled from sources believed to be reliable, it is the responsibility of the user to investigate and verify its validity. The buyer assumes all responsibility of using and handling the product in accordance with applicable federal, state, and local regulations.

# Material Safety Data Sheet

MSDS Revision Date: 12/17/2007  
Page 1 of 7



## 1. Product Identification

**Product Identity:** Ammonium Hydroxide Solutions (10%-30%)

**Molecular Weight:** 35.05 (NH<sub>4</sub>OH)

**Chemical Formula:** NH<sub>4</sub>OH + H<sub>2</sub>O

**Technical Information:** 270-830-1200

**Emergency Number:** 800-424-9300

(CHEMTREC)

**Synonyms:** Aqua Ammonia greater than 10% and less than 30%; Aqua ammonia 15.8 to 26°Be.(all grades)

### Distributed By Brenntag

Brenntag Great Lakes LLC.  
4420 N. Harley Davidson Ave  
Wauwatosa, WI 53225

Brenntag Mid-South Inc.  
1405 Hwy 136 W  
Henderson, KY 42420

Brenntag Northeast, Inc.  
81 West Huller Lane  
Reading, PA 19605

Brenntag Southeast, Inc.  
2000 East Pettigrew Street  
Durham, NC 27703

Brenntag Southwest, Inc.  
610 Fisher Road  
Longview, TX 75604

Brenntag Pacific, Inc.  
10747 Patterson Place  
Santa Fe Springs, CA 90670

## 2. Hazards Identification

### Emergency Overview

**DANGER!**

**POISON! DANGER! CORROSIVE, ALKALINE SOLUTION. CAUSES BURNS TO ANY AREA OF CONTACT. HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN.**

### Potential Health Effects

**Inhalation:**

Exposure by inhalation can cause irritation of the nose, throat, and mucous membranes. Exposure to high concentrations of ammonia vapor (above approximately 2500ppm) is life threatening, causing severe damage to the respiratory tract and resulting in bronchitis Chemical pneumonitis, and pulmonary edema, which can be fatal. Chronic exposure to ammonia can cause respiratory irritation and damage

**Ingestion:**

Ingestion of ammonium hydroxide burns the mouth, throat, and gastrointestinal tract and can lead to severe abdominal pain, nausea, vomiting, and collapse. Ingestion of as little as 3-4 ml of ammonium hydroxide may be fatal.

# Material Safety Data Sheet

MSDS Revision Date: 12/17/2007  
Page 2 of 7



## Skin Contact:

Skin contact can result in severe irritation, blister formation and burns; contact with the liquid results in cryogenic burns as well.

## Eye Contact:

Eye contact with ammonia vapor is severely irritating, and exposure of the eyes to ammonium hydroxide can result in serious damage and may cause permanent eye injury and blindness. Tearing or edema may occur.

## 3. Composition/Information on Ingredients

CAS#	Chemical Name	Percent by Weight
1336-21-6	Ammonium Hydroxide	10-30%
7732-18-5	Water	70-90

## 4. First Aid Measures

### Inhalation:

If a person breathes in chemical, remove exposed person promptly to fresh air. If breathing has stopped, perform artificial respiration. Oxygen should be provided for a person having difficulty breathing (but only administered by an authorized individual) until the person is able to breath easily by themselves. Keep the affected person warm and at rest. Get medical attention as soon as possible.

### Ingestion:

If conscious, give large amounts of water. DO NOT induce vomiting. Get medical attention immediately. If vomiting occurs spontaneously, keep head below hips. May drink orange juice or diluted vinger (1: 4) to counteract ammonia.

### Skin Contact:

Promptly wash the contaminated skin using soap or mild detergent and water. If chemical, or solution containing chemical, soaks through clothing, remove the clothing promptly and wash the skin using soap or mild detergent and water. Medical attention should be given as soon as possible for all burns, regardless of how minor they seem.

### Eye Contact:

# Material Safety Data Sheet

MSDS Revision Date: 12/17/2007  
Page 3 of 7



Flush eyes with large amounts of water, lifting the upper and lower lids at periodic intervals to insure contact of water with all accessible tissue of the eyes and lids. Medical attention should be given as soon as possible, preferably an eye specialist.

## 5. Fire Fighting Measures

**Go to Section 9 for Flammable Properties.**

### Fire:

Not considered to be a fire hazard. The mixture will not burn, but escaping ammonia gas can burn in the range of 16-25% in air.

LEL / UEL = 15 – 28%

### Explosion:

Not considered to be an explosion hazard. When heated, will give off ammonia gas. Ammonia increases the fire hazards from other combustible materials, including oil. Flammable limits are broadened by increasing temperature. Ammonia vapor in the range of 16 - 25% in air can explode on contact with ignition sources. Closed containers exposed to extreme heat may build up pressure and rupture violently. Combustion of released ammonia may form nitrogen oxides.

### Fire Extinguishing Media:

Use any means suitable for extinguishing surrounding fire. Water spray or fog may be used for escaping ammonia gas and to cool ammonia containers.

### Special Considerations:

Firefighters should avoid all bodily contact; wear full protective clothing and self-contained breathing apparatus in positive pressure mode. When this product is heated to combustion it will release ammonia which could form nitrogen oxides.

## 6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment. Pick up and place in a suitable container for reclamation or disposal, using a method that does not generate fumes. Use copious amounts of water spray or fog to absorb the evolved gas. Stay upwind when containers are threatened. Contain spill and runoff from entering drains, sewers, and water systems by utilizing methods such as diking, containment, and absorption. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

# Material Safety Data Sheet

MSDS Revision Date: 12/17/2007  
Page 4 of 7



## 7. Handling and Storage

Keep containers tightly closed. Store in a cool, dry place. Use only with adequate ventilation, dust mask or self-contained breathing apparatus. Protective clothing should always be worn. Avoid contact with eyes, skin, and clothing. Keep container closed when not in use. Avoid breathing mist. Do not get on skin, clothing, or in eyes. Wash off with water. Do not take internally. Open container slowly in case of pressure build-up. Ammonia hydroxide will react exothermically with acid.

## 8. Exposure Controls/Personal Protection

OSHA Permissible Exposure Limit (PEL): 35 ppm (STEL)

ACGIH Threshold Limit Value (TLV): 25 PPM (TLV) 35 PPM (STEL)

### Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, a Manual of Recommended Practices*, most recent edition, for details. Personal Respirators (NIOSH Approved): If the exposure limit is exceeded and engineering controls are not feasible, a full-face piece particulate respirator (NIOSH type NI00 filters) may be worn for exposure limit, or the maximum use concentration specified by the appropriate regulatory agency, or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. **WARNING:** Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

### Skin Protection:

Impervious rubber or neoprene gloves should be worn. Protective, impervious clothing should be worn in presence to prevent contact with skin (coveralls, boots, etc.).

### Eye Protection:

Splash-proof goggles and full face shield should be worn when there is danger of splash from solution containing chemical. Protection against splash or mist from solution containing chemical with 8-inch minimum face shield is recommended. Eye protection should be worn in presence of solution containing chemical, at all times. Maintain eye wash fountain and quick-drench facilities in work area.

# Material Safety Data Sheet

MSDS Revision Date: 12/17/2007  
Page 5 of 7



## 9. Physical and Chemical Properties

Appearance:	Clear colorless liquid
Odor:	strong pungent (ammonia) odor
Physical State:	liquid
PH of water solutions:	13+
Melting Point:	N/A
Boiling Point:	27.8 - 59.5 °C (82-139F)
Flash Point:	N/A
Upper Explosive Limit:	N/A
Lower Explosive Limit:	N/A
Vapor Pressure:	(60F) 420 – 475 FOR 29.7% NH <sub>3</sub>
Vapor Density:	0.596
Specific Gravity:	0.89-0.96
Solubility in Water:	100% Soluble in Water

## 10. Stability and Reactivity

**Chemical Stability:** Stable under normal conditions of use and storage.

**Conditions to Avoid:** Heat, exposure to high temperature should be minimized. This material should avoid direct sunlight.

**Incompatible Materials:** Contact with strong acids and alkalis, chlorine bleach, halogens, strong hydroxide, iron, reactive metals, mercury, gold, silver and strong oxidizers.

**Hazardous Decomposition Products:** Hydrogen and nitrogen gases. Gaseous ammonia upon heating.

## 11. Toxicological Information

LD50 Inhalation Rat: 2000 ppm/4hr

LD50 Oral Rat: 350 mg/kg

LD50 Oral mouse: 4837mg/kg

**Acute:** POISON! DANGER! CORROSIVE, ALKALINE SOLUTION. CAUSES BURNS TO ANY AREA OF CONTACT. HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN.

# Material Safety Data Sheet

MSDS Revision Date: 12/17/2007  
Page 6 of 7



Exposure by inhalation can cause irritation of the nose, throat, and mucous membranes. Exposure to high concentrations of ammonia vapor (above approximately 2500ppm) is life threatening, causing severe damage to the respiratory tract and resulting in bronchitis, chemical pneumonitis, and pulmonary edema, which can be fatal. Chronic exposure to ammonia can cause respiratory irritation and damage. Ingestion of ammonium hydroxide burns the mouth, throat, and gastrointestinal tract and can lead to severe abdominal pain, nausea, vomiting, and collapse. Ingestion of as little as 3-4 ml of ammonium hydroxide may be fatal. Skin contact can result in severe irritation and burns; contact with the liquid results in cryogenic burns as well. Eye contact with ammonia vapor is severely irritating, and exposure of the eyes to ammonium hydroxide can result in serious damage and may cause permanent eye injury and blindness.

**Chronic:** Ingestion of as little as 3-4 ml of ammonia hydroxide may be fatal. Investigated as a tumorigen and mutagen.

## 12. Ecological Information

**ENVIRONMENTAL FATE:** No data found

**ENVIRONMENTAL TOXICITY:** LC50 Daphnia magna 0.66 mg/l/48 hr 22°C; LC50 Perch 0.29 mg/l/7days/un-ionized NH<sub>3</sub>; LC50 Salmon gairdnerli 8 ug/ml NH<sub>3</sub>/24 hr

## 13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

## 14. Transport Information

### US DOT (ground)

Proper Shipping Name: Ammonia Solution  
Hazard Class: 8  
UN/NA: UN2672  
Packing Group: III  
Marine Pollutant: No  
RQ Amount: 1,000 lbs

### IMDG (water)

Proper Shipping Name: Ammonia Solution

**Material Safety Data Sheet**MSDS Revision Date: 12/17/2007  
Page 7 of 7Hazard Class: 8  
UN/NA: UN2672  
Packing Group: III  
Marine Pollutant: No  
RQ Amount: 1,000 lbs**15. Regulatory Information**SARA 302  
Not ListedSARA 304  
Not ListedSARA 313  
Not ListedCERCLA  
Listed 1,000lbsTSCA Inventory  
YesCalifornia Proposition 65  
Not Listed**16. Other Information**

This MSDS is provided as an information resource only. It should not be taken as a warranty or representation for which Brenntag assumes legal liability. While Brenntag believes the information contained herein is accurate and compiled from sources believed to be reliable, it is the responsibility of the user to investigate and verify its identity. The buyer assumes all responsibility for using and handling the product in accordance with applicable federal, state, and local regulations.

**Distributed By Brenntag**Brenntag Great Lakes LLC.  
4420 N. Harley Davidson Ave  
Wauwatosa, WI 53225Brenntag Mid-South Inc.  
1405 Hwy 136 W  
Henderson, KY 42420Brenntag Northeast, Inc.  
81 West Huller Lane  
Reading, PA 19605Brenntag Southeast, Inc.  
2000 East Pettigrew Street  
Durham, NC 27703Brenntag Southwest, Inc.  
610 Fisher Road  
Longview, TX 75604Brenntag Pacific, Inc.  
10747 Patterson Place  
Santa Fe Springs, CA  
90670**SOLUTION-SPECIFIC PHYSICAL DATA**

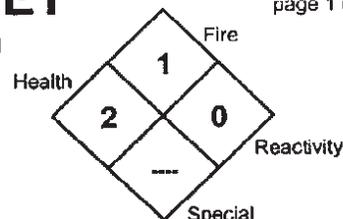
	<b>20.5° Baume</b>	<b>25° Baume</b>	<b>26° Baume</b>
<b>AMMONIA %</b>	18.5-19.5%	26.5-27.5%	29.0-29.9%
<b>WATER %</b>	81.5-80.5%	73.5-72.5%	71.0-70.1%
<b>SPECIFIC GRAVITY</b>	0.9341-09276 @60F	0.9061-9032@60F	0.8974-0.8960@60F
<b>BOILING POINT</b>	124°F@14.7psis	88°F @14.7psis	84.9°F @14.7psis
<b>VAPOR PRESSURE</b>	3.9 psis @ 60°F	6.9 @ 60°F	9.1 @ 60°F
<b>APPROX. FREEZING POINT</b>	-32°F	-89°F	-110°F

# MATERIAL SAFETY DATA SHEET

**BRENNTAG**

NFPA 704 DESIGNATION  
HAZARD RATING

4=Extreme  
3=High  
2=Moderate  
1=Slight  
0=Insignificant



Brenntag MSDS #:	BPI-00180
MSDS Revision/Issue Date:	07/26/07
Supersedes Revision Date:	New

## 1. CHEMICAL PRODUCT IDENTIFICATION & COMPANY IDENTIFICATION

**PRODUCT IDENTIFIER:** Citric Acid 50% Solution (All Grades)

**GENERAL USE:** Used as an acidulant in beverages, to adjust the pH of foods, as synergistic antioxidant in processing cheese, as a foam inhibitor, and as a sequestering agent to remove trace metals.

**PRODUCT DESCRIPTION:** An aqueous solution of an aliphatic acid. Synonyms include: beta-hydroxytricarboxylic acid, and 2-hydroxy-1,2,3-propanetricarboxylic acid.

**INFORMATION PROVIDED BY:** Brenntag Pacific, Inc.  
5700 N.W. Front Avenue  
Portland, OR 97210

### EMERGENCY PHONE NUMBERS

**BRENNTAG:** 503-699-7055  
**CHEMTREC:** 800-424-9300  
**CANUTEC:** 613-996-6666

For MSDS call: PHONE: 503-242-0200

## 2. COMPOSITION & INFORMATION ON INGREDIENTS

COMPONENT	CAS #	OSHA HAZARD	WT %	ACGIH		OSHA	
				TLV <sub>(TWA)</sub>	STEL	PEL <sub>(TWA)</sub>	STEL
Citric Acid	77-92-9	Severe Eye & Respiratory Irritant; Skin Irritant	50 ± 2	None	None	None	None

NDA = No Data Available N/A = Not Applicable

## 3. HAZARDS IDENTIFICATION

**EMERGENCY OVERVIEW:** A clear, colorless to light yellow, strongly acidic liquid having no characteristic odor. This product can cause severe irritation or burns to the eyes. It may cause moderate to severe irritation to the skin and respiratory tract.

### POTENTIAL HEALTH EFFECTS

**INHALATION:** Inhalation of mists or aerosols may cause severe irritation to the nose, mouth, throat, mucous membranes and lungs. Symptoms of exposure may include sneezing, coughing, chest discomfort or pain and shortness of breath. Inhalation of high mist concentrations may result in permanent lung damage.

**EYE CONTACT:** Exposure to the mists or liquid can cause severe eye irritation. Symptoms of exposure may include tearing, redness, swelling and a painful burning sensation. Corneal damage with impairment of vision may result from direct contact with the liquid, unless promptly treated.

**SKIN CONTACT:** Exposure to the mists or liquid may cause moderate to severe skin irritation. Symptoms of exposure may include redness, swelling, a stinging sensation and/or pain. No published reports indicate this product is absorbed through the skin.

**INGESTION:** Ingestion may cause moderate to severe irritation to the mouth, throat and the entire gastrointestinal tract, including the stomach and intestines, characterized by nausea, vomiting, diarrhea, abdominal pain, possible bleeding and/or tissue ulceration.

**CHRONIC:** The chronic health effects of exposure to this product are expected to be the same as for acute exposure.



Revision Number: 001.1

Issue date: 06/26/2009

**1. PRODUCT AND COMPANY IDENTIFICATION**

**Product name:** BONDERITE S-AD RODINE 2010 ACID INHIBITOR ADDITIVE known as P3 RODINE 20 10 **IDH number:** 1314676

**Product type:** Corrosion inhibitor **Region:** United States

**Company address:** Henkel Corporation  
32100 Stephenson Highway  
Madison Heights, MI 48071 **Contact information:**  
Telephone: 248.583.9300  
For Chemical Emergency: Call CHEMTREC at 800.424.9300  
Internet: www.henkelna.com

**2. HAZARDS IDENTIFICATION**

**EMERGENCY OVERVIEW**

<b>Physical state:</b>	Liquid	<b>HMIS:</b>	
<b>Color:</b>	Light amber	<b>HEALTH:</b>	*2
<b>Odor:</b>	Aromatic	<b>FLAMMABILITY:</b>	0
		<b>PHYSICAL HAZARD:</b>	0
		<b>Personal Protection:</b>	See MSDS Section 8

**WARNING:** CAUSES EYE, SKIN AND RESPIRATORY TRACT IRRITATION.  
MAY BE HARMFUL OR FATAL IF SWALLOWED.  
MAY CAUSE ALLERGIC SKIN REACTION.

**Relevant routes of exposure:** Skin, Inhalation, Eyes

**Potential Health Effects**

**Inhalation:** Inhalation of vapors or mists of the product may be irritating to the respiratory system.

**Skin contact:** Prolonged and/or repeated skin contact with this product may cause irritation/dermatitis. Contact with skin can cause irritation and allergic reaction (sensitization) in some individuals.

**Eye contact:** Contact with eyes can cause eye irritation. May cause severe eye irritation.

**Ingestion:** May cause irritation and symptoms similar to ethyl alcohol intoxication. Swallowing large volumes of ethylene glycol can lead to kidney damage.

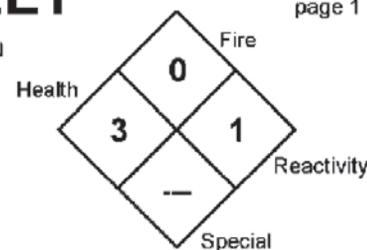
**Existing conditions aggravated by exposure:** Eye, skin and respiratory disorders.

This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

See Section 11 for additional toxicological information.

**3. COMPOSITION / INFORMATION ON INGREDIENTS**

Hazardous components	CAS NUMBER	%
Poly(ethylene glycol)	Proprietary	30 - 60
Ethylene glycol	107-21-1	5 - 10
1,3-Diethyl-2-thiourea	105-55-5	5 - 10
Ethoxylated Propoxylated alcohol	Proprietary	1 - 5
quinolinium chloride	530-64-3	1 - 5

**BRENNTAG**NFPA 704 DESIGNATION  
HAZARD RATING4=Extreme  
3=High  
2=Moderate  
1=Slight  
0=InsignificantBrenntag MSDS #: **BPI-00182**MSDS Revision/Issue Date: **07/31/07**Supersedes Revision Date: **New****1. CHEMICAL PRODUCT IDENTIFICATION & COMPANY IDENTIFICATION****PRODUCT IDENTIFIER: Sodium Hydroxide 50% Solution (All Grades)****GENERAL USE:** Used in industry to neutralize acids; to precipitate alkaloids; in metal finishing; in cleaners; and to precipitate most metals (as hydroxides) from aqueous solutions.**PRODUCT DESCRIPTION:** An aqueous solution of Sodium Hydroxide. Synonyms for Sodium Hydroxide include: caustic soda, lye soda, sodium hydrate and white caustic.**INFORMATION PROVIDED BY:** Brenntag Pacific, Inc.  
5700 N.W. Front Avenue  
Portland, OR 97210**EMERGENCY PHONE NUMBERS****BRENNTAG:** 503-699-7055**CHEMTREC:** 800-424-9300**CANUTEC:** 613-996-6666For MSDS call: **PHONE: 503-242-0200****2. COMPOSITION & INFORMATION ON INGREDIENTS**

COMPONENT	CAS #	OSHA HAZARD	WT %	ACGIH		OSHA	
				TLV <sub>(TWA)</sub>	STEL	PEL <sub>(TWA)</sub>	STEL
Sodium Hydroxide	1310-73-2	Corrosive; Lung Toxin	50 ± 1	None Ceiling: 2 mg/m <sup>3</sup>	None	2 mg/m <sup>3</sup>	None

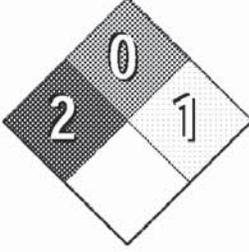
NDA = No Data Available

N/A = Not Applicable

**3. HAZARDS IDENTIFICATION****EMERGENCY OVERVIEW:** A clear to slightly turbid, colorless liquid having no characteristic odor. The mists and liquid are corrosive to all tissues contacted. Inhalation of mists may cause permanent lung damage. This material reacts with water to release a large amount of heat and can react violently with acids and other substances. **The NIOSH I.D.L.H. for Sodium Hydroxide is: 10 mg/m<sup>3</sup>.****POTENTIAL HEALTH EFFECTS****INHALATION:** Inhalation of mists or an aerosol can cause severe irritation or burns to the nose, mouth, throat, mucous membranes and lungs. Symptoms of exposure can include coughing, sneezing, choking, shortness of breath, chest pain and impairment of lung function. Inhalation of a high mist concentration may result in permanent lung damage.**EYE CONTACT:** Exposure to the mists or liquid can cause severe eye irritation and/or burns. Symptoms of exposure can include tearing, redness, swelling, pain and possible mucous discharge. Exposure may cause corneal damage and/or visual impairment even when prompt treatment is provided.**SKIN CONTACT:** Exposure to the mists or liquid can cause severe skin irritation and/or burns. Symptoms of exposure may include redness, swelling, pain and possible ulceration. Prolonged skin exposure to this material may cause destruction of the dermis with impairment of the skin, at site of contact, to regenerate. No published data indicates this material is absorbed through the skin.**INGESTION:** Ingestion can cause severe irritation and/or burns to the entire gastrointestinal tract, including the stomach and intestines characterized by nausea, vomiting, abdominal pain, bleeding, tissue ulceration and possible diarrhea.**CHRONIC:** The chronic health effects of exposure to this material are expected to be the same as for acute exposure.

## MATERIAL SAFETY DATA SHEET



NFPA	HMIS	PPE	Symbol(s)
			  <p style="text-align: center;">Regulated</p>
Current Issue Date: May 16, 2013		Revision Number: 0	
<b>1. PRODUCT AND COMPANY IDENTIFICATION</b>			
Product Name:	Sodium Nitrite		
Other/Generic Names:	Nitrous Acid, Sodium Salt, Sodium Nitrite (various grades)		
Recommended Use:	Food preservation, dye manufacturing, corrosion inhibitor		
Manufacturer:	General Chemical, LLC 90 East Halsey Road Parsippany, NJ 07054		
For More Information:	General Chemical Performance Products Ltd. 90 East Halsey Road Parsippany, NJ 07054 Customer Service US ONLY: 800-631-8050 (Monday – Friday 9:00AM – 4:30PM)		
Emergency Telephone Number:	Customer Service CANADA ONLY: 866-543-3896 (Monday – Friday 9:00AM – 4:30PM) US ONLY - CALL CHEMTREC: 800-424-9300 (24 Hours/Day, 7 Days/Week) CANADA ONLY - CALL CANUTEC: 613-996-6666 (24 Hours/Day, 7 Days/Week) OUTSIDE THE US - 703-527-3887		
<b>2. HAZARDS IDENTIFICATION</b>			
<b>EMERGENCY OVERVIEW:</b> White to slightly yellow crystalline solid. Toxic if swallowed or dust is inhaled. Oxidizer: may ignite organic materials and react with other materials. Can decompose if mixed with acids or exposed to fire conditions, releasing toxic nitrogen oxides.			
<b>OSHA Status:</b>	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200)		
<b>Potential Health Affects</b>			
<b>Skin:</b>	May cause skin irritation.		
<b>Eyes:</b>	May strongly irritate or burn the eyes.		
<b>Inhalation:</b>	Product mists may cause irritation to the respiratory tract.		
<b>Ingestion:</b>	May irritate the gastrointestinal tract. Although small quantities are used in food preparation, swallowing moderate amounts of sodium nitrite can result in serious toxic effects including death. Effects include nausea, weakness, cyanosis (blue skin), collapse and coma, possibly leading to death. Sodium nitrite interferes with the blood's ability to transport oxygen.		
<b>Delayed Effects:</b>	None known. If Sodium nitrite is used with amines found in certain cutting fluids, potentially carcinogenic nitrosamine compounds may be formed.		

# Material Safety Data Sheet

## 1. Product and company identification

 Product name : **SURFONIC® N-95**

MSDS # 00033063

Product use : Surfactant

Huntsman Petrochemical Corporation  
 P.O. Box 4980  
 The Woodlands, TX 77387-4980

### TELEPHONE NUMBERS

Transportation Emergency

Company: (800) 328-8501

CHEMTREC: (800) 424-9300

Medical Emergency: (409) 722-9673 (24 Hour)

General MSDS Assistance: (281) 719-6000

Technical Information: (281) 719-7780

E-MAIL: MSDS@huntsman.com

Validation date : 3/4/2009.

### In case of emergency

**Spills Leaks Fire or Exposure Call Chemtrec: (800) 424-9300**

**Medical Emergency Information: (800) 328-8501**

**In Mexico: 01 800 00 214 00**

**In Columbia: 01 800 91 6012**

## 2. Hazards identification

Physical state : Liquid. [Liquid.]

Odor : Slight

OSHA/HCS status : While this material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200), this MSDS contains valuable information critical to the safe handling and proper use of the product. This MSDS should be retained and available for employees and other users of this product.

Emergency overview : CAUTION!

MAY CAUSE EYE AND SKIN IRRITATION.

Slightly irritating to the eyes and skin. Avoid breathing vapor or mist. Avoid contact with eyes. Avoid prolonged or repeated contact with skin. Wash thoroughly after handling.

GENERAL INFORMATION : Read the entire MSDS for a more thorough evaluation of the hazards.

## 3. Composition/information on ingredients

Name	CAS number	%
Nonylphenol, ethoxylated	9016-45-9	60 - 100

**SURFONIC® N-95****4 . First aid measures**

<b>Eye contact</b>	: Get medical attention immediately. Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician.
<b>Skin contact</b>	: Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.
<b>Inhalation</b>	: Move exposed person to fresh air. Keep person warm and at rest. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
<b>Ingestion</b>	: Wash out mouth with water. Move exposed person to fresh air. Do not induce vomiting unless directed to do so by medical personnel. Get medical attention if symptoms occur. Never give anything by mouth to an unconscious person.
<b>Notes to physician</b>	: Symptomatic and supportive therapy as needed. Following severe exposure medical follow-up should be monitored for at least 48 hours.

**5 . Fire-fighting measures**

<b>Flash point</b>	: Closed cup: 237.78°C (460°F) [Pensky-Martens.]
<b>Products of combustion</b>	: Decomposition products may include the following materials: carbon dioxide carbon monoxide
<b><u>Extinguishing media</u></b>	
<b>Suitable</b>	: Use an extinguishing agent suitable for the surrounding fire.
<b>Not suitable</b>	: None known.
<b>Special exposure hazards</b>	: In a fire or if heated, a pressure increase will occur and the container may burst. Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.
<b>Special protective equipment for fire-fighters</b>	: Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

**6 . Accidental release measures**

<b>Personal precautions</b>	: No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Put on appropriate personal protective equipment (see section 8).
<b>Environmental precautions</b>	: Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
<b>Methods for cleaning up</b>	: Stop leak if without risk. Move containers from spill area. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Dispose of via a licensed waste disposal contractor. Note: see section 1 for emergency contact information and section 13 for waste disposal.

**SURFONIC® N-95****7 . Handling and storage**

- Handling** : Put on appropriate personal protective equipment (see section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapor or mist. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.
- Storage** : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. 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. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

**8 . Exposure controls/personal protection**

**Consult local authorities for acceptable exposure limits.**

- Preventive Measures** : Conditions of use, adequacy of engineering or other control measures, and actual exposures will dictate the need for specific protective devices at your workplace.
- Engineering controls** : Use local exhaust ventilation to maintain airborne concentrations below the TLV. Suitable respiratory equipment should be used in cases of insufficient ventilation or where operational procedures demand it. For guidance on engineering control measures refer to publications such as the ACGIH current edition of 'Industrial Ventilation, a manual of Recommended Practice.'
- Personal protection**
- Eyes** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.
- Skin** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Respiratory** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.
- Hands** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

**9 . Physical and chemical properties****General information****Appearance**

- Physical state** : Liquid. [Liquid.]
- Color** : Pale color.
- Odor** : Slight
- Odor threshold** : Not available.

**Important health, safety and environmental information**

- pH** : 7
- Boiling point** : Not available.
- Melting point** : 5°C (41°F)
- Flash point** : Closed cup: 237.78°C (460°F) [Pensky-Martens.]

**SURFONIC® N-95****9 . Physical and chemical properties**

Oxidizing properties	: Not available.
Vapor pressure	: <0.13 kPa (<1 mm Hg)
Relative density	: 1.06
Viscosity	: Kinematic: 1.1 cm <sup>2</sup> /s (110 cSt at 100°F)
Vapor density	: Not available.
VOC content	: Not available.

**10 . Stability and reactivity**

Stability and reactivity	: The product is stable.
Incompatibility with various substances	: Reactive or incompatible with the following materials: oxidizing materials, reducing materials and metals.
Hazardous polymerization	: Under normal conditions of storage and use, hazardous polymerization will not occur.
Hazardous decomposition products	: Decomposition products may include the following materials: carbon dioxide carbon monoxide

**11 . Toxicological information**Toxicity dataAcute toxicity

Product/ingredient name	test	Species	Result	Exposure
Nonylphenol, ethoxylated	LD50 Oral	Rat	3310 mg/kg	-
	LD50 Dermal	Rabbit	>2000 mg/kg	-

Potential acute health effects

Ingestion	: No known significant effects or critical hazards.
Inhalation	: No known significant effects or critical hazards.
Eyes	: Slightly irritating to the eyes.
Skin	: Slightly irritating to the skin.

Potential chronic health effects

Target organs	: No known significant effects or critical hazards.
Carcinogenicity	: No known significant effects or critical hazards.
Mutagenicity	: No known significant effects or critical hazards.
Teratogenicity	: No known significant effects or critical hazards.
Fertility effects	: No known significant effects or critical hazards.
Developmental effects	: No known significant effects or critical hazards.

**12 . Ecological information**Aquatic ecotoxicity

Product/ingredient name	test	Result	Species	Exposure
Nonylphenol, ethoxylated	-	Acute LC50 1 to 10 mg/L	Fish	96 hours

Biodegradability

Product/ingredient name	test	Result	Dose	Inoculum
Nonylphenol, ethoxylated	-	60 % - Inherent - 28 days	-	-

<u>Product/ingredient name</u>	<u>Aquatic half-life</u>	<u>Photolysis</u>	<u>Biodegradability</u>
--------------------------------	--------------------------	-------------------	-------------------------

**SURFONIC® N-95****12 . Ecological information**

Nonylphenol, ethoxylated - - Not readily  
**Environmental effects** : Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

**13 . Disposal considerations**

**Waste disposal** : The generation of waste should be avoided or minimized wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

**14 . Transport information**

Transportation Emergency Number 1-800-424-9300 (CHEMTREC).

Regulatory information	UN number	Proper shipping name	Class	PG*	Label	Additional information
DOT Classification	Not regulated.					-
TDG Classification	Not regulated.					-
IMDG Class	Not regulated.		-	-		-
IATA-DGR Class	Not regulated.		-	-		-

PG\* : Packing group

**15 . Regulatory information**United States

**HCS Classification** : Not regulated.  
**U.S. Federal regulations** : **United States inventory (TSCA 8b)**: All components are listed or exempted.

**CERCLA: Hazardous substances.** : No ingredients listed.

This product does not contain nor is it manufactured with ozone depleting substances.

SARA 313

	<u>Product name</u>	<u>CAS number</u>	<u>Concentration</u>
<b>Form R - Reporting requirements</b>	: GLYCOL ETHERS (FRACTION OF PRODUCT MEETING EPA DEFINITION)	Blend	3%

SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

State regulations

**California Prop 65** :

SURFONIC® N-95

## 15 . Regulatory information

**WARNING:** This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

<u>Ingredient name</u>	<u>Cancer</u>	<u>Reproductive</u>	<u>No significant risk level</u>	<u>Maximum acceptable dosage level</u>
Ethylene oxide	Yes.	Yes.	Yes.	Yes.

### Canada

WHMIS (Canada) : Class D-2B: Material causing other toxic effects (Toxic).  
 CEPA (DSL) : DSL: All Ingredients Listed.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

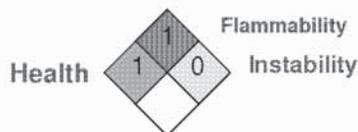
## 16 . Other information

Label requirements : MAY CAUSE EYE AND SKIN IRRITATION.

Hazardous Material Information System (U.S.A.) :

Health	1
Fire hazard	1
Reactivity	0

National Fire Protection Association (U.S.A.) :



Date of printing : 3/5/2009.

Date of issue : 4 March 2009

Date of previous issue : 3/3/2009.

### Notice to reader

*While the information and recommendations in this publication are to the best of our knowledge, information and belief accurate at the date of publication, NOTHING HEREIN IS TO BE CONSTRUED AS A WARRANTY, EXPRESS OR OTHERWISE.*

*IN ALL CASES, IT IS THE RESPONSIBILITY OF THE USER TO DETERMINE THE APPLICABILITY OF SUCH INFORMATION AND RECOMMENDATIONS AND THE SUITABILITY OF ANY PRODUCT FOR ITS OWN PARTICULAR PURPOSE.*

*THE PRODUCT MAY PRESENT HAZARDS AND SHOULD BE USED WITH CAUTION. WHILE CERTAIN HAZARDS ARE DESCRIBED IN THIS PUBLICATION, NO GUARANTEE IS MADE THAT THESE ARE THE ONLY HAZARDS THAT EXIST.*

*Hazards, toxicity and behaviour of the products may differ when used with other materials and are dependent upon the manufacturing circumstances or other processes. Such hazards, toxicity and behaviour should be determined by the user and made known to handlers, processors and end users.*

*NO PERSON OR ORGANIZATION EXCEPT A DULY AUTHORIZED HUNTSMAN EMPLOYEE IS AUTHORIZED TO PROVIDE OR MAKE AVAILABLE DATA SHEETS FOR HUNTSMAN PRODUCTS. DATA SHEETS FROM UNAUTHORIZED SOURCES MAY CONTAIN INFORMATION THAT IS NO LONGER CURRENT OR ACCURATE. NO PART OF THIS DATA SHEET MAY BE REPRODUCED OR TRANSMITTED IN ANY FORM, OR BY ANY MEANS, WITHOUT PERMISSION IN WRITING FROM HUNTSMAN. ALL REQUESTS FOR PERMISSION TO REPRODUCE MATERIAL FROM THIS DATA SHEET SHOULD BE DIRECTED TO HUNTSMAN, MANAGER, PRODUCT SAFETY AT THE ABOVE ADDRESS.*

### Trademarks:

SURFONIC® is a registered trademark of Huntsman Corporation or an affiliate thereof in one or more countries, but not all countries.

*SURFONIC® N-95*

## 16 . Other information

▣ Indicates information that has changed from previously issued version.

## SODIUM NITRITE

3. COMPOSITION/INFORMATION ON INGREDIENTS		
Component	CAS No	Weight %
Sodium nitrite	7632-00-0	>98%
4. FIRST AID MEASURES		
<b>Eye Contact</b>	Immediately flush eyes with water for at least 15 minutes. Get medical attention if irritation persists.	
<b>Skin Contact</b>	Flush with plenty of water, removing contaminated clothing. If irritation develops, get medical attention.	
<b>Inhalation</b>	Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get prompt medical attention.	
<b>Ingestion</b>	Do not induce vomiting. Immediately give large quantities of water. Get medical attention immediately.	
<b>Notes to Physician</b>	Sodium nitrite forms methemoglobin in the blood stream. Treat accordingly.	
5. FIRE-FIGHTING MEASURES		
<u>Flammable Properties</u>		
<b>FLASH POINT:</b>	Not Flammable	
<b>FLASH POINT METHOD:</b>	Not Applicable	
<b>AUTOIGNITION TEMPERATURE:</b>	Not Applicable	
<b>UPPER FLAME LIMIT (VOLUME % IN AIR):</b>	Not Applicable	
<b>LOWER FLAME LIMIT (VOLUME % IN AIR):</b>	Not Applicable	
<b>FLAME PROPAGATION RATE (SOLIDS):</b>	Not Applicable	
<b>OSHA FLAMMABILITY CLASS:</b>	Not Applicable	
<b>SUITABLE EXTINGUISHING MEDIA:</b>	Use flooding amounts of water or other agents.	
<b>UNSUITABLE EXTINGUISHING MEDIA:</b>	Do NOT use dry chemicals containing ammonium phosphate.	
<u>Explosion Limits</u>		
<b>Hazardous Combustion Products</b>	No information available	
<b>Impact sensitivity</b>	No information available	
<b>Sensitivity to static discharge</b>	No information available	
<b>Specific Hazards Arising from the Chemical</b>	Material does not burn but is an oxidizing agent and will support combustion of other materials. Product decomposes above 608 °F releasing toxic nitrogen oxides.	
<b>Protective Equipment and Precautions for Firefighters</b>	Wear self-contained breathing apparatus (SCBA) and full protective equipment.	
6. ACCIDENTAL RELEASE MEASURES		
<b>IN CASE OF SPILL OR OTHER RELEASE</b>	Remove sources of ignition. Ventilate area. Use non-sparking tools and equipment. Sweep or shovel spilled material into containers. Dispose of material according to local, state and federal authorities. Do not allow product or residues to enter waterways and/or any source of drinking water.	
7. HANDLING AND STORAGE		
<b>Handling</b>	Avoid contact with skin and eyes. Do not breathe product dusts. Avoid contact with incompatible, combustible, organic or readily oxidizable materials.	
<b>Storage</b>	Store in a cool, dry, well-ventilated area. Keep containers tightly closed. Do not store on wooden floors. Isolate from combustible materials. Empty containers may contain product residues; observe all warnings and precautions listed for the product.	

## SODIUM NITRITE

8. EXPOSURE CONTROLS/PERSONAL PROTECTION					
Component	ACGIH TLV	OSHA PEL	Ontario TWAEV	Mexico OEL (TWA)	NIOSH IDLH
Sodium Nitrite				TWA: 2 mg/m <sup>3</sup>	
<b>Engineering Measures</b>	Use local exhaust to keep airborne concentrations below the permissible exposure limits.				
<b>Personal Protective Equipment</b>					
<b>Eye/Face Protection</b>	Wear chemical safety goggles. Do not wear contact lenses.				
<b>Skin Protection</b>	Wear appropriate personal protective clothing to prevent skin contact. If prolonged or repeated contact is anticipated, all clothing should be impervious to liquid.				
<b>Respiratory Protection</b>	A respiratory protection program that meets OSHA 1910.134 and ANSI Z88.2 or applicable federal/provincial requirements must be followed whenever workplace conditions warrant respirator use. NIOSH's "Respirator Decision Logic" may be useful in determining the suitability of various types of respirators.				
<b>General Hygiene Considerations</b>	To identify additional Personal Protective Equipment (PPE) requirements, it is recommended that a hazard assessment in accordance with the OSHA PPE Standard (29 CFR 1910.132) be conducted before using this product. Eyewash and safety showers are recommended.				
9. PHYSICAL AND CHEMICAL PROPERTIES					
<b>Appearance</b>	Crystals				
<b>Color</b>	White to slightly yellow				
<b>Chemical Formula</b>	NaNO <sub>2</sub>				
<b>Odor</b>	None				
<b>Odor Threshold</b>	No information available				
<b>Physical State</b>	Solid				
<b>pH</b>	~9.0 (for aqueous solution)				
<b>Flash Point</b>	Not flammable				
<b>Autoignition Temperature</b>	Not applicable				
<b>Boiling Point/Range</b>	Decomposes above 608°F				
<b>Melting Point/Range</b>	520°F				
<b>Flammability Limits in Air</b>	No information available				
<b>Explosive Properties</b>	No information available				
<b>Oxidizing Properties</b>	No information available				
<b>Evaporation Rate</b>	Not determined				
<b>Vapor Pressure</b>	Not applicable				
<b>Vapor Density</b>	Not applicable				
<b>Specific Gravity</b>	2.17				
<b>Partition Coefficient (n-octano/water)</b>	No information available				
<b>Viscosity</b>	No information available				
<b>Molecular Weight</b>	69.0				
<b>Water Solubility</b>	80.8 g/100 g at 68°F				
<b>VOC Content (%)</b>	0				

## SODIUM NITRITE

10. STABILITY AND REACTIVITY				
<b>Chemical Stability</b>	Normally stable.			
<b>Conditions to Avoid</b>	Material slowly oxidizes to sodium nitrate when exposed to air. Avoid heat, flame, ignition sources, shock, friction and incompatibilities.			
<b>Incompatible Products</b>	Hazardous reactions can occur with acids, ammonium compounds, reducing agents (particularly cyanides, thiocyanates and thiosulfates). May ignite organic compounds and other combustible materials.			
<b>Hazardous Decomposition Products</b>	Oxides of nitrogen (toxic and irritating)			
<b>Possibility of Hazardous Reactions</b>	Will not occur.			
11. TOXICOLOGICAL INFORMATION				
<b>Acute Toxicity</b>				
<b>Component Information</b>				
<b>Component</b>	<b>LD50 Oral</b>	<b>LD50 Dermal</b>	<b>LC50 Inhalation</b>	
Sodium nitrite	88 mg/kg (rat)		5.5 mg/m <sup>3</sup> /4hr (rat)	
<b>Irritation</b>	No information available			
<b>Corrosivity</b>	No information available			
<b>Sensitization</b>	No information available			
<b>Chronic Toxicity</b>				
<b>Carcinogenicity</b>	There are no known carcinogenic chemicals in this product.			
<b>Mutagenic Effects</b>	No information available			
<b>Reproductive Effects</b>	No information available			
<b>Developmental Effects</b>	No information available			
<b>Teratogenicty</b>	Multiple reproductive tests indicate that sodium nitrite is not teratogenic.			
<b>Target Organ Effects</b>	No information available			
<b>Other Adverse Effects</b>	Fetal toxicity has been demonstrated in pregnant animals fed toxic doses of sodium nitrite. This is due to the formation of methemoglobin.			
<b>Endocrine Disruptor Information</b>	No information available			
12. ECOLOGICAL INFORMATION				
<b>Ecotoxicity</b>				
Contains no substances known to be hazardous to the environment or not degradable in waste water treatment plants.				
<b>Component</b>	<b>Freshwater Algae</b>	<b>Freshwater Fish</b>	<b>Microtox</b>	<b>Water Flea</b>
Sodium nitrite		LC50 = 0.19 mg/L Oncorhynchus mykiss 96 h		
<b>Persistence and Degradability</b>	No information available			
<b>Bioaccumulation</b>	No information available			
<b>Mobility in Environmental Media</b>	No information available			
<b>Component</b>	<b>Log Pow</b>			
Sodium nitrite	-3.7			
13. DISPOSAL CONSIDERATIONS				
<b>Waste Disposal Methods</b>	Dispose of waste in accordance with all federal, state, and local regulations.			
<b>Contaminated Packaging</b>	Empty containers should be taken for local recycling, recovery or waste disposal.			

## SODIUM NITRITE

14. TRANSPORT INFORMATION				
<b>DOT</b>	Regulated			
Proper Shipping Name	Sodium nitrite			
Hazard Class	5.1			
Subsidiary Hazard Class	6.1			
UN-No	UN1500			
Packing Group	PGIII			
<b>TDG</b>	Regulated			
Hazard Class	5.1			
Subsidiary Hazard Class	6.1			
UN-No	UN1500			
Packing Group	PGIII			
<b>IMDG</b>	Product is a marine pollutant if shipped overseas			
15. REGULATORY INFORMATION				
<b>International Inventories</b>				
TSCA	Yes			
DSL	Yes			
ELINCS	No			
EINECS	Yes			
ENCS	Yes			
CHIINA	Yes			
KECL	Yes			
PICCS	Yes			
AICS	Yes			
<b>U.S. Federal Regulations</b>				
<b>SARA 313</b>				
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains the following chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372:				
<b>Component</b>	<b>CAS-No</b>	<b>Weight %</b>	<b>SARA 13 - Threshold Values</b>	
Sodium nitrite	7632-00-0	>98	1.0	
<b>SARA 311/312 Hazardous Categorization</b>				
Chronic Health Hazard	No			
Acute Health Hazard	Yes			
Fire Hazard	No			
Sudden Release of Pressure Hazard	No			
Reactive Hazard	Yes			
<b>Clean Water Act</b>				
<b>Component</b>	<b>CWA – Reportable Quantities</b>	<b>CWA – Toxic Pollutants</b>	<b>CWA – Priority Pollutants</b>	<b>CWA – Hazardous Substances</b>
Sodium nitrite	100 lb			X
<b>CERCLA</b>				
<b>Component</b>	<b>CERCLA RQ (lb)</b>	<b>SARA TPQ (lb)</b>		
Sodium nitrite	100 lb			
<b>U.S. State Regulations</b>				
<b>California Proposition 65</b>				
This product does not contain any Proposition 65 chemicals.				

## SODIUM NITRITE

<b>State Right-to-Know</b>					
<b>Component</b>	<b>Massachusetts</b>	<b>New Jersey</b>	<b>Pennsylvania</b>	<b>Illinois</b>	<b>Rhode Island</b>
Sodium nitrite	X	X	X		
<b>Other International Regulations</b>					
Mexico	No information available				
Canada	This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.				
<b>WHMIS Hazard Class</b>					
C Oxidizing materials					
D1B Toxic materials					
D2B Toxic materials					
<b>16. OTHER INFORMATION</b>					
Current Issue Date:	May 16, 2013				
Previous Issue Date:	November 26, 2012				
Revision Summary:	Change to section 1				
<b>Disclaimer:</b> <i>All information, statements, data, service and/or recommendations, including, without limitation, those relating to storage, loading/unloading, piping and transportation (collectively referred to herein as "information") are believed to be accurate and reliable. However, no representation or warranty, express or implied, is made as to its completeness, accuracy, fitness for a particular purpose or any other matter, including, without limitation, that the practice or application of any such information is free of patent infringement or other intellectual property misappropriation. General Chemical, LLC is not engaged in the business of providing technical, operational, engineering or safety information for a fee, and therefore; any such information provided herein has been furnished as an accommodation and without charge. All information provided herein is intended for use by persons having requisite knowledge, skill and experience in the chemical industry. General Chemical, LLC shall not be responsible or liable for the use, application or implementation of the information, provided herein, and all such information is to be used at the risk, and in the sole judgment and discretion, of such persons, their employees, advisors and agents.</i>					
End of MSDS					

**4. FIRST AID MEASURES**

- INHALATION:** If inhaled, immediately move to fresh air. If not breathing, give artificial respiration. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; use the Holger Nielsen method (back pressure-arm lift) or proper respiratory device. If breathing is difficult, give oxygen. Call a physician.
- EYE CONTACT:** In case of contact, immediately flush eyes with plenty of clean running water for at least 15 minutes, lifting the upper and lower lids occasionally. Remove contact lenses, if worn. Get medical attention immediately.
- SKIN CONTACT:** In case of contact, immediately flush skin with plenty of clean running water for at least 15 minutes, while removing contaminated clothing and shoes. If burn or irritation occurs, call a physician.
- INGESTION:** If swallowed, DO NOT induce vomiting. Get medical attention immediately. If victim is fully conscious, give plenty of water to drink. Never give anything by mouth to an unconscious person.
- NOTE TO PHYSICIANS:** Sodium Hydroxide has a relatively low oral toxicity, but it can be corrosive to the eyes, skin and mucous membranes. If ingested, consideration should be given to careful endoscopy as stomach or esophageal burns, perforations or strictures may occur. Careful gastric lavage with an endotracheal tube in place should be considered. Treat exposure symptomatically.

**5. FIRE FIGHTING MEASURES**

- Flashpoint and Method:** This material does not flash.
- Flammable Limits (in air, % by volume)**    **Lower:** Not applicable                      **Upper:** Not applicable
- Autoignition Temperature:** Not applicable
- GENERAL HAZARD:** The Uniform Fire Code physical hazard classification for this material is: **Water Reactive, Class I**. Direct contact with water causes an exothermic reaction (generation of heat). The Uniform Fire Code health hazard classification for this material is: **Corrosive (Alkaline)**. This material may generate flammable / explosive Hydrogen gas on contact with some soft metals (i.e. Aluminum). This material may produce hazardous decomposition products.
- FIRE FIGHTING INSTRUCTIONS:**                      **EXTINGUISHING MEDIA:** Foam, CO<sub>2</sub> or dry chemicals.  
If water must be used and it can contact this material, it is best to use a water flood technique.
- FIRE FIGHTING EQUIPMENT:** Fire fighters should wear full protective equipment, including self-contained breathing apparatus.
- HAZARDOUS COMBUSTION PRODUCTS:** When heated to dryness and decomposition, it emits toxic sodium oxide.

**6. ACCIDENTAL RELEASE MEASURES**

- LAND SPILL:** Wearing recommended protective equipment and clothing, dike the spill and pick up the bulk of liquid using pumps or a vacuum truck, or absorb the liquid in sand or a commercial absorbent. Place in approved containers for recovery, disposal, or satellite accumulation. Neutralize the alkalinity, of the remaining liquid, using a dilute acid solution appropriate for neutralizing alkaline liquids. Liberally cover the spill area with sodium bicarbonate. Flush the spill area with water; collect the rinsates for disposal or sewer, as appropriate.
- WATER SPILL:** Wear recommended protective equipment and clothing if contact with hazardous material can occur. Stop or divert water flow. Dike contaminated water and remove for disposal and/or treatment. As appropriate, notify all downstream users of possible contamination.

**7. HANDLING AND STORAGE****STORAGE TEMPERATURE:** Ambient**STORAGE PRESSURE:** Ambient

**GENERAL:** Store in a cool, dry, well-ventilated area away from incompatible materials and products. Do not get this material in eyes, on skin or on clothing. Wear recommended personnel protective equipment. Do not breathe mists or aerosols. Use only with adequate ventilation. Do not take internally. Keep the container tightly closed when not in use. Wash thoroughly after handling.

This material is corrosive to Aluminum, Magnesium, Tin, Zinc and alloys containing these metals, and it will react violently with these metals in powder form.

Considerable heat is generated when this material is mixed with water. Never add water to this material. Always add this material slowly, with constant stirring, to the surface of cool (40 – 50° F.) water. If this material is added too rapidly, or without stirring, and becomes concentrated at the bottom of the mixing vessel, excessive heat may be generated, resulting in dangerous boiling and spattering, and a possible immediate and violent eruption of a highly caustic solution.

**8. EXPOSURE CONTROLS / PERSONAL PROTECTION**

**CONTROL MEASURES:** Use a local or general, mechanical exhaust ventilation system capable of maintaining emissions, in the work area, below the OSHA-PEL or ACGIH Ceiling level.

**RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT**

**RESPIRATOR:** For exposure above the OSHA-PEL or ACGIH-TLV, wear a NIOSH-approved full facepiece or half mask air-purifying cartridge respirator equipped with a good particulate filter cartridge or supplied air. For exposure to Sodium Hydroxide above 10 mg/m<sup>3</sup>, wear a supplied air respirator or a self-contained breathing apparatus (SCBA) operated in the positive pressure mode.

**EYES:** Wear chemical goggles (recommended by ANSI Z87.1-1979), unless a full facepiece respirator is worn.

**GLOVES:** Wear Neoprene, Nitrile, Butyl Rubber or Natural Rubber gloves.

**CLOTHING & EQUIPMENT:** Wear a Neoprene, Nitrile, Butyl Rubber or Natural Rubber apron, or full protective clothing when handling this material. An eye wash station and safety shower should be available in the work area.

**FOOTWEAR:** Wear Neoprene, Nitrile, Butyl Rubber or Natural Rubber boots.

**9. PHYSICAL AND CHEMICAL PROPERTIES**

<b>Appearance:</b>	Clear to slightly turbid, colorless	<b>Bulk Density (pounds/ft<sup>3</sup>):</b>	Not applicable
<b>Physical State:</b>	Liquid	<b>Vapor Pressure:</b>	13 mm Hg @ 60° F.
<b>Odor:</b>	No characteristic	<b>Vapor Density (air=1):</b>	No data available
<b>Odor Threshold:</b>	No data available	<b>Evaporation Rate (n-Butyl Acetate=1):</b>	No data available
<b>Molecular Formula:</b>	NaOH (in water)	<b>VOC Content:</b>	Nil
<b>Molecular Weight:</b>	40.00 (in water)	<b>% Volatile:</b>	49 – 51
<b>Boiling Point:</b>	Approximately 142.2° C. (288° F.)	<b>Solubility in H<sub>2</sub>O:</b>	Complete
<b>Freezing/Melting Point:</b>	Approximately 12.2° C. (54° F.)	<b>Octanol/Water Partition Coefficient:</b>	No data available
<b>Specific Gravity:</b>	Approximately 1.525 @ 20° C.	<b>pH (as is):</b>	14.0
<b>Density (pounds/gallon):</b>	Approximately 12.72	<b>pH (1% solution):</b>	13.0 to 14.0

**10. STABILITY AND REACTIVITY**

**GENERAL:** This product is stable and hazardous polymerization will not occur.

**CONDITIONS TO AVOID:** Avoid contact with small amounts of water.

**INCOMPATIBLE MATERIAL:** Acids and acidic salts, chlorinated or fluorinated hydrocarbons, Acetaldehyde, Acrolein, Chlorine trifluoride, Hydroquinone, Maleic anhydride, Phosphorus pentoxide, Tetrahydrofuran, Aluminum, Magnesium, Tin, Zinc and alloys of these metals.

**HAZARDOUS DECOMPOSITION PRODUCTS:** When heated to decomposition, it emits toxic oxides of sodium.

**SENSITIVITY TO MECHANICAL IMPACT:** This material is not sensitive to mechanical impact.

**SENSITIVITY TO STATIC DISCHARGE:** This material is not sensitive to static discharge.

**11. TOXICOLOGICAL INFORMATION**

<b>Components:</b>	<b>Sodium Hydroxide</b>
<b>Eye Contact:</b>	Rabbit: 50 ug/24 hours; Severe
<b>Skin Contact:</b>	Rabbit: 500 mg/24 hours; Severe
<b>Oral Rat LD<sub>50</sub>:</b>	No data available (Oral Rabbit LD <sub>50</sub> : 500 mg/kg)
<b>Dermal Rabbit LD<sub>50</sub>:</b>	1,350 mg/kg
<b>Inhalation Rat LC<sub>50</sub>:</b>	No data available
<b>Human Data:</b>	No data available
<b>Other Toxicological Data:</b>	Intraperitoneal Mouse LD <sub>50</sub> : 40 mg/kg
<b>Carcinogenicity:</b>	No data available
<b>Teratogenicity:</b>	No data available
<b>Mutagenicity:</b>	Hamster Cytogenetic Analysis; Lung: 10 mmol/Liter
<b>Synergistic Products:</b>	None reported
<b>Target Organs:</b>	Eyes, Skin, Mucous membranes & Lungs
<b>Medical Conditions</b>	
<b>Aggravated By Exposure:</b>	Skin or Respiratory disorders

**12. ECOLOGICAL INFORMATION****ENVIRONMENTAL FATE:**

This material is completely soluble in water and will significantly affect the pH of water. No specific environmental fate information is available.

**ENVIRONMENTAL CONSIDERATIONS:**

The aquatic toxicity for this material has not been determined. The aquatic toxicity for pure Sodium Hydroxide is: *Cyprinus carpio* LC<sub>100</sub> = 180 ppm/24 hours at 25° C.

**13. DISPOSAL CONSIDERATIONS**

**RCRA 40 CFR 261 CLASSIFICATION:** Corrosive Waste

**U.S. EPA WASTE NUMBER/DESCRIPTION:** D002

If this product is disposed of as shipped, it meets the criteria of a hazardous waste as defined under 40 CFR 261 due to its corrosivity. If this product becomes a waste, it will be a hazardous waste, which is subject to the Land Disposal Restrictions under 40 CFR 268 and must be managed accordingly. As a hazardous liquid waste, it must be disposed of in accordance with local, state, and federal regulations in a permitted hazardous waste treatment, storage, and disposal facility.

**14. TRANSPORTATION INFORMATION**

**DOT PROPER SHIPPING NAME:** Sodium hydroxide solution

**Hazard Class:** 8

**UN Number:** UN1824

**Packing Group:** II

**Primary Label:** Corrosive

**Subsidiary Label(s):** None Required

**Primary/Subsidiary Placards:** Corrosive

**DOT Reportable Quantity (RQ):** 1,000 pounds (NaOH)

**RQ for Product:** 2,000 pounds (157.2 gallons)

**Marine Pollutant:** No

**2004 North American Emergency Response Guidebook No.:** 154

**TDG PROPER SHIPPING NAME:** SODIUM HYDROXIDE SOLUTION

**Hazard Class:** 8

**UN Number:** UN1824

**Packing Group:** II

**Primary Label:** Corrosive

**Subsidiary Label(s):** None Required

**Primary/Subsidiary Placards:** Corrosive

**TDG Reportable Quantity (RQ):<sup>#</sup>** At least 5kg or 5 liters.

**TDG Schedule XII:** Not listed

**Regulated Limit (RL):<sup>##</sup>** 50 kg (NaOH)

**RL for Product:** 100 kg (65.6 liters)

**Other Shipping Information:** None

<sup>#</sup> Canadian Transportation of Dangerous Goods Regulations (TDGR), Part IX, Table I, Quantities or levels for Immediate Reporting: releases of reportable quantities, RQ, that meet the definition of a "dangerous occurrence" (a threat to life, health, property, or the environment) must be reported to the appropriate authorities as outlined in TDGR 9.13(1) and 9.14(1).

<sup>##</sup> Reporting to Environment Canada is required for any releases exceeding the regulated limits, RL, of 9.2 materials (primary or secondary). The regulated limits are found in Schedule XIII of the TDGR.

**15. REGULATORY INFORMATION**

**COMPONENTS:** Sodium Hydroxide  
**OSHA Target Organs:** Eyes, Skin, Mucous membranes & Lungs

**Carcinogenic Potential:**

**Regulated by OSHA:** No  
**Listed on NTP Report:** No  
**Listed by IARC:** No  
 IARC Group: Not applicable  
**ACGIH Appendix A:** Not listed  
 A1 Confirmed Human: Not applicable  
 A2 Suspected Human: Not applicable

**U.S. EPA Requirements****Release Reporting****CERCLA (40 CFR 302)**

**Listed Substance:** Yes  
 Reportable Quantity: 1,000 pounds  
 Category: C  
 RCRA Waste No.: None listed  
**Unlisted Substance:** Not applicable  
 Reportable Quantity: Not applicable  
 Characteristic: Not applicable  
 RCRA Waste No.: Not applicable

**SARA TITLE III****Section 302 & 303 (40 CFR 355):**

**Listed Substance:** Not listed  
 Reportable Quantity: Not applicable  
 Planning Threshold: Not applicable

**Section 311 & 312 (40 CFR 370):**

Hazard Categories (product): Fire: N Sudden Release of Pressure: N Reactive: N Acute Health: Y Chronic Health: N  
 Planning threshold: 10,000 pounds

**Section 313 (40 CFR 372):**

**Listed Toxic Chemical:** Not listed  
 Reporting Threshold: Not applicable

**U.S. TSCA Status**

**Listed (40 CFR 710):** Yes

**State Regulations****State of California: Safe Drinking Water and Toxins Enforcement Act, 1986 (Proposition 65):**

Carcinogen: No  
 Reproductive Toxin: No

**Other Regulations**

**State Right To Know Laws:** MA, NJ, PA, CA

**Canadian Regulations****Product Information:**

Controlled Product: **Yes**  
 WHMIS Hazard Symbols: **Corrosive Material**  
 WHMIS Class & Division: **E**

**Ingredient Information:**

IDL Substance: Yes  
 DSL or NDSL Lists: DSL

**16. OTHER INFORMATION**

EPA Registration number: Not applicable

Approved Product Uses: Not applicable

**Special Notes:**

This product does not contain any material, which the State of California has found to cause cancer and/or birth defects or other reproductive harm.

**NOTE:** Deadly carbon monoxide gas can form when this material contacts food soil containing sugars. After cleaning operations are completed, thoroughly ventilate enclosed areas before entering. Always monitor oxygen and carbon monoxide levels when personnel are in enclosed areas. For proper tank entry procedures, see ANSI Z117.1-1977.

**Special Instructions:**

When making solutions, always add this material to cool (40 – 50° F.) water with adequate mixing to prevent overheating and possible spattering of a highly alkaline solution.

Do not allow this product to contact Aluminum, Magnesium, Tin or Zinc surfaces as this causes corrosion of the metal and generation of flammable / explosive Hydrogen gas.

**MSDS Revision Information:** Information Revised This Issue Date: **New product MSDS.**

Form Revision made 2/03/06

MSDS Distributed by: Brenntag Pacific, Inc.

NW Environmental Department

Phone: 503-242-0200 FAX: 503-412-3390

Prepared By: Edward Doheny

Date Prepared: July 31, 2007

This Material Safety Data Sheet is provided as an information resource only. It should not be taken as a warranty or representation for which Brenntag Pacific, Inc. assumes legal responsibility. While Brenntag Pacific, Inc. believes the information contained herein is accurate and compiled from sources believed to be reliable, it is the responsibility of the user to investigate and verify its validity. The buyer assumes all responsibility of using and handling the product in accordance with applicable federal, state, and local regulations.

#### 4. FIRST AID MEASURES

<b>Inhalation:</b>	If mist or vapor of this product is inhaled, remove person immediately to fresh air. Seek medical attention if symptoms develop or persist.
<b>Skin contact:</b>	For skin contact flush with large amounts of water. Obtain medical attention if irritation persists.
<b>Eye contact:</b>	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
<b>Ingestion:</b>	Seek medical advice. DO NOT induce vomiting unless directed to do so by medical personnel.
<b>Notes to physician:</b>	In the treatment of ethylene glycol overdose, ethanol competitively inhibits alcohol dehydrogenase (ADH) and prevents the formation of toxic metabolites. The affinity of ethylene glycol for ADH appears to be similar to ethanol. Ethanol should be administered only by qualified medical personnel.

#### 5. FIRE FIGHTING MEASURES

<b>Flash point:</b>	Not applicable
<b>Flashback:</b>	Not applicable
<b>Flame projection:</b>	Not applicable
<b>Autoignition temperature:</b>	Not determined
<b>Flammable/Explosive limits - lower:</b>	Not determined
<b>Flammable/Explosive limits - upper:</b>	Not determined
<b>Extinguishing media:</b>	Water spray (fog), foam, dry chemical or carbon dioxide.
<b>Special firefighting procedures:</b>	Wear full protective clothing. Wear self-contained breathing apparatus.
<b>Unusual fire or explosion hazards:</b>	This product is an aqueous mixture which will not burn.
<b>Hazardous combustion products:</b>	Irritating and toxic gases or fumes may be released during a fire.

#### 6. ACCIDENTAL RELEASE MEASURES

Use personal protection recommended in Section 8, isolate the hazard area and deny entry to unnecessary and unprotected personnel.

<b>Environmental precautions:</b>	Prevent further leakage or spillage if safe to do so. Wear appropriate protective equipment and clothing during clean-up. Do not allow product to enter sewer or waterways.
<b>Clean-up methods:</b>	Absorb spill with inert material. Shovel material into appropriate container for disposal.

#### 7. HANDLING AND STORAGE

<b>Handling:</b>	Prevent contact with eyes, skin and clothing. Do not breathe vapor and mist. Wash thoroughly after handling. Do not take internally. For industrial use only. Launder work clothes frequently.
<b>Storage:</b>	For safe storage, store between -10 °C (14°F) and 40 °C (104°F) Keep container tightly closed and in a cool, well-ventilated place away from incompatible materials. Thaw and mix thoroughly if frozen.

For information on product shelf life, please review labels on container or check the Technical Data Sheet.

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Employers should complete an assessment of all workplaces to determine the need for, and selection of, proper exposure controls and protective equipment for each task performed.

Hazardous components	ACGIH TLV	OSHA PEL	AIHA WEEL	OTHER
Poly(ethylene glycol)	None	None	10 mg/m <sup>3</sup> TWA Particulate.	None
Ethylene glycol	100 mg/m <sup>3</sup> Ceiling Aerosol.	None	None	None
1,3-Diethyl-2-thiourea	None	None	None	None
Ethoxylated Propoxylated alcohol	None	None	None	None
quinolinium chloride	None	None	0.001 ppm (0.005 mg/m <sup>3</sup> ) TWA (SKIN)	None

<b>Engineering controls:</b>	Provide local and general exhaust ventilation to effectively remove and prevent buildup of any vapors or mists generated from the handling of this product.
<b>Respiratory protection:</b>	If ventilation is not sufficient to effectively prevent buildup of aerosols, mists or vapors, appropriate NIOSH/MSHA respiratory protection must be provided.
<b>Eye/face protection:</b>	Wear chemical goggles; face shield (if splashing is possible).
<b>Skin protection:</b>	Wear impervious gloves for prolonged contact. Use of impervious apron and boots are recommended.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Physical state:</b>	Liquid
<b>Color:</b>	Light amber
<b>Odor:</b>	Aromatic
<b>Odor threshold:</b>	Not available
<b>pH:</b>	3.8 - 4.2 (10% solution)
<b>Vapor pressure:</b>	17 mbar
<b>Boiling point/range:</b>	103.2 °C (217.8 °F)
<b>Melting point/ range:</b>	-20 °C (-4°F)
<b>Specific gravity:</b>	1.09 - 1.11 at 20 °C (68°F)
<b>Vapor density:</b>	Not available
<b>Flash point:</b>	Not applicable
<b>Flashback:</b>	Not applicable
<b>Flame projection:</b>	Not applicable
<b>Flammable/Explosive limits - lower:</b>	Not determined
<b>Flammable/Explosive limits - upper:</b>	Not determined
<b>Autoignition temperature:</b>	Not determined
<b>Evaporation rate:</b>	Not available
<b>Solubility in water:</b>	Complete
<b>Partition coefficient (n-octanol/water):</b>	Not determined
<b>VOC content:</b>	Not available

## 10. STABILITY AND REACTIVITY

<b>Stability:</b>	Stable at normal conditions.
<b>Hazardous reactions:</b>	Will not occur.
<b>Hazardous decomposition products:</b>	Upon decomposition, this product emits carbon monoxide, carbon dioxide and/or low molecular weight hydrocarbons.
<b>Incompatible materials:</b>	This product may react with strong alkalis.
<b>Conditions to avoid:</b>	None identified.

## 11. TOXICOLOGICAL INFORMATION

Hazardous components	NTP Carcinogen	IARC Carcinogen	OSHA Carcinogen (Specifically Regulated)
Poly(ethylene glycol)	No	No	No
Ethylene glycol	No	No	No
1,3-Diethyl-2-thiourea	No	No	No
Ethoxylated Propoxylated alcohol	No	No	No
quinolinium chloride	No	No	No

Hazardous components	Health Effects/Target Organs
Poly(ethylene glycol)	Irritant
Ethylene glycol	Blood, Bone Marrow, Central nervous system, Developmental, Eyes, Irritant, Kidney, Liver, Metabolic
1,3-Diethyl-2-thiourea	Irritant, Allergen
Ethoxylated Propoxylated alcohol	Irritant, Allergen
quinolinium chloride	No Data

## 12. ECOLOGICAL INFORMATION

Ecological information: Not available

## 13. DISPOSAL CONSIDERATIONS

Information provided is for unused product only.

**Recommended method of disposal:** Dispose of according to Federal, State and local governmental regulations.

**Hazardous waste number:** Material, if discarded, is not expected to be a characteristic hazardous waste under RCRA. Wastes must be tested using methods described in 40 CFR Part 261 to determine if it meets applicable definitions of hazardous wastes.

## 14. TRANSPORT INFORMATION

### U.S. Department of Transportation Ground (49 CFR)

**Proper shipping name:** Not regulated  
**Hazard class or division:** None  
**Identification number:** None  
**Packing group:** None

### International Air Transportation (ICAO/IATA)

**Proper shipping name:** Not regulated  
**Hazard class or division:** None  
**Identification number:** None  
**Packing group:** None

### Water Transportation (IMO/IMDG)

**Proper shipping name:** Not regulated  
**Hazard class or division:** None  
**Identification number:** None  
**Packing group:** None

## 15. REGULATORY INFORMATION

### United States Regulatory Information

**TSCA 8 (b) Inventory Status:** All components are listed or are exempt from listing on the Toxic Substances Control Act Inventory.

**TSCA 12(b) Export Notification:** None above reporting de minimus

**CERCLA/SARA Section 302 EHS:** None above reporting de minimus  
**CERCLA/SARA Section 311/312:** Immediate Health, Delayed Health

**CERCLA/SARA 313:** This product contains the following toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 (40 CFR 372). Ethylene glycol (CAS# 107-21-1).

**California Proposition 65:** This product contains a chemical known in the State of California to cause cancer. This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

**Canada Regulatory Information**

**CEPA DSL/NDSL Status:** Contains one or more components listed on the Non-Domestic Substances List. All other components are listed on or are exempt from listing on the Domestic Substances List. Components listed on the NDSL must be tracked by all Canadian Importers of Record as required by Environment Canada. They may be imported into Canada in limited quantities. Please contact Regulatory Affairs for additional details.

**WHMIS hazard class:** D.2.A

**16. OTHER INFORMATION**

**This material safety data sheet contains changes from the previous version in sections:** Updated composition in Section 3.

**Prepared by:** John DiCerbo, Regulatory Affairs Specialist

**DISCLAIMER:** The data contained herein are furnished for information only and are believed to be reliable. However, Henkel Corporation does not assume responsibility for any results obtained by persons over whose methods Henkel Corporation has no control. It is the user's responsibility to determine the suitability of Henkel's products or any production methods mentioned herein for a particular purpose, and to adopt such precautions as may be advisable for the protection of property and persons against any hazards that may be involved in the handling and use of any of Henkel Corporation's products. In light of the foregoing, Henkel Corporation specifically disclaims all warranties, express or implied, including warranties of merchantability and fitness for a particular purpose, arising from sale or use of Henkel Corporation's products. Henkel Corporation further disclaims any liability for consequential or incidental damages of any kind, including lost profits.

PRODUCT IDENTIFIER: Citric Acid 50% Solution (All Grades)

page 2 of 6

**4. FIRST AID MEASURES**

- INHALATION:** If inhaled, immediately move to fresh air. If not breathing, give artificial respiration. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; use the Holger Nielsen method (back pressure-arm lift) or proper respiratory device. If breathing is difficult, give oxygen. Call a physician.
- EYE CONTACT:** In case of contact, immediately flush eyes with plenty of clean running water for at least 15 minutes, lifting the upper and lower lids occasionally. Remove contact lenses, if worn. Get medical attention immediately.
- SKIN CONTACT:** In case of contact, immediately flush skin with plenty of clean running water for at least 15 minutes, while removing contaminated clothing and shoes. Then wash with soap and water. If burn or irritation occurs, call a physician.
- INGESTION:** If swallowed, DO NOT induce vomiting. Get medical attention immediately. If victim is fully conscious, give plenty of water to drink. Never give anything by mouth to an unconscious person.
- NOTE TO PHYSICIANS:** Treat exposure symptomatically.

**5. FIRE FIGHTING MEASURES**

- Flashpoint and Method:** This product does not flash.
- Flammable Limits (in air, % by volume) Lower:** Not applicable **Upper:** Not applicable
- Autoignition Temperature:** Not applicable
- GENERAL HAZARD:** This product is an aqueous solution of a non-volatile organic acid having no characteristic odor. The Uniform Fire Code health hazard classification for this product is: **Irritant**. When in contact with some soft metals (i.e. Aluminum), this product can corrode the metal, liberating flammable / explosive Hydrogen gas. This product may produce hazardous mists or hazardous decomposition products.
- FIRE FIGHTING INSTRUCTIONS:** **EXTINGUISHING MEDIA:** Water fog, CO<sub>2</sub> foam or dry chemicals.  
Use the extinguishing media that is appropriate to the surrounding fire.
- FIRE FIGHTING EQUIPMENT:** Fire fighters should wear full protective equipment, including self-contained breathing apparatus.
- HAZARDOUS COMBUSTION PRODUCTS:** When heated to dryness and decomposition, it emits toxic carbon monoxide and carbon dioxide plus dense, irritating smoke.

**6. ACCIDENTAL RELEASE MEASURES**

- LAND SPILL:** Wearing recommended protective equipment and clothing, dike spill using soil, sand or compatible commercial absorbent. Pick up bulk of liquid using pumps or vacuum truck or absorb liquid in sand or commercial absorbent. Place in approved containers for recovery, disposal or satellite accumulation. Neutralize the acidity using soda ash, lime or a suitable agent appropriate for neutralizing acidic liquids. Flush the spill area with water; collect rinsates for disposal or sewer, as appropriate.
- WATER SPILL:** Wear recommended protective equipment and clothing if contact with hazardous material can occur. Stop or divert water flow. Dike contaminated water and remove for disposal and/or treatment. As appropriate, notify all downstream users of possible contamination.

PRODUCT IDENTIFIER: Citric Acid 50% Solution (All Grades)

page 3 of 6

**7. HANDLING AND STORAGE****STORAGE TEMPERATURE:** Ambient**STORAGE PRESSURE:** Ambient

**GENERAL:** Store in a cool, dry, well-ventilated area away from incompatible materials and products. Avoid getting this product in eyes, on skin or on clothing. Wear the recommended personnel protective equipment. Avoid breathing mists or aerosols. Use with adequate ventilation. Keep the container tightly closed when not in use. Wash thoroughly after handling this product.

**8. EXPOSURE CONTROLS / PERSONAL PROTECTION**

**CONTROL MEASURES:** Use a local or general, mechanical exhaust ventilation system capable of maintaining mist levels, in the work area, below any level, which may be irritating.

**RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT**

**RESPIRATOR:** If use causes an irritating mist, wear a NIOSH-approved respirator equipped with a good mist / particulate cartridge or supplied air.

**EYES:** Wear chemical goggles (recommended by ANSI Z87.1-1979).

**GLOVES:** Wear Nitrile, Neoprene, Butyl Rubber, Viton or Natural Rubber gloves.

**CLOTHING & EQUIPMENT:** Wear a Nitrile, Neoprene, Butyl Rubber or Natural Rubber apron when handling this product. An eye wash station and safety shower should be available in the work area.

**FOOTWEAR:** Wear Nitrile, Neoprene, Butyl Rubber or Natural Rubber boots, if contact is likely.

**9. PHYSICAL AND CHEMICAL PROPERTIES**

<b>Appearance:</b>	Clear, colorless to light yellow	<b>Bulk Density (pounds/ft<sup>3</sup>):</b>	Not applicable
<b>Physical State:</b>	Liquid	<b>Vapor Pressure:</b>	No data available
<b>Odor:</b>	No characteristic	<b>Vapor Density (air=1):</b>	No data available
<b>Odor Threshold:</b>	No data available	<b>Evaporation Rate (n-Butyl Acetate=1):</b>	No data available
<b>Molecular Formula:</b>	C <sub>6</sub> H <sub>8</sub> O <sub>7</sub> (in water)	<b>VOC Content:</b>	Not applicable
<b>Molecular Weight:</b>	192.14 (in water)	<b>% Volatile:</b>	Approximately 50
<b>Boiling Point:</b>	Approximately 104° C. (219° F.)	<b>Solubility in H<sub>2</sub>O:</b>	Complete
<b>Freezing/Melting Point:</b>	Less than 0° C. (32° F.)	<b>Octanol/Water Partition Coefficient:</b>	No data available
<b>Specific Gravity:</b>	Approximately 1.22 @ 20° C.	<b>pH (as is):</b>	1.5 – 2.0
<b>Density (pounds/gallon):</b>	Approximately 10.2	<b>pH (1% solution):</b>	2.0 – 2.5

**10. STABILITY AND REACTIVITY**

**GENERAL:** This product is stable and hazardous polymerization will not occur.

**CONDITIONS TO AVOID:** Hot storage.

**INCOMPATIBLE MATERIAL:** Strong oxidizers, caustics & alkali, chlorine releasers, sulfides, sulfites, cyanides, Aluminum, Magnesium, Zinc and alloys of these metals.

**HAZARDOUS DECOMPOSITION PRODUCTS:** When heated to dryness and decomposition, it emits toxic oxides of carbon plus dense, irritating smoke.

**SENSITIVITY TO MECHANICAL IMPACT:** This product is not sensitive to mechanical impact.

**SENSITIVITY TO STATIC DISCHARGE:** This product is not sensitive to static discharge.

PRODUCT IDENTIFIER: Citric Acid 50% Solution (All Grades)

page 4 of 6

**11. TOXICOLOGICAL INFORMATION**

**Components:** Citric Acid  
**Eye Contact:** Rabbit: 750 ug/24 Hours; Severe  
**Skin Contact:** Rabbit: 500 mg/24 Hours; Moderate  
**Oral Rat LD<sub>50</sub>:** 3 gm/kg  
**Dermal Rabbit LD<sub>50</sub>:** No data available  
**Inhalation Rat LC<sub>50</sub>:** No data available  
**Human Data:** No data available  
**Other Toxicological Data:** Intravenous Mouse LD<sub>50</sub>: 42 mg/kg  
**Carcinogenicity:** No data available  
**Teratogenicity:** No data available  
**Mutagenicity:** No data available  
**Synergistic Products:** None reported  
**Target Organs:** Eyes, Skin, Mucous membranes, Lungs & Teeth  
**Medical Conditions Aggravated By Exposure:** Skin or Respiratory disorders

**12. ECOLOGICAL INFORMATION****ENVIRONMENTAL FATE:**

The environmental fate of this product is expected to be: **Land:** biodegradation with some leaching into the groundwater. **Water:** biodegradation. **Air:** not expected to volatilize due to low vapor pressure. This product is not expected to bioaccumulate.

**ENVIRONMENTAL CONSIDERATIONS:**

The aquatic toxicity of this product has not been determined. However the aquatic toxicity of pure Citric Acid is: Goldfish LD<sub>50</sub>: 625 mg/liter, longtime exposure in hard water. Goldfish LD<sub>100</sub>: 894 mg/liter, longtime exposure in hard water.

**13. DISPOSAL CONSIDERATIONS**

**RCRA 40 CFR 261 CLASSIFICATION:** Corrosive Waste

**U.S. EPA WASTE NUMBER/DESCRIPTION:** D002

If this product is disposed of as shipped, it meets the criteria of a hazardous waste as defined under 40 CFR 261 due to its corrosivity. If this product becomes a waste, it will be a hazardous waste which is subject to the Land Disposal Restrictions under 40 CFR 268 and must be managed accordingly. As a hazardous liquid waste, it must be disposed of in accordance with local, state and federal regulations in a permitted hazardous waste treatment, storage and disposal facility.

**14. TRANSPORTATION INFORMATION**

**DOT PROPER SHIPPING NAME:** Not Restricted (See Other Shipping Information)

**Hazard Class:** Not applicable **UN Number:** Not applicable **Packing Group:** Not applicable

**Primary Label:** None Required **Subsidiary Label(s):** None Required

**Primary/Subsidiary Placards:** None Required

**DOT Reportable Quantity (RQ):** Not listed **RQ for Product:** Not applicable

**Marine Pollutant:** No

**2004 North American Emergency Response Guidebook No.:** Not applicable (in U.S.); 154 (Outside U.S.)

**TDG PROPER SHIPPING NAME:** CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. (Contains Citric Acid)

**Hazard Class:** 8 **UN Number:** UN3265 **Packing Group:** III

**Primary Label:** Corrosive **Subsidiary Label(s):** None Required

**Primary/Subsidiary Placards:** Corrosive

**TDG Reportable Quantity (RQ):** # At least 5 kg or 5 liters.

**TDG Schedule XII:** Not listed

**Regulated Limit (RL):** ## Not listed **RL for Product:** Not applicable

**Other Shipping Information:** DOT exception taken for materials only corrosive to Aluminum and mild steel; 49 CFR 173.154 (d) (1) and (2), when shipped by ground.

# Canadian Transportation of Dangerous Goods Regulations (TDGR), Part IX, Table I, Quantities or levels for immediate reporting: releases of reportable quantities, RQ, that meet the definition of a "dangerous occurrence" (a threat to life, health, property, or the environment) must be reported to the appropriate authorities as outlined in TDGR 9.13(1) and 9.14(1).

## Reporting to Environment Canada is required for any releases exceeding the regulated limits, RL, of 9.2 materials (primary or secondary). The regulated limits are found in Schedule XIII of the TDGR.

PRODUCT IDENTIFIER: Citric Acid 50% Solution (All Grades)

page 5 of 6

### 15. REGULATORY INFORMATION

**COMPONENTS:** Citric Acid  
**OSHA Target Organs:** Eyes, Skin, Mucous membranes, Lungs & Teeth

#### Carcinogenic Potential:

**Regulated by OSHA:** No  
**Listed on NTP Report:** No  
**Listed by IARC:** No  
**IARC Group:** Not applicable  
**ACGIH Appendix A:** Not listed  
**A1 Confirmed Human:** Not applicable  
**A2 Suspected Human:** Not applicable

#### U.S. EPA Requirements

##### Release Reporting

##### **CERCLA (40 CFR 302)**

**Listed Substance:** Not listed  
**Reportable Quantity:** Not applicable  
**Category:** Not applicable  
**RCRA Waste No.:** Not applicable  
**Unlisted Substance:** Yes  
**Reportable Quantity:** 100 pounds  
**Characteristic:** Corrosivity  
**RCRA Waste No.:** D002

##### SARA TITLE III

##### **Section 302 & 303 (40 CFR 355):**

**Listed Substance:** Not listed  
**Reportable Quantity:** Not applicable  
**Planning Threshold:** Not applicable

##### **Section 311 & 312 (40 CFR 370):**

**Hazard Categories (product):** Fire: N Sudden Release of Pressure: N Reactive: N Acute Health: Y Chronic Health: N  
**Planning threshold:** 10,000 pounds

##### **Section 313 (40 CFR 372):**

**Listed Toxic Chemical:** Not listed  
**Reporting Threshold:** Not applicable

#### U.S. TSCA Status

**Listed (40 CFR 710):** Yes

#### State Regulations

##### **State of California: Safe Drinking Water and Toxins Enforcement Act, 1986 (Proposition 65):**

**Carcinogen:** No  
**Reproductive Toxin:** No

#### Other Regulations

**State Right To Know Laws:** None known

#### Canadian Regulations

##### **Product Information:**

**Controlled Product:** Yes  
**WHMIS Hazard Symbols:** Corrosive Material  
**WHMIS Class & Division:** E

##### **Ingredient Information:**

**IDL Substance:** Yes  
**DSL or NDSL Lists:** DSL

PRODUCT IDENTIFIER: **Citric Acid 50% Solution (All Grades)**

page 6 of 6

**16. OTHER INFORMATION**

**EPA Registration number:** Not applicable

**Approved Product Uses:** Not applicable

**Special Notes:**

This product does not contain any material, which the State of California has found to cause cancer and/or birth defects or other reproductive harm.

**Special Instructions:**

When making solutions, always add this product to water with adequate mixing to ensure a uniform solution.

Do not mix this product with strong caustic or alkaline solutions as violent boiling or spattering may result.

Do not add Citric Acid 50% Solution to hypochlorite bleaches, chlorine sanitizers or chlorinated cleaners as this liberates toxic, corrosive Chlorine gas.

**MSDS Revision Information:** Information Revised This Issue Date: **New MSDS format with additional information.**

Form Revision made 2/03/06

MSDS Distributed by: Brenntag Pacific, Inc.

NW Environmental Department

Phone: 503-242-0200 FAX: 503-412-3390

**Prepared By:** Edward Doheny

**Date Prepared:** July 26, 2007

This Material Safety Data Sheet is provided as an information resource only. It should not be taken as a warranty or representation for which Brenntag Pacific, Inc. assumes legal responsibility. While Brenntag Pacific, Inc. believes the information contained herein is accurate and compiled from sources believed to be reliable, it is the responsibility of the user to investigate and verify its validity. The buyer assumes all responsibility of using and handling the product in accordance with applicable federal, state, and local regulations.

# Material Safety Data Sheet

## 1. Product and company identification

 Product name : **SURFONIC® N-95**

MSDS # 00033063

Product use : Surfactant

Huntsman Petrochemical Corporation  
 P.O. Box 4980  
 The Woodlands, TX 77387-4980

### TELEPHONE NUMBERS

Transportation Emergency

Company: (800) 328-8501

CHEMTREC: (800) 424-9300

Medical Emergency: (409) 722-9673 (24 Hour)

General MSDS Assistance: (281) 719-6000

Technical Information: (281) 719-7780

E-MAIL: MSDS@huntsman.com

Validation date : 3/4/2009.

### In case of emergency

**Spills Leaks Fire or Exposure Call Chemtrec: (800) 424-9300**

**Medical Emergency Information: (800) 328-8501**

**In Mexico: 01 800 00 214 00**

**In Columbia: 01 800 91 6012**

## 2. Hazards identification

Physical state : Liquid. [Liquid.]

Odor : Slight

OSHA/HCS status : While this material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200), this MSDS contains valuable information critical to the safe handling and proper use of the product. This MSDS should be retained and available for employees and other users of this product.

Emergency overview : CAUTION!

MAY CAUSE EYE AND SKIN IRRITATION.

Slightly irritating to the eyes and skin. Avoid breathing vapor or mist. Avoid contact with eyes. Avoid prolonged or repeated contact with skin. Wash thoroughly after handling.

GENERAL INFORMATION : Read the entire MSDS for a more thorough evaluation of the hazards.

## 3. Composition/information on ingredients

Name	CAS number	%
Nonylphenol, ethoxylated	9016-45-9	60 - 100

**SURFONIC® N-95****4 . First aid measures**

<b>Eye contact</b>	: Get medical attention immediately. Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician.
<b>Skin contact</b>	: Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.
<b>Inhalation</b>	: Move exposed person to fresh air. Keep person warm and at rest. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
<b>Ingestion</b>	: Wash out mouth with water. Move exposed person to fresh air. Do not induce vomiting unless directed to do so by medical personnel. Get medical attention if symptoms occur. Never give anything by mouth to an unconscious person.
<b>Notes to physician</b>	: Symptomatic and supportive therapy as needed. Following severe exposure medical follow-up should be monitored for at least 48 hours.

**5 . Fire-fighting measures**

<b>Flash point</b>	: Closed cup: 237.78°C (460°F) [Pensky-Martens.]
<b>Products of combustion</b>	: Decomposition products may include the following materials: carbon dioxide carbon monoxide
<b><u>Extinguishing media</u></b>	
<b>Suitable</b>	: Use an extinguishing agent suitable for the surrounding fire.
<b>Not suitable</b>	: None known.
<b>Special exposure hazards</b>	: In a fire or if heated, a pressure increase will occur and the container may burst. Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.
<b>Special protective equipment for fire-fighters</b>	: Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

**6 . Accidental release measures**

<b>Personal precautions</b>	: No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Put on appropriate personal protective equipment (see section 8).
<b>Environmental precautions</b>	: Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
<b>Methods for cleaning up</b>	: Stop leak if without risk. Move containers from spill area. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Dispose of via a licensed waste disposal contractor. Note: see section 1 for emergency contact information and section 13 for waste disposal.

**SURFONIC® N-95****7 . Handling and storage**

- Handling** : Put on appropriate personal protective equipment (see section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapor or mist. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.
- Storage** : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. 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. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

**8 . Exposure controls/personal protection**

**Consult local authorities for acceptable exposure limits.**

- Preventive Measures** : Conditions of use, adequacy of engineering or other control measures, and actual exposures will dictate the need for specific protective devices at your workplace.
- Engineering controls** : Use local exhaust ventilation to maintain airborne concentrations below the TLV. Suitable respiratory equipment should be used in cases of insufficient ventilation or where operational procedures demand it. For guidance on engineering control measures refer to publications such as the ACGIH current edition of 'Industrial Ventilation, a manual of Recommended Practice.'
- Personal protection**
- Eyes** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.
- Skin** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Respiratory** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.
- Hands** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

**9 . Physical and chemical properties****General information****Appearance**

- Physical state** : Liquid. [Liquid.]
- Color** : Pale color.
- Odor** : Slight
- Odor threshold** : Not available.

**Important health, safety and environmental information**

- pH** : 7
- Boiling point** : Not available.
- Melting point** : 5°C (41°F)
- Flash point** : Closed cup: 237.78°C (460°F) [Pensky-Martens.]

**SURFONIC® N-95****9 . Physical and chemical properties**

Oxidizing properties	: Not available.
Vapor pressure	: <0.13 kPa (<1 mm Hg)
Relative density	: 1.06
Viscosity	: Kinematic: 1.1 cm <sup>2</sup> /s (110 cSt at 100°F)
Vapor density	: Not available.
VOC content	: Not available.

**10 . Stability and reactivity**

Stability and reactivity	: The product is stable.
Incompatibility with various substances	: Reactive or incompatible with the following materials: oxidizing materials, reducing materials and metals.
Hazardous polymerization	: Under normal conditions of storage and use, hazardous polymerization will not occur.
Hazardous decomposition products	: Decomposition products may include the following materials: carbon dioxide carbon monoxide

**11 . Toxicological information**Toxicity dataAcute toxicity

Product/ingredient name	test	Species	Result	Exposure
Nonylphenol, ethoxylated	LD50 Oral	Rat	3310 mg/kg	-
	LD50 Dermal	Rabbit	>2000 mg/kg	-

Potential acute health effects

Ingestion	: No known significant effects or critical hazards.
Inhalation	: No known significant effects or critical hazards.
Eyes	: Slightly irritating to the eyes.
Skin	: Slightly irritating to the skin.

Potential chronic health effects

Target organs	: No known significant effects or critical hazards.
Carcinogenicity	: No known significant effects or critical hazards.
Mutagenicity	: No known significant effects or critical hazards.
Teratogenicity	: No known significant effects or critical hazards.
Fertility effects	: No known significant effects or critical hazards.
Developmental effects	: No known significant effects or critical hazards.

**12 . Ecological information**Aquatic ecotoxicity

Product/ingredient name	test	Result	Species	Exposure
Nonylphenol, ethoxylated	-	Acute LC50 1 to 10 mg/L	Fish	96 hours

Biodegradability

Product/ingredient name	test	Result	Dose	Inoculum
Nonylphenol, ethoxylated	-	60 % - Inherent - 28 days	-	-

<u>Product/ingredient name</u>	<u>Aquatic half-life</u>	<u>Photolysis</u>	<u>Biodegradability</u>
--------------------------------	--------------------------	-------------------	-------------------------

**SURFONIC® N-95****12 . Ecological information**

Nonylphenol, ethoxylated - - Not readily  
**Environmental effects** : Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

**13 . Disposal considerations**

**Waste disposal** : The generation of waste should be avoided or minimized wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

**14 . Transport information**

Transportation Emergency Number 1-800-424-9300 (CHEMTREC).

Regulatory information	UN number	Proper shipping name	Class	PG*	Label	Additional information
DOT Classification	Not regulated.					-
TDG Classification	Not regulated.					-
IMDG Class	Not regulated.		-	-		-
IATA-DGR Class	Not regulated.		-	-		-

PG\* : Packing group

**15 . Regulatory information**United States

**HCS Classification** : Not regulated.  
**U.S. Federal regulations** : **United States inventory (TSCA 8b)**: All components are listed or exempted.

**CERCLA: Hazardous substances.** : No ingredients listed.

This product does not contain nor is it manufactured with ozone depleting substances.

SARA 313

	<u>Product name</u>	<u>CAS number</u>	<u>Concentration</u>
<b>Form R - Reporting requirements</b>	: GLYCOL ETHERS (FRACTION OF PRODUCT MEETING EPA DEFINITION)	Blend	3%

SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

State regulations

**California Prop 65** :

SURFONIC® N-95

## 15 . Regulatory information

**WARNING:** This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

<u>Ingredient name</u>	<u>Cancer</u>	<u>Reproductive</u>	<u>No significant risk level</u>	<u>Maximum acceptable dosage level</u>
Ethylene oxide	Yes.	Yes.	Yes.	Yes.

### Canada

WHMIS (Canada) : Class D-2B: Material causing other toxic effects (Toxic).  
 CEPA (DSL) : DSL: All Ingredients Listed.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

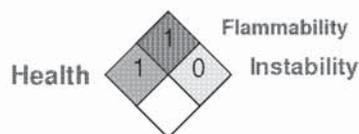
## 16 . Other information

Label requirements : MAY CAUSE EYE AND SKIN IRRITATION.

Hazardous Material Information System (U.S.A.) :

Health	1
Fire hazard	1
Reactivity	0

National Fire Protection Association (U.S.A.) :



Date of printing : 3/5/2009.

Date of issue : 4 March 2009

Date of previous issue : 3/3/2009.

### Notice to reader

*While the information and recommendations in this publication are to the best of our knowledge, information and belief accurate at the date of publication, NOTHING HEREIN IS TO BE CONSTRUED AS A WARRANTY, EXPRESS OR OTHERWISE.*

*IN ALL CASES, IT IS THE RESPONSIBILITY OF THE USER TO DETERMINE THE APPLICABILITY OF SUCH INFORMATION AND RECOMMENDATIONS AND THE SUITABILITY OF ANY PRODUCT FOR ITS OWN PARTICULAR PURPOSE.*

*THE PRODUCT MAY PRESENT HAZARDS AND SHOULD BE USED WITH CAUTION. WHILE CERTAIN HAZARDS ARE DESCRIBED IN THIS PUBLICATION, NO GUARANTEE IS MADE THAT THESE ARE THE ONLY HAZARDS THAT EXIST.*

*Hazards, toxicity and behaviour of the products may differ when used with other materials and are dependent upon the manufacturing circumstances or other processes. Such hazards, toxicity and behaviour should be determined by the user and made known to handlers, processors and end users.*

*NO PERSON OR ORGANIZATION EXCEPT A DULY AUTHORIZED HUNTSMAN EMPLOYEE IS AUTHORIZED TO PROVIDE OR MAKE AVAILABLE DATA SHEETS FOR HUNTSMAN PRODUCTS. DATA SHEETS FROM UNAUTHORIZED SOURCES MAY CONTAIN INFORMATION THAT IS NO LONGER CURRENT OR ACCURATE. NO PART OF THIS DATA SHEET MAY BE REPRODUCED OR TRANSMITTED IN ANY FORM, OR BY ANY MEANS, WITHOUT PERMISSION IN WRITING FROM HUNTSMAN. ALL REQUESTS FOR PERMISSION TO REPRODUCE MATERIAL FROM THIS DATA SHEET SHOULD BE DIRECTED TO HUNTSMAN, MANAGER, PRODUCT SAFETY AT THE ABOVE ADDRESS.*

### Trademarks:

SURFONIC® is a registered trademark of Huntsman Corporation or an affiliate thereof in one or more countries, but not all countries.

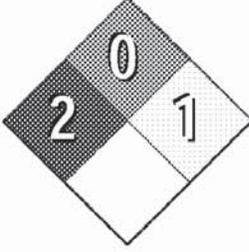
*SURFONIC® N-95*

## 16 . Other information

▣ Indicates information that has changed from previously issued version.

## MATERIAL SAFETY DATA SHEET



NFPA	HMIS	PPE	Symbol(s)
			  <p style="text-align: center;">Regulated</p>
Current Issue Date: May 16, 2013		Revision Number: 0	
<b>1. PRODUCT AND COMPANY IDENTIFICATION</b>			
Product Name:	Sodium Nitrite		
Other/Generic Names:	Nitrous Acid, Sodium Salt, Sodium Nitrite (various grades)		
Recommended Use:	Food preservation, dye manufacturing, corrosion inhibitor		
Manufacturer:	General Chemical, LLC 90 East Halsey Road Parsippany, NJ 07054		
For More Information:	General Chemical Performance Products Ltd. 90 East Halsey Road Parsippany, NJ 07054 Customer Service US ONLY: 800-631-8050 (Monday – Friday 9:00AM – 4:30PM)		
Emergency Telephone Number:	Customer Service CANADA ONLY: 866-543-3896 (Monday – Friday 9:00AM – 4:30PM) US ONLY - CALL CHEMTREC: 800-424-9300 (24 Hours/Day, 7 Days/Week) CANADA ONLY - CALL CANUTEC: 613-996-6666 (24 Hours/Day, 7 Days/Week) OUTSIDE THE US - 703-527-3887		
<b>2. HAZARDS IDENTIFICATION</b>			
<b>EMERGENCY OVERVIEW:</b> White to slightly yellow crystalline solid. Toxic if swallowed or dust is inhaled. Oxidizer: may ignite organic materials and react with other materials. Can decompose if mixed with acids or exposed to fire conditions, releasing toxic nitrogen oxides.			
<b>OSHA Status:</b>	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200)		
<b>Potential Health Affects</b>			
<b>Skin:</b>	May cause skin irritation.		
<b>Eyes:</b>	May strongly irritate or burn the eyes.		
<b>Inhalation:</b>	Product mists may cause irritation to the respiratory tract.		
<b>Ingestion:</b>	May irritate the gastrointestinal tract. Although small quantities are used in food preparation, swallowing moderate amounts of sodium nitrite can result in serious toxic effects including death. Effects include nausea, weakness, cyanosis (blue skin), collapse and coma, possibly leading to death. Sodium nitrite interferes with the blood's ability to transport oxygen.		
<b>Delayed Effects:</b>	None known. If Sodium nitrite is used with amines found in certain cutting fluids, potentially carcinogenic nitrosamine compounds may be formed.		

## SODIUM NITRITE

3. COMPOSITION/INFORMATION ON INGREDIENTS		
Component	CAS No	Weight %
Sodium nitrite	7632-00-0	>98%
4. FIRST AID MEASURES		
<b>Eye Contact</b>	Immediately flush eyes with water for at least 15 minutes. Get medical attention if irritation persists.	
<b>Skin Contact</b>	Flush with plenty of water, removing contaminated clothing. If irritation develops, get medical attention.	
<b>Inhalation</b>	Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get prompt medical attention.	
<b>Ingestion</b>	Do not induce vomiting. Immediately give large quantities of water. Get medical attention immediately.	
<b>Notes to Physician</b>	Sodium nitrite forms methemoglobin in the blood stream. Treat accordingly.	
5. FIRE-FIGHTING MEASURES		
<u>Flammable Properties</u>		
<b>FLASH POINT:</b>	Not Flammable	
<b>FLASH POINT METHOD:</b>	Not Applicable	
<b>AUTOIGNITION TEMPERATURE:</b>	Not Applicable	
<b>UPPER FLAME LIMIT (VOLUME % IN AIR):</b>	Not Applicable	
<b>LOWER FLAME LIMIT (VOLUME % IN AIR):</b>	Not Applicable	
<b>FLAME PROPAGATION RATE (SOLIDS):</b>	Not Applicable	
<b>OSHA FLAMMABILITY CLASS:</b>	Not Applicable	
<b>SUITABLE EXTINGUISHING MEDIA:</b>	Use flooding amounts of water or other agents.	
<b>UNSUITABLE EXTINGUISHING MEDIA:</b>	Do NOT use dry chemicals containing ammonium phosphate.	
<u>Explosion Limits</u>		
<b>Hazardous Combustion Products</b>	No information available	
<b>Impact sensitivity</b>	No information available	
<b>Sensitivity to static discharge</b>	No information available	
<b>Specific Hazards Arising from the Chemical</b>	Material does not burn but is an oxidizing agent and will support combustion of other materials. Product decomposes above 608 °F releasing toxic nitrogen oxides.	
<b>Protective Equipment and Precautions for Firefighters</b>	Wear self-contained breathing apparatus (SCBA) and full protective equipment.	
6. ACCIDENTAL RELEASE MEASURES		
<b>IN CASE OF SPILL OR OTHER RELEASE</b>	Remove sources of ignition. Ventilate area. Use non-sparking tools and equipment. Sweep or shovel spilled material into containers. Dispose of material according to local, state and federal authorities. Do not allow product or residues to enter waterways and/or any source of drinking water.	
7. HANDLING AND STORAGE		
<b>Handling</b>	Avoid contact with skin and eyes. Do not breathe product dusts. Avoid contact with incompatible, combustible, organic or readily oxidizable materials.	
<b>Storage</b>	Store in a cool, dry, well-ventilated area. Keep containers tightly closed. Do not store on wooden floors. Isolate from combustible materials. Empty containers may contain product residues; observe all warnings and precautions listed for the product.	

## SODIUM NITRITE

8. EXPOSURE CONTROLS/PERSONAL PROTECTION					
Component	ACGIH TLV	OSHA PEL	Ontario TWAEV	Mexico OEL (TWA)	NIOSH IDLH
Sodium Nitrite				TWA: 2 mg/m <sup>3</sup>	
<b>Engineering Measures</b>	Use local exhaust to keep airborne concentrations below the permissible exposure limits.				
<b>Personal Protective Equipment</b>					
<b>Eye/Face Protection</b>	Wear chemical safety goggles. Do not wear contact lenses.				
<b>Skin Protection</b>	Wear appropriate personal protective clothing to prevent skin contact. If prolonged or repeated contact is anticipated, all clothing should be impervious to liquid.				
<b>Respiratory Protection</b>	A respiratory protection program that meets OSHA 1910.134 and ANSI Z88.2 or applicable federal/provincial requirements must be followed whenever workplace conditions warrant respirator use. NIOSH's "Respirator Decision Logic" may be useful in determining the suitability of various types of respirators.				
<b>General Hygiene Considerations</b>	To identify additional Personal Protective Equipment (PPE) requirements, it is recommended that a hazard assessment in accordance with the OSHA PPE Standard (29 CFR 1910.132) be conducted before using this product. Eyewash and safety showers are recommended.				
9. PHYSICAL AND CHEMICAL PROPERTIES					
<b>Appearance</b>	Crystals				
<b>Color</b>	White to slightly yellow				
<b>Chemical Formula</b>	NaNO <sub>2</sub>				
<b>Odor</b>	None				
<b>Odor Threshold</b>	No information available				
<b>Physical State</b>	Solid				
<b>pH</b>	~9.0 (for aqueous solution)				
<b>Flash Point</b>	Not flammable				
<b>Autoignition Temperature</b>	Not applicable				
<b>Boiling Point/Range</b>	Decomposes above 608°F				
<b>Melting Point/Range</b>	520°F				
<b>Flammability Limits in Air</b>	No information available				
<b>Explosive Properties</b>	No information available				
<b>Oxidizing Properties</b>	No information available				
<b>Evaporation Rate</b>	Not determined				
<b>Vapor Pressure</b>	Not applicable				
<b>Vapor Density</b>	Not applicable				
<b>Specific Gravity</b>	2.17				
<b>Partition Coefficient (n-octano/water)</b>	No information available				
<b>Viscosity</b>	No information available				
<b>Molecular Weight</b>	69.0				
<b>Water Solubility</b>	80.8 g/100 g at 68°F				
<b>VOC Content (%)</b>	0				

## SODIUM NITRITE

10. STABILITY AND REACTIVITY				
<b>Chemical Stability</b>	Normally stable.			
<b>Conditions to Avoid</b>	Material slowly oxidizes to sodium nitrate when exposed to air. Avoid heat, flame, ignition sources, shock, friction and incompatibilities.			
<b>Incompatible Products</b>	Hazardous reactions can occur with acids, ammonium compounds, reducing agents (particularly cyanides, thiocyanates and thiosulfates). May ignite organic compounds and other combustible materials.			
<b>Hazardous Decomposition Products</b>	Oxides of nitrogen (toxic and irritating)			
<b>Possibility of Hazardous Reactions</b>	Will not occur.			
11. TOXICOLOGICAL INFORMATION				
<b>Acute Toxicity</b>				
<b>Component Information</b>				
<b>Component</b>	<b>LD50 Oral</b>	<b>LD50 Dermal</b>	<b>LC50 Inhalation</b>	
Sodium nitrite	88 mg/kg (rat)		5.5 mg/m <sup>3</sup> /4hr (rat)	
<b>Irritation</b>	No information available			
<b>Corrosivity</b>	No information available			
<b>Sensitization</b>	No information available			
<b>Chronic Toxicity</b>				
<b>Carcinogenicity</b>	There are no known carcinogenic chemicals in this product.			
<b>Mutagenic Effects</b>	No information available			
<b>Reproductive Effects</b>	No information available			
<b>Developmental Effects</b>	No information available			
<b>Teratogenicty</b>	Multiple reproductive tests indicate that sodium nitrite is not teratogenic.			
<b>Target Organ Effects</b>	No information available			
<b>Other Adverse Effects</b>	Fetal toxicity has been demonstrated in pregnant animals fed toxic doses of sodium nitrite. This is due to the formation of methemoglobin.			
<b>Endocrine Disruptor Information</b>	No information available			
12. ECOLOGICAL INFORMATION				
<b>Ecotoxicity</b>				
Contains no substances known to be hazardous to the environment or not degradable in waste water treatment plants.				
<b>Component</b>	<b>Freshwater Algae</b>	<b>Freshwater Fish</b>	<b>Microtox</b>	<b>Water Flea</b>
Sodium nitrite		LC50 = 0.19 mg/L Oncorhynchus mykiss 96 h		
<b>Persistence and Degradability</b>	No information available			
<b>Bioaccumulation</b>	No information available			
<b>Mobility in Environmental Media</b>	No information available			
<b>Component</b>	<b>Log Pow</b>			
Sodium nitrite	-3.7			
13. DISPOSAL CONSIDERATIONS				
<b>Waste Disposal Methods</b>	Dispose of waste in accordance with all federal, state, and local regulations.			
<b>Contaminated Packaging</b>	Empty containers should be taken for local recycling, recovery or waste disposal.			

## SODIUM NITRITE

14. TRANSPORT INFORMATION				
<b>DOT</b>	Regulated			
Proper Shipping Name	Sodium nitrite			
Hazard Class	5.1			
Subsidiary Hazard Class	6.1			
UN-No	UN1500			
Packing Group	PGIII			
<b>TDG</b>	Regulated			
Hazard Class	5.1			
Subsidiary Hazard Class	6.1			
UN-No	UN1500			
Packing Group	PGIII			
<b>IMDG</b>	Product is a marine pollutant if shipped overseas			
15. REGULATORY INFORMATION				
<b>International Inventories</b>				
TSCA	Yes			
DSL	Yes			
ELINCS	No			
EINECS	Yes			
ENCS	Yes			
CHIINA	Yes			
KECL	Yes			
PICCS	Yes			
AICS	Yes			
<b>U.S. Federal Regulations</b>				
<b>SARA 313</b>				
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains the following chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372:				
<b>Component</b>	<b>CAS-No</b>	<b>Weight %</b>	<b>SARA 13 - Threshold Values</b>	
Sodium nitrite	7632-00-0	>98	1.0	
<b>SARA 311/312 Hazardous Categorization</b>				
Chronic Health Hazard	No			
Acute Health Hazard	Yes			
Fire Hazard	No			
Sudden Release of Pressure Hazard	No			
Reactive Hazard	Yes			
<b>Clean Water Act</b>				
<b>Component</b>	<b>CWA – Reportable Quantities</b>	<b>CWA – Toxic Pollutants</b>	<b>CWA – Priority Pollutants</b>	<b>CWA – Hazardous Substances</b>
Sodium nitrite	100 lb			X
<b>CERCLA</b>				
<b>Component</b>	<b>CERCLA RQ (lb)</b>	<b>SARA TPQ (lb)</b>		
Sodium nitrite	100 lb			
<b>U.S. State Regulations</b>				
<b>California Proposition 65</b>				
This product does not contain any Proposition 65 chemicals.				

## SODIUM NITRITE

<b>State Right-to-Know</b>					
<b>Component</b>	<b>Massachusetts</b>	<b>New Jersey</b>	<b>Pennsylvania</b>	<b>Illinois</b>	<b>Rhode Island</b>
Sodium nitrite	X	X	X		
<b>Other International Regulations</b>					
Mexico	No information available				
Canada	This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.				
<b>WHMIS Hazard Class</b>					
C Oxidizing materials					
D1B Toxic materials					
D2B Toxic materials					
<b>16. OTHER INFORMATION</b>					
Current Issue Date:	May 16, 2013				
Previous Issue Date:	November 26, 2012				
Revision Summary:	Change to section 1				
<b>Disclaimer:</b> <i>All information, statements, data, service and/or recommendations, including, without limitation, those relating to storage, loading/unloading, piping and transportation (collectively referred to herein as "information") are believed to be accurate and reliable. However, no representation or warranty, express or implied, is made as to its completeness, accuracy, fitness for a particular purpose or any other matter, including, without limitation, that the practice or application of any such information is free of patent infringement or other intellectual property misappropriation. General Chemical, LLC is not engaged in the business of providing technical, operational, engineering or safety information for a fee, and therefore; any such information provided herein has been furnished as an accommodation and without charge. All information provided herein is intended for use by persons having requisite knowledge, skill and experience in the chemical industry. General Chemical, LLC shall not be responsible or liable for the use, application or implementation of the information, provided herein, and all such information is to be used at the risk, and in the sole judgment and discretion, of such persons, their employees, advisors and agents.</i>					
End of MSDS					



Revision Number: 001.1

Issue date: 06/26/2009

**1. PRODUCT AND COMPANY IDENTIFICATION**

**Product name:** BONDERITE S-AD RODINE 2010 ACID INHIBITOR ADDITIVE known as P3 RODINE 20 10 **IDH number:** 1314676

**Product type:** Corrosion inhibitor **Region:** United States

**Company address:** Henkel Corporation  
32100 Stephenson Highway  
Madison Heights, MI 48071

**Contact information:**  
Telephone: 248.583.9300  
For Chemical Emergency: Call CHEMTREC at 800.424.9300  
Internet: www.henkelna.com

**2. HAZARDS IDENTIFICATION**

**EMERGENCY OVERVIEW**

<b>Physical state:</b>	Liquid	<b>HMIS:</b>	
<b>Color:</b>	Light amber	<b>HEALTH:</b>	*2
<b>Odor:</b>	Aromatic	<b>FLAMMABILITY:</b>	0
		<b>PHYSICAL HAZARD:</b>	0
		<b>Personal Protection:</b>	See MSDS Section 8

**WARNING:** CAUSES EYE, SKIN AND RESPIRATORY TRACT IRRITATION.  
MAY BE HARMFUL OR FATAL IF SWALLOWED.  
MAY CAUSE ALLERGIC SKIN REACTION.

**Relevant routes of exposure:** Skin, Inhalation, Eyes

**Potential Health Effects**

**Inhalation:** Inhalation of vapors or mists of the product may be irritating to the respiratory system.

**Skin contact:** Prolonged and/or repeated skin contact with this product may cause irritation/dermatitis. Contact with skin can cause irritation and allergic reaction (sensitization) in some individuals.

**Eye contact:** Contact with eyes can cause eye irritation. May cause severe eye irritation.

**Ingestion:** May cause irritation and symptoms similar to ethyl alcohol intoxication. Swallowing large volumes of ethylene glycol can lead to kidney damage.

**Existing conditions aggravated by exposure:** Eye, skin and respiratory disorders.

This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

See Section 11 for additional toxicological information.

**3. COMPOSITION / INFORMATION ON INGREDIENTS**

Hazardous components	CAS NUMBER	%
Poly(ethylene glycol)	Proprietary	30 - 60
Ethylene glycol	107-21-1	5 - 10
1,3-Diethyl-2-thiourea	105-55-5	5 - 10
Ethoxylated Propoxylated alcohol	Proprietary	1 - 5
quinolinium chloride	530-64-3	1 - 5

#### 4. FIRST AID MEASURES

<b>Inhalation:</b>	If mist or vapor of this product is inhaled, remove person immediately to fresh air. Seek medical attention if symptoms develop or persist.
<b>Skin contact:</b>	For skin contact flush with large amounts of water. Obtain medical attention if irritation persists.
<b>Eye contact:</b>	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
<b>Ingestion:</b>	Seek medical advice. DO NOT induce vomiting unless directed to do so by medical personnel.
<b>Notes to physician:</b>	In the treatment of ethylene glycol overdose, ethanol competitively inhibits alcohol dehydrogenase (ADH) and prevents the formation of toxic metabolites. The affinity of ethylene glycol for ADH appears to be similar to ethanol. Ethanol should be administered only by qualified medical personnel.

#### 5. FIRE FIGHTING MEASURES

<b>Flash point:</b>	Not applicable
<b>Flashback:</b>	Not applicable
<b>Flame projection:</b>	Not applicable
<b>Autoignition temperature:</b>	Not determined
<b>Flammable/Explosive limits - lower:</b>	Not determined
<b>Flammable/Explosive limits - upper:</b>	Not determined
<b>Extinguishing media:</b>	Water spray (fog), foam, dry chemical or carbon dioxide.
<b>Special firefighting procedures:</b>	Wear full protective clothing. Wear self-contained breathing apparatus.
<b>Unusual fire or explosion hazards:</b>	This product is an aqueous mixture which will not burn.
<b>Hazardous combustion products:</b>	Irritating and toxic gases or fumes may be released during a fire.

#### 6. ACCIDENTAL RELEASE MEASURES

Use personal protection recommended in Section 8, isolate the hazard area and deny entry to unnecessary and unprotected personnel.

<b>Environmental precautions:</b>	Prevent further leakage or spillage if safe to do so. Wear appropriate protective equipment and clothing during clean-up. Do not allow product to enter sewer or waterways.
<b>Clean-up methods:</b>	Absorb spill with inert material. Shovel material into appropriate container for disposal.

#### 7. HANDLING AND STORAGE

<b>Handling:</b>	Prevent contact with eyes, skin and clothing. Do not breathe vapor and mist. Wash thoroughly after handling. Do not take internally. For industrial use only. Launder work clothes frequently.
<b>Storage:</b>	For safe storage, store between -10 °C (14°F) and 40 °C (104°F) Keep container tightly closed and in a cool, well-ventilated place away from incompatible materials. Thaw and mix thoroughly if frozen.

For information on product shelf life, please review labels on container or check the Technical Data Sheet.

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Employers should complete an assessment of all workplaces to determine the need for, and selection of, proper exposure controls and protective equipment for each task performed.

Hazardous components	ACGIH TLV	OSHA PEL	AIHA WEEL	OTHER
Poly(ethylene glycol)	None	None	10 mg/m3 TWA Particulate.	None
Ethylene glycol	100 mg/m3 Ceiling Aerosol.	None	None	None
1,3-Diethyl-2-thiourea	None	None	None	None
Ethoxylated Propoxylated alcohol	None	None	None	None
quinolinium chloride	None	None	0.001 ppm (0.005 mg/m3) TWA (SKIN)	None

<b>Engineering controls:</b>	Provide local and general exhaust ventilation to effectively remove and prevent buildup of any vapors or mists generated from the handling of this product.
<b>Respiratory protection:</b>	If ventilation is not sufficient to effectively prevent buildup of aerosols, mists or vapors, appropriate NIOSH/MSHA respiratory protection must be provided.
<b>Eye/face protection:</b>	Wear chemical goggles; face shield (if splashing is possible).
<b>Skin protection:</b>	Wear impervious gloves for prolonged contact. Use of impervious apron and boots are recommended.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Physical state:</b>	Liquid
<b>Color:</b>	Light amber
<b>Odor:</b>	Aromatic
<b>Odor threshold:</b>	Not available
<b>pH:</b>	3.8 - 4.2 (10% solution)
<b>Vapor pressure:</b>	17 mbar
<b>Boiling point/range:</b>	103.2 °C (217.8 °F)
<b>Melting point/ range:</b>	-20 °C (-4°F)
<b>Specific gravity:</b>	1.09 - 1.11 at 20 °C (68°F)
<b>Vapor density:</b>	Not available
<b>Flash point:</b>	Not applicable
<b>Flashback:</b>	Not applicable
<b>Flame projection:</b>	Not applicable
<b>Flammable/Explosive limits - lower:</b>	Not determined
<b>Flammable/Explosive limits - upper:</b>	Not determined
<b>Autoignition temperature:</b>	Not determined
<b>Evaporation rate:</b>	Not available
<b>Solubility in water:</b>	Complete
<b>Partition coefficient (n-octanol/water):</b>	Not determined
<b>VOC content:</b>	Not available

## 10. STABILITY AND REACTIVITY

<b>Stability:</b>	Stable at normal conditions.
<b>Hazardous reactions:</b>	Will not occur.
<b>Hazardous decomposition products:</b>	Upon decomposition, this product emits carbon monoxide, carbon dioxide and/or low molecular weight hydrocarbons.
<b>Incompatible materials:</b>	This product may react with strong alkalis.
<b>Conditions to avoid:</b>	None identified.

## 11. TOXICOLOGICAL INFORMATION

Hazardous components	NTP Carcinogen	IARC Carcinogen	OSHA Carcinogen (Specifically Regulated)
Poly(ethylene glycol)	No	No	No
Ethylene glycol	No	No	No
1,3-Diethyl-2-thiourea	No	No	No
Ethoxylated Propoxylated alcohol	No	No	No
quinolinium chloride	No	No	No

Hazardous components	Health Effects/Target Organs
Poly(ethylene glycol)	Irritant
Ethylene glycol	Blood, Bone Marrow, Central nervous system, Developmental, Eyes, Irritant, Kidney, Liver, Metabolic
1,3-Diethyl-2-thiourea	Irritant, Allergen
Ethoxylated Propoxylated alcohol	Irritant, Allergen
quinolinium chloride	No Data

## 12. ECOLOGICAL INFORMATION

Ecological information: Not available

## 13. DISPOSAL CONSIDERATIONS

Information provided is for unused product only.

**Recommended method of disposal:** Dispose of according to Federal, State and local governmental regulations.

**Hazardous waste number:** Material, if discarded, is not expected to be a characteristic hazardous waste under RCRA. Wastes must be tested using methods described in 40 CFR Part 261 to determine if it meets applicable definitions of hazardous wastes.

## 14. TRANSPORT INFORMATION

### U.S. Department of Transportation Ground (49 CFR)

**Proper shipping name:** Not regulated  
**Hazard class or division:** None  
**Identification number:** None  
**Packing group:** None

### International Air Transportation (ICAO/IATA)

**Proper shipping name:** Not regulated  
**Hazard class or division:** None  
**Identification number:** None  
**Packing group:** None

### Water Transportation (IMO/IMDG)

**Proper shipping name:** Not regulated  
**Hazard class or division:** None  
**Identification number:** None  
**Packing group:** None

## 15. REGULATORY INFORMATION

### United States Regulatory Information

**TSCA 8 (b) Inventory Status:** All components are listed or are exempt from listing on the Toxic Substances Control Act Inventory.

**TSCA 12(b) Export Notification:** None above reporting de minimus

**CERCLA/SARA Section 302 EHS:** None above reporting de minimus  
**CERCLA/SARA Section 311/312:** Immediate Health, Delayed Health

**CERCLA/SARA 313:** This product contains the following toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 (40 CFR 372). Ethylene glycol (CAS# 107-21-1).

**California Proposition 65:** This product contains a chemical known in the State of California to cause cancer. This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

**Canada Regulatory Information**

**CEPA DSL/NDSL Status:** Contains one or more components listed on the Non-Domestic Substances List. All other components are listed on or are exempt from listing on the Domestic Substances List. Components listed on the NDSL must be tracked by all Canadian Importers of Record as required by Environment Canada. They may be imported into Canada in limited quantities. Please contact Regulatory Affairs for additional details.

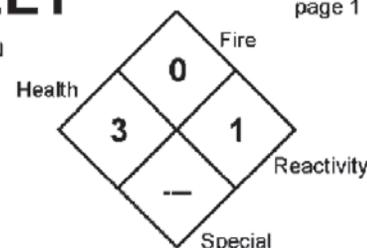
**WHMIS hazard class:** D.2.A

**16. OTHER INFORMATION**

**This material safety data sheet contains changes from the previous version in sections:** Updated composition in Section 3.

**Prepared by:** John DiCerbo, Regulatory Affairs Specialist

**DISCLAIMER:** The data contained herein are furnished for information only and are believed to be reliable. However, Henkel Corporation does not assume responsibility for any results obtained by persons over whose methods Henkel Corporation has no control. It is the user's responsibility to determine the suitability of Henkel's products or any production methods mentioned herein for a particular purpose, and to adopt such precautions as may be advisable for the protection of property and persons against any hazards that may be involved in the handling and use of any of Henkel Corporation's products. In light of the foregoing, Henkel Corporation specifically disclaims all warranties, express or implied, including warranties of merchantability and fitness for a particular purpose, arising from sale or use of Henkel Corporation's products. Henkel Corporation further disclaims any liability for consequential or incidental damages of any kind, including lost profits.

**BRENNTAG**NFPA 704 DESIGNATION  
HAZARD RATING4=Extreme  
3=High  
2=Moderate  
1=Slight  
0=InsignificantBrenntag MSDS #: **BPI-00182**MSDS Revision/Issue Date: **07/31/07**Supersedes Revision Date: **New****1. CHEMICAL PRODUCT IDENTIFICATION & COMPANY IDENTIFICATION****PRODUCT IDENTIFIER: Sodium Hydroxide 50% Solution (All Grades)****GENERAL USE:** Used in industry to neutralize acids; to precipitate alkaloids; in metal finishing; in cleaners; and to precipitate most metals (as hydroxides) from aqueous solutions.**PRODUCT DESCRIPTION:** An aqueous solution of Sodium Hydroxide. Synonyms for Sodium Hydroxide include: caustic soda, lye soda, sodium hydrate and white caustic.**INFORMATION PROVIDED BY:** Brenntag Pacific, Inc.  
5700 N.W. Front Avenue  
Portland, OR 97210**EMERGENCY PHONE NUMBERS****BRENNTAG:** 503-699-7055**CHEMTREC:** 800-424-9300**CANUTEC:** 613-996-6666For MSDS call: **PHONE: 503-242-0200****2. COMPOSITION & INFORMATION ON INGREDIENTS**

COMPONENT	CAS #	OSHA HAZARD	WT %	ACGIH		OSHA	
				TLV <sub>(TWA)</sub>	STEL	PEL <sub>(TWA)</sub>	STEL
Sodium Hydroxide	1310-73-2	Corrosive; Lung Toxin	50 ± 1	None Ceiling: 2 mg/m <sup>3</sup>	None	2 mg/m <sup>3</sup>	None

NDA = No Data Available

N/A = Not Applicable

**3. HAZARDS IDENTIFICATION****EMERGENCY OVERVIEW:** A clear to slightly turbid, colorless liquid having no characteristic odor. The mists and liquid are corrosive to all tissues contacted. Inhalation of mists may cause permanent lung damage. This material reacts with water to release a large amount of heat and can react violently with acids and other substances. **The NIOSH I.D.L.H. for Sodium Hydroxide is: 10 mg/m<sup>3</sup>.****POTENTIAL HEALTH EFFECTS****INHALATION:** Inhalation of mists or an aerosol can cause severe irritation or burns to the nose, mouth, throat, mucous membranes and lungs. Symptoms of exposure can include coughing, sneezing, choking, shortness of breath, chest pain and impairment of lung function. Inhalation of a high mist concentration may result in permanent lung damage.**EYE CONTACT:** Exposure to the mists or liquid can cause severe eye irritation and/or burns. Symptoms of exposure can include tearing, redness, swelling, pain and possible mucous discharge. Exposure may cause corneal damage and/or visual impairment even when prompt treatment is provided.**SKIN CONTACT:** Exposure to the mists or liquid can cause severe skin irritation and/or burns. Symptoms of exposure may include redness, swelling, pain and possible ulceration. Prolonged skin exposure to this material may cause destruction of the dermis with impairment of the skin, at site of contact, to regenerate. No published data indicates this material is absorbed through the skin.**INGESTION:** Ingestion can cause severe irritation and/or burns to the entire gastrointestinal tract, including the stomach and intestines characterized by nausea, vomiting, abdominal pain, bleeding, tissue ulceration and possible diarrhea.**CHRONIC:** The chronic health effects of exposure to this material are expected to be the same as for acute exposure.

**4. FIRST AID MEASURES**

- INHALATION:** If inhaled, immediately move to fresh air. If not breathing, give artificial respiration. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; use the Holger Nielsen method (back pressure-arm lift) or proper respiratory device. If breathing is difficult, give oxygen. Call a physician.
- EYE CONTACT:** In case of contact, immediately flush eyes with plenty of clean running water for at least 15 minutes, lifting the upper and lower lids occasionally. Remove contact lenses, if worn. Get medical attention immediately.
- SKIN CONTACT:** In case of contact, immediately flush skin with plenty of clean running water for at least 15 minutes, while removing contaminated clothing and shoes. If burn or irritation occurs, call a physician.
- INGESTION:** If swallowed, DO NOT induce vomiting. Get medical attention immediately. If victim is fully conscious, give plenty of water to drink. Never give anything by mouth to an unconscious person.
- NOTE TO PHYSICIANS:** Sodium Hydroxide has a relatively low oral toxicity, but it can be corrosive to the eyes, skin and mucous membranes. If ingested, consideration should be given to careful endoscopy as stomach or esophageal burns, perforations or strictures may occur. Careful gastric lavage with an endotracheal tube in place should be considered. Treat exposure symptomatically.

**5. FIRE FIGHTING MEASURES**

- Flashpoint and Method:** This material does not flash.
- Flammable Limits (in air, % by volume)**    **Lower:** Not applicable                      **Upper:** Not applicable
- Autoignition Temperature:** Not applicable
- GENERAL HAZARD:** The Uniform Fire Code physical hazard classification for this material is: **Water Reactive, Class I**. Direct contact with water causes an exothermic reaction (generation of heat). The Uniform Fire Code health hazard classification for this material is: **Corrosive (Alkaline)**. This material may generate flammable / explosive Hydrogen gas on contact with some soft metals (i.e. Aluminum). This material may produce hazardous decomposition products.
- FIRE FIGHTING INSTRUCTIONS:**                      **EXTINGUISHING MEDIA:** Foam, CO<sub>2</sub> or dry chemicals.  
If water must be used and it can contact this material, it is best to use a water flood technique.
- FIRE FIGHTING EQUIPMENT:** Fire fighters should wear full protective equipment, including self-contained breathing apparatus.
- HAZARDOUS COMBUSTION PRODUCTS:** When heated to dryness and decomposition, it emits toxic sodium oxide.

**6. ACCIDENTAL RELEASE MEASURES**

- LAND SPILL:** Wearing recommended protective equipment and clothing, dike the spill and pick up the bulk of liquid using pumps or a vacuum truck, or absorb the liquid in sand or a commercial absorbent. Place in approved containers for recovery, disposal, or satellite accumulation. Neutralize the alkalinity, of the remaining liquid, using a dilute acid solution appropriate for neutralizing alkaline liquids. Liberally cover the spill area with sodium bicarbonate. Flush the spill area with water; collect the rinsates for disposal or sewer, as appropriate.
- WATER SPILL:** Wear recommended protective equipment and clothing if contact with hazardous material can occur. Stop or divert water flow. Dike contaminated water and remove for disposal and/or treatment. As appropriate, notify all downstream users of possible contamination.

**7. HANDLING AND STORAGE****STORAGE TEMPERATURE:** Ambient**STORAGE PRESSURE:** Ambient

**GENERAL:** Store in a cool, dry, well-ventilated area away from incompatible materials and products. Do not get this material in eyes, on skin or on clothing. Wear recommended personnel protective equipment. Do not breathe mists or aerosols. Use only with adequate ventilation. Do not take internally. Keep the container tightly closed when not in use. Wash thoroughly after handling.

This material is corrosive to Aluminum, Magnesium, Tin, Zinc and alloys containing these metals, and it will react violently with these metals in powder form.

Considerable heat is generated when this material is mixed with water. Never add water to this material. Always add this material slowly, with constant stirring, to the surface of cool (40 – 50° F.) water. If this material is added too rapidly, or without stirring, and becomes concentrated at the bottom of the mixing vessel, excessive heat may be generated, resulting in dangerous boiling and spattering, and a possible immediate and violent eruption of a highly caustic solution.

**8. EXPOSURE CONTROLS / PERSONAL PROTECTION**

**CONTROL MEASURES:** Use a local or general, mechanical exhaust ventilation system capable of maintaining emissions, in the work area, below the OSHA-PEL or ACGIH Ceiling level.

**RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT**

**RESPIRATOR:** For exposure above the OSHA-PEL or ACGIH-TLV, wear a NIOSH-approved full facepiece or half mask air-purifying cartridge respirator equipped with a good particulate filter cartridge or supplied air. For exposure to Sodium Hydroxide above 10 mg/m<sup>3</sup>, wear a supplied air respirator or a self-contained breathing apparatus (SCBA) operated in the positive pressure mode.

**EYES:** Wear chemical goggles (recommended by ANSI Z87.1-1979), unless a full facepiece respirator is worn.

**GLOVES:** Wear Neoprene, Nitrile, Butyl Rubber or Natural Rubber gloves.

**CLOTHING & EQUIPMENT:** Wear a Neoprene, Nitrile, Butyl Rubber or Natural Rubber apron, or full protective clothing when handling this material. An eye wash station and safety shower should be available in the work area.

**FOOTWEAR:** Wear Neoprene, Nitrile, Butyl Rubber or Natural Rubber boots.

**9. PHYSICAL AND CHEMICAL PROPERTIES**

<b>Appearance:</b>	Clear to slightly turbid, colorless	<b>Bulk Density (pounds/ft<sup>3</sup>):</b>	Not applicable
<b>Physical State:</b>	Liquid	<b>Vapor Pressure:</b>	13 mm Hg @ 60° F.
<b>Odor:</b>	No characteristic	<b>Vapor Density (air=1):</b>	No data available
<b>Odor Threshold:</b>	No data available	<b>Evaporation Rate (n-Butyl Acetate=1):</b>	No data available
<b>Molecular Formula:</b>	NaOH (in water)	<b>VOC Content:</b>	Nil
<b>Molecular Weight:</b>	40.00 (in water)	<b>% Volatile:</b>	49 – 51
<b>Boiling Point:</b>	Approximately 142.2° C. (288° F.)	<b>Solubility in H<sub>2</sub>O:</b>	Complete
<b>Freezing/Melting Point:</b>	Approximately 12.2° C. (54° F.)	<b>Octanol/Water Partition Coefficient:</b>	No data available
<b>Specific Gravity:</b>	Approximately 1.525 @ 20° C.	<b>pH (as is):</b>	14.0
<b>Density (pounds/gallon):</b>	Approximately 12.72	<b>pH (1% solution):</b>	13.0 to 14.0

**10. STABILITY AND REACTIVITY**

**GENERAL:** This product is stable and hazardous polymerization will not occur.

**CONDITIONS TO AVOID:** Avoid contact with small amounts of water.

**INCOMPATIBLE MATERIAL:** Acids and acidic salts, chlorinated or fluorinated hydrocarbons, Acetaldehyde, Acrolein, Chlorine trifluoride, Hydroquinone, Maleic anhydride, Phosphorus pentoxide, Tetrahydrofuran, Aluminum, Magnesium, Tin, Zinc and alloys of these metals.

**HAZARDOUS DECOMPOSITION PRODUCTS:** When heated to decomposition, it emits toxic oxides of sodium.

**SENSITIVITY TO MECHANICAL IMPACT:** This material is not sensitive to mechanical impact.

**SENSITIVITY TO STATIC DISCHARGE:** This material is not sensitive to static discharge.

**11. TOXICOLOGICAL INFORMATION**

<b>Components:</b>	<b>Sodium Hydroxide</b>
<b>Eye Contact:</b>	Rabbit: 50 ug/24 hours; Severe
<b>Skin Contact:</b>	Rabbit: 500 mg/24 hours; Severe
<b>Oral Rat LD<sub>50</sub>:</b>	No data available (Oral Rabbit LD <sub>50</sub> : 500 mg/kg)
<b>Dermal Rabbit LD<sub>50</sub>:</b>	1,350 mg/kg
<b>Inhalation Rat LC<sub>50</sub>:</b>	No data available
<b>Human Data:</b>	No data available
<b>Other Toxicological Data:</b>	Intraperitoneal Mouse LD <sub>50</sub> : 40 mg/kg
<b>Carcinogenicity:</b>	No data available
<b>Teratogenicity:</b>	No data available
<b>Mutagenicity:</b>	Hamster Cytogenetic Analysis; Lung: 10 mmol/Liter
<b>Synergistic Products:</b>	None reported
<b>Target Organs:</b>	Eyes, Skin, Mucous membranes & Lungs
<b>Medical Conditions</b>	
<b>Aggravated By Exposure:</b>	Skin or Respiratory disorders

**12. ECOLOGICAL INFORMATION****ENVIRONMENTAL FATE:**

This material is completely soluble in water and will significantly affect the pH of water. No specific environmental fate information is available.

**ENVIRONMENTAL CONSIDERATIONS:**

The aquatic toxicity for this material has not been determined. The aquatic toxicity for pure Sodium Hydroxide is: *Cyprinus carpio* LC<sub>100</sub> = 180 ppm/24 hours at 25° C.

**13. DISPOSAL CONSIDERATIONS**

**RCRA 40 CFR 261 CLASSIFICATION:** Corrosive Waste

**U.S. EPA WASTE NUMBER/DESCRIPTION:** D002

If this product is disposed of as shipped, it meets the criteria of a hazardous waste as defined under 40 CFR 261 due to its corrosivity. If this product becomes a waste, it will be a hazardous waste, which is subject to the Land Disposal Restrictions under 40 CFR 268 and must be managed accordingly. As a hazardous liquid waste, it must be disposed of in accordance with local, state, and federal regulations in a permitted hazardous waste treatment, storage, and disposal facility.

**14. TRANSPORTATION INFORMATION**

**DOT PROPER SHIPPING NAME:** Sodium hydroxide solution

**Hazard Class:** 8

**UN Number:** UN1824

**Packing Group:** II

**Primary Label:** Corrosive

**Subsidiary Label(s):** None Required

**Primary/Subsidiary Placards:** Corrosive

**DOT Reportable Quantity (RQ):** 1,000 pounds (NaOH)

**RQ for Product:** 2,000 pounds (157.2 gallons)

**Marine Pollutant:** No

**2004 North American Emergency Response Guidebook No.:** 154

**TDG PROPER SHIPPING NAME:** SODIUM HYDROXIDE SOLUTION

**Hazard Class:** 8

**UN Number:** UN1824

**Packing Group:** II

**Primary Label:** Corrosive

**Subsidiary Label(s):** None Required

**Primary/Subsidiary Placards:** Corrosive

**TDG Reportable Quantity (RQ):<sup>#</sup>** At least 5kg or 5 liters.

**TDG Schedule XII:** Not listed

**Regulated Limit (RL):<sup>##</sup>** 50 kg (NaOH)

**RL for Product:** 100 kg (65.6 liters)

**Other Shipping Information:** None

<sup>#</sup> Canadian Transportation of Dangerous Goods Regulations (TDGR), Part IX, Table I, Quantities or levels for Immediate Reporting: releases of reportable quantities, RQ, that meet the definition of a "dangerous occurrence" (a threat to life, health, property, or the environment) must be reported to the appropriate authorities as outlined in TDGR 9.13(1) and 9.14(1).

<sup>##</sup> Reporting to Environment Canada is required for any releases exceeding the regulated limits, RL, of 9.2 materials (primary or secondary). The regulated limits are found in Schedule XIII of the TDGR.

**15. REGULATORY INFORMATION**

**COMPONENTS:** Sodium Hydroxide  
**OSHA Target Organs:** Eyes, Skin, Mucous membranes & Lungs

**Carcinogenic Potential:**

**Regulated by OSHA:** No  
**Listed on NTP Report:** No  
**Listed by IARC:** No  
 IARC Group: Not applicable  
**ACGIH Appendix A:** Not listed  
 A1 Confirmed Human: Not applicable  
 A2 Suspected Human: Not applicable

**U.S. EPA Requirements****Release Reporting****CERCLA (40 CFR 302)**

**Listed Substance:** Yes  
 Reportable Quantity: 1,000 pounds  
 Category: C  
 RCRA Waste No.: None listed  
**Unlisted Substance:** Not applicable  
 Reportable Quantity: Not applicable  
 Characteristic: Not applicable  
 RCRA Waste No.: Not applicable

**SARA TITLE III****Section 302 & 303 (40 CFR 355):**

**Listed Substance:** Not listed  
 Reportable Quantity: Not applicable  
 Planning Threshold: Not applicable

**Section 311 & 312 (40 CFR 370):**

Hazard Categories (product): Fire: N Sudden Release of Pressure: N Reactive: N Acute Health: Y Chronic Health: N  
 Planning threshold: 10,000 pounds

**Section 313 (40 CFR 372):**

**Listed Toxic Chemical:** Not listed  
 Reporting Threshold: Not applicable

**U.S. TSCA Status**

**Listed (40 CFR 710):** Yes

**State Regulations****State of California: Safe Drinking Water and Toxins Enforcement Act, 1986 (Proposition 65):**

Carcinogen: No  
 Reproductive Toxin: No

**Other Regulations**

**State Right To Know Laws:** MA, NJ, PA, CA

**Canadian Regulations****Product Information:**

Controlled Product: **Yes**  
 WHMIS Hazard Symbols: **Corrosive Material**  
 WHMIS Class & Division: **E**

**Ingredient Information:**

IDL Substance: Yes  
 DSL or NDSL Lists: DSL

**16. OTHER INFORMATION**

EPA Registration number: Not applicable

Approved Product Uses: Not applicable

**Special Notes:**

This product does not contain any material, which the State of California has found to cause cancer and/or birth defects or other reproductive harm.

**NOTE:** Deadly carbon monoxide gas can form when this material contacts food soil containing sugars. After cleaning operations are completed, thoroughly ventilate enclosed areas before entering. Always monitor oxygen and carbon monoxide levels when personnel are in enclosed areas. For proper tank entry procedures, see ANSI Z117.1-1977.

**Special Instructions:**

When making solutions, always add this material to cool (40 – 50° F.) water with adequate mixing to prevent overheating and possible spattering of a highly alkaline solution.

Do not allow this product to contact Aluminum, Magnesium, Tin or Zinc surfaces as this causes corrosion of the metal and generation of flammable / explosive Hydrogen gas.

**MSDS Revision Information:** Information Revised This Issue Date: **New product MSDS.**

Form Revision made 2/03/06

MSDS Distributed by: Brenntag Pacific, Inc.

NW Environmental Department

Phone: 503-242-0200 FAX: 503-412-3390

Prepared By: Edward Doheny

Date Prepared: July 31, 2007

This Material Safety Data Sheet is provided as an information resource only. It should not be taken as a warranty or representation for which Brenntag Pacific, Inc. assumes legal responsibility. While Brenntag Pacific, Inc. believes the information contained herein is accurate and compiled from sources believed to be reliable, it is the responsibility of the user to investigate and verify its validity. The buyer assumes all responsibility of using and handling the product in accordance with applicable federal, state, and local regulations.

**"Rundquist, Dale@Energy"**

04/29/2014 03:00 PM

Send To	"Steven.Pochmara@abeinsaepc.abengoa.com" <Steven.Pochmara@abeinsaepc.abengoa.com>
cc	"pablo.schenone@abeinsaepc.abengoa.com" <pablo.schenone@abeinsaepc.abengoa.com>, "larry.davis@abeinsaepc.abengoa.com" <larry.davis@abeinsaepc.abengoa.com>, "ozabala@abeinsaepc.abengoa.com" <ozabala@abeinsaepc.abengoa.com>,
bcc	
Subject	RE: HAZ2-05-00 Chemical Cleaning procedure

Hi Steven,

Staff has reviewed and approved the Submittal for HAZ-2-05-00 Chemical Cleaning Procedure as long as the conditions below are met.

1. **After the cleaning procedure when the steam boiler, deareator water tank, condenser, etc. are first opened for inspection and removal of possible sediments, no workers shall enter these tanks or structures unless Cal-OSHA regulations and procedures for entry into a Confined Space are followed.**
2. **No worker shall look inside or enter any tank or structure for inspection upon first opening after cleaning/flushing unless wearing PPE consisting of a respirator with full-face shield (air supplied or SCBA), protective apron, and protective gloves.**
3. **These tanks and structures shall be locked-out and placarded and a work permit and confined space entry permit shall be required for any worker entry into the structures.**
4. **The existing AMS heat illness prevention procedures shall be followed at all times if a worker is to enter into any of these tanks or structures.**
5. **The existing AMS Safety Management Plan and SPCC Plan shall be followed during the implementation of this cleaning procedure.**
6. **The application of the wash and rinse water for site dust control is approved for one-time only. Multiple applications to the same location is not allowed.**
7. **Prior to commencing cleaning operations, all chemicals listed in the Chemical Pipe Cleaning Procedure (dated April 23, 2014) are to be included in a revised "Hazardous Materials Appendix A: List of Hazardous Materials Proposed for Use During Operations" and submitted to the CPM for review**

and approval (as per Condition HAZ-1). Of the six (6) mixtures proposed for use, only two are listed in Appendix A and some of the mixtures proposed for use contain multiple chemicals. All chemicals must be listed properly.

8. Prior to commencing cleaning operations, all chemicals listed in the Chemical Pipe Cleaning Procedure (dated April 23, 2014) are to be included in a revised HMBP and submitted to the SBCFD for review and comment and to the CPM for review and approval. Of the six (6) mixtures proposed for use, only two are listed in the most current HMBP and some of the mixtures proposed for use contain multiple chemicals.

Please acknowledge that these conditions will be followed to proceed with the Chemical Cleaning Procedure.

Thank you,  
Dale R.

**From:** Steven.Pochmara@abeinsaepc.abengoa.com [mailto:Steven.Pochmara@abeinsaepc.abengoa.com]

**Sent:** Wednesday, April 23, 2014 3:34 PM

**To:** Rundquist, Dale@Energy; Rundquist, Dale@Energy

**Cc:** pablo.schenone@abeinsaepc.abengoa.com; larry.davis@abeinsaepc.abengoa.com; ozabala@abeinsaepc.abengoa.com; andres.perez@abeinsaepc.abengoa.com; david.trenado@abeinsaepc.abengoa.com; vernon.leeming@abeinsaepc.abengoa.com; mercedes.macias@abeinsaepc.abengoa.com; lbruno@abeinsaepc.abengoa.com; enrique.valades@abeinsaepc.abengoa.com; Alejandra.Moreno@abeinsaepc.abengoa.com; kristine.yates@abeinsaepc.abengoa.com; kirk.anderson@abeinsaepc.abengoa.com; holmes.bassette@solar.abengoa.com; Kathleen.Sullivan@solar.abengoa.com; william.grisolia@solar.abengoa.com; frances.sanchez@solar.abengoa.com

**Subject:** HAZ2-05-00 Chemical Cleaning procedure

Good Afternoon Dale,

Please find attached the procedure for chemical cleaning of the steam generator, deareator, condensate pump and condenser systems. Please don't hesitate to contact me if you have any questions.

Regards,

Steven Pochmara - Permit Manager

## **ABEINSA EPC**

13911 Park Avenue, Suite 208  
Victorville, CA 92392  
Cell: +14802871419

[Steven.Pochmara@teyma.abengoa.com](mailto:Steven.Pochmara@teyma.abengoa.com)

[www.teyma.com](http://www.teyma.com)

 Eco-Tip: Printing e-mails is usually a waste.

\*\*\*\*\*|Internet Email Confidentiality Footer\*\*\*\*\*

This email and any files transmitted with it are confidential and intended solely for the use of the organization or individual to whom they are addressed. It is expressly forbidden to retransmit or copy email and/or this attached files without our permission. If you are not the addressee indicated in this message (or responsible for delivery of the message to such person), you may not copy or deliver this message to anyone. In such case, you should destroy this message and kindly notify the sender by reply email. Please advise immediately if you or your employer does not consent to Internet email for messages of this kind. Opinions, conclusions and other information in this message that do not relate to the official business of my firm shall be understood as neither given nor endorsed by it.

\*\*\*\*\* Confidencialidad de Correo electr?nico de Internet \*\*\*\*\*

Este correo electr?nico y cualquier archivo transmitido con el, es confidencial y destinado exclusivamente para el empleo de la organizaci?n o el individuo a quien esta dirigido. Esta expresamente prohibido su reenvio o copia del correo electr?nico y/o de los archivos anexados sin permiso del remitente. El contenido esta protegido seg?n la regulaci?n sobre la Protecci?n de Datos e Informaci?n Personal. Si usted no es el destinatario indicado en este mensaje (o responsable de la entrega del mensaje a tal persona), no puede copiar, reenviar o entregar este mensaje. En tal caso, usted debe destruir este mensaje y notificar al remitente por el correo electr?nico de respuesta. Puede notificar igualmente si no desea recibir correos electr?nicos de esta clase. Las opiniones, conclusiones y otra informaci?n en este mensaje que no se relaciona con la actividad de la compa??a ni ser?n entendidas como autorizadas por ?sta.