Britt T. McKinney
Vice President-Nuclear Site Operations

PPL Susquehanna, LLC
769 Salem Boulevard
Berwick, PA 18603
Tel. 570.542.3149 Fax 570.542.1504
btmckinney@pplweb.com
blshriver@pplweb.com

JAN 28 2005

U. S. Nuclear Regulatory Commission
Attn.: Document Control Center
Mail Station OP1-17
Washington, DC 20555

SUSQUEHANNA STEAM ELECTRIC STATION
NRC NOTIFICATION OF NPDES PERMIT
RENEWAL APPLICATION **Docket Nos. 50-387**
PLA-5852 **and 50-388**

The purpose of this letter is to submit the Susquehanna Steam Electric Station NPDES permit renewal application to the NRC in accordance with Section 3.2 of the Environmental Protection Plan.

Please contact Mr. Curtis H. Saxton at (570) 542-1879, if there are any questions concerning the renewal application.

B. T. McKinney

Attachment

Copy: Regional Administrator - Region I
Mr. A. J. Blamey, NRC Sr. Resident Inspector
Mr. R. V. Guzman, NRC Project Manager
Mr. R. Janati, DEP/BRP

C001

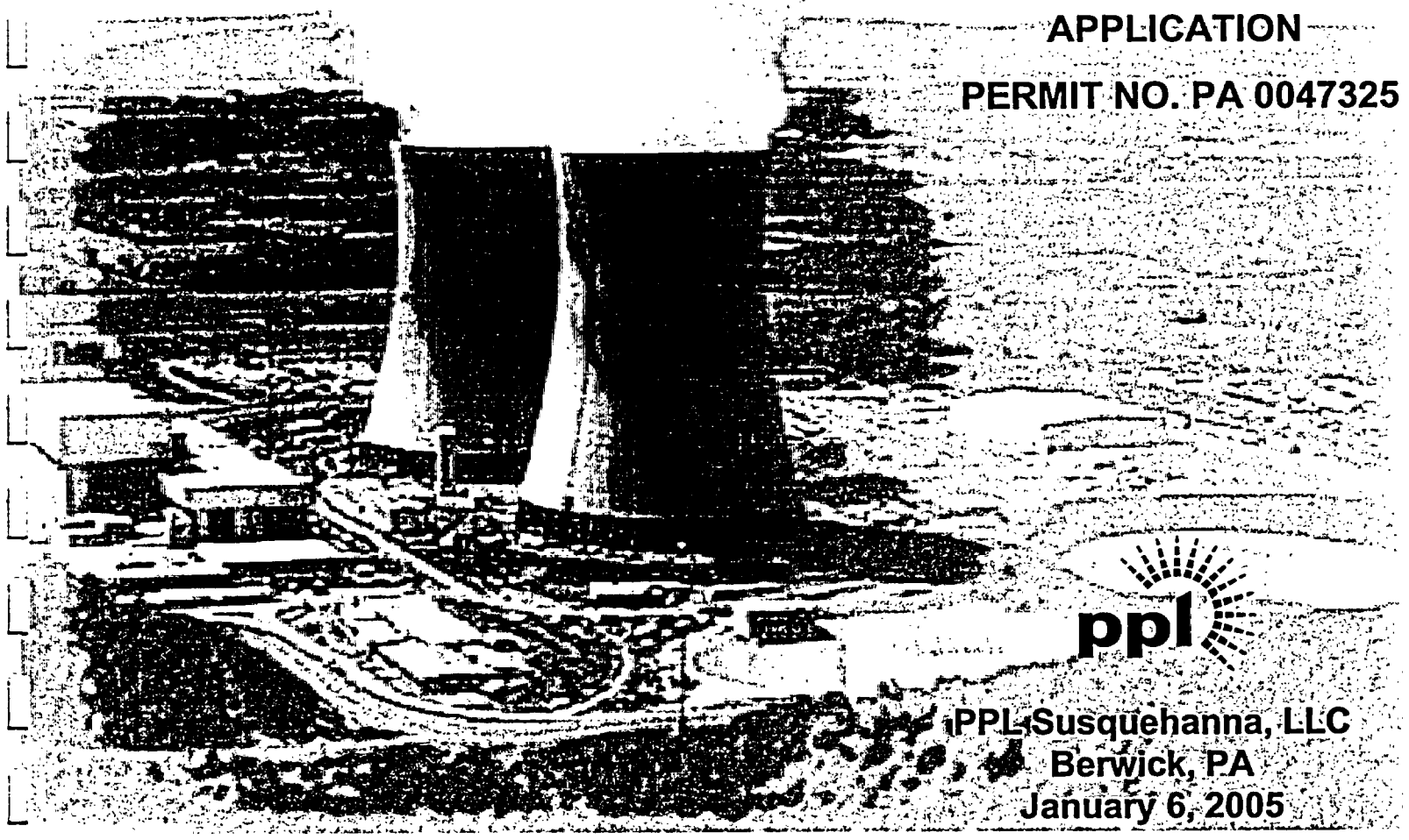
SUSQUEHANNA STEAM ELECTRIC STATION

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

(NPDES)

RENEWAL PERMIT APPLICATION

PERMIT NO. PA 0047325



PPL Susquehanna, LLC
Berwick, PA
January 6, 2005

January 6, 2005

Mr. Dino Agustini
Chief Permits Section
Water Management Program
Pennsylvania Department of Environmental Protection
2 Public Square
Wilkes-Barre, PA 18711-0790

SUSQUEHANNA STEAM ELECTRIC STATION
APPLICATION-NPDES RENEWAL PERMIT PA-0047325
CCN 741326
PLE-0023763

Dear Mr. Agustini:

PPL Susquehanna, LLC is submitting a NPDES permit renewal application for the Susquehanna Steam Electric Station (SES), Salem Township, Luzerne County, PA. The present NPDES permit no. PA-0047325 expires on July 6, 2005.

Included for Pennsylvania Department of Environmental Protection review are; 1) three copies of the application (one notarized), 2) an application fee of $500.00, payable to the Commonwealth of Pennsylvania, 3) copies of letters with certified mail receipts notifying Salem Township and Luzerne County of this renewal permit application and 4) two copies of the Susquehanna SES, Pollution Prevention and Contingency (PPC) Plan.

If you have any questions please call Curt Saxton at (570) 542-1879.

Sincerely,

Bruce Rhoads

Bruce E. Rhoads
Manager – Plant Chemistry

Enclosure

Attachment A – Requested Permit Changes
Attachment B – Table of Contents – Permit Application and Supplemental Information

bcc:

T.	D.	Belles	NUCSA3	w/a
M.	B.	Detamore	GENPL5	wo/a
R.	L.	Doty	GENPL5	wo/a
N.	A.	Evans	GENTW17	w/a
J.	P.	Felock	NUCSB2	w/a
J.	S.	Fields	GENPL5	w/a
B.	H.	Herre	SFC	w/a
L.	J.	Humpf	NUCPT	w/a
T.	V.	Jacobsen	NUCE3	w/a
A.		Khanwalkar	GENTW3	wo/a
J.	L.	McCormick	NUCSA3	w/a
B.	T.	McKinney	NUCSB3	wo/a
D.	J.	Morgan	NUCSA3	w/a
W.	E.	Morrissey	NUCSA4	w/a
R.	W.	Osborne	Allegheny	w/a
L.	A.	Ramos	SSO	wo/a
P.		Renshaw	GENPL6	wo/a
B.	E.	Rhoads	NUCSA3	w/a
R.	A.	Saccone	NUCSB3	wo/a
C.	H.	Saxton	NUCSA3	w/a
J.	P.	Schmidt	GENTW17	wo/a
R.	L.	Takacs	NUCSA3	w/a
J.	R.	Wolfer	NUCSA3	wo/a
J.		Zerance	NUCPT	wo/a
SP&E File (CCN 773015-07A)			GENN3	w/a
DCS File			NUCSA2	w/a

Attachment A

Requested Permit Changes

1. Request elimination of Internal Outfall 571 Circ Water Pumphouse Sump, since it merely returns cooling water pump seal water (domestic/well water mixed with circulating water) to the Circulating water system and is not impacted by SSES operation. It is included within the limits of Outfall 071 cooling tower blowdown.

2. Request revised monitoring frequency for Outfall 072, Service & Administration (S&A) Sump, to be consistent with Outfalls 073 and 074, currently sampled quarterly. This sump similarly consistently shows minimal level of oil & grease and total suspended solids. Frequency of this discharge is related to storm events and not station operation. The S&A Sump collects stormwater around the Emergency transformers on the east side of the site, the diesel generator oil unloading area and equipment and S&A oil storage area berm. Controls, treatment and visual inspection prior to discharge are a place to ensure no contamination of this miscellaneous wastewater. Consistent increased long-term monitoring has indicated no challenges to the monitored parameters.

3. Request eliminating condition or specific edition reference to Standards Methods of Analysis for CBOD5 in permit part C, Special Condition #11. If this special condition needs to remain recommend simply referring to compliance with 40CFR136 accepted methods. In the past this detail of this special condition has caused confusion when the Standard Method editions have changed or been updated from time to time. (Concurrence to eliminate this specific reference discussed with Dino Agustini, May 12, 2004.)

4. In Permit Part C, Special Condition 12, the last paragraph requires that accurate records of chemical usage (name of additive, quantity added, date added, and blowdown discharge volumes) be maintained, and kept on site by the permittee. We agree and comply with this condition, however, request elimination of the wording on the *"Chemical Additive Report Form"* as we have specific procedures, controls and records for chemical additions and system operation which collect and record this information and using the PaDEP example form is duplicative and unnecessary effort. Request clarification of the special condition to eliminate that specific wording on the *"Chemical Additive Report Form"*.

Attachment B

Table of Contents

NPDES Permit Application and Supplemental Information

December 10, 2004

Ms. Patricia Owens
Secretary, Salem Township
Salem Township Municipal Building
400 Luzerne Avenue
Berwick, PA 18603

SUSQUEHANNA STEAM ELECTRIC STATION
NATIONAL POLLUTANT DISCHARGE ELIMINATION
SYSTEM PERMIT RENEWAL: PA 0047325
PLE-0023750

Dear Ms. Owens:

In accordance with Act Number 14, P.L. 834, this letter is to notify you that PPL Susquehanna, LLC intends to submit a National Pollutant Discharge Elimination System Permit renewal application in January 2005 to the Pennsylvania Department of Environmental Protection for the Susquehanna Steam Electric Station (SES) located in Salem Township, Luzerne County, Pennsylvania.

If you have any questions concerning this permit renewal application, please call Curt Saxton (570) 542-1879.

Sincerely,

Bruce E. Rhoads
Manager – Plant Chemistry

Certified Mail Number: 7001 1940 0000 2651 8118

Copy to:

Ms. N. Green, EPA Region III
Mr. Dino Augustini, PaDEP

December 10, 2004

Mr. Samuel Guesto, Chief Clerk
Luzerne County Courthouse
200 North River Street
Wilkes-Barre, PA 18711

SUSQUEHANNA STEAM ELECTRIC STATION
NATIONAL POLLUTANT DISCHARGE ELIMINATION
SYSTEM PERMIT RENEWAL: PA 0047325
CCN 741326-100
PLE-0023751

Dear Mr. Guesto,

In accordance with Act Number 14, P.L. 834, this letter is to notify you that PPL Susquehanna, LLC intends to submit a National Pollutant Discharge Elimination System Permit renewal application in January 2005 to the Pennsylvania Department of Environmental Protection for the Susquehanna Steam Electric Station (SES) located in Salem Township, Luzerne County, Pennsylvania.

If you have any questions concerning this permit renewal application, please call Curt Saxton (570) 542-1879.

Sincerely,

Bruce E. Rhoads
Manager – Plant Chemistry

Certified Mail Number: 7001 1940 0000 2651 8125

Copy to:

Ms. N. Green, EPA Region III
Mr. Dino Augustini, PaDEP

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Ms. Patricia Owens
Secretary, Salem Township
Salem Township Municipal Building
400 Luzerne Avenue
Berwick, PA 18603

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Judy Bordner ☐ Agent ☐ Addressee

B. Received by (Printed Name) Judy Bordner
C. Date of Delivery 12/18/04

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Certified Mail ☐ Express Mail
☒ Registered ☒ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (Extra Fee) ☐ Yes

2. Article Number (Transfer from service label) 7001 1940 0000 2651 8118

PS Form 3811, August 2001 Domestic Return Receipt 102595-01-M-2506

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Mr. Samuel Guesty Chief Clerk
Luzerne County Courthouse
200 North River Street
Wilkes-Barre, PA 18711

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Carol Yanik ☐ Agent ☐ Addressee

B. Received by (Printed Name)
C. Date of Delivery 12/15/04

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Certified Mail ☐ Express Mail
☒ Registered ☒ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (Extra Fee) ☐ Yes

2. Article Number (Transfer from service label) 7001 1940 0000 2651 8125

PS Form 3811, August 2001 Domestic Return Receipt 102595-01-M-2506

3800-PM-WSWM0008c 1/2004
Checklist

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER SUPPLY AND WASTEWATER MANAGEMENT

APPLICATION FOR NPDES PERMIT FOR INDUSTRIAL DISCHARGERS

APPLICANT'S ✓ CHECKLIST

APPLICANT NAME: PPL Susquehanna, LLC

Please check the following list to make sure that you have included all the required information. Place a checkmark in the column provided for all items completed and/or provided.

Failure to provide all of the requested information will delay the processing of the application and may result in the application being placed on hold with no action, or will be considered withdrawn and the application file closed.

	Item	Check If Included	DEP Use Only
1.	General Information Form (8000-PM-IT0001)	☒	
2.	Three (3) copies of application package submitted	☒	
3.	Additional copy for Erie and Allegheny counties (if required)	N/A	
4.	Additional copy for the river basin commission (if required)	N/A	
5.	Application Fee - $500	☒	
6.	Proper evidence of Act 14 municipality and county notification	☒	
7.	Proof of local newspaper public notice (for new and substantially changed discharges only)	N/A	
8.	Topographic Map	☒	
9.	Industrial Wastewater - Module 1	☒	
10.	Wastewater Treatment Technologies - Module 2	☒	
11.	Sources Of Wastewater sheet(s) - Module 3	☒	
12.	Analysis Results Table(s) - Modules 4-9	☒	
13.	Hazardous Substance Table - Module 10	☒	
14.	Toxic Chemicals (Optional) - Module 11	☒	
15.	Stormwater (if required) - Module 12	☒	
16.	Stormwater Sampling Data Table (if required) - Module 13	☒	
17.	No Exposure Certification (if required) - Module 14	N/A	
18.	Other: Additional Outfall description, 316B Supporting Info, Requested Permit Changes.	☒	

8000-PM-IT0001 Rev 06/07/2002

FORM

COMMONWEALTH OF PENNSYLVANIA

DEPARTMENT OF ENVIRONMENTAL PROTECTION
GENERAL INFORMATION FORM – AUTHORIZATION APPLICATION

Before completing this General Information Form (GIF), read the step-by-step instructions provided in this application package. This version of the General Information Form (GIF) must be completed and returned with any program-specific application being submitted to the Department.

Related ID#s (If Known)		DEP USE ONLY
Client ID#	APS ID#	Date Received & General Notes
Site ID#	Auth ID#	
Facility ID#		

CLIENT INFORMATION

DEP Client ID#	Client Type / Code			
	LLC			
Organization Name or Registered Fictitious Name		**Employer ID# (EIN)**	**Dun & Bradstreet ID#**	
PPL Susquehanna, LLC		23-3022601	14-498-6556	
Individual Last Name	**First Name**	**MI**	**Suffix**	**SSN**
N/A				
Additional Individual Last Name	**First Name**	**MI**	**Suffix**	**SSN**
N/A				
Mailing Address Line 1		**Mailing Address Line 2**		
769 Salem Blvd.				
Address Last Line – City	**State**	**ZIP+4**	**Country**	
Berwick	PA	18603-0467	USA	
Client Contact Last Name	**First Name**	**MI**	**Suffix**	
McKinney	Britt	T	Mr.	
Client Contact Title		**Phone**	**Ext**	
VP-Nuclear Site Operations		570-542-3149		
Email Address		**FAX**		
BTMckinney@pplweb.com		570-542-1504		

SITE INFORMATION

DEP Site ID#	Site Name				
	PPL Susquehanna, LLC				
EPA ID#	PAD 000765883	**Estimated Number of Employees to be Present at Site**	1000		
Description of Site					
Two Unit Generating Station					
County Name	**Municipality**	**City**	**Boro**	**Twp**	**State**
Luzerne	Salem Township	☐	☐	☒	PA
County Name	**Municipality**	**City**	**Boro**	**Twp**	**State**
		☐	☐	☐	
Site Location Line 1		**Site Location Line 2**			
769 Salem Blvd.					
Site Location Last Line – City		**State**	**ZIP+4**		
Berwick		PA	18603-0467		
Detailed Written Directions to Site					
5 miles North of Berwick on U.S. Route 11					
Site Contact Last Name	**First Name**	**MI**	**Suffix**		
Saxton	Curtis	H	Mr.		
Site Contact Title		**Site Contact Firm**			
Services & Programs Supervisor		PPL Susquehanna, LLC			
Mailing Address Line 1		**Mailing Address Line 2**			
769 Salem Blvd.					
Mailing Address Last Line – City		**State**	**ZIP+4**		
Berwick		PA	18603-0467		
Phone	**Ext**	**FAX**	**Email Address**		
(570)542-1879		(570) 542-3461	chsaxton@pplweb.com		

NAICS Codes (Two- & Three-Digit Codes – List All That Apply)
221

6-Digit Code (Optional)
221113

Client to Site Relationship
OWNOP

FACILITY INFORMATION

Modification of Existing Facility

		Yes	No
1.	**Will this project modify an existing facility, system, or activity?**	☐	☒
2.	**Will this project involve an addition to an existing facility, system, or activity?**	☐	☒

If "Yes", check all relevant facility types and provide DEP facility identification numbers below.

	Facility Type	DEP Fac ID#		Facility Type	DEP Fac ID#
☐	Air Emission Plant		☐	Industrial Minerals Mining Operation	
☐	Beneficial Use (water)		☐	Laboratory Location	
☐	Blasting Operation		☐	Land Recycling Cleanup Location	
☐	Captive Hazardous Waste Operation		☐	MineDrainageTrmt/LandRecyProjLocation	
☐	Coal Ash Beneficial Use Operation		☐	Municipal Waste Operation	
☐	Coal Mining Operation		☐	Oil & Gas Encroachment Location	
☐	Coal Pillar Location		☐	Oil & Gas Location	
☐	Commercial Hazardous Waste Operation		☐	Oil & Gas Water Poll Control Facility	
☐	Dam Location		☐	Public Water Supply System	
☐	Deep Mine Safety Operation -Anthracite		☐	Radiation Facility	
☐	Deep Mine Safety Operation -Bituminous		☐	Residual Waste Operation	
☐	Deep Mine Safety Operation -Ind Minerals		☐	Storage Tank Location	
☐	Encroachment Location (water, wetland)		☐	Water Pollution Control Facility	
☐	Erosion & Sediment Control Facility		☐	Water Resource	
☐	Explosive Storage Location		☐	Other:	

Latitude/Longitude Point of Origin	Latitude			Longitude		
	Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
	41	5	30	-76	8	55

Horizontal Accuracy Measure Feet 20.0 --or-- Meters

Horizontal Reference Datum Code
- ☐ North American Datum of 1927
- ☒ North American Datum of 1983
- ☐ World Geodetic System of 1984

Horizontal Collection Method Code GPSST / SURVY

Reference Point Code H20PI

Altitude Feet 676' --or-- Meters

Altitude Datum Name
- ☐ The National Geodetic Vertical Datum of 1929
- ☒ The North American Vertical Datum of 1988 (NAVD88)

Altitude (Vertical) Location Datum Collection Method Code GPSST / SRVEY

Geometric Type Code POINT

Data Collection Date 12/21/04

Source Map Scale Number 1" Inch(es) = 24,000 Feet
--or-- Centimeter(s) = Meters

PROJECT INFORMATION

Project Name
PPL Susquehanna, LLC

Project Description
NPDES Permit Renewal

Project Consultant Last Name **First Name** **MI** **Suffix**
N/A

Project Consultant Title **Consulting Firm**
N/A

Mailing Address Line 1 **Mailing Address Line 2**
N/A

Address Last Line – City **State** **ZIP+4**
N/A

Phone **Ext** **FAX** **Email Address**
N/A

Time Schedules	Project Milestone (Optional)

1.	**Is this application for an authorization type on the list of authorizations affected by the land use policy?** **Note:** If "Yes", you must complete the following Land Use Information section, unless exempted by Questions 2 or 3 below. If "No", skip Questions 2 & 3 below as well as the following Land Use Information section. For referenced list, see Appendix A attached to the GIF Instructions.	☐ Yes	☒ No	
2.	**For an Air program authorization only. All other authorizations continue with Question 3 below. Will the permit authorize the construction of facilities outside an existing permitted area?** **Note:** If "Yes", you must complete the following Land Use Information section unless exempted by Question 3 below. If "No", skip Question 3 below as well as the following Land Use Information section.	☐ Yes	☐ No	
3.	**Have you attached or submitted municipal and county 'Early Opt Out' approval letters for the project?** **Note:** If "Yes" to Question 3, skip the following Land Use Information section. This should only be checked "Yes" if applicant is choosing the early opt-out option. Required approval letters described in the GIF Checklist and Instructions should be attached. If "No" to Question 3, continue with the following Land Use Information section.	☐ Yes	☐ No	

LAND USE INFORMATION

Note: Applicants are encouraged to submit copies of local land use approvals or other evidence of compliance with local comprehensive plans and zoning ordinances.

1.	**Is there a municipal comprehensive plan(s)?**	☐ Yes	☐ No	
2.	**Is there a county comprehensive plan(s)?**	☐ Yes	☐ No	
3.	**Is there a multi-municipal or multi-county comprehensive plan?**	☐ Yes	☐ No	
4.	**Is the proposed project consistent with these plans?** If no plan(s) exists, answer "Yes".	☐ Yes	☐ No	
5.	**Is there a municipal zoning ordinance(s)?**	☐ Yes	☐ No	
6.	**Is there a joint municipal zoning ordinance(s)?**	☐ Yes	☐ No	
7.	**Will the proposed project require a zoning approval (e.g., special exception, conditional approval, re-zoning, variance)?** If zoning approval has already been received, attach documentation.	☐ Yes	☐ No	
8.	**Are any zoning ordinances that are applicable to this project currently the subject of any type of legal proceeding?**	☐ Yes	☐ No	
9.	**Will the project be located on a site that has been or is being remediated under DEP's Land Recycling Program?**	☐ Yes	☐ No	
10.	**Will the project result in reclamation of abandoned mine lands through re-mining or as part of DEP's Reclaim PA Program?**	☐ Yes	☐ No	
11.	**Will the project be located in an agricultural security area or an area protected under an agricultural conservation easement?**	☐ Yes	☐ No	
12.	**Will the project be located in a Keystone Opportunity Zone or Enterprise Development Area?**	☐ Yes	☐ No	
13.	**Will the project be located in a Designated Growth Area as defined by the Municipalities Planning Code?**	☐ Yes	☐ No	

COORDINATION INFORMATION

Note: The PA Historical and Museum Commission must be notified of proposed projects in accordance with DEP Technical Guidance Document 012-0700-001 and the accompanying Cultural Resource Notice Form.

If the activity will be a mining project (i.e., mining of coal or industrial minerals, coal refuse disposal and/or the operation of a coal or industrial minerals preparation/processing facility), respond to questions 1.0 through 2.5 below.

If the activity will not be a mining project, skip questions 1.0 through 2.5 and begin with question 3.0.

1.0	Is this a coal mining project? If "Yes", respond to 1.1-1.6. If "No", skip to Question 2.0. (DEP Use/48y1)	☐ Yes	☐ No
1.1	Will this coal mining project involve coal preparation/ processing activities in which the total amount of coal prepared/processed will be equal to or greater than 200 tons/day? (DEP Use/4x70)	☐ Yes	☐ No
1.2	Will this coal mining project involve coal preparation/ processing activities in which the total amount of coal prepared/processed will be greater than 50,000 tons/year? (DEP Use/4x70)	☐ Yes	☐ No
1.3	Will this coal mining project involve coal preparation/ processing activities in which thermal coal dryers or pneumatic coal cleaners will be used? (DEP Use/4x70)	☐ Yes	☐ No
1.4	For this coal mining project, will sewage treatment facilities be constructed and treated waste water discharged to surface waters? (DEP Use/4x62)	☐ Yes	☐ No
1.5	Will this coal mining project involve the construction of a permanent impoundment meeting one or more of the following criteria: (1) a contributory drainage area exceeding 100 acres; (2) a depth of water measured by the upstream toe of the dam at maximum storage elevation exceeding 15 feet; (3) an impounding capacity at maximum storage elevation exceeding 50 acre-feet? (DEP Use/3140)	☐ Yes	☐ No
1.6	Will this coal mining project involve underground coal mining to be conducted within 500 feet of an oil or gas well? (DEP Use/4z41)	☐ Yes	☐ No
2.0	Is this a non-coal (industrial minerals) mining project? If "Yes", respond to 2.1-2.6. If "No", skip to Question 3.0. (DEP Use/48y1)	☐ Yes	☐ No
2.1	Will this non-coal (industrial minerals) mining project involve the crushing and screening of non-coal minerals other than sand and gravel? (DEP Use/4x70)	☐ Yes	☐ No
2.2	Will this non-coal (industrial minerals) mining project involve the crushing and/or screening of sand and gravel with the exception of wet sand and gravel operations (screening only) and dry sand and gravel operations with a capacity of less than 150 tons/hour of unconsolidated materials? (DEP Use/4x70)	☐ Yes	☐ No
2.3	Will this non-coal (industrial minerals) mining project involve the construction, operation and/or modification of a portable non-metallic (i.e., non-coal) minerals processing plant under the authority of the General Permit for Portable Non-metallic Mineral Processing Plants (i.e., BAQ-PGPA/GP-3)? (DEP Use/4x70)	☐ Yes	☐ No
2.4	For this non-coal (industrial minerals) mining project, will sewage treatment facilities be constructed and treated waste water discharged to surface waters? (DEP Use/4x62)	☐ Yes	☐ No
2.5	Will this non-coal (industrial minerals) mining project involve the construction of a permanent impoundment meeting one or more of the following criteria: (1) a contributory drainage area exceeding 100 acres; (2) a depth of water measured by the upstream toe of the dam at maximum storage elevation exceeding 15 feet; (3) an impounding capacity at maximum storage elevation exceeding 50 acre-feet? (DEP Use/3140)	☐ Yes	☐ No

3.0	**Will your project, activity, or authorization have anything to do with a well related to oil or gas production, site development for such activity, or the waste from such a well?** If "Yes", respond to 3.1-3.3. If "No", skip to Question 4.0. (DEP Use/4z41)	☐	Yes	☒	No
3.1	**Does the oil- or gas-related project involve any of the following: placement of fill, excavation within or placement of a structure, located in, along, across or projecting into a watercourse, floodway or body of water (including wetlands)?** (DEP Use/4z41)	☐	Yes	☐	No
3.2	**Will the oil- or gas-related project involve discharge of industrial wastewater or stormwater to a dry swale, surface water, ground water or an existing sanitary sewer system or storm water system?** If "Yes", discuss in *Project Description.* (DEP Use/4z41)	☐	Yes	☐	No
3.3	**Will the oil- or gas-related project involve the construction and operation of industrial waste treatment facilities?** (DEP Use/4z41)	☐	Yes	☐	No
4.0	**Will the project involve a construction activity that results in earth disturbance?** If "Yes", specify the total disturbed acreage. (DEP Use/4x66) **4.0.1 Total Disturbed Acreage**	☐	Yes	☒	No
5.0	**Does the project involve any of the following: placement of fill, excavation within or placement of a structure, located in, along, across or projecting into a watercourse, floodway or body of water (including wetlands)?** (DEP Use/4x66)	☐	Yes	☒	No
6.0	**Will the project involve discharge of industrial wastewater or stormwater to a dry swale, surface water, ground water or an existing sanitary sewer system or separate storm water system?** If "Yes", discuss in *Project Description.* (DEP Use/4x62)	☒	Yes	☐	No
7.0	**Will the project involve the construction and operation of industrial waste treatment facilities?** (DEP Use/4x62)	☐	Yes	☒	No
8.0	**Will the project involve construction of sewage treatment facilities, sanitary sewers, or sewage pumping stations?** If "Yes", indicate estimated proposed flow (gal/day). Also, discuss the sanitary sewer pipe sizes and the number of pumping stations/treatment facilities/name of downstream sewage facilities in the *Project Description*, where applicable. (DEP Use/4x62) **8.0.1 Estimated Proposed Flow (gal/day)**	☐	Yes	☒	No
9.0	**Was sewage planning submitted and approved?** If "Yes", attach the Act 537 approval letter unless the submitted application is actually requesting Act 537 approval (Approval required prior to 105/NPDES approval). (DEP Use/4x61) **9.0.1 Is Act 537 Approval Letter attached?**	☐ ☐	Yes Yes	☒ ☐	No No
10.0	**Is this project for the beneficial use of biosolids for land application within Pennsylvania?** If "Yes" indicate how much (i.e. gallons or dry tons per year). (DEP Use/4X62) **10.0.1 Gallons Per Year (residential septage)** _____ **10.0.2 Dry Tons Per Year (biosolids)**	☐	Yes	☒	No
11.0	**Does the project involve construction, modification or removal of a dam?** If "Yes", identify the dam. (DEP Use/3140) **11.0.1 Dam Name**	☐	Yes	☒	No
12.0	**Will the project interfere with the flow from, or otherwise impact, a dam?** If "Yes", identify the dam. (DEP Use/3140) **12.0.1 Dam Name**	☐	Yes	☒	No
13.0	**Will the project involve operations (excluding during the construction period) that produce air emissions (i.e., NOX, VOC, etc.)?** If "Yes", identify each type of emission followed by the amount of that emission. (DEP Use/4x70) **13.0.1 Enter all types & amounts of emissions; separate each set with semicolons.**	☐	Yes	☒	No

14.0	**Is an on-site drinking water supply (well), other than individual house wells, proposed for your project?** If "Yes", indicate total number of people served and/or the total number of connections served, if applicable. Also, check all proposed sub-facilities. (DEP Use/4x81)	☐	Yes	☒	No
	14.0.1 Number of Persons Served				
	14.0.2 Number of Employee/Guests				
	14.0.3 Number of Connections				
	14.0.4 Sub-Fac: Distribution System	☐	Yes	☐	No
	14.0.5 Sub-Fac: Water Treatment Plant	☐	Yes	☐	No
	14.0.6 Sub-Fac: Source	☐	Yes	☐	No
	14.0.7 Sub-Fac: Pump Station	☐	Yes	☐	No
	14.0.8 Sub-Fac: Entry Point	☐	Yes	☐	No
	14.0.9 Sub-Fac: Transmission Main	☐	Yes	☐	No
	14.0.10 Sub-Fac: Storage Facility	☐	Yes	☐	No
15.0	**Will your project involve purchasing water in bulk, excluding during the construction period?** If "Yes, name the provider. Also, indicate the daily number of employees or guests served. (DEP Use/4x81)	☐	Yes	☒	No
	15.0.1 Provider's Name				
	15.0.2 Number of Employees/Guests				
16.0	**Is your project to be served by public water supply?** If "Yes", indicate name of supplier and attach letter from supplier stating that it will serve the project. (DEP Use/4x81)	☐	Yes	☒	No
	16.0.1 Supplier's Name				
	16.0.2 Letter of Approval from Supplier is Attached	☐	Yes	☒	No
17.0	**Will this project involve a new or increased drinking water withdrawal from a stream or other water body?** If "Yes", provide name of stream. (DEP Use/4x81)	☐	Yes	☒	No
	17.0.1 Stream Name				
18.0	**Will the construction or operation of this project involve treatment, storage, reuse, or disposal of waste?** If "Yes", indicate what type (i.e., hazardous, municipal (including infectious & chemotherapeutic), residual) and the amount to be treated, stored, re-used or disposed. (DEP/Use4x32)	☐	Yes	☒	No
	18.0.1 Type & Amount				
19.0	**Will your project involve the removal of coal, minerals, etc. as part of any earth disturbance activities?** (DEP Use/48y1)	☐	Yes	☒	No
20.0	**Does your project involve installation of a field constructed underground storage tank?** If "Yes", list each Substance & its Capacity. **Note**: Applicant may need a Storage Tank Site Specific Installation Permit. (DEP Use/2570)	☐	Yes	☒	No
	20.0.1 Enter all substances & capacity of each; separate each set with semicolons.				
21.0	**Does your project involve installation of an aboveground storage tank greater than 21,000 gallons capacity at an existing facility?** If "Yes", list each Substance & its Capacity. **Note**: Applicant may need a Storage Tank Site Specific Installation Permit. (DEP Use/2570)	☐	Yes	☒	No
	21.0.1 Enter all substances & capacity of each; separate each set with semicolons.				
22.0	**Does your project involve installation of a tank greater than 1,100 gallons which will contain a highly hazardous substance as defined in DEP's Regulated Substances List, 2570-BK-DEP2724?** If "Yes", list each Substance & its Capacity. **Note**: Applicant may need a Storage Tank Site Specific Installation Permit. (DEP Use/2570)	☐	Yes	☒	No
	22.0.1 Enter all substances & capacity of each; separate each set with semicolons.				

23.0	**Does your project involve installation of a storage tank at a new facility with a total AST capacity greater than 21,000 gallons?** If "Yes", list each Substance & its Capacity. Note: Applicant may need a Storage Tank Site Specific Installation Permit. (DEP Use/2570) **23.0.1 Enter all substances & capacity of each; separate each set with semicolons.**	☐ Yes	☒ No

CERTIFICATION

I certify that I have the authority to submit this application on behalf of the applicant named herein and that the information provided in this application is true and correct to the best of my knowledge and information.

Type or Print Name Britt T. McKinney

Signature	Title: VP - Nuclear Site Operations	Date: 1-3-05

Applicant Name: PPL Susquehanna, LLC

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER SUPPLY AND WASTEWATER MANAGEMENT

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) APPLICATION FOR PERMIT TO DISCHARGE INDUSTRIAL WASTEWATER

Before completing this form, read the step-by-step instructions provided in this application package.

Related ID#s (If Known)				DEP USE ONLY
Client ID#		APS ID#		Date Received & General Notes
Site ID#		Auth ID#		
Facility ID#				

APPLICANT IDENTIFIER

Applicant/Operator Name:

Is this an application for a:

☐ New permit

Complete the General Information Form (GIF) 8000-PM-IT0001 and attach to the front of the application.

☒ Permit Renewal

List the current NPDES Permit number PA-0047325

Complete the Client and Site Sections of the GIF and attach to the front of the application.

☐ Permit Amendment or Permit Renewal with Amendment

List the current NPDES Permit number PA

List the current WQM Permit number

Complete the GIF and attach to the front of the application.

GENERAL INFORMATION

1. SIC Code	NAICS Code	Corresponding SIC/NAICS Description
4911	221113	Electric Utility Power Generation

2. Is the facility required to obtain a stormwater NPDES permit for any listed SIC code?

☒ YES (Answer question 3 below.) ☐ NO (Skip question 3.)

3. Is the facility applying for permit exemption under the No Exposure rule? (See Instructions)

☐ YES ☒ NO

4. General Description and Nature of Business.

Two Unit Nuclear Generating Station

5. List all NPDES and WQM Permits issued by DEP for this facility.

Permit Type	Permit Number	Date Issued
NPDES Permit	PA 0047325	July 7, 2000
Water Quality Permit - STP	4085411	October 7, 1985
Water Quality Permit – IND.	4076203	May 25, 1977

6. ATTACH TOPOGRAPHIC MAP (See Instructions)

7. NUMBER OF OUTFALLS

a. Industrial Wastewater Only	2	**Complete Module 1 and associated Modules.**
b. Combined Industrial Wastewater and Stormwater	3	**Complete Module 1, associated Modules and Module 12 or Module 14 (if required).**
c. Stormwater Only	3	**Complete Module 12 or Module 14.**

8. OUTFALL LOCATION: Using the same Locational Data supplied on the General Information Form under Facility Information, list the latitude and longitude of the location to the nearest ten-thousandth of a second and the name of the receiving water of each outfall. Where available, the receiving stream width and depth should also be provided using actual measurements or topographic map and navigational charts.

OUTFALL NUMBER *(list)*	LATITUDE			LONGITUDE			RECEIVING WATER (Name)	LOW FLOW STREAM	
	Deg	Min	Sec	Deg	Min	Sec		Width (ft)	Depth (ft)
070	41	5	18.4	-76	8	34.1	Lake Took-a-While	160	3
071	41	5	12.4	-76	7	53.2	Susquehanna River	800	13
072	41	5	34.2	-76	8	42.8	Lake Took-a-While	160	3
073	41	5	33.3	-76	8	49.6	Lake Took-a-While	160	3
074	41	5	28.9	-76	8	49.3	Lake Took-a-While	160	3
075	41	5	40.2	-76	8	17.5	Lake Took-a-While	160	3
079	41	5	13.8	-76	7	53.4	Susquehanna River	800	10
080	41	5	33.4	-76	8	18.8	Lake Took-a-While	160	3

9. WHOLE EFFLUENT TOXICITY (WET) TEST RESULTS

Is there known or reason to believe that WET testing was conducted in the last 3 years on any of the facility's discharges, or on a receiving water in relation to a discharge? ☐ YES ☒ NO

If "YES," *attach any information* available on the purpose and nature of such testing, and the test results.

If "NO," all dischargers are still encouraged to perform WET testing. The DEP regional office may be contacted for appropriate protocols.

10. CONTRACTED ANALYTICAL ASSISTANCE

Did a contract laboratory or consulting firm perform any of the analysis required by this application?

☐ NO ☒ YES (Provide information below.)

Name	Analytical Laboratory Services	Types of Analysis Performed:
Address	34 Dogwood Lane Middletown, PA 17057	All Physical Chemical BOD, COD, TSS, O&C, TOC, pH, Metals, Volatiles, Organic Compounds, Acid Compounds, Base Compounds, Nitrates, Ammonia, Priority Pollutants, and PCB's.
Phone	(717) 944-5541	
Name	Teledyne Brown Engineering	Types of Analysis Performed:
Address	2508 Quality Lane Knoxville, TN 37931	Radiological Analysis Gross Alpha, Gross Beta
Phone	(865) 690-6819	

11. ADDITIONAL INFORMATION: (OPTIONAL)

Additional information may be attached to expand upon any response to any questions or call attention to any other information felt should be considered in establishing permit limitations for the proposed or existing facility. Check if additional sheets are attached.

☒ YES ☐ NO

COMPLIANCE HISTORY REVIEW

Is the facility owner or operator in violation of any DEP regulation, permit, order or schedule of compliance at this or any other facility? ☐ YES ☒ NO

If "YES," list each permit, order and schedule of compliance and provide compliance status. Use additional sheets to provide information on all permits.

Permit Program | Permit No.

Brief Description of Noncompliance

Steps Taken to Achieve Compliance	Date(s) Compliance Achieved

Current Compliance Status ☒ In Compliance ☐ In Noncompliance

CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Britt T. McKinney — V.P. – Nuclear Site Operations

Name (type or print legibly) — Official Title

Signature — Date: 1-3-05

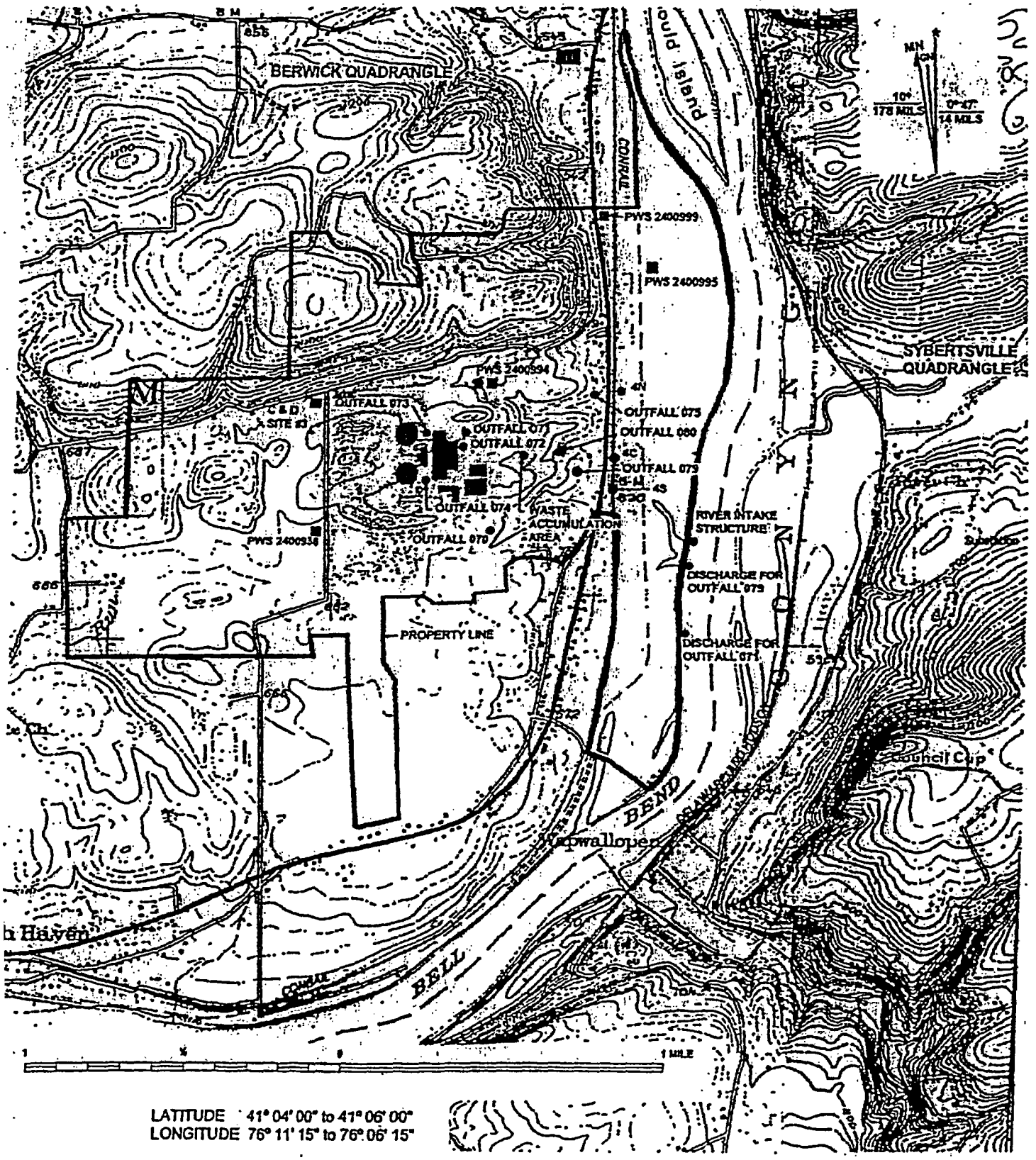
(Use corporate or professional seal as appropriate.)

Taken, sworn, and subscribed before me, this 3rd day of January 20 05

Notary Seal

Laurie Minto

Notarial Seal
Laurie Minto, Notary Public
Salem Twp., Luzerne County
My Commission Expires July 24, 2006
Member, Pennsylvania Association of Notaries



LATITUDE 41° 04' 00" to 41° 06' 00"
LONGITUDE 76° 11' 15" to 76° 06' 15"

FIGURE 4-1
Topographic Map
SSES

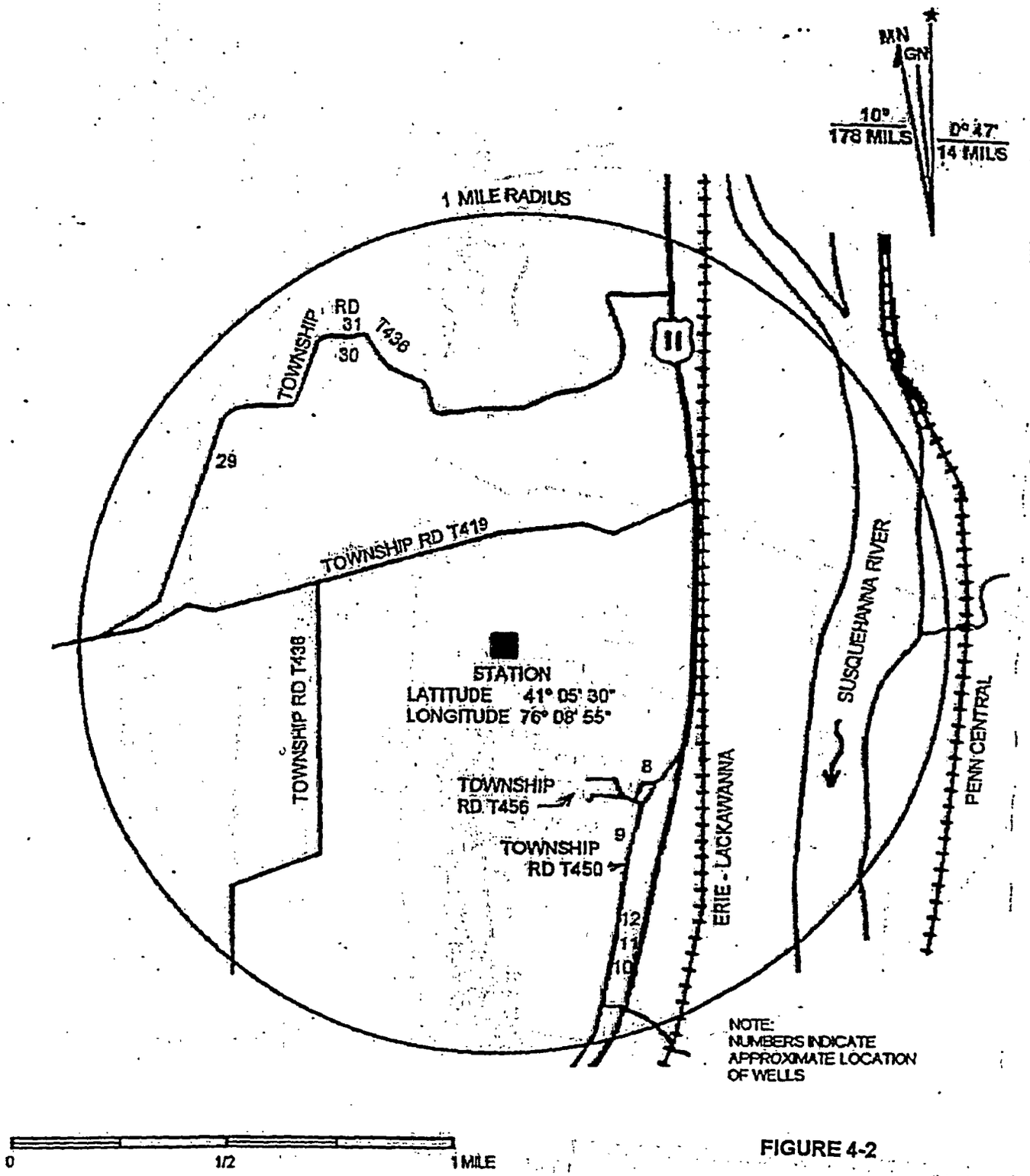


FIGURE 4-2

Springs Used for Water Supply Within 1 Mile of SSES

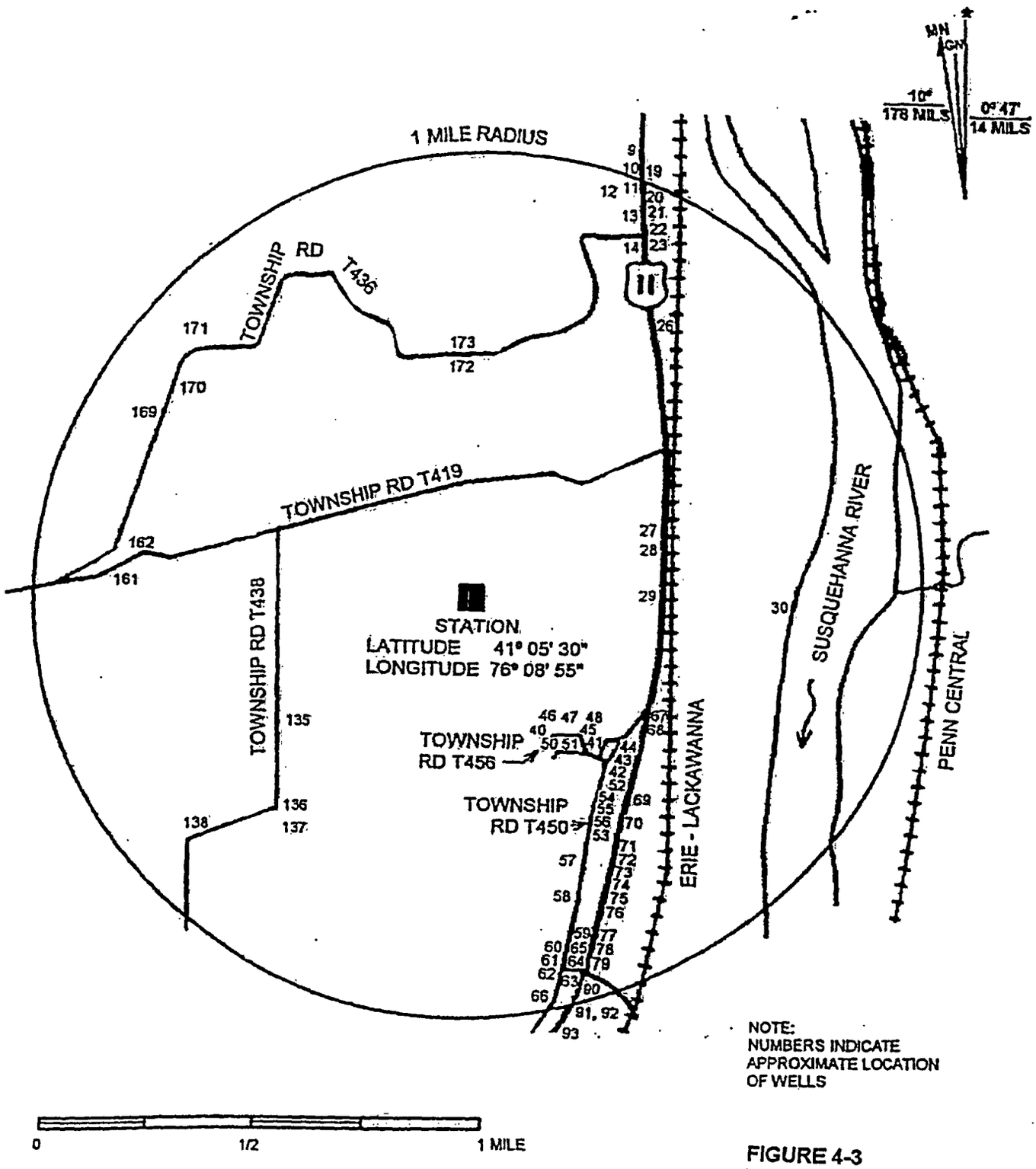
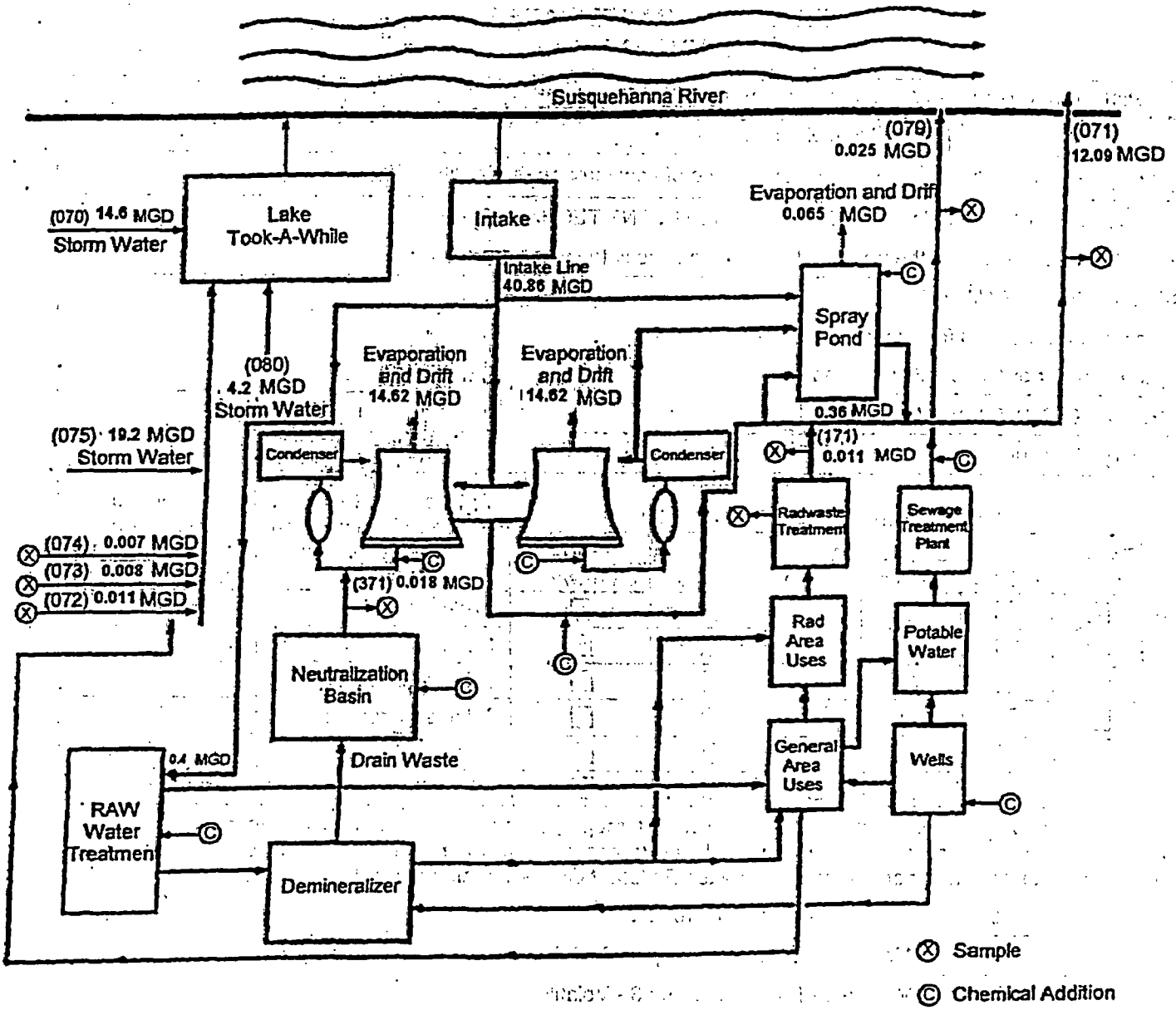


FIGURE 4-3

Water Wells Within
1 Mile of SSES

Line Drawing per Module 1 of NPDES Permit Application



Note

Data averaged over years 2002, 2003, 2004 were used to determine river water withdrawal, consumptive use, and blowdown back to the river.

Applicant Name: PPL Susquehanna, LLC

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER SUPPLY AND WASTEWATER MANAGEMENT

INDUSTRIAL WASTEWATER
MODULE 1

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME: PPL Susquehanna, LLC

1. Line Drawing. Attach a line drawing and water balance of flow through the facility. (See instructions)

2. OUTFALLS AND ASSOCIATED WASTEWATER TREATMENT TECHNOLOGIES
   Complete Module 2 identifying the treatment processes associated with each outfall.

3. SOURCES OF WASTEWATER
   Attach a separate Module 3 for every outfall.
   Indicate the number of Module 3s attached. 8

4. REQUIRED AND OPTIONAL ANALYSIS

   a. Summary of Required Analysis

Outfall Number	Discharge Contains (see Instructions)						Pollutants or Pollutant Groups which must be sampled for and analyzed	Required Number of Sample Events (see instructions)
	Process Waste	NCCW	Sanitary Waste	Misc. Waste	GW Cleanup	Stormwater		
070 075 080	☐	☐	☐	☐	☐	☒	Module 13	1
071	☒	☐	☐	☐	☐	☐	1,2,3,4,5, & PCBs	3
072	☐	☐	☐	☒	☐	☐	Selected Group 1	1
073, 074	☐	☐	☐	☒	☐	☐	Selected Group 1	1
079	☐	☐	☒	☐	☐	☐	Group 1	1
River Intake	☐	☐	☐	☐	☐	☐	1,2,3,4,5, & PCBs	3 (Optional)

   b. Complete the modules for the Pollutant(s) or Pollutant Group(s) identified above. A separate module must be submitted for each process wastewater and combined (process wastewater and stormwater) outfall identified in the application. List the number of modules for each Pollutant Group submitted with this application.

5	Module 4 - Pollutant Group 1
2	Module 5 - Pollutant Group 2 - Metals
2	Module 6 - Pollutant Group 3 - Volatile
2	Module 7 - Pollutant Group 4 - Acids
2	Module 8 - Pollutant Group 5 - Base/Neutral
2	Module 9 - Pollutant Group 6 – Pesticides (PCBs only)

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c. Optional Site-Specific Data

Additional modules may be attached to provide any of the optional site-specific information discussed in Appendix 2. (The modules should be used to report intake water quality, upstream background or ambient water quality, and parameter-specific coefficient of effluent variability. Space is provided at the top of the module to provide description of sampling points used.)

Optional data is attached to application. ☒ YES ☐ NO

5. PREPAREDNESS, PREVENTION, AND CONTINGENCY (PPC) PLANNING.

Does the facility have a PPC plan?

☒ YES ☐ NO

Does the facility have any other related plans, such as a Pollution Incident Prevention (PIP) Plan, Spill Prevention Control and Counter Measure (SPCC) Plan or BMP Plan?

☒ YES ☐ NO

If "YES," identify and indicate date(s) implemented.

Type of Plan		Date Implemented
PPC Plan	Note: Two (2) copies provided w/Application	11/19/2004 (Updated)
SPCC Plan	Note: Two (2) copies provided w/Application	11/19/2004 (Updated)

DEP may require the plan(s) be submitted with this application.

6. OTHER INFORMATION (OPTIONAL): Attach additional sheets describing any additional environmental pollution control programs which may affect the discharges which are underway or which are planned. Indicate whether each program is now underway or planned, and indicate the actual or planned schedules.

☐ MARK "X" IF DESCRIPTION OF ADDITIONAL INFORMATION IS ATTACHED

7. INFORMATION AND ANALYSIS OF EFFLUENT QUALITY FOR OTHER POTENTIALLY TOXIC POLLUTANTS

a. Information on Chemical Additives ***NOTE(1) Equivalent Chemicals may be purchased from other suppliers. (See Notes 1 – 8 attached)***

(Read instructions carefully and use the tabular format to present the required information)

Outfall	Chemical Substance or Compound Trade Names or Specific Ingredients	Manufacturer Name and Address	Average & Maximum Usage Rate lbs/day	Concentration			Lowest Possible Analytical Detection Level (µg/L)	Whole Product 96 Hr LC50 (mg/L) and species[1]	Whole Product 48 Hr LC50 (mg/L) and species[1]
				In-system	Effluent	Units			
071	Acrylic Acid Sulfonated Acrylic Acid Copolymer Dispersant, 32.125 PCL-401	Nalco Company 1601 W. Diehl Rd. Naperville, IL 60563-1189	Avg. 950 Max 2,000 (180,000 lbs/yr)	2,400	2,400	µg/l	1,500	Rainbow Trout (4,900 mg/l)	Daphnia Magna (2,800 mg/l)
071	Hydroxy ethylidene disphosponic acid (HEDP, 32.127 PCL-57	"	Avg. 750 Max 1,500 (90,000 lbs/yr)	4,000	4,000	µg/l	83	Rainbow Trout (368 mg/l)	Daphnia Magna (527 mg/l)
071	Solution of Quaternary Alkyl Ammonium Compound Molluscide and General Biocide, 32.126 H-130	"	Avg. 800 Max 2,000 (160,000 lbs/yr)	10,600	100	µg/l	100 µg/l	Bluegill Sunfish (0.32-0.59 mg/l)	Daphnia Magna (0.094 mg/l)
071	Sodium Bromide, 32.114 H-940	"	Avg. 500 Max 1,000	3,300	3,300	µg/l	125	Rainbow Trout (0.23 mg/l) Note (2)	Daphnia Magna (0.71 mtg/l)
071/072/079	Magnesium Nitrate and 5-Chloro-2-methyl-4-isothiazolin-1, 32.53 NX-1106	Betz Dearborn Inc. 4636 Somerton Rd. Trevose, PA 19057	See Note 3	---	---	---	---	Rainbow Trout (8.7 mg/l)	Daphnia Magna (2.9 mg/l)
071/072/079	Glutaraldehyde 40%-70%, 32.70 H-550	Nalco Company 1601 W. Diehl Rd. Naperville, IL 60563-1198	See Note 4	---	---	---	---	Flathead Minnow (12 mg/l)	Daphnia Magna (12 mg/l)
071	Proprietary Descaling Agent Betz 860	Betz Dearborn Inc. 4636 Somerton Rd. Trevose, PA 19057	See Note 5	---	---	---	---	---	---
071	Bentonite Clay Slurry, 32.128	Nalco Company 1601 W. Diehl Rd. Naperville, IL 60563-1189	Avg – 2,000 Max – 8,000 (350,000 lbs/yr)	0	330,000	µg/l	100	---	---
071/079	Sodium Hypochlorite, 15%, 32.63	Manley-Regan Chemicals 532 East Emaus St. PO Box 280 Middletown, PA 17057	Avg – 5,000 Max – 10,000	33,000	33,000	µg/l	400	Ceriodaphnia Dubia (1.23 mg/l)	---
071	Rotenone, 32.15	AgroEvo Environmental Health 95 Chestnut Ridge Rd. Montvale, NJ 07645	See Note 6	---	---	---	---	---	---
071	Fluridone, 32.46	SePro 11550 N. Meridian Carmel, IN 46032	See Note 6	---	---	---	---	---	---

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071/079	Sodium Bisulfite, 32.113 Chlorkill 8816	Allied Corp. Chemical Sector PO Box 1139R Morristown, NJ 07960	Avg – 183 Max – 400	0	500	µg/l	125	Mosquito Fish (240 mg/l)	Mosquito Fish (240 mg/l)
071	Sulfuric Acid, 32.57	Allied Corp. PO Box 2064R Morristown, NJ 079609	(Approx. 435,000 lbs/yr)	---	---	---	---	---	---
071	2-(Tert-butylamino)-4-Chloro-6-(Elthylamino)s-Trizine; Terbuthylazine (Algicide)	FMC Corp. Process Additives Divison 1735 Market St. Philadelphia, PA 19103	(13,800 lbs. Twice a year)	67,000	2,200	µg/l	---	Rainbow Trout (3.8 mg/l)	Daphni Magna (39 mg/l)
071	2-phosphono-1,2,4-butanetricarboxylic acid aqueous solution (corrosion inhibitor)	Bayer Corp. Product Safety & Reg. Affairs 100 Bayer Road Pittsburgh, PA 15205-9741	(864 lbs. Four times a year)	4,000	131	µg/l	---	---	Rainbow Trout (5,300 mg/l)
071	Depositrol PY5206	Betz Dearborn Inc. 4636 Somerton Rd. Trevose, PA 19057	Avg. – 96 lbs/day Max – 385 lbs/day	32,000	1,140	µg/l	12,000	Fathead Minnow (1,680 mg/l)	Daphnia Magna (1,635 mg/l)
071	Aquashade, 32.135	Applied Biochemists	See Note 6	5,000 mg/l	5	µg/l	100	---	---
071/072/079	Miscellaneous	Various	See Note 7	---	---	---	---	---	---

(1) If LC50 Data for whole product is not available, data for the individual active ingredients may be provided.

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b. Specific Substances which must be identified if Known or Expected to be Present

(Read instructions carefully and use the tabular format and additional pages, where necessary, to present the required information)

Outfall	Chemical Substance or Compound	Reason for Presence in Discharge	Average Effluent Concentration (µg/L)	Analytical Detection Level (µg/L)

c. Are any Table 2 substances identified for which a spill reporting exemption is requested? ☒ YES ☐ NO
If "YES," complete the Hazardous Substance Table.

d. Any other toxic chemicals known or expected to be present in the discharge. NONE
Report any additional significant detections in effluent samples on the Other Toxic Chemicals sheets.

MODULE I, Item 7, Section a. Continued

Note (1) Equivalent chemicals from other suppliers may be purchased. Product concentrations may change; however, the concentration of active ingredients discharged should remain about the same. Approval numbers are included for those chemicals listed in the Susquehanna Approved Materials Manual. Other chemicals will be approved prior to their use onsite.

Note (2) Toxicity of hypobromous acid is expressed as bromine.

Note (3) Approximately 25 gallons/year of this biocide is injected into the closed system cooling water to a maximum average concentration of 330 mg/l of product or 5.0 mg/l as active isothiazolin. Occasionally these systems are drained to the Cooling Tower basin. This product would not be expected to be detected in the Cooling Tower blowdown.

Note (4) Glutaraldehyde is added to closed cooling water systems to maintain microbiological control. A maximum concentration of 300 mg/l active or 600 mg/l product is used. Occasionally these systems are drained to the Cooling Tower blowdown. This product would not be expected to be detected in the Cooling Tower blowdown.

Note (5) The Cooling Tower blowdown is isolated when this descaling agent is used in Circulating Water System (4,000 gal/treatment). Treatment has been very infrequent.

Note (6) Rotenone and Fluridone are products used in the Emergency Spray Pond that has been permitted for use by the Pa Fish and Boat Commission and the PaDEP. The Emergency Spray Pond is treated when needed with 1,000 lbs. of Rotenone to a level of 5 mg/l; however, it is detoxified with potassium permanganate at a rate equal to this concentration prior to discharge and, therefore, is not expected to be present in Outfall 071. Also, 32 lbs. of Fluridone will be applied as necessary to an area of 8/10 surface acre along the pond's edge. Aquashade is used around the perimeter of the pond periodically in the summer to control algae growth.

Note (7) Miscellaneous chemicals used in very small quantities for cleaning surfaces, cooling coils, decontamination of floors, walls, and equipment, cleaning agents, liquid dye for flow tests, laboratory reagents and standards, etc. The following are some of these chemicals:

Chemical/SAMM #	Est. gal/yr.
Power Coil, A-10.29	a
Coil Rite, C-10.384	a
Acti-Klean, C-10.326	a
By-Pas, E-10.11	220
Organic Orange, E-10.35	110
Citirikleen, E-10.29	a
MSA/Cleaner/Sanitizer II, E-10.8	288, b
Rhodamine WT Dye, 32.68	a
Spartan SD-20, C-10.167	a
Touch It Up, E-10.4	a
601-Nami-Lo, C-10.74	a
Powerline PPL10, 32.90	50
Cobratec TT-50-S, 32.87	a
Yellow/Green liquid dye, 32.42	a
Clarifloc C-9490 polymer, 32.109	10-15, c
Nalco 9905, 32.81	220, c
Ethylene Glycol mixture, 16.20	d
Iron Oxalate, 32.129	500 lbs./yr.
Polyfloc CP1160, 32.130	20 lbs./yr.
Polyfloc AP1100, 32.131	20 lbs./yr.
Propylene Glycol Mixture, 16.36	a, d
EPA 2000 WCI-140, B-10.27	a
Trisodium Phosphate, A-20.24	a
Sodium Hydroxide, 32.59	500
Sodium Nitrite, 32.14	200 lb/yr
Nitric Acid, 38.89	5
Borax, 32.62	15
Boric Acid, 32.61	10

Key
a. Not available
b. Ounces
c. Flocculent aid used infrequently for dewatering sludge
d. Present in equipment onsite and has potential for entering storm drains. Preventative maintenance and analysis of replacement chemicals such as Propylene Glycol will minimize any adverse impacts to the environment.

Some of these chemicals may be discharged to the Cooling Tower Basins/ Blowdown, Sewage Treatment Plant, or storm drains in accordance with their Material Safety Data Sheet recommendations.

SAMM 32.125

NALCO

MATERIAL SAFETY DATA SHEET

PRODUCT

PCL-401

EMERGENCY TELEPHONE NUMBER(S)
(800) 424-9300 (24 Hours) CHEMTREC

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : **PCL-401**

APPLICATION : WATER TREATMENT

COMPANY IDENTIFICATION : Nalco Company
1601 W. Diehl Road
Naperville, Illinois
60563-1198

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING
HEALTH : 0 / 1 FLAMMABILITY : 1 / 1 INSTABILITY : 0 / 0 OTHER :
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

2. COMPOSITION/INFORMATION ON INGREDIENTS

Based on our hazard evaluation, none of the substances in this product are hazardous.

3. HAZARDS IDENTIFICATION

****EMERGENCY OVERVIEW****

CAUTION
May cause irritation with prolonged contact.
Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water.
Wear suitable protective clothing.
May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) and sulfur (SOx) under fire conditions.

PRIMARY ROUTES OF EXPOSURE :
Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :
May cause irritation with prolonged contact.

SKIN CONTACT :
May cause irritation with prolonged contact.

INGESTION :
Not a likely route of exposure. No adverse effects expected.

INHALATION :
Not a likely route of exposure. No adverse effects expected.

SYMPTOMS OF EXPOSURE :
Acute :
A review of available data does not identify any symptoms from exposure not previously mentioned.
Chronic :
A review of available data does not identify any symptoms from exposure not previously mentioned.

AGGRAVATION OF EXISTING CONDITIONS :
A review of available data does not identify any worsening of existing conditions.

4. FIRST AID MEASURES

EYE CONTACT :
Flush affected area with water. If symptoms develop, seek medical advice.

SKIN CONTACT :
Flush affected area with water. If symptoms develop, seek medical advice.

INGESTION :
Do not induce vomiting without medical advice. If conscious, washout mouth and give water to drink. If symptoms develop, seek medical advice.

INHALATION :
Remove to fresh air, treat symptomatically. If symptoms develop, seek medical advice.

NOTE TO PHYSICIAN :
Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

5. FIRE FIGHTING MEASURES

FLASH POINT : None

EXTINGUISHING MEDIA :
This product would not be expected to burn unless all the water is boiled away. The remaining organics may be ignitable. Use extinguishing media appropriate for surrounding fire.

FIRE AND EXPLOSION HAZARD :
May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) and sulfur (SOx) under fire conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :
In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :
Do not touch spilled material. Restrict access to area as appropriate until clean-up operations are complete. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Stop or reduce any leaks if it is safe to do so. Ventilate spill area if possible.

METHODS FOR CLEANING UP :
SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. LARGE SPILLS: Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :
Do not contaminate surface water.

7. HANDLING AND STORAGE

HANDLING :
Avoid eye and skin contact. Do not take internally. Ensure all containers are labelled. Keep the containers closed when not in use.

STORAGE CONDITIONS :
Store the containers tightly closed.

SUITABLE CONSTRUCTION MATERIAL :
PVC, Buna-N, HDPE (high density polyethylene), Polyurethane, Polypropylene, Polyethylene, Stainless Steel 304, Compatibility with Plastic Materials can vary; we therefore recommend that compatibility is tested prior to use.

UNSUITABLE CONSTRUCTION MATERIAL :
Brass, Hypalon, Viton, Neoprene, EPDM

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :
This product does not contain any substance that has an established exposure limit.

ENGINEERING MEASURES :
General ventilation is recommended.

RESPIRATORY PROTECTION :
Respiratory protection is not normally needed.

HAND PROTECTION :
Neoprene gloves, Nitrile gloves, Butyl gloves, PVC gloves

SKIN PROTECTION :
Wear standard protective clothing.

EYE PROTECTION :
Wear chemical splash goggles. Wear chemical splash goggles.

HYGIENE RECOMMENDATIONS :
Keep an eye wash fountain available. Keep a safety shower available. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	Light yellow
ODOR	None

SPECIFIC GRAVITY	1.16 - 1.20
SOLUBILITY IN WATER	Complete
pH ()	4.2 - 5.0
VISCOSITY	20 - 160 cps
FREEZING POINT	25 °F /
VAPOR PRESSURE	Same as water
VOC CONTENT	0.00 % EPA Method 24

Note: These physical properties are typical values for this product and are subject to change.

10. STABILITY AND REACTIVITY

STABILITY :
Stable under normal conditions.

HAZARDOUS POLYMERIZATION :
Hazardous polymerization will not occur.

CONDITIONS TO AVOID :
Freezing temperatures.

MATERIALS TO AVOID :
Strong oxidizing agents

HAZARDOUS DECOMPOSITION PRODUCTS :
Under fire conditions: Oxides of carbon, Oxides of nitrogen, Oxides of sulfur

11. TOXICOLOGICAL INFORMATION

The following results are for the product.

ACUTE ORAL TOXICITY :

Species	LD50	Test Descriptor
Rat	5 g/kg	Product

Rating : Non-Hazardous

ACUTE DERMAL TOXICITY :

Species	LD50	Test Descriptor
Rabbit	2 g/kg	Product

Rating : Non-Hazardous

SENSITIZATION :
This product is not expected to be a sensitizer.

CARCINOGENICITY :
None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL EFFECTS :

The following results are for the product.

ACUTE FISH RESULTS :

Species	Exposure	LC50	Test Descriptor
Rainbow Trout	96 hrs	4,900 mg/l	Product
Bluegill Sunfish	96 hrs	> 5,000 mg/l	Product

Rating : Essentially non-toxic

ACUTE INVERTEBRATE RESULTS :

Species	Exposure	LC50	EC50	Test Descriptor
Daphnia magna	48 hrs	2,800 mg/l		Product

Rating : Essentially non-toxic

MOBILITY :
The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM , provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models. If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	Water	Soil/Sediment
<5%	30 - 50%	50 - 70%

The portion in water is expected to be soluble or dispersible.

BIOACCUMULATION POTENTIAL
This preparation or material is not expected to bioaccumulate.

If released into the environment, see CERCLA/SUPERFUND in Section 15.

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it is not a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.

As a non-hazardous waste, it is not subject to federal regulation. Consult state or local regulation for any additional handling, treatment or disposal requirements. For disposal, contact a properly licensed waste treatment, storage, disposal or recycling facility.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

LAND TRANSPORT :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

15. REGULATORY INFORMATION

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :
Based on our hazard evaluation, none of the substances in this product are hazardous.

CERCLA/SUPERFUND, 40 CFR 117, 302 :
Notification of spills of this product is not required.

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :
This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :
Our hazard evaluation has found that this product is not hazardous under 29 CFR 1910.1200.

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :
This product does not contain substances on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA) :
The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :
None of the substances are specifically listed in the regulation.

CLEAN AIR ACT, Sec. 111 (40 CFR 60, Volatile Organic Compounds), Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :
None of the substances are specifically listed in the regulation.

CALIFORNIA PROPOSITION 65 :
This product does not contain substances which require warning under California Proposition 65.

MICHIGAN CRITICAL MATERIALS :
None of the substances are specifically listed in the regulation.

STATE RIGHT TO KNOW LAWS :
None of the substances are specifically listed in the regulation.

NATIONAL REGULATIONS, CANADA :

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :
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.

WHMIS CLASSIFICATION :
Not considered a WHMIS controlled product.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :
The substances in this preparation are listed on the Domestic Substances List (DSL), are exempt, or have been reported in accordance with the New Substances Notification Regulations.

INTERNATIONAL CHEMICAL CONTROL LAWS

AUSTRALIA
All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS) and are listed on the Australian Inventory of Chemical Substances (AICS).

EUROPE
The substances in this preparation have been reviewed for compliance with the EINECS or ELINCS inventories.

THE PHILIPPINES
All substances in this product comply with the Republic Act 6969 (RA 6969) and are listed on the Philippine Inventory of Chemicals & Chemical Substances (PICCS).

16. OTHER INFORMATION

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight# (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department
Date issued : 02/26/2004
Version Number : 1.4

SAMM 32.127

NALCO

MATERIAL SAFETY DATA SHEET

PRODUCT

PCL-57

EMERGENCY TELEPHONE NUMBER(S)
(800) 424-9300 (24 Hours) CHEMTREC

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : **PCL-57**

APPLICATION : SCALE INHIBITOR

COMPANY IDENTIFICATION : Nalco Energy Services, L.P.
P.O. Box 87
Sugar Land, Texas
77487-0087

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING
HEALTH : 2 / 3 FLAMMABILITY : 1 / 1 INSTABILITY : 0 / 0 OTHER :
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

Hazardous Substance(s)	CAS NO	% (w/w)
Hydroxyethylidenediphosphonic Acid	2809-21-4	60.0 - 100.0
Phosphonic Acid	13598-36-2	1.0 - 5.0

3. HAZARDS IDENTIFICATION

****EMERGENCY OVERVIEW****

DANGER
Corrosive. May cause tissue damage.
Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water.
Wear a face shield. Wear chemical resistant apron, chemical splash goggles, impervious gloves and boots.
Contact with reactive metals (e.g. aluminum) may result in the generation of flammable hydrogen gas. May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of phosphorus (POx) under fire conditions.

PRIMARY ROUTES OF EXPOSURE :
Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :
Corrosive. Will cause eye burns and permanent tissue damage.

SKIN CONTACT :
May cause severe irritation or tissue damage depending on the length of exposure and the type of first aid administered.

INGESTION :
Not a likely route of exposure. Corrosive; causes chemical burns to the mouth, throat and stomach.

INHALATION :
Not a likely route of exposure. Irritating, in high concentrations, to the eyes, nose, throat and lungs.

SYMPTOMS OF EXPOSURE :
Acute :
A review of available data does not identify any symptoms from exposure not previously mentioned.
Chronic :
Hydroxyethylenediphosphonic Acid (HEDP) has been reported to alter the development of the bone density by affecting bone mineralization and calcium and phosphate metabolism in animal studies.

AGGRAVATION OF EXISTING CONDITIONS :
A review of available data does not identify any worsening of existing conditions.

HUMAN HEALTH HAZARDS - CHRONIC :
None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).
No adverse effects expected other than those mentioned above.

4. FIRST AID MEASURES

EYE CONTACT :
PROMPT ACTION IS ESSENTIAL IN CASE OF CONTACT. Immediately flush eye with water for at least 15 minutes while holding eyelids open. Get immediate medical attention.

SKIN CONTACT :
Immediately flush with plenty of water for at least 15 minutes. For a large splash, flood body under a shower. Remove contaminated clothing. Wash off affected area immediately with plenty of water. Get immediate medical attention. Contaminated clothing, shoes, and leather goods must be discarded or cleaned before re-use.

INGESTION :
DO NOT INDUCE VOMITING. If conscious, washout mouth and give water to drink. Get immediate medical attention.

INHALATION :
Remove to fresh air, treat symptomatically. Get medical attention.

NOTE TO PHYSICIAN :
Probable mucosal damage may contraindicate the use of gastric lavage. Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

5. FIRE FIGHTING MEASURES

FLASH POINT : > 200 °F / > 93 °C (TCC)

EXTINGUISHING MEDIA :
Not expected to burn. Use extinguishing media appropriate for surrounding fire.

FIRE AND EXPLOSION HAZARD :
Contact with reactive metals (e.g. aluminum) may result in the generation of flammable hydrogen gas: May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of phosphorus (POx) under fire conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :
In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :
Restrict access to area as appropriate until clean-up operations are complete. Ensure clean-up is conducted by trained personnel only. Ventilate spill area if possible. Do not touch spilled material. Stop or reduce any leaks if it is safe to do so. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Notify appropriate government, occupational health and safety and environmental authorities.

METHODS FOR CLEANING UP :
SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. LARGE SPILLS: Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Wash site of spillage thoroughly with water. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :
Do not contaminate surface water.

7. HANDLING AND STORAGE

HANDLING :
Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Avoid generating aerosols and mists. Keep the containers closed when not in use. Have emergency equipment (for fires, spills, leaks, etc.) readily available.

STORAGE CONDITIONS :
Store the containers tightly closed. Store in suitable labelled containers. Store separately from bases.

UNSUITABLE CONSTRUCTION MATERIAL :
Product is corrosive to aluminum. Aluminum should not be used for feed, storage, or transportation systems.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :
This product does not contain any substance that has an established exposure limit.

ENGINEERING MEASURES :
General ventilation is recommended. Use local exhaust ventilation if necessary to control airborne mist and vapor.

RESPIRATORY PROTECTION :
If significant mists, vapors or aerosols are generated an approved respirator is recommended. An organic vapor/acid gas cartridge with dust/mist prefilter may be used. In event of emergency or planned entry into unknown concentrations a positive pressure, full-facepiece SCBA should be used. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection. Respiratory protection is not normally needed. If significant mists, vapors or aerosols are generated an approved respirator is recommended.

HAND PROTECTION :
Neoprene gloves, PVC gloves, Butyl gloves

SKIN PROTECTION :
Wear chemical resistant apron, chemical splash goggles, impervious gloves and boots. A full slicker suit is recommended if gross exposure is possible.

EYE PROTECTION :
Wear a face shield with chemical splash goggles.

HYGIENE RECOMMENDATIONS :
Eye wash station and safety shower are necessary. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	Clear Light yellow
ODOR	None
SPECIFIC GRAVITY	1.41 - 1.47 @ 77 °F / 25 °C
DENSITY	11.7 - 12.2 lb/gal
SOLUBILITY IN WATER	Complete
pH (1 %)	< 2
VISCOSITY	40 cps @ 77 °F / 25 °C
FREEZING POINT	-13 °F / -25 °C
BOILING POINT	226 °F / 108 °C
VAPOR PRESSURE	Same as water
EVAPORATION RATE	Same as water

Note: These physical properties are typical values for this product and are subject to change.

10. STABILITY AND REACTIVITY

STABILITY :
Stable under normal conditions.

HAZARDOUS POLYMERIZATION :
Hazardous polymerization will not occur.

CONDITIONS TO AVOID :
Freezing temperatures.
Avoid temperatures greater than 392 °F

MATERIALS TO AVOID :
Contact with strong alkalies (e.g. ammonia and its solutions, carbonates, sodium hydroxide (caustic), potassium hydroxide, calcium hydroxide (lime), cyanide, sulfide, hypochlorites, chlorites) may generate heat, splattering or boiling and toxic vapors. Contact with reactive metals (e.g. aluminum) may result in the generation of flammable hydrogen gas. Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors.

HAZARDOUS DECOMPOSITION PRODUCTS :
Under fire conditions: Oxides of carbon, Oxides of phosphorus

11. TOXICOLOGICAL INFORMATION

The following results are for the product.

ACUTE ORAL TOXICITY :

Species	LD50	Test Descriptor
Rat	2,400 mg/kg	Product

Rating : Non-Hazardous

ACUTE DERMAL TOXICITY :

Species	LD50	Test Descriptor
Rabbit	> 7,940 mg/kg	Product

Rating : Non-Hazardous

PRIMARY SKIN IRRITATION :

Draize Score	Test Descriptor
0.0 / 8.0	Product

Rating : Practically non-irritating

PRIMARY EYE IRRITATION :

Draize Score	Test Descriptor
39 / 110.0	

Rating : Moderately irritating

SENSITIZATION :
This product is not expected to be a sensitizer.

CARCINOGENICITY :
None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

HUMAN HAZARD CHARACTERIZATION :
Based on our hazard characterization, the potential human hazard is: High

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL EFFECTS :

The following results are for the product.

ACUTE FISH RESULTS :

Species	Exposure	LC50	Test Descriptor
Fathead Minnow	96 hrs	> 1,000 mg/l	Product
Bluegill Sunfish	96 hrs	868 mg/l	Product
Rainbow Trout	96 hrs	368 mg/l	Product
Channel Catfish	96 hrs	695 mg/l	Product
Sheepshead Minnow	96 hrs	2,180 mg/l	Product

Rating : Essentially non-toxic

ACUTE INVERTEBRATE RESULTS :

Species	Exposure	LC50	EC50	Test Descriptor
Daphnia magna	48 hrs	520 mg/l		Product
Grass Shrimp	96 hrs	1,770 mg/l		Product

Rating : Essentially non-toxic

PERSISTENCY AND DEGRADATION :

Chemical Oxygen Demand (COD) : 0.263 mg/l

Biological Oxygen Demand (BOD) :

Incubation Period	Value	Test Descriptor
	0 mg/l	

The organic portion of this preparation is expected to be inherently biodegradable.

MOBILITY :
The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM , provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of

the models. If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	Water	Soil/Sediment
<5%	30 - 50%	50 - 70%

The portion in water is expected to be soluble or dispersible.

BIOACCUMULATION POTENTIAL
This preparation or material is not expected to bioaccumulate.

ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION
Based on our hazard characterization, the potential environmental hazard is: Low

If released into the environment, see CERCLA/SUPERFUND in Section 15.

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it could meet the criteria of a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. Before disposal, it should be determined if the waste meets the criteria of a hazardous waste.

Hazardous Waste: D002

Hazardous wastes must be transported by a licensed hazardous waste transporter and disposed of or treated in a properly licensed hazardous waste treatment, storage, disposal or recycling facility. Consult local, state, and federal regulations for specific requirements.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

LAND TRANSPORT :

Proper Shipping Name :	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.
Technical Name(s) :	HYDROXYETHYLIDENE DIPHOSPHONIC ACID
UN/ID No :	UN 3265
Hazard Class - Primary :	8
Packing Group :	II
Flash Point :	> 93 °C / > 200 °F

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name :	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.
Technical Name(s) :	HYDROXYETHYLIDENE DIPHOSPHONIC ACID

UN/ID No :	UN 3265
Hazard Class - Primary :	8
Packing Group :	II
IATA Cargo Packing Instructions :	812
IATA Cargo Aircraft Limit :	30 L (Max net quantity per package)

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name :	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.
Technical Name(s) :	HYDROXYETHYLIDENE DIPHOSPHONIC ACID
UN/ID No :	UN 3265
Hazard Class - Primary :	8
Packing Group :	II

15. REGULATORY INFORMATION

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :
Based on our hazard evaluation, the following substance(s) in this product is/are hazardous and the reason(s) is/are shown below.

Hydroxyethylidenediphosphonic Acid : Corrosive to eyes, Target Organ - Bone
Phosphonic Acid : Corrosive

CERCLA/SUPERFUND, 40 CFR 117, 302 :
Notification of spills of this product is not required.

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :
This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :
Our hazard evaluation has found this product to be hazardous. The product should be reported under the following indicated EPA hazard categories:

X	Immediate (Acute) Health Hazard
X	Delayed (Chronic) Health Hazard
-	Fire Hazard
-	Sudden Release of Pressure Hazard
-	Reactive Hazard

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :
This product does not contain substances on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA) :
The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

FOOD AND DRUG ADMINISTRATION (FDA) Federal Food, Drug and Cosmetic Act :
When use situations necessitate compliance with FDA regulations, this product is acceptable under : 21 CFR 173.310 Boiler Water Additives

Limitations: no more than required to produce intended technical effect.

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :
None of the substances are specifically listed in the regulation.

CLEAN AIR ACT, Sec. 111 (40 CFR 60, Volatile Organic Compounds), Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :
None of the substances are specifically listed in the regulation.

CALIFORNIA PROPOSITION 65 :
This product does not contain substances which require warning under California Proposition 65.

MICHIGAN CRITICAL MATERIALS :
None of the substances are specifically listed in the regulation.

STATE RIGHT TO KNOW LAWS :
The following substances are disclosed for compliance with State Right to Know Laws:

Water	7732-18-5
Hydroxyethylidenediphosphonic Acid	2809-21-4
Phosphonic Acid	13598-36-2

NATIONAL REGULATIONS, CANADA :

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :
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.

WHMIS CLASSIFICATION :
E - Corrosive Material

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :
The substances in this preparation are listed on the Domestic Substances List (DSL), are exempt, or have been reported in accordance with the New Substances Notification Regulations.

INTERNATIONAL CHEMICAL CONTROL LAWS

AUSTRALIA
All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS) and are listed on the Australian Inventory of Chemical Substances (AICS).

EUROPE
The substances in this preparation have been reviewed for compliance with the EINECS or ELINCS inventories.

JAPAN
All substances in this product comply with the Law Regulating the Manufacture and Importation Of Chemical Substances and are listed on the Ministry of International Trade & industry List (MITI).

KOREA
All substances in this product comply with the Toxic Chemical Control Law (TCCL) and are listed on the Existing Chemicals List (ECL)

THE PHILIPPINES
All substances in this product comply with the Republic Act 6969 (RA 6969) and are listed on the Philippine Inventory of Chemicals & Chemical Substances (PICCS).

16. OTHER INFORMATION

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight# (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department
Date issued : 02/26/2004
Version Number : 1.3

JAMM 02.126

NALCO

MATERIAL SAFETY DATA SHEET

PRODUCT

H-130 MICROBIOCIDE

EMERGENCY TELEPHONE NUMBER(S)
(800) 424-9300 (24 Hours) CHEMTREC

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME :	**H-130 MICROBIOCIDE**
APPLICATION :	BIOCIDETWIN-CHAIN QUATERNARY AMMONIUM COMPOUND CONCENTRATE
COMPANY IDENTIFICATION :	Nalco Company 1601 W. Diehl Road Naperville, Illinois 60563-1198
EMERGENCY TELEPHONE NUMBER(S) :	(800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING
HEALTH : 3 / 3 FLAMMABILITY : 2 / 2 INSTABILITY : 0 / 0 OTHER :
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

Hazardous Substance(s)	CAS NO	% (w/w)
Didecyl-Dimethyl-Ammonium chloride	7173-51-5	30 - 60
Ethanol	64-17-5	10 - 30

3. HAZARDS IDENTIFICATION

****EMERGENCY OVERVIEW****

DANGER
Combustible. May cause tissue damage. Toxic to aquatic organisms. Corrosive. Causes severe eye and skin damage. Do not get in eyes, on skin or on clothing. Wears goggles or face shield and rubber gloves when handling. Harmful or fatal if swallowed. Avoid contamination of food. KEEP OUT OF REACH OF CHILDREN. Corrosive to eyes and skin. Do not get in eyes, on skin or clothing. May be fatal if swallowed or inhaled. Do not swallow. Do not breathe vapour or mist.
Do not get in eyes, on skin, on clothing. Do not take internally. Keep away from heat. Keep away from sources of ignition - No smoking. Use with adequate ventilation. Keep container tightly closed and in a well-ventilated place. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water. Do not get in eyes, on skin or on clothing. Wear goggles or face shield and rubber gloves when handling. Harmful if inhaled. Avoid breathing vapor. Remove contaminated clothing and wash before reuse. Harmful or fatal if swallowed. Avoid contamination of food.
Wear chemical resistant apron, chemical splash goggles, impervious gloves and boots.
Combustible Liquid; may form combustible mixtures at or above the flash point. Empty product containers may contain product residue. Do not pressurize, cut, heat, weld, or expose containers to flame or other sources of ignition. May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) under fire conditions. May evolve HCl under fire conditions. May evolve ammonia (NH4) under fire conditions.

PRIMARY ROUTES OF EXPOSURE :
Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :
May cause severe irritation or tissue damage depending on the length of exposure and the type of first aid administered.

SKIN CONTACT :
May cause severe irritation or tissue damage depending on the length of exposure and the type of first aid administered.

INGESTION :
May cause burns to mouth and gastro-intestinal tract.

INHALATION :
Repeated or prolonged exposure may irritate the respiratory tract. Can cause central nervous system depression.

SYMPTOMS OF EXPOSURE :
Acute :
A review of available data does not identify any symptoms from exposure not previously mentioned.
Chronic :
A review of available data does not identify any symptoms from exposure not previously mentioned.

AGGRAVATION OF EXISTING CONDITIONS :
A review of available data does not identify any worsening of existing conditions.

4. FIRST AID MEASURES

First Aid: In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. For eyes, call a physician. Remove and wash contaminated clothing before reuse.

If swallowed, drink promptly a large quantity of milk, egg whites, gelatin solution, or if these are not available, drink large quantities of water. Avoid alcohol. Call a physician immediately.

NOTE TO PHYSICIAN: Probable mucosal damage may contraindicate the use of gastric lavage. Measures against circulatory shock, respiratory depression and convulsions may be needed.

NOTE TO PHYSICIAN :
Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

5. FIRE FIGHTING MEASURES

FLASH POINT : 109 °F / 43 °C (SETAFLASH)

EXTINGUISHING MEDIA :
Foam, Carbon dioxide, Dry powder, Other extinguishing agent suitable for Class B fires, For large fires, use water spray or fog, thoroughly drenching the burning material.
Water mist may be used to cool closed containers.

FIRE AND EXPLOSION HAZARD :
Combustible Liquid; may form combustible mixtures at or above the flash point. Empty product containers may contain product residue. Do not pressurize, cut, heat, weld, or expose containers to flame or other sources of ignition. May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) under fire conditions. May evolve HCl under fire conditions. May evolve ammonia (NH4) under fire conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :
In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :
Notify appropriate government, occupational health and safety and environmental authorities. Restrict access to area as appropriate until clean-up operations are complete. Ensure clean-up is conducted by trained personnel only. Ventilate spill area if possible. Do not touch spilled material. Eliminate ignition sources. Stop or reduce any leaks if it is safe to do so. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection).

METHODS FOR CLEANING UP :
SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. LARGE SPILLS: Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Wash site of spillage thoroughly with water. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :
This product is toxic to fish and other water organisms. Do not discharge directly into lakes, ponds, streams, waterways or public water supplies.

7. HANDLING AND STORAGE

HANDLING :
Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Avoid release of vapors or mists into workplace air. Keep the containers closed when not in use. Do not use in locations where vapor is likely to travel to welding flames or arcs or to other hot surfaces. Vapors are much heavier than air, this can result in uneven distribution. Have emergency equipment (for fires, spills, leaks, etc.) readily available.

STORAGE CONDITIONS :
Store away from heat and sources of ignition. Connections must be grounded to avoid electrical charges. Store the containers tightly closed. Store separately from oxidizers. Store in suitable labelled containers.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :
Exposure guidelines have not been established for this product. Available exposure limits for the substance(s) are shown below.

ACGIH/TLV :
Substance(s)
Ethanol TWA: 1,000 ppm , 1,880 mg/m3

OSHA/PEL :
Substance(s)
Ethanol TWA: 1,000 ppm , 1,900 mg/m3

ENGINEERING MEASURES :
Use general ventilation with local exhaust ventilation.

RESPIRATORY PROTECTION :
If significant mists, vapors or aerosols are generated an approved respirator is recommended. An organic vapor cartridge with dust/mist prefilter may be used. In event of emergency or planned entry into unknown concentrations a positive pressure, full-facepiece SCBA should be used. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection.

HAND PROTECTION :
Neoprene gloves, Viton# gloves

SKIN PROTECTION :
Wear impervious apron and boots. A full slicker suit is recommended if gross exposure is possible.

EYE PROTECTION :
Wear chemical splash goggles.

HYGIENE RECOMMENDATIONS :
Eye wash station and safety shower are necessary. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse. Use good work and personal hygiene practices to avoid exposure.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	Light yellow
ODOR	Alcoholic
SPECIFIC GRAVITY	0.93 @ 77 °F / 25 °C
DENSITY	7.7 lb/gal

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL EFFECTS :

The following results are for the product.

ACUTE FISH RESULTS :

Species	Exposure	LC50	Test Descriptor
Rainbow Trout	96 hrs	2.2 mg/l	
Bluegill Sunfish	96 hrs	0.92 mg/l	

Rating : Very toxic

ACUTE INVERTEBRATE RESULTS :

Species	Exposure	LC50	EC50	Test Descriptor
Daphnia magna	48 hrs	0.19 mg/l		
Mysid Shrimp (Mysidopsis bahia)	96 hrs	0.14 mg/l		

Rating : Very toxic

If released into the environment, see CERCLA/SUPERFUND in Section 15.

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it could meet the criteria of a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. Before disposal, it should be determined if the waste meets the criteria of a hazardous waste.

Hazardous Waste: D001

Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste Representative at the nearest EPA Regional Office for guidance.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

LAND TRANSPORT :

Proper Shipping Name :	DISINFECTANTS, LIQUID, CORROSIVE, N.O.S.
Technical Name(s) :	DIDECYLDIMETHYLAMMONIUM CHLORIDE
UN/ID No :	UN 1903
Hazard Class - Primary :	8
Packing Group :	II

SOLUBILITY IN WATER	Complete
pH (1 %)	7.0 - 8.0
VISCOSITY	< 100 cps @ 77 °F / 25 °C
FREEZING POINT	12 °F /
VAPOR PRESSURE	30 mm Hg @ 77 °F / 25 °C
VOC CONTENT	10 % EPA Method 24

Note: These physical properties are typical values for this product and are subject to change.

10. STABILITY AND REACTIVITY

STABILITY :
Stable under normal conditions.

HAZARDOUS POLYMERIZATION :
Hazardous polymerization will not occur.

CONDITIONS TO AVOID :
Heat and sources of ignition including static discharges.

MATERIALS TO AVOID :
Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors. Contact with reducing agents (e.g. hydrazine, sulfites, sulfide, aluminum or magnesium dust) may generate heat, fires, explosions and toxic vapors.

HAZARDOUS DECOMPOSITION PRODUCTS :
Under fire conditions: Oxides of carbon, Oxides of nitrogen, HCl

11. TOXICOLOGICAL INFORMATION

The following results are for the product.

ACUTE ORAL TOXICITY :

Species	LD50	Test Descriptor
Rat	645 mg/kg	Product

ACUTE DERMAL TOXICITY :

Species	LD50	Test Descriptor
Rabbit	> 4 g/kg	Product

SENSITIZATION :
This product is not expected to be a sensitizer.

CARCINOGENICITY :
None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

Flash Point :	43 °C / 109 °F
DOT Reportable Quantity (per package) :	1,000 lbs
DOT RQ Component :	ETHANOL

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name :	CORROSIVE LIQUID, FLAMMABLE, N.O.S.
Technical Name(s) :	DIDECYLDIMETHYLAMMONIUM CHLORIDE, ETHANOL
UN/ID No :	UN 2920
Hazard Class - Primary :	8
Hazard Class - Secondary :	3
Packing Group :	II
IATA Cargo Packing Instructions :	
IATA Cargo Aircraft Limit :	(Max net quantity per package)

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name :	CORROSIVE LIQUID, FLAMMABLE, N.O.S.
Technical Name(s) :	DIDECYLDIMETHYLAMMONIUM CHLORIDE, ETHANOL
UN/ID No :	UN 2920
Hazard Class - Primary :	8
Hazard Class - Secondary :	3
Packing Group :	II

15. REGULATORY INFORMATION

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :
Based on our hazard evaluation, the following substance(s) in this product is/are hazardous and the reason(s) is/are shown below.

Didecyl-Dimethyl-Ammonium chloride : Corrosive
Ethanol : Flammable

CERCLA/SUPERFUND, 40 CFR 117, 302 :
This product contains the following Reportable Quantity (RQ) Substance. Also listed is the RQ for the product. If a reportable quantity of product is released, it requires notification to the NATIONAL RESPONSE CENTER, WASHINGTON, D.C. (1-800-424-8802).

RQ Substance	RQ
Ethanol	1,000 lbs
	10,000 lbs

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :
This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :
Our hazard evaluation has found this product to be hazardous. The product should be reported under the following indicated EPA hazard categories:

X	Immediate (Acute) Health Hazard
-	Delayed (Chronic) Health Hazard
X	Fire Hazard
-	Sudden Release of Pressure Hazard
-	Reactive Hazard

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :
This product does not contain substances on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA) :
The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

FEDERAL INSECTICIDE, FUNGICIDE AND RODENTICIDE ACT (FIFRA) :
EPA Reg. No. 1706-186
In all cases follow instructions on the product label.

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :
None of the substances are specifically listed in the regulation.

CLEAN AIR ACT, Sec. 111 (40 CFR 60, Volatile Organic Compounds), Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :
This product contains the following substances listed in the regulation:

Substance(s)	Citations
• Ethanol	Sec. 111

CALIFORNIA PROPOSITION 65 :
This product does not contain substances which require warning under California Proposition 65.

MICHIGAN CRITICAL MATERIALS :
None of the substances are specifically listed in the regulation.

STATE RIGHT TO KNOW LAWS :
This product is a registered biocide and is exempt from State Right to Know Labelling Laws.

NATIONAL REGULATIONS, CANADA :

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :
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.

WHMIS CLASSIFICATION :
Pesticide controlled products are not regulated under WHMIS.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :
The substances in this preparation are listed on the Domestic Substances List (DSL), are exempt, or have been reported in accordance with the New Substances Notification Regulations.

16. OTHER INFORMATION

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight# (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department
Date issued : 02/28/2004
Version Number : 1.6

NALCO

MATERIAL SAFETY DATA SHEET

PRODUCT

H-940 MICROBIOCIDE

EMERGENCY TELEPHONE NUMBER(S)
(800) 424-9300 (24 Hours) CHEMTREC

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : **H-940 MICROBIOCIDE**

APPLICATION : INDUSTRIAL LIQUID MICROBIOCIDE

COMPANY IDENTIFICATION : Nalco Company
1601 W. Diehl Road
Naperville, Illinois
60563-1198

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING
HEALTH : 1 / 1 FLAMMABILITY : 0 / 0 INSTABILITY : 0 / 0 OTHER :
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

Hazardous Substance(s)	CAS NO	% (w/w)
Sodium Bromide	7647-15-6	30.0 - 60.0

3. HAZARDS IDENTIFICATION

****EMERGENCY OVERVIEW****

WARNING
Irritation may develop from eye and skin exposure. Avoid contact with eyes. Wear gloves and safety goggles. Wash contaminated clothing before reuse.
Avoid contact with eyes, skin and clothing. Wash with soap and water after handling. Remove contaminated clothing and wash before reuse.
May evolve hydrogen bromide and bromine under fire conditions.

PRIMARY ROUTES OF EXPOSURE :
Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :
Can cause mild to moderate irritation.

SKIN CONTACT :
May cause irritation with prolonged contact.

INGESTION :
Not a likely route of exposure. No adverse effects expected.

INHALATION :
Not a likely route of exposure. Aerosols or product mist may irritate the upper respiratory tract.

SYMPTOMS OF EXPOSURE :
Acute :
A review of available data does not identify any symptoms from exposure not previously mentioned.
Chronic :
A review of available data does not identify any symptoms from exposure not previously mentioned.

AGGRAVATION OF EXISTING CONDITIONS :
A review of available data does not identify any worsening of existing conditions.

4. FIRST AID MEASURES

Eye contact: Flush eyes with cold water for at least 15 minutes. If irritation persists, seek medical attention.

Skin contact: Prolonged contact can produce skin irritation. If skin contact occurs, wash with cold water for 15 minutes.

NOTE TO PHYSICIAN :
Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

5. FIRE FIGHTING MEASURES

FLASH POINT : None

EXTINGUISHING MEDIA :
Not expected to burn. Keep containers cool by spraying with water. Use extinguishing media appropriate for surrounding fire.

FIRE AND EXPLOSION HAZARD :
May evolve hydrogen bromide and bromine under fire conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :
In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :
Restrict access to area as appropriate until clean-up operations are complete. Ensure clean-up is conducted by trained personnel only. Ventilate spill area if possible. Do not touch spilled material. Stop or reduce any leaks if it is safe to do so. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Notify appropriate government, occupational health and safety and environmental authorities.

METHODS FOR CLEANING UP :
SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. LARGE SPILLS: Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Wash site of spillage thoroughly with water. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :
This pesticide is toxic to fish and aquatic organisms. Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans or other waters, unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance contact your State Water Board or Regional Office of the EPA.

7. HANDLING AND STORAGE

HANDLING :
Avoid eye and skin contact. Do not take internally. Do not get in eyes, on skin, on clothing. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Ensure all containers are labelled. Keep the containers closed when not in use. Use with adequate ventilation.

STORAGE CONDITIONS :
Store the containers tightly closed. Store in suitable labelled containers. Store in a cool well ventilated area away from direct sunlight.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :
This product does not contain any substance that has an established exposure limit.

ENGINEERING MEASURES :
General ventilation is recommended.

RESPIRATORY PROTECTION :
Respiratory protection is not normally needed.

HAND PROTECTION :
Neoprene gloves, Nitrile gloves, Butyl gloves, PVC gloves

SKIN PROTECTION :
Wear standard protective clothing.

EYE PROTECTION :
Wear chemical splash goggles.

HYGIENE RECOMMENDATIONS :
If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse. Keep an eye wash fountain available. Keep a safety shower available.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	Colorless
ODOR	None

SPECIFIC GRAVITY	1.43 @ 77 °F / 25 °C
DENSITY	11.9 lb/gal
SOLUBILITY IN WATER	Complete
pH (100 %)	5.5 - 9.0
FREEZING POINT	-10 °F / -23.3 °C
BOILING POINT	218 °F / 103.5 °C
VAPOR PRESSURE	Same as water
VOC CONTENT	0.00 % EPA Method 24

Note: These physical properties are typical values for this product and are subject to change.

10. STABILITY AND REACTIVITY

STABILITY :
Stable under normal conditions.

HAZARDOUS POLYMERIZATION :
Hazardous polymerization will not occur.

CONDITIONS TO AVOID :
High temperatures

MATERIALS TO AVOID :
Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors. Strong acids

HAZARDOUS DECOMPOSITION PRODUCTS :
Hydrogen bromide, Bromine

11. TOXICOLOGICAL INFORMATION

The following results are for the product and a similar product.

ACUTE ORAL TOXICITY :

Species	LD50	Test Descriptor
Rat	> 5,000 mg/kg	Product

Rating : Non-Hazardous

ACUTE DERMAL TOXICITY :

Species	LD50	Test Descriptor
Rabbit	> 2,000 mg/kg	Product

Rating : Non-Hazardous

PRIMARY SKIN IRRITATION :

Draize Score	Test Descriptor
0.4 / 8.0	Similar Product

Rating : Minimally irritating

PRIMARY EYE IRRITATION :

Draize Score	Test Descriptor
10.8 / 110.0	Similar Product

Rating : Practically non-irritating

SENSITIZATION :
This product is not expected to be a sensitizer.

CARCINOGENICITY :
None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

HUMAN HAZARD CHARACTERIZATION :
Based on our hazard characterization, the potential human hazard is: Low

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL EFFECTS :

The following results are for the product.

ACUTE FISH RESULTS :

Species	Exposure	LC50	Test Descriptor
Bluegill Sunfish	96 hrs	> 100 mg/l	Product
Rainbow Trout	96 hrs	> 100 mg/l	Product

Rating : Essentially non-toxic

ACUTE INVERTEBRATE RESULTS :

Species	Exposure	LC50	EC50	Test Descriptor
Daphnia magna	48 hrs	> 1,000 mg/l		Product

Rating : Essentially non-toxic

PERSISTENCY AND DEGRADATION :

Biological Oxygen Demand (BOD) : This material is an oxidizing biocide and is not expected to persist in the environment.

ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION
Based on our hazard characterization, the potential environmental hazard is: Low

If released into the environment, see CERCLA/SUPERFUND in Section 15.

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it is not a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.

Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

DO NOT REUSE EMPTY CONTAINER. Triple rinse the container (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or incinerate. Burn only if allowed by state and local authorities. If burned, stay out of smoke.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

LAND TRANSPORT :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

15. REGULATORY INFORMATION

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :
Based on our hazard evaluation, the following substance(s) in this product is/are hazardous and the reason(s) is/are shown below.

Sodium Bromide : Eye irritant

CERCLA/SUPERFUND, 40 CFR 117, 302 :
Notification of spills of this product is not required.

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :
This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :
Our hazard evaluation has found this product to be hazardous. The product should be reported under the following indicated EPA hazard categories:

X	Immediate (Acute) Health Hazard
-	Delayed (Chronic) Health Hazard
-	Fire Hazard
-	Sudden Release of Pressure Hazard
-	Reactive Hazard

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :
This product does not contain substances on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA) :
This product is exempted under TSCA and regulated under FIFRA. The inerts are on the Inventory List.

FEDERAL INSECTICIDE, FUNGICIDE AND RODENTICIDE ACT (FIFRA) :
EPA Reg. No. 1706-217
In all cases follow instructions on the product label.

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :
None of the substances are specifically listed in the regulation.

CLEAN AIR ACT, Sec. 111 (40 CFR 60, Volatile Organic Compounds), Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :
None of the substances are specifically listed in the regulation.

CALIFORNIA PROPOSITION 65 :
This product does not contain substances which require warning under California Proposition 65.

MICHIGAN CRITICAL MATERIALS :
None of the substances are specifically listed in the regulation.

STATE RIGHT TO KNOW LAWS :
This product is a registered biocide and is exempt from State Right to Know Labelling Laws.

NATIONAL REGULATIONS, CANADA :

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :
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.

WHMIS CLASSIFICATION :
Pesticide controlled products are not regulated under WHMIS.

16. OTHER INFORMATION

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight# (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department
Date issued : 02/28/2004
Version Number : 1.5

SAMM 32.53

GE Betz

GE Betz, Inc.
4636 Somerton Road
Trevose, PA 19053
Business telephone: (215) 355-3300

Material Safety Data Sheet

Issue Date: 17-MAY-2001

EMERGENCY TELEPHONE (Health/Accident): (800) 877-1940

1 PRODUCT IDENTIFICATION

PRODUCT NAME:

SPECTRUS NX1106

PRODUCT APPLICATION AREA:

WATER-BASED MICROBIAL CONTROL AGENT.

2 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. This product is subject to the Pennsylvania and New Jersey Worker and Community Right to Know Law.

HAZARDOUS INGREDIENTS:

CAS#	CHEMICAL NAME
10377-60-3	MAGNESIUM NITRATE Oxidizer; irritant (eyes and skin)
26172-55-4	5-CHLORO-2-METHYL-4-ISOTHIAZOLIN-3-ONE Corrosive; toxic (by ingestion and skin absorption); sensitizer (skin)

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 Pennsylvania thresholds for carcinogens.

NON-HAZARDOUS INGREDIENTS:

CAS#	CHEMICAL NAME
7732-18-5	WATER

3 HAZARDS IDENTIFICATION

****

EMERGENCY OVERVIEW

DANGER

Corrosive to skin. Skin sensitizer with delayed onset of symptoms. Corrosive to the eyes. Mists/aerosols cause irritation to the upper respiratory tract.

DOT hazard: Corrosive to skin
Emergency Response Guide #153
Odor: Slight; Appearance: Light Yellow To Green, 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. Skin sensitizer with delayed onset of symptoms.

ACUTE EYE EFFECTS:
Corrosive to the eyes.

ACUTE RESPIRATORY EFFECTS:
Mists/aerosols cause irritation to the upper respiratory tract.

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 repeated exposures may cause tissue necrosis and/or skin sensitization.

MEDICAL CONDITIONS AGGRAVATED:
Not known.

SYMPTOMS OF EXPOSURE:
Direct contact with skin will cause severe delayed skin reactions or burns if not washed off immediately- follow first aid instructions.

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. Dilute contents of stomach using 3-4 glasses 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.

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:

Thermal decomposition (destructive fires) yields elemental oxides.

FLASH POINT:

> 200F > 93C P-M(CC)

MISCELLANEOUS:

Corrosive to skin
UN3265;Emergency Response Guide #153

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. Do not add decontaminant solution to waste drum containing biocide or adsorbent. Decontaminate floor residual with 10% metabisulfite solution. Use 10 volumes of solution to one volume of spill.

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 - Dispose of in approved pesticide facility or according to label instructions.

7 HANDLING & STORAGE

HANDLING:

Contains an oxidizer. Avoid all contact with reducing agents, oils, greases, organics and acids. Corrosive to skin and/or eyes.

STORAGE:

Keep containers closed when not in use. Store between 20-100F for no more than 6 months. Store upright in original vented containers. Product evolves CO2 slowly. Store samples in plastic bottles due to pressure build-up. < 1.00

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMITS

CHEMICAL NAME

MAGNESIUM NITRATE
PEL (OSHA): NOT DETERMINED
TLV (ACGIH): NOT DETERMINED

5-CHLORO-2-METHYL-4-ISOTHIAZOLIN-3-ONE
PEL (OSHA): NOT DETERMINED
TLV (ACGIH): NOT DETERMINED
MISC: Note-mfg. sugg. exp. limit:0.1 mg/m3 TWA;0.3mg/m3 STEL total isothiazoline).

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 a respirator with organic vapor/acid gas cartridges and dust/mist prefilters.

SKIN PROTECTION:
gauntlet-type butyl gloves, chemical resistant apron-- Wash off after each use. Replace as necessary.

EYE PROTECTION:
splash proof chemical goggles, face shield

9 PHYSICAL & CHEMICAL PROPERTIES

Specific Grav.(70F,21C)	1.033	Vapor Pressure (mmHG)	~ 18.0
Freeze Point (F)	28	Vapor Density (air=1)	< 1.00
Freeze Point (C)	-2		
Viscosity(cps 70F,21C)	8	% Solubility (water)	100.0

Odor		Slight
Appearance		Light Yellow To Green
Physical State		Liquid
Flash Point	P-M(CC)	> 200F > 93C
pH As Is (approx.)		3.0
Evaporation Rate (Ether=1)		< 1.00

NA = not applicable ND = not determined

10 STABILITY & REACTIVITY

STABILITY:
Stable under normal storage conditions.

HAZARDOUS POLYMERIZATION:
Will not occur.

INCOMPATIBILITIES:
May react with strong oxidizers.

DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.

INTERNAL PUMPOUT/CLEANOUT CATEGORIES:
"B"

11 TOXICOLOGICAL INFORMATION

Oral LD50 RAT:	>5,000 mg/kg
Teratology :	NEGATIVE
Dermal LD50 RABBIT:	>2,000 mg/kg
NOTE - Estimated value	
Skin Sensitization HUMAN:	POSITIVE
Non-Ames Mutagenicity :	NEGATIVE

12 ECOLOGICAL INFORMATION

AQUATIC TOXICOLOGY

Bluegill Sunfish 96 Hour Static Acute Bioassay
LC50= 12.1; No Effect Level= 6.5 mg/L
Daphnia magna 48 Hour Flow-Thru Bioassay
LC50= 2.9; 10% Mortality= .6 mg/L
Fathead Minnow 36 Day Early Life Stage Test
LOEC= 4; No Effect Level= 1.3 mg/L
Fathead Minnow 96 Hour Flow-Thru Bioassay
LC50= 6.6; No Effect Level= 2.5 mg/L
Rainbow Trout 14 Day Chronic Bioassay
LC50= 4.6; No Effect Level= 3.3 mg/L
Rainbow Trout 96 Hour Static Acute Bioassay
LC50= 8.7; No Effect Level= 6.5 mg/L
Sheepshead Minnow 96 Hour Static Acute Bioassay
LC50= 20; No Effect Level= 12 mg/L

BIODEGRADATION

BOD-28 (mg/g): 0
BOD-5 (mg/g): 0
COD (mg/g): 17
TOC (mg/g): 6

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

DOT HAZARD:	Corrosive to skin
UN / NA NUMBER:	UN3265
DOT EMERGENCY RESPONSE GUIDE #:	153

15 REGULATORY INFORMATION

TSCA:
This is an EPA registered biocide and is exempt from TSCA inventory requirements.

CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):
No regulated constituent present at OSHA thresholds

FIFRA REGISTRATION NUMBER:
3876- 143

FOOD AND DRUG ADMINISTRATION:

The ingredients in this product are approved by FDA under 21 CFR 176.300.

USDA FEDERALLY INSPECTED MEAT AND POULTRY PLANTS:

SEC.G7

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
10377-60-3	MAGNESIUM NITRATE	2.0-5.0%

CALIFORNIA REGULATORY INFORMATION

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65) CHEMICALS PRESENT:

No regulated constituent present at OSHA thresholds

MICHIGAN REGULATORY INFORMATION

No regulated constituent present at OSHA thresholds

16 OTHER INFORMATION

NFPA/HMIS		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.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
MSDS status:	16-MAR-1998		** NEW **
	01-MAY-1998	;EDIT:9	16-MAR-1998
	08-APR-1999	;EDIT:9	01-MAY-1998
	17-MAY-2001	4,16	08-APR-1999

SAMM 32.10

NALCO

MATERIAL SAFETY DATA SHEET

PRODUCT

H-550

EMERGENCY TELEPHONE NUMBER(S)
(800) 424-9300 (24 Hours) CHEMTREC

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : **H-550**

APPLICATION : MICROBIOCIDE

COMPANY IDENTIFICATION : Nalco Company
1601 W. Diehl Road
Naperville, Illinois
60563-1198

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING
HEALTH : 3 / 3 FLAMMABILITY : 1 / 1 INSTABILITY : 0 / 0 OTHER :
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

Hazardous Substance(s)	CAS NO	% (w/w)
Glutaraldehyde	111-30-8	30.0 - 60.0

3. HAZARDS IDENTIFICATION

****EMERGENCY OVERVIEW****

DANGER
Corrosive. Causes irreversible eye damage. Causes skin burns. Harmful if inhaled. May be fatal if swallowed. Harmful if absorbed through skin. Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals. Causes asthmatic signs and symptoms in hyper-reactive individuals.
Do not get in eyes, on skin, on clothing. Avoid breathing vapor. Do not swallow. Wear goggles, protective clothing, and rubber gloves. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash before reuse.
Not flammable or combustible. May evolve oxides of carbon (COx) under fire conditions.

PRIMARY ROUTES OF EXPOSURE :
Eye, Skin, Inhalation

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :
Corrosive. Will cause eye burns and permanent tissue damage.

SKIN CONTACT :
May cause severe irritation or tissue damage depending on the length of exposure and the type of first aid administered. Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals.

INGESTION :
Not a likely route of exposure. Corrosive; causes chemical burns to the mouth, throat and stomach.

INHALATION :
Irritating, in high concentrations, to the eyes, nose, throat and lungs. Inhalation of product mist or vapors may cause respiratory allergy.

SYMPTOMS OF EXPOSURE :
Acute :
A review of available data does not identify any symptoms from exposure not previously mentioned.
Chronic :
A review of available data does not identify any symptoms from exposure not previously mentioned.

AGGRAVATION OF EXISTING CONDITIONS :
A review of available data does not identify any worsening of existing conditions.

HUMAN HEALTH HAZARDS - CHRONIC :
Prolonged inhalation of product can increase lung injury in persons with emphysema, asthma, or other lung disorders.

4. FIRST AID MEASURES

EYE CONTACT :
Get immediate medical attention. PROMPT ACTION IS ESSENTIAL IN CASE OF CONTACT. Immediately flush eye with water for at least 15 minutes while holding eyelids open.

SKIN CONTACT :
Get immediate medical attention. Immediately flush with plenty of water for at least 15 minutes. For a large splash, flood body under a shower. Remove contaminated clothing. Wash off affected area immediately with plenty of water. Contaminated clothing, shoes, and leather goods must be discarded or cleaned before re-use.

INGESTION :
Get immediate medical attention. DO NOT INDUCE VOMITING. If conscious, washout mouth and give water to drink.

INHALATION :
Remove to fresh air, treat symptomatically. If symptoms develop, seek medical advice.

IF IN EYES: Immediately flush with plenty of water for at least 15 minutes. Get immediate medical attention.

IF ON SKIN: Immediately wash with plenty of soap and water. Get medical attention.

IF INHALED: Remove to fresh air. If breathing is difficult, administer oxygen. If symptoms persist, call a physician.

IF SWALLOWED: DO NOT INDUCE VOMITING. Do not give anything to drink. Seek medical advice with urgency.

NOTE TO PHYSICIAN :
Probable mucosal damage may contraindicate the use of gastric lavage. Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

5. FIRE FIGHTING MEASURES

FLASH POINT : None

EXTINGUISHING MEDIA :
This product would not be expected to burn unless all the water is boiled away. The remaining organics may be ignitable. Use extinguishing media appropriate for surrounding fire.

FIRE AND EXPLOSION HAZARD :
Not flammable or combustible. May evolve oxides of carbon (COx) under fire conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :
In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :
Restrict access to area as appropriate until clean-up operations are complete. Ensure clean-up is conducted by trained personnel only. Ventilate spill area if possible. Do not touch spilled material. Stop or reduce any leaks if it is safe to do so. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Notify appropriate government, occupational health and safety and environmental authorities.

METHODS FOR CLEANING UP :
SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. LARGE SPILLS: Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Wash site of spillage thoroughly with water. Dilute the glutaraldehyde to 5% or less with water. Add sodium bisulfite (2-3 parts by weight per part glutaraldehyde). This will typically reduce the glutaraldehyde concentration to 2 ppm or less in 5 minutes at room temperature. The remaining solution can be disposed of via appropriate means. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :
This pesticide is toxic to fish. Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans or other waters, unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance contact your State Water Board or Regional Office of the EPA.

7. HANDLING AND STORAGE

HANDLING :
Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Avoid generating aerosols and mists. Keep the containers closed when not in use. Have emergency equipment (for fires, spills, leaks, etc.) readily available.

STORAGE CONDITIONS :
Store the containers tightly closed. Store separately from oxidizers. Store in suitable labelled containers.

SUITABLE CONSTRUCTION MATERIAL :
Compatibility with Plastic Materials can vary; we therefore recommend that compatibility is tested prior to use.

UNSUITABLE CONSTRUCTION MATERIAL :
Aluminum, Tin, Zinc, Steel

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :
Exposure guidelines have not been established for this product. Available exposure limits for the substance(s) are shown below.

ACGIH/TLV :

Substance(s)	
Glutaraldehyde	CEILING: 0.05 ppm , 0.2 mg/m3 0.05 ppm , 0.2 mg/m3

OSHA/PEL :

Substance(s)	
Glutaraldehyde	CEILING: 0.2 ppm , 0.8 mg/m3

ENGINEERING MEASURES :
General ventilation is recommended. Use local exhaust ventilation if necessary to control airborne mist and vapor.

RESPIRATORY PROTECTION :
If significant mists, vapors or aerosols are generated an approved respirator is recommended. A dust, mist, fume cartridge may be used. In event of emergency or planned entry into unknown concentrations a positive pressure, full-facepiece SCBA should be used. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection.

HAND PROTECTION :
BUTYL GLOVES, NEOPRENE GLOVES, Viton# gloves

SKIN PROTECTION :
Wear chemical resistant apron, chemical splash goggles, impervious gloves and boots. A full slicker suit is recommended if gross exposure is possible.

EYE PROTECTION :
Wear a face shield with chemical splash goggles.

HYGIENE RECOMMENDATIONS :
Eye wash station and safety shower are necessary. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	Colorless
ODOR	Aldehyde

SPECIFIC GRAVITY	1.11 - 1.13 @ 77 °F / 25 °C
DENSITY	9.4 lb/gal
SOLUBILITY IN WATER	Complete
pH (100 %)	3.1 - 4.5
VISCOSITY	21 cps @ 68 °F / 20 °C
FREEZING POINT	-5.8 °F / -21 °C
BOILING POINT	213 °F / 100.5 °C
VAPOR PRESSURE	16 mm Hg
VAPOR DENSITY	1.1
VOC CONTENT	54 % EPA Method 24

Note: These physical properties are typical values for this product and are subject to change.

10. STABILITY AND REACTIVITY

STABILITY :
Stable under normal conditions.

HAZARDOUS POLYMERIZATION :
Hazardous polymerization will not occur.

CONDITIONS TO AVOID :
Freezing temperatures.

MATERIALS TO AVOID :
Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors.

HAZARDOUS DECOMPOSITION PRODUCTS :
Under fire conditions: Oxides of carbon

11. TOXICOLOGICAL INFORMATION

The following results are for the product.

ACUTE ORAL TOXICITY :

Species	LD50	Test Descriptor
Rat	1,300 mg/kg	Product Glutaraldehyde
Rat	1.2 ml/kg	45% Active Ingredient
Rat	1.54 -1.87 ml/kg	25% Active Ingredient
Rat	1.07 - 1.62 ml/kg	10% Active Ingredient

Rating : Harmful

ACUTE DERMAL TOXICITY :

Species	LD50	Test Descriptor
Rabbit	897 mg/kg	Product Glutaraldehyde
Rabbit	2.00 - 2.71 ml/kg	45% Active Ingredient
Rabbit	8.0 - 12.8 ml/kg	25% Active Ingredient

Rating : Harmful

ACUTE INHALATION TOXICITY :

Species	LC50	Test Descriptor
Rat	0.48 mg/l ()	Product

Rating : Very Toxic

PRIMARY SKIN IRRITATION : At 10% or greater, glutaraldehyde solutions may cause moderate to severe irritation, with possible necrosis after prolonged contact.

PRIMARY EYE IRRITATION : At levels of 0.2% and below of glutaraldehyde, no eye irritation was noted. Levels above 0.2% of glutaraldehyde produced moderate to severe irritation and corneal injury.

SENSITIZATION :
Levels of greater than 0.2% of glutaraldehyde produced allergic contact dermatitis in human studies. May cause sensitization by inhalation and skin contact.

CARCINOGENICITY :
None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

HUMAN HAZARD CHARACTERIZATION :
Based on our hazard characterization, the potential human hazard is: High

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL EFFECTS :

The following results are for the product along with results on the active substances.

ACUTE FISH RESULTS :

Species	Exposure	LC50	Test Descriptor
Bluegill Sunfish	96 hrs	22.4 mg/l	Product
Fathead Minnow	96 hrs	10.8 mg/l	Product
Sheepshead Minnow	96 hrs	64 mg/l	Product
Rainbow Trout	96 hrs	24 mg/l	Product

Rating : Slightly toxic

ACUTE INVERTEBRATE RESULTS :

Species	Exposure	LC50	EC50	Test Descriptor
Daphnia magna	48 hrs	11.5 mg/l		Product
Shore Crab	96 hrs	930 mg/l		Product
Grass Shrimp	96 hrs	82 mg/l		Product
Mysid Shrimp (Mysidopsis bahia)	96 hrs	14.2 mg/l		Product
American Oyster	96 hrs		1.56 mg/l	Product
Acartia tonsa	48 hrs		0.22 mg/l	Product

Rating : Slightly toxic

AQUATIC PLANT RESULTS :

Species	Exposure	EC50/LC50	Test Descriptor
Marine Algae (Skeletonema costatum)	72 hrs	1.22 mg/l	Product
Algae (Scenedesmus subspicatus)	72 hrs	1.7 mg/l	Product

Rating : Toxic

AQUATIC MICROORGANISM RESULTS :

Species	Exposure	EC50/LC50	Test Descriptor
Sewage Microorganisms	96 hrs	34 mg/l	Active Substance

AVIAN RESULTS :

Species	Exposure	LC50	Test Descriptor
Bobwhite Quail	8 Days	10,000 ppm	Active Substance
Mallard Duck	8 Days	10,000 ppm	Active Substance
Mallard Duck		933 mg/kg	50% Active Ingredient

MOBILITY :

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM , provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models. If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	Water	Soil/Sediment
<5%	30 - 50%	50 - 70%

The portion in water is expected to be soluble or dispersible.

BIOACCUMULATION POTENTIAL
This preparation or material is not expected to bioaccumulate.

ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION
Based on our hazard characterization, the potential environmental hazard is: Moderate

If released into the environment, see CERCLA/SUPERFUND in Section 15.

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it is not a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.

As a non-hazardous waste, it is not subject to federal regulation. Consult state or local regulation for any additional handling, treatment or disposal requirements. For disposal, contact a properly licensed waste treatment, storage, disposal or recycling facility.

^<B>CONTAINER DISPOSAL:<B> Metal Containers or Plastic Containers: Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or other procedures approved by state and local authorities. Plastic Containers: May be incinerated, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke. Metal Containers: Must not be incinerated. Do not cut or weld on or near metal containers.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

LAND TRANSPORT :

Proper Shipping Name :	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.
Technical Name(s) :	GLUTARALDEHYDE
UN/ID No :	UN 3265
Hazard Class - Primary :	8
Packing Group :	II
Flash Point :	None

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name :	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.
Technical Name(s) :	GLUTARALDEHYDE
UN/ID No :	UN 3265
Hazard Class - Primary :	8
Packing Group :	II

IATA Cargo Packing Instructions :	812
IATA Cargo Aircraft Limit :	30 L (Max net quantity per package)

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name :	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.
Technical Name(s) :	GLUTARALDEHYDE
UN/ID No :	UN 3265
Hazard Class - Primary :	8
Packing Group :	II

15. REGULATORY INFORMATION

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :
Based on our hazard evaluation, the following substance(s) in this product is/are hazardous and the reason(s) is/are shown below.

Glutaraldehyde : Corrosive, Sensitizer

CERCLA/SUPERFUND, 40 CFR 117, 302 :
This product contains the following Reportable Quantity (RQ) Substance. Also listed is the RQ for the product.

RQ Substance	RQ
Methanol	5,000 lbs

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :
This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :
Our hazard evaluation has found this product to be hazardous. The product should be reported under the following indicated EPA hazard categories:

X	Immediate (Acute) Health Hazard
X	Delayed (Chronic) Health Hazard
-	Fire Hazard
-	Sudden Release of Pressure Hazard
-	Reactive Hazard

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :
This product contains the following substance(s), (with CAS # and % range) which appear(s) on the List of Toxic Chemicals

Hazardous Substance(s)	CAS NO	% (w/w)
Methanol	67-56-1	1.0 - 5.0

TOXIC SUBSTANCES CONTROL ACT (TSCA) :
This product is exempted under TSCA and regulated under FIFRA. The inerts are on the Inventory List.

FEDERAL INSECTICIDE, FUNGICIDE AND RODENTICIDE ACT (FIFRA) :
EPA Reg. No. 464-704-1706
In all cases follow instructions on the product label.

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :
None of the substances are specifically listed in the regulation.

CLEAN AIR ACT, Sec. 111 (40 CFR 60, Volatile Organic Compounds), Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :
This product contains the following substances listed in the regulation:

Substance(s)	Citations
• Methanol	Sec. 111, Sec. 112

CALIFORNIA PROPOSITION 65 :
This product does not contain substances which require warning under California Proposition 65.

MICHIGAN CRITICAL MATERIALS :
None of the substances are specifically listed in the regulation.

STATE RIGHT TO KNOW LAWS :
This product is a registered biocide and is exempt from State Right to Know Labelling Laws.

Methanol	67-56-1
Glutaraldehyde	111-30-8

NATIONAL REGULATIONS, CANADA :

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :
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.

WHMIS CLASSIFICATION :
Pesticide controlled products are not regulated under WHMIS.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :
The substances in this preparation are listed on the Domestic Substances List (DSL), are exempt, or have been reported in accordance with the New Substances Notification Regulations.

INTERNATIONAL CHEMICAL CONTROL LAWS

AUSTRALIA
All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).

CHINA
All substances in this product comply with the Chemical Control Law and are listed on the Inventory of Existing Chemical Substances China (IECSC).

EUROPE
The substances in this preparation have been reviewed for compliance with the EINECS or ELINCS inventories.

JAPAN
All substances in this product comply with the Law Regulating the Manufacture and Importation Of Chemical Substances and are listed on the Ministry of International Trade & industry List (MITI).

KOREA
All substances in this product comply with the Toxic Chemical Control Law (TCCL) and are listed on the Existing Chemicals List (ECL)

NEW ZEALAND
This product's trade name is registered with the Environmental Risk Management Authority (ERMA).

THE PHILIPPINES
All substances in this product comply with the Republic Act 6969 (RA 6969) and are listed on the Philippine Inventory of Chemicals & Chemical Substances (PICCS).

16. OTHER INFORMATION

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight# (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department
Date issued : 04/22/2004
Version Number : 1.9

BETZDEARBORN MATERIAL
SAFETY DATA SHEET

Proprietary
Descaling Agent

EFFECTIVE DATE: 25-FEB-1997
PRINTED DATE: 25-FEB-1997

1) CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : BETZ 860

PRODUCT APPLICATION AREA: WATER-BASED DEPOSIT CONTROL AGENT.

COMPANY ADDRESS:
BetzDearborn Inc.
4636 Somerton Road, Trevose, Pa. 19053
Information phone number: (215) - 355-3300

EMERGENCY TELEPHONE (HEALTH/ACCIDENT): (800)-877-1940 (USA)

2) 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
	TRADE SECRET INGREDIENT(E195);TSRN 125438 - 5118P Irritant (eyes)
	TRADE SECRET INGREDIENT(122);;TSRN 125438 - 5214P Potential irritant (eyes)
	TRADE SECRET INGREDIENT(222);TSRN 125438 - 5238P Oxidizer; corrosive; pulmonary damage; dental erosion

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.

CONTINUED

3) HAZARDS IDENTIFICATION

****

EMERGENCY OVERVIEW

WARNING

May cause slight irritation to the skin. Severe irritant to the eyes. Vapors, gases, mists and/or aerosols cause irritation to the upper respiratory tract.

DOT hazard: Corrosive to steel
Emergency Response Guide #154
Odor: Acid; Appearance: Yellow To Dark Brown, 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:
Severe irritant to the eyes.

ACUTE RESPIRATORY EFFECTS:
Primary route of exposure;Vapors, gases, mists and/or aerosols cause irritation to the upper respiratory tract.

INGESTION EFFECTS:
May cause slight gastrointestinal irritation.

TARGET ORGANS:
Prolonged or repeated exposures may cause primary irritant dermatitis and/or toxicity to the lung.

MEDICAL CONDITIONS AGGRAVATED:
Not known.

SYMPTOMS OF EXPOSURE:
Inhalation may cause irritation of the respiratory tract. Skin contact may cause itching and/or redness.

CONTINUED

4) FIRST AID MEASURES

SKIN CONTACT:
Remove contaminated clothing. Wash exposed area with a large quantity of soap solution or water for 15 minutes.

EYE CONTACT:
Immediately flush eyes with water for 15 minutes. Immediately contact a physician for additional treatment.

INHALATION:
Remove victim from contaminated area to fresh air. Apply appropriate first aid treatment as necessary.

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 3-4 glasses milk or water.

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:
Thermal decomposition (destructive fires) yields elemental oxides.

FLASH POINT:
> 200F P-M(CC)

MISCELLANEOUS:
Corrosive to steel
UN3264;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.

CONTINUED

7) HANDLING AND STORAGE

HANDLING:
Contains an oxidizer. Avoid all contact with reducing agents, oils, greases, organics and acids.

STORAGE:
Keep containers closed when not in use. Use approved containers only. Store in cool, well-vented area. Contact with metals may release flammable hydrogen gas.

8) EXPOSURE CONTROLS/PERSONAL PROTECTION

EXPOSURE LIMITS

CHEMICAL NAME

TRADE SECRET INGREDIENT(E195);TSRN 125438 - 5118P
PEL (OSHA): NOT DETERMINED
TLV (ACGIH): NOT DETERMINED

TRADE SECRET INGREDIENT(122);;TSRN 125438 - 5214P
PEL (OSHA): NUISANCE DUST
TLV (ACGIH): 5 MG/M3
MISC: Note: manufacturer's recommended exposure limit: 10 mg/m3.

TRADE SECRET INGREDIENT(222);TSRN 125438 - 5238P
PEL (OSHA): 5 MG/M3(10MG/M3-STEL)
TLV (ACGIH): 5 MG/M3(10MG/M3-STEL)

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.
An air-supplying respirator (positive pressure full facepiece) may be needed for this product.

SKIN PROTECTION:
neoprene gloves-- Wash off after each use. Replace as necessary.

EYE PROTECTION:
splash proof chemical goggles

CONTINUED

9) PHYSICAL AND CHEMICAL PROPERTIES

Specific Grav. (70F)	1.098	Vapor Pressure (mmHG)	~ 18.0
Freeze Point (F)	26.00	Vapor Density (air=1)	< 1.00
Viscosity (cps 70F)	ND	% Solubility (water)	100.0

Odor	Acid
Appearance	Yellow To Dark Brown
Physical State	Liquid
Flash Point (F)	> 200 P-M(CC)
pH As Is (approx.)	1.4
Evaporation Rate (Ether=1)	< 1.00

NA = not applicable ND = not determined

10) STABILITY AND REACTIVITY

STABILITY:
Stable under normal storage conditions.
HAZARDOUS POLYMERIZATION:
Will not occur.
INCOMPATIBILITIES:
May react with organics or alkaline materials.
DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.
BETZ INTERNAL PUMPOUT/CLEANOUT CATEGORIES:
"D"

11) TOXICOLOGICAL INFORMATION

Oral LD50 RAT:	>2,000 mg/kg
NOTE - Estimated value	
Dermal LD50 RABBIT:	>2,000 mg/kg
NOTE - Estimated value	
Inhalation LC50 RAT:	>2,000 ppm/hr
NOTE - Estimated value	

12) ECOLOGICAL INFORMATION

AQUATIC TOXICOLOGY
No Data Available.

BIODEGRADATION

COD (mg/gm):	443
TOC (mg/gm):	203
BOD-5 (mg/gm):	381
BOD-28 (mg/gm):	505

CONTINUED

13) DISPOSAL CONSIDERATIONS

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :
D002=Corrosive(pH, 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.

14) TRANSPORT INFORMATION

DOT HAZARD:	Corrosive to steel
UN / NA NUMBER:	UN3264
DOT EMERGENCY RESPONSE GUIDE #:	154

15) REGULATORY INFORMATION

TSCA:
All components of this product are listed in the TSCA inventory.
CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):
9,111 gallons due to (122);5,466 gallons due to (222);
SARA SECTION 312 HAZARD CLASS:
Immediate(acute);Delayed(Chronic)
SARA SECTION 302 CHEMICALS:

CAS#	CHEMICAL NAME
	TRADE SECRET(222)--INORGANIC ACID

SARA SECTION 313 CHEMICALS:

CAS#	CHEMICAL NAME	RANGE
	TRADE SECRET(222)--INORGANIC ACID	2.0-5.0%

CALIFORNIA REGULATORY INFORMATION

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65) CHEMICALS PRESENT:

No regulated constituent present at OSHA thresholds

MICHIGAN REGULATORY INFORMATION

No regulated constituent present at OSHA thresholds

CONTINUED

16) OTHER INFORMATION

NFPA/HMIS	CODE TRANSLATION	
Health	2	Moderate Hazard
Fire	1	Slight Hazard
Reactivity	0	Minimal Hazard
Special	CORR	DOT corrosive
(1) Protective Equipment	B	Goggles,Gloves

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
MSDS status:	22-AUG-1995	REVISED FORMAT	** NEW **
	28-SEP-1996	3,5,14	22-AUG-1995
	25-FEB-1997	12	28-SEP-1996

SAMM 32.128

NALCO

MATERIAL SAFETY DATA SHEET

PRODUCT

COAGULANT AID 35

EMERGENCY TELEPHONE NUMBER(S)
(800) 424-9300 (24 Hours) CHEMTREC

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : COAGULANT AID 35

COMPANY IDENTIFICATION : Nalco Company
1601 W. Diehl Road
Naperville, Illinois
60563-1198

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING
HEALTH : 0 / 1 FLAMMABILITY : 1 / 1 INSTABILITY : 0 / 0 OTHER :
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

Hazardous Substance(s)	CAS NO	% (w/w)
Quartz, crystalline silica	14808-60-7	1.0 - 5.0

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

CAUTION
May cause irritation with prolonged contact. Inhalation of crystalline silica can cause silicosis.
Do not get in eyes, on skin, on clothing. Do not take internally. Do not breathe dust. Wear suitable protective clothing. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of soap and water.
Not flammable or combustible. Water in contact with the product will cause slippery floor conditions.

PRIMARY ROUTES OF EXPOSURE :
Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :
Particles may scratch eye surfaces or cause mechanical irritation.

SKIN CONTACT :
May cause irritation with prolonged contact.

INGESTION :
Not a likely route of exposure. No adverse effects expected.

INHALATION :
Repeated or prolonged exposure may irritate the respiratory tract. May cause irritation of mucous membranes.

SYMPTOMS OF EXPOSURE :
Acute :
A review of available data does not identify any symptoms from exposure not previously mentioned.
Chronic :
A review of available data does not identify any symptoms from exposure not previously mentioned.

AGGRAVATION OF EXISTING CONDITIONS :
Prolonged inhalation of product can increase lung injury in persons with emphysema, asthma, or other lung disorders.

4. FIRST AID MEASURES

EYE CONTACT :
Flush affected area with water. If symptoms develop, seek medical advice.

SKIN CONTACT :
First aid is normally not required. If symptoms develop, seek medical advice.

INGESTION :
Do not induce vomiting without medical advice. If conscious, washout mouth and give water to drink. If symptoms develop, seek medical advice.

INHALATION :
Remove to fresh air, treat symptomatically. If symptoms develop, seek medical advice.

NOTE TO PHYSICIAN :
Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

5. FIRE FIGHTING MEASURES

FLASH POINT : None

EXTINGUISHING MEDIA :
Not expected to burn. Use extinguishing media appropriate for surrounding fire.

FIRE AND EXPLOSION HAZARD :
Not flammable or combustible. Water in contact with the product will cause slippery floor conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :
In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :
Notify appropriate government, occupational health and safety and environmental authorities. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection).

METHODS FOR CLEANING UP :
Sweep up and shovel. Reclaim into recovery or salvage drums. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations). Water in contact with the product will cause slippery floor conditions.

ENVIRONMENTAL PRECAUTIONS :
Do not contaminate surface water.

7. HANDLING AND STORAGE

HANDLING :
Do not take internally. Ensure all containers are labelled. Avoid eye and skin contact. Avoid generating dusts.

STORAGE CONDITIONS :
Keep in dry place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :
Exposure guidelines have not been established for this product. Available exposure limits for the substance(s) are shown below.

ACGIH/TLV :

Substance(s)	
Respirable Nuisance Particulates	TWA: 3 mg/m3
Inhalable (Total) Nuisance Particulates	TWA: 10 mg/m3
Quartz, crystalline silica	TWA: 0.1 mg/m3 0.1 mg/m3

OSHA/PEL :

Substance(s)	
Respirable Nuisance Particulates	TWA: 5 mg/m3
Inhalable (Total) Nuisance Particulates	TWA: 15 mg/m3 (total dust)
Quartz, crystalline silica	TWA: 0.1 mg/m3

ENGINEERING MEASURES :
General ventilation is recommended. Local exhaust ventilation may be necessary when dusts or mists are generated.

RESPIRATORY PROTECTION :
An approved respirator must be worn if the occupational exposure limit is likely to be exceeded. If dusts are generated, use an approved air-purifying respirator. A dust, mist, fume cartridge may be used. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection.

HAND PROTECTION :
Nitrile gloves, PVC gloves, Neoprene gloves, Rubber gloves, Butyl gloves, Cloth gloves

SKIN PROTECTION :
Wear standard protective clothing.

EYE PROTECTION :
Wear safety glasses with side-shields.

HYGIENE RECOMMENDATIONS :
Keep an eye wash fountain available. Keep a safety shower available.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Powder
APPEARANCE	Light grey
ODOR	None
SOLUBILITY IN WATER	Insoluble
pH (5 %)	8.5 - 10.5

Note: These physical properties are typical values for this product and are subject to change.

10. STABILITY AND REACTIVITY

STABILITY :
Stable under normal conditions.

HAZARDOUS POLYMERIZATION :
Hazardous polymerization will not occur.

CONDITIONS TO AVOID :
Moisture

MATERIALS TO AVOID :
None known

HAZARDOUS DECOMPOSITION PRODUCTS :
Under fire conditions: None known

11. TOXICOLOGICAL INFORMATION

No toxicity studies have been conducted on this product.

CARCINOGENICITY :
Contains crystalline silica (quartz or cristobalite). The International Agency for Research on Cancer (IARC) has evaluated crystalline silica (inhaled in the form of quartz or cristobalite from occupational sources) and found it to be a human carcinogen (Group 1) based on sufficient animal data and sufficent human evidence. The National Toxicology Program (NTP) has evaluated crystalline silica and found it may be reasonably anticipated to be a human carcinogen. Overexposure to the respirable dust (less than or equal to 5 microns in size) may lead to silicosis, which is a progressive and irreversible lung disease.

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL EFFECTS :

No toxicity studies have been conducted on this product.

If released into the environment, see CERCLA/SUPERFUND in Section 15.

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it is not a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.

As a non-hazardous waste, it is not subject to federal regulation. Consult state or local regulation for any additional handling, treatment or disposal requirements. For disposal, contact a properly licensed waste treatment, storage, disposal or recycling facility.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

LAND TRANSPORT :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

15. REGULATORY INFORMATION

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :
Based on our hazard evaluation, the following substance(s) in this product is/are hazardous and the reason(s) is/are shown below.

Quartz, crystalline silica : Cancer suspect agent (refer to Section 3)

CERCLA/SUPERFUND, 40 CFR 117, 302 :
Notification of spills of this product is not required.

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :
This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :
Our hazard evaluation has found that this product is not hazardous under 29 CFR 1910.1200.

X	Immediate (Acute) Health Hazard
X	Delayed (Chronic) Health Hazard
	Fire Hazard
	Sudden Release of Pressure Hazard
	Reactive Hazard

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :
This product does not contain substances on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA) :
The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

FOOD AND DRUG ADMINISTRATION (FDA) Federal Food, Drug and Cosmetic Act :
When use situations necessitate compliance with FDA regulations, this product is acceptable under : 21 CFR 173.310 Boiler Water Additives, 21 CFR 176.170 Components of paper and paperboard in contact with aqueous and fatty foods and 21 CFR 176.180 Components of paper and paperboard in contact with dry foods.

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :
None of the substances are specifically listed in the regulation.

CLEAN AIR ACT, Sec. 111 (40 CFR 60, Volatile Organic Compounds), Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :
None of the substances are specifically listed in the regulation.

CALIFORNIA PROPOSITION 65 :
This product contains the following substances which require warning under California Proposition 65.

Substance(s)	Concentration	EFFECTS
• Quartz, crystalline silica	5 %	Causes Cancer

MICHIGAN CRITICAL MATERIALS :
None of the substances are specifically listed in the regulation.

STATE RIGHT TO KNOW LAWS :
The following substances are disclosed for compliance with State Right to Know Laws:

Quartz, crystalline silica 14808-60-7

NATIONAL REGULATIONS, CANADA :

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :
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.

WHMIS CLASSIFICATION :
D2A - Materials Causing Other Toxic Effects - Very Toxic Material

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :
The substances in this preparation are listed on the Domestic Substances List (DSL), are exempt, or have been reported in accordance with the New Substances Notification Regulations.

16. OTHER INFORMATION

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight# (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department
Date issued : 02/21/2004
Version Number : 1.6

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SODIUM HYPOCHLORITE SOLUTION

Date Prepared September 19, 1998

1 - Chemical Product and Company Identification

MANUFACTURER'S NAME:	MANLEY-REGAN CHEMICALS DIVISION OF E+E (US) INC.
EMERGENCY TELEPHONE NUMBER:	800-424-9300 (Chemtrec) 24 hours a day, 7 days a week
ADDRESS:	532 EAST EMAUS STREET P.O. BOX 280 MIDDLETOWN, PA 17057 800-283-0326
DATE OF REVISION:	September 19, 1998

2 - Composition/Information on Ingredients

TRADE NAME: SODIUM HYPOCHLORITE 15% CL/VOL

Component:
Sodium Hypochlorite Solution — *CAS Number:* *7681-52-9*

CONTAINS:	CAS NUMBER:	PERCENTAGE:	PEL/TLV -SOURCE
Sodium Hydroxide	1310-73-2	0.8 to 2.4	PEL 8hr 2mg/m(3) OSHA TLV 8hr 2mg/m(3) Ceiling ACGIH
Chlorine (Available)	7782-50-5	Approx. 10	OSHA (PEL) TWA - 0.5 ppm STEL - 1 ppm ACGIH (TLV) TWA - 0.5 ppm STEL - 1 ppm
Water	7732-18-5	Approx. 89.0	

****

Synonyms/Common Names:	Chlorine Bleach, Soda Bleach, Liquid Chlorine
Chemical Formula:	NaOCl
DOT Proper Shipping Name:	Hypochlorite Solutions
DOT Hazard Class:	8
DOT ID Number:	UN1791
DOT Packing Group:	III
DOT Hazardous Substance:	RQ 100# (Sodium Hypochlorite)
DOT Marine Pollutant:	N/A
Additional Description Requirement:	N/A

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3 - Physical Data

Boiling Point:	(@760 mm Hg)	Decomposes above 110 Deg C (230 Deg F)	
Freezing Point:	Weight %	Freezing Point Deg F	
	10	7	
	12	- 3	
Vapor Pressure:	Temperature Deg F	mm Hg	PSIA
	48.2	3.7	0.071
	60.8	8.0	0.15
	68.0	12.1	0.23
	89.6	31.1	0.60
	118.4	100.00	1.93
Specific Gravity:	(H_2O) = 1)	Approximately 1.19	
Solubility in H_2O	(By Weight)	100%	
pH	9 - 12		
Appearance/Odor:	Colorless to light yellow-green liquid with chlorine like odor.		

4 - Emergency and First Aid Procedures

EYES: Immediately flush eyes with flowing water for at least 15 minutes. Washing eyes within one (1) minute is essential to achieve maximum effectiveness.
SEEK MEDICAL ATTENTION IMMEDIATELY.

SKIN: Skin contact may cause severe irritation. Flush thoroughly with cool water under shower while removing contaminated clothing and shoes. Discard non-rubber shoes. Wash clothing before reuse. Continue to flush until medical attention arrives.
SEEK MEDICAL ATTENTION IMMEDIATELY.

INHALATION: Remove to fresh air. If breathing is difficult, have a qualified person administer oxygen. If respiration stops, give mouth-to-mouth resuscitation.
GET IMMEDIATE MEDICAL ATTENTION.

INGESTION: Never give anything by mouth to an unconscious person. If swallowed, *DO NOT INDUCE VOMITING.* Give large quantities of milk. If these are not available, give large quantities of water. If vomiting occurs spontaneously keep airway clear and give more milk or water. Avoid vomiting, lavage or acidic antidotes.
GET MEDICAL ATTENTION IMMEDIATELY.

NOTE TO PHYSICIAN: Sodium Hypochlorite is an alkaline corrosive. For exposure by ingestion do not use emesis, lavage or acidic antidotes. Dilute immediately by giving milk, melted Ice cream, beaten egg white, starch paste or antacids such as milk of magnesia, aluminum hydroxide gel or magnesium trisilicate gel. Avoid sodium bicarbonate because of carbon dioxide release. Sodium thiosulfate solution may prove beneficial by reducing unreacted material.

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5- First Aid Measures and Effects of Overexposure

INHALATION: Inhalation of hypochlorous acid fumes may cause severe respiratory tract irritation and pulmonary edema.

SKIN: Skin contact may cause severe irritation and burns.

EYE CONTACT: Eye contact may cause severe irritation, burns and/or corrosion.

INGESTION: Ingestion may cause pain and inflammation of the mouth and digestive system, burns and perforation of the esophagus or stomach, vomiting, circulatory collapse, confusion, delirium and coma.

EFFECTS OF OVEREXPOSURE:

ACUTE: Corrosive and strongly irritating to the eyes, skin, and respiratory tract. Inhalation of fumes may cause pulmonary edema. Ingestion may cause burns to the mouth and digestive tract and abdominal distress.

CHRONIC: No Data.

6 - Fire and Explosion Hazard Data

FLASH POINT (test method) :		Non-Flammable	
AUTOIGNITION TEMPERATURE:		None	
FLAMMABILITY LIMITS IN AIR:		None	
LEL:	N/A	UEL:	N/A

EXTINGUISHING MEDIA: Use water spray, fog, foam, dry chemical, or carbon dioxide or agents suitable for materials in surrounding fire.

SPECIAL FIRE FIGHTING PROCEDURES: Avoid fumes from spilled or exposed liquid, dilute copiously, ventilate and be prepared to use respiratory protection if needed. Use self-contained breathing apparatus and full protective equipment. Acid contamination will produce very irritating fumes similar to chlorine.

UNUSUAL FIRE AND EXPLOSION HAZARD: Product decomposes when heated and may cause containers to rupture or explode. Vigorous reaction is possible with organic materials or oxidizing agents and may result in fire.

7 - Reactivity Data

CONDITIONS CONTRIBUTING TO INSTABILITY: Strong oxidizer, stability decreases with concentration, heat, light, decrease in pH and contamination by metals.

INCOMPATIBILITY: Avoid contamination with heavy metals, reducing agents, ether, ammonia, and acids.

HAZARDOUS DECOMPOSITION PRODUCTS: Acid fumes.

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION: Material is not known to polymerize.

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8- Special Protection

VENTILATION REQUIREMENTS: Provide good general room ventilation plus local exhaust at points of emission.

SPECIFIC PERSONAL PROTECTIVE EQUIPMENT:

RESPIRATORY: NIOSH/MSHA approved respirator, following manufacturer's recommendations, should be used as a precautionary measure where airborne contaminants may occur.

EYE: Wear chemical safety goggles plus full face shield to protect against splashing when appropriate.

GLOVES: Wear impervious gloves such as rubber, neoprene or vinyl.

OTHER CLOTHING AND EQUIPMENT: Wear impervious protective clothing including gloves, apron or rain suit and boots to avoid bodily contact. Eye wash facility and emergency shower should be in close proximity.

9- Handling and Storage

HANDLING AND STORAGE PRECAUTIONS: Do not store adjacent to chemicals that may react if spillage occurs. Comply with DOT regulations when shipped. If closed containers become heated, vent to release decomposition products (mainly oxygen under normal decomposition). Do not mix or contaminate with ammonia, hydrocarbons, acids, alcohol's or others.

DO NOT REUSE CONTAINERS: Product residues may remain in containers. All labeled precautions must be observed. Dispose of container in a manner meeting government regulations.

PRODUCT DISPOSAL: Product should be completely removed from containers. Material that cannot be used or chemically reprocessed should be disposed of in a manner meeting government regulations.

10 - Environmental Procedures

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Do not allow spilled material to enter sewers or streams. Flush with water to dilute as much as possible and pump into polyethylene containers for disposal. Avoid heat and contamination with acid materials. Do not use combustible materials such as sawdust to absorb Sodium Hypochlorite Solution.

WASTE DISPOSAL METHOD: Reduce with agents such as bisulfites or ferrous salt solutions. Some heat will be produced. Keep on alkaline side and dilute with copious amount of water. Main end-product is salt water. Comply with all applicable governmental regulations.

11 - Toxicological Information

TOXICOLOGY DATA:

The toxicity and corrosivity of Sodium Hypochlorite is a function of concentration. Industrial grades of higher concentrations than household bleach are more toxic and corrosive.

Aquatic Toxicity Rating:	96 hr. LC50
Ceriodaphnia dubia:	1.23 ppm
Pimephales promelas:	1.19 ppm

Sodium Hypochlorite @ 12.5% (Rat, Oral LD50)	Test Result:	5.0 g/kg
Sodium Hypochlorite @ 5.25% (Rat, Oral LD50)	Test Result:	13.0 g/kg

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12- Additional Information

This blend does not contain any substances subject to the Threshold Planning Quantity (TPQ) requirements of Section 313 of the act.

CONTAINER DISPOSAL: Dispose in a licensed facility. Recommend crushing or other means to prevent unauthorized reuse.

NSF LIMITS: NSF Maximum Drinking Water Use Concentration, 100 mg/L as Sodium Hypochlorite. The finished drinking water should be monitored for disinfection by-products in accordance with state and U.S. E.P.A. regulations and guidelines. Levels of chlorite ion and chlorate ion should not exceed 10 ppb.

USDA APPROVAL: This product is acceptable as a sanitizer for all surfaces not always requiring a rinse in official establishments operating under the Federal meat, poultry, shell egg, and egg products inspection programs.

Section 311 of The Clean Water Act lists this product as a hazardous substance which, if discharged to water, may require immediate response to mitigate danger to public health and welfare. Spills of 100 pounds or more must be reported to the National Response Center at the following number: 800-424-8802

Material is contained on a composite list as required under 101 (14) of CERCLA.

Sodium Hypochlorite Solution is regulated by the USEPA under the Federal Insecticide, Fungicide and Rodenticide Acid (FIFRA) as a pesticide product.

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DISCLAIMER: The information and recommendations are offered for the user's consideration and examination, and it is the user's responsibility to satisfy itself that they are suitable and complete for its particular use. If buyer relabels this product, legal counsel should be consulted to insure proper health, safety and other necessary information is included on the container.

Manley-Regan Chemicals provides no warranties, either expressed or implied, and assumes no responsibility for the accuracy or completeness of the data contained herein.

The above information complies with the OSHA's hazard communication standard 29CFR1910.1200. The standard must be consulted for specific requirements.

AgrEvo®

Material Safety Data Sheet

Issue Date: 07/28/98
Supersedes: 02/14/96

A company of Hoechst and Schering, Berlin

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NUSYN-NOXFISH® FISH TOXICANT

SECTION 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

AgrEvo Environmental Health
95 Chestnut Ridge Road
Montvale, NJ 07645

COMPANY CONTACT: *Regulatory Department*
TELEPHONE NUMBER: *(800)438-5837*

EMERGENCY TELEPHONE NUMBER
(800)471-0660

PRODUCT NAME: *NUSYN-NOXFISH® FISH TOXICANT*
PRODUCT CODE: *B467413*
CHEMICAL NAME: *Mixture; a.i.'s, rotenone and piperonyl butoxide*
EPA REGISTRY NUMBER: *432-550*
MSDS IDENTIFICATION CODE/NUMBER: *B467413*

Nusyn-Noxfish is a registered trademark of AgrEvo Environmental Health, Inc.

PRODUCT DESCRIPTION: Nusyn-Noxfish Fish Toxicant is a restricted use pesticide to be used in fisheries management for the eradication of fish from lakes, ponds, reservoirs and streams.

SECTION 2. COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENT NAME	EXPOSURE LIMITS	CONCENTRATION PERCENT BY WEIGHT
Rotenone CAS NUMBER: 83-79-4	ACGIH TLV-TWA 5 mg/m3 OSHA PEL-TWA 5 mg/m3	= 2.5
Piperonyl Butoxide, technical CAS NUMBER: 51-03-6	None established	= 2.5
Other associated resins	None established	= 5
Other ingredients, including:		= 90
Aromatic petroleum solvent CAS NUMBER: 64742-94-5	100 ppm (Manufacturer recommended)	< 85

SECTION 3. HAZARDS IDENTIFICATION

********** EMERGENCY OVERVIEW **********

A clear to brown liquid with a mild odor.

- *Fatal if inhaled.*
- *May be fatal if swallowed.*
- *Harmful if absorbed through skin.*
- *Causes substantial but temporary eye injury.*
- *Causes skin irritation.*
- *Combustible mixture.*
- *This pesticide is extremely toxic to fish.*

****

POTENTIAL HEALTH EFFECTS

NUSYN-NOXFISH® FISH TOXICANT

SECTION 3. HAZARDS IDENTIFICATION - Continued

PRIMARY ROUTE(S) OF ENTRY
Inhalation, ingestion, skin and eye contact.

EYES
Causes substantial but temporary eye injury.

SKIN
Causes skin irritation.

INGESTION
May be fatal if swallowed.

INHALATION
Fatal if inhaled.

SECTION 4. FIRST AID MEASURES

EYES
Hold eyelids open and flush with a steady, gentle stream of water for 15 minutes. Get medical attention.

SKIN
Wash with plenty of soap and water. Get medical attention.

INGESTION
Promptly drink a large quantity of milk, egg white, gelatin, solution or if these are not available, large quantities of water. Avoid alcohol. Do not induce vomiting. Call a physician or Poison Control Center.

INHALATION
Remove victim to fresh air. If not breathing, give artificial respiration, preferably mouth to mouth. Get medical attention.

NOTE TO PHYSICIAN
This product is highly toxic when spray mist is inhaled, moderately toxic by the oral route and slightly toxic by the dermal route. This product causes substantial but reversible eye irritation. Initial treatment is removal of exposure by washing, emesis or lavage and is followed by symptomatic and supportive care.

SECTION 5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES
FLASH POINT: *115°F 46°C TCC*

FIRE AND EXPLOSION HAZARDS
Keep away from sources of ignition.

EXTINGUISHING MEDIA
Fog, foam, carbon dioxide or dry chemical.

FIRE FIGHTING INSTRUCTIONS
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH approved (or equivalent) and full protective gear. Keep upwind. Isolate hazard area. Avoid inhalation of smoke and fumes. Use water or foam to reduce fumes. Do not touch spilled material. If possible, move containers from area. Extinguish only if flow can be stopped. Use flooding amounts of water as a fog. Cool containers with flooding amounts of water from as far a distance as possible. Avoid breathing vapors.

FLAMMABILITY CLASSIFICATION/RATING:

NUSYN-NOXFISH® FISH TOXICANT

SECTION 5. FIRE FIGHTING MEASURES - Continued

NFPA/OSHA Class: II
NFPA Rating (Fire): 2

SECTION 6. ACCIDENTAL RELEASE MEASURES

GENERAL AND DISPOSAL Use proper protective equipment to minimize personal exposure (see Section 8). Take all necessary action to prevent and to remedy the adverse effect of the spill. Ensure that the disposal is in compliance with all Federal, State/Provincial, and local regulations (See Section 13 for applicable RCRA Number). Refer to Section 15 for applicable Reportable Quantity (RQ) and other regulatory requirements.

LAND SPILL OR LEAK

Small Spills: Absorb liquid with an inert absorbent material such as granular clay, saw dust, or pet litter. Sweep up carefully while avoiding the formation of a dust cloud. Place in an approved chemical waste container for disposal. Rinse spill area with small amount of soapy water. Contain and absorb the rinsate with inert absorbents and place into the same disposal container. Area can be washed with water to remove the last trace residue. Do not allow water to contaminate water supplies or sewers.

Large Spills: Eliminate all ignition sources. Stop leak if you can do so without coming into contact with spilled material. Dike far ahead of liquid spill for later disposal. All equipment used to clean up spill should be grounded. Prevent entry into waterways, sewers, basements or confined areas. Inform appropriate authorities immediately if contamination occurs. Contact AgrEvo for further assistance if necessary.

SECTION 7. HANDLING AND STORAGE

HANDLING PRECAUTIONS
- *Do not breathe spray mist.*
- *Do not get in eyes, on skin or on clothing.*
- *Do not use near heat or open flame.*

STORAGE PRECAUTIONS
- *Do not store near heat or open flame.*
- *Do not contaminate water, food or feed by storage.*
- *Store only in original containers, in a dry place inaccessible to children and pets. Nusyn-Noxfish will not solidify nor show any separation at temperatures down to 40°F and is stable for a minimum of one year when stored in sealed drums at 70°F.*

WORK/HYGIENIC PRACTICES
- *Wash thoroughly with soap and water after handling and before eating, drinking or using tobacco.*
- *Remove contaminated clothing and wash before reuse.*

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

MANUFACTURING, FORMULATION AND OTHER NON-AGRICULTURAL USES

ENGINEERING CONTROLS
Control airborne concentrations below the appropriate exposure guideline (see Section 2 for applicable OSHA/ACGIH Exposure Limits). Local exhaust ventilation may be necessary.

EYE/FACE PROTECTION
Wear safety glasses, splash goggles or face shield.

NUSYN-NOXFISH® FISH TOXICANT

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION - Continued

SKIN PROTECTION
Wear chemical-resistant gloves (Neoprene, Nitrile, PVC) and other protective clothing to avoid skin contact.

RESPIRATORY PROTECTION
Ensure good ventilation. If not adequate, use a chemical cartridge-type respirator approved by the National Institute of Occupational Health and Safety.

GENERAL PROTECTION
Eye wash facility and safety shower should be available.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE
Clear, brown liquid.

ODOR
Mild odor.

BASIC PHYSICAL PROPERTIES

PHYSICAL STATE: Liquid
pH: Not available
VAPOR PRESSURE: Not available
VAPOR DENSITY (AIR=1): Not available
EVAPORATION RATE (BUTYL ACETATE = 1): Not available
SPECIFIC GRAVITY OR DENSITY (G/ML): Not available
PACKING (BULK) DENSITY (LB/GAL): 8.25
BOILING POINT/RANGE: 200°C
MELTING/FREEZING POINT RANGE: Not available
SOLUBILITY (IN WATER): Miscible
SOLUBILITY IN SOLVENTS/OIL (SPECIFIED): Not available
DUST EXPLOSION SEVERITY DATA: Not applicable
MINIMUM IGNITION ENERGY (MJ): Not available
MINIMUM EXPLOSION CONCENTRATION (MEC): Not available
LIMITED OXYGEN CONCENTRATION (LOC): Not available

SECTION 10. STABILITY AND REACTIVITY

STABILITY: *Stable*

CONDITIONS TO AVOID (STABILITY)
None.

INCOMPATIBLE MATERIALS
Strong oxidizing and strong reducing agents.

HAZARDOUS DECOMPOSITION PRODUCTS
Carbon monoxide and carbon dioxide.

CONDITIONS TO AVOID (POLYMERIZATION)
Avoid excessive heat and ignition sources.

HAZARDOUS POLYMERIZATION: *Will not occur.*

NUSYN-NOXFISH® FISH TOXICANT

SECTION 11. TOXICOLOGICAL INFORMATION

ACUTE STUDIES
THE FOLLOWING DATA WERE DEVELOPED WITH: Nusyn-Noxfish Fish Toxicant.

EYE EFFECTS
(Rabbit) Moderately irritating

SKIN EFFECTS
Irritation (Rabbit): Moderately irritating
Absorption (Rabbit): LD50 > 2020 mg/kg (slightly toxic)
Sensitization (Guinea Pig): non-sensitizing

ACUTE ORAL EFFECTS
Oral LD50 (Rat, female): 147 mg/kg (moderately toxic)
Oral LD50 (Rat, male): 704 mg/kg (slightly toxic)
Oral LD50 (Rat, overall): 561 mg/kg (slightly toxic)

ACUTE INHALATION EFFECTS
4-Hour LC50 (Rat, female): .041 mg/l (highly toxic)
4-Hour LC50 (Rat, male): .059 mg/l (moderately toxic)
4-Hour LC50 (Rat, overall): .049 mg/l (highly toxic)

NOTE: The severity classifications listed above are those of AgrEvo, and, particularly for eye irritation, may not always coincide with EPA-mandated Precautionary Statements.

THE FOLLOWING DATA WERE DEVELOPED WITH: rotenone and piperonyl butoxide, the active ingredients

CHRONIC (CANCER INFORMATION)
Rotenone was not carcinogenic when tested in rats and mice.

A statistically significant increase in the number of benign liver tumors appeared in mice fed piperonyl butoxide technical at doses which far exceed any anticipated daily human intake. Independent and industry toxicological experts who have reviewed the data agree that the findings of the study do not indicate a health risk to human beings.

CARCINOGENICITY: **NTP:** *No* **IARC:** *No* **OSHA:** *No*

TERATOGENICITY (BIRTH DEFECTS)
Rotenone was not teratogenic or fetotoxic when tested in rats and mice.

REPRODUCTIVE EFFECTS
Rotenone had no adverse effects on reproduction when tested over two successive generations in rats.

MUTAGENICITY (GENETIC EFFECTS)
Rotenone was not mutagenic nor clastogenic when tested in the Ames Test, Yeast Test, Mouse Lymphoma Test, Mouse Micronucleus Test, Chromosome Aberration Test and the Mitotic Recombination Test in Yeast.

SECTION 12. ECOLOGICAL INFORMATION

ENVIRONMENTAL PRECAUTIONS: This pesticide is extremely toxic to fish. Fish kills are expected at recommended rates. Consult your State Fish and Game Agency before applying this product to public waters to determine if a permit is needed for such an application. Do not contaminate untreated water when disposing of equipment washwaters.

NUSYN-NOXFISH® FISH TOXICANT

SECTION 13. DISPOSAL CONSIDERATIONS

Do not contaminate water, food or feed by disposal.

Pesticide Disposal: *Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide, spray mixture or rinsate is a violation of federal law. If these wastes cannot be disposed of by use according to the label instructions contact your state pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.*

Container Disposal: *Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities.*

RCRA INFORMATION
RCRA HAZARDOUS WASTE INGREDIENTS: None

SECTION 14. TRANSPORT INFORMATION

PROPER SHIPPING NAME: *Pesticides, liquid, toxic, flammable, n.o.s. (Rotenone, petroleum distillate)*

HAZARD CLASS: *6.1, PG I*
SUBSIDIARY HAZARD CLASS: *3*
DOT IDENTIFICATION NUMBER: *UN2903*
DOT SHIPPING LABEL: *Poison and/or Toxic*

NOTE: For transport purposes (49 CFR Part 173.132), the calculated 1-Hour LC50 (Rat, overall) is: .196 mg/l

SECTION 15. REGULATORY INFORMATION

U.S. FEDERAL REGULATORY INFORMATION
EPA Registration Number: 432-550
TSCA Inventory: registered pesticide, exempt from TSCA

SARA TITLE III NOTIFICATION AND INFORMATION
Section 302 (EHS) ingredients: None
Section 304 (CERCLA & EHS) ingredients (RQ): None
Section 313 ingredients: None

SARA TITLE III NOTIFICATIONS AND INFORMATION

SARA TITLE III - HAZARD CLASSES: *Acute Health Hazard - "Yes"*
Chronic Health Hazard - "No"
Fire Hazard - "Yes"
Sudden Release of Pressure Hazard - "No"
Reactivity Hazard - "No"

SARA TITLE III - SECTION 313 SUPPLIER NOTIFICATION
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 (EPCRA) of 1986 and of 40 CFR 372:

CAS NUMBER	INGREDIENT NAME	PERCENT BY WEIGHT
51-03-6	Piperonyl Butoxide, technical	= 2.5

This information must be included on all MSDSs that are copied and distributed for this material.

REGULATED INGREDIENTS

NUSYN-NOXFISH® FISH TOXICANT

SECTION 15. REGULATORY INFORMATION - Continued

REGULATED INGREDIENTS - Continued

INGREDIENT: Rotenone
CAS NUMBER: 83-79-4
PERCENT BY WEIGHT: = 2.5
Regulations: Illinois Toxic Substance
Massachusetts Hazardous Substance
New Jersey Special Health Hazardous Substance
New Jersey Workplace Hazardous Substance
Pennsylvania Workplace Hazardous Substance

INGREDIENT: Piperonyl Butoxide, technical
CAS NUMBER: 51-03-6
PERCENT BY WEIGHT: = 2.5
Regulations: SARA Section 313 Toxic Chemical

U.S. STATE REGULATORY INFORMATION

CALIFORNIA (Proposition 65): This product does not contain any chemical which is known to the State of California to cause cancer or birth defects or other reproductive harm.

CANADIAN REGULATORY INFORMATION

CPC NUMBER: None

WHMIS Classification for Control Product Regulations (CPR): Registered pesticide under US FIFRA regulations; exempt from CPR classification.

The MSDS contains all CPR required hazard-related information.

WHMIS HAZARD RATING: See HMIS rating (Section 16)

SECTION 16. OTHER INFORMATION

HMIS HAZARD RATING - HEALTH: 3 High
- FIRE: 2 Moderate
- REACTIVITY: 0 Negligible
- PROTECTION: H

NFPA HAZARD RATING - HEALTH: 3 High
- FIRE: 2 Moderate
- REACTIVITY: 0 Negligible
- SPECIAL:

MSDS IDENTIFICATION CODE/NUMBER: *B467413*

PREPARED BY: *Regulatory* PHONE: *(800)438-5837*
SUPERCEDES MSDS DATED: *02/14/96*

DATE AND TIME OF PRINTING: 07/28/98 11:23:44

MSDS Revision Indicators: Revisions made in Section 1 (added trademarks and product description), Section 2 (added Other ingredient statement), Section 3 (Emergency Overview), Section 5 (changed Flash Point and Fire Fighting Procedures and added Flammability Classification/Rating), Section 7 (changed text under each heading), Section 8 (changed text under each heading), Section 9 (Basic Physical Properties), Section 11 (changed the eye, skin irritation toxicity data, added to the acute oral and inhalation toxicity data, chronic toxicity data, added where the data was developed from and what animal was used in the study), Section 12 (Environmental Precautions), Section 13 (Disposal Considerations), Section 14 (changed DOT

NUSYN-NOXFISH® FISH TOXICANT

SECTION 16. OTHER INFORMATION - Continued

Shipping Label and added 1-Hour LC50) Section 15 (added Regulatory Information) and Section 16 (added HMIS Protection Code and Disclaimer).

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES

This information is provided in good faith but without express or implied warranty. Buyer assumes all responsibility for safety and use not in accordance with label instructions.

Material Safety Data Sheet

SePRO

Emergency Phone: 317-580-8282
General Phone: 1-317-580-8282

EPA Reg. Number: 67690-3
Effective Date: August 25, 1994

SONAR* SRP Herbicide 32.46

SePRO Corporation • Carmel, IN

1. INGREDIENTS: (% w/w, unless otherwise noted)

1-Methyl-3-phenyl-5-(3-(trifluoromethyl)phenyl)-4(1H)-pyridinone (Fluridone)
CAS# 059756-60-4 ..... 5%

Other Ingredients 95%

This document is prepared pursuant to the OSHA Hazard Communication Standard (29 CFR 1910.1200). In addition, other substances not 'Hazardous' per this OSHA Standard may be listed. Where proprietary ingredient shows, the identity may be made available as provided in this standard.

2. PHYSICAL DATA:

BOILING POINT: Not applicable

VAP. PRESS: Not applicable

VAP. DENSITY: Not applicable

SOL. IN WATER: Insoluble, but disintegrates in water

SP. GRAVITY: Not applicable

APPEARANCE: Dark gray to dark brown pellet

ODOR: Faint musty odor

pH: (aqueous 50/50) 3.5

3. FIRE AND EXPLOSION HAZARD DATA:

FLASH POINT: Not applicable

METHOD USED: Not applicable

FLAMMABLE LIMITS:
LFL: Not applicable
UFL: Not applicable

AUTO-IGNITION TEMPERATURE: No ignition up to 1382°F, 750°C

EXTINGUISHING MEDIA: Use water, CO_2 or dry chemicals.

FIRE AND EXPLOSION HAZARDS: Will emit toxic vapors as it burns.

FIRE-FIGHTING EQUIPMENT: Wear full protective clothing and use self-contained breathing apparatus.

4. REACTIVITY DATA:

STABILITY: (CONDITIONS TO AVOID) None known

INCOMPATIBILITY: (SPECIFIC MATERIALS TO AVOID) None known

HAZARDOUS DECOMPOSITION PRODUCTS: Will emit toxic vapors as it burns.

HAZARDOUS POLYMERIZATION: Does not occur.

5. ENVIRONMENTAL AND DISPOSAL INFORMATION:

ENVIRONMENTAL DATA: Follow use directions carefully so as to minimize adverse effects on nontarget organisms. IN ORDER TO AVOID IMPACT ON THREATENED OR ENDANGERED AQUATIC PLANT OR ANIMAL SPECIES, USERS MUST CONSULT THEIR STATE FISH AND GAME AGENCY OR THE U.S. FISH AND WILDLIFE SERVICE BEFORE MAKING APPLICATIONS. Do not contaminate water by cleaning of equipment or disposal of wastes. Trees and shrubs growing in water treated with SONAR may be injured. Do not apply in tidewater or brackish water. Do not apply in lakes, ponds, or other bodies of water where crayfish farming is performed.

ACTION TO TAKE FOR SPILLS: Contain and sweep up material of small spills and dispose as waste. Large spills report to CHEMTREC and SePRO Corporation for assistance. Prevent runoff.

DISPOSAL METHOD: Do not contaminate water, food or feed by storage or disposal. Wastes resulting from the use of this product may be disposed of at an approved waste disposal facility in accordance with applicable regulations.

6. HEALTH HAZARD DATA:

ACUTE EXPOSURE (SONAR SRP)
Eyes - Rabbit, irritant
Skin - Rabbit, 2000 mg/kg, no deaths or toxicity, nonirritant
Inhalation - This formulation is not considered to be an inhalation hazard due to pelleted nature of material
Ingestion - Rat, 500 mg/kg, no deaths or toxicity
Sensitization - This formulation was not tested. Fluridone technical is not a contact sensitizer in guinea pigs.

CHRONIC EXPOSURE (Fluridone Technical) The following effects were reported in chronic, teratogenic, and reproductive toxicity studies in laboratory animals where experimental dosage levels and durations of exposure were far in excess of those likely to occur in humans.
Chronic Toxicity - Decreased survival in lifetime feeding study. Increased liver enzyme activity, liver weight, liver cell size, and microscopic liver cell changes.

*Trademark of SePRO Corporation

SePRO

Emergency Phone: 317-580-8282
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EPA Reg. Number: 67690-3
Effective Date: August 25, 1994

SONAR* SRP Herbicide

SePRO Corporation • Carmel, IN

Increased kidney weights, and microscopic kidney cell changes. Increased serum enzyme levels.
Teratology & Reproduction - Not teratogenic. Fetal deaths at maternally toxic doses. No effects on reproductive performance.
Mutagenicity - Not mutagenic in either bacterial or mammalian cells.
Carcinogenicity - Not listed as a carcinogen or potential carcinogen by IARC, NCI/NTP, OSHA, or ACGIH. Not considered to be carcinogenic in lifetime feeding studies.

SIGNS AND SYMPTOMS OF EXPOSURE: There are no reports of significant exposure to SONAR SRP. In two reports of children swimming in water treated with SONAR, no symptoms developed.

PRIMARY ROUTES OF ENTRY: Skin and inhalation.

7. FIRST AID:

EYES: Flush eyes with plenty of water and call a physician if irritation develops.

SKIN: Wash exposed areas with plenty of soap and water. Wash all contaminated clothing before reuse. Call a physician if irritation develops.

INGESTION: Do not induce vomiting. Call a physician or Poison Control Center. If available, administer activated charcoal (6-8 heaping teaspoonfuls) with a large quantity of water. Do not give anything by mouth to an unconscious person. Immediately transport to a medical care facility and see a physician.

INHALATION: If discomfort occurs, move individual to fresh air. If breathing difficulty occurs, get medical attention. If not breathing, provide cardiopulmonary resuscitation assistance and get medical attention immediately.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: No information available.

8. HANDLING PRECAUTIONS:

EXPOSURE GUIDELINE(S): PEL and TLV not established.

VENTILATION: Good general ventilation should be sufficient for most conditions.

RESPIRATORY PROTECTION: No respiratory protection should be needed when used in accordance with label instructions.

SKIN PROTECTION: No precautions other than normal work clothing should be needed.

EYE PROTECTION: Use safety glasses.

9. ADDITIONAL INFORMATION:

SPECIAL PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Keep out of reach of children. Harmful if swallowed, absorbed through skin, or if inhaled. Avoid breathing of dust or contact with skin, eyes, or clothing. Wash thoroughly with soap and water after handling. Wash exposed clothing before reuse.

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA 704)
(4=Extreme; 3=High; 2=Moderate; 1=Slight; 0=Insignificant)
Health: 2 Flammability: 1 Reactivity: 0

SHIPPING REQUIREMENTS DOT Hazard Class: Not regulated.

MSDS STATUS: Revised 1/92, Section 8

REGULATORY INFORMATION:

(Not meant to be all-inclusive—selected regulations represented).

NOTICE: The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with federal, state or provincial, and local laws. The following specific information is made for the purpose of complying with numerous federal, state or provincial, and local laws and regulations. See MSD Sheet for health and safety information.

SARA HAZARD CATEGORY: This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:
An immediate health hazard

The Information Herein Is Given In Good Faith,
But No Warranty, Express Or Implied, Is Made.
Consult SePRO Corporation For Further Information.

NALCO

MATERIAL SAFETY DATA SHEET

PRODUCT

ChlorKill 8816

EMERGENCY TELEPHONE NUMBER(S)
(800) 424-9300 (24 Hours) CHEMTREC

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : **ChlorKill 8816**

APPLICATION : WATER TREATMENT

COMPANY IDENTIFICATION : Nalco Company
1601 W. Diehl Road
Naperville, Illinois
60563-1198

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING
HEALTH : 1 / 2 FLAMMABILITY : 0 / 0 INSTABILITY : 0 / 0 OTHER :
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

Hazardous Substance(s)	CAS NO	% (w/w)
Sodium Bisulfite	7631-90-5	30.0 - 60.0

3. HAZARDS IDENTIFICATION

****EMERGENCY OVERVIEW****

WARNING
Harmful if swallowed. Contains Sulfite. Causes asthmatic signs and symptoms in hyper-reactive individuals.
Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water.
Wear suitable protective clothing.
May evolve oxides of sulfur (SOx) under fire conditions.

PRIMARY ROUTES OF EXPOSURE :
Skin, Eye, Inhalation

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :
Can cause mild irritation.

SKIN CONTACT :
Can cause mild irritation.

INGESTION :
Not a likely route of exposure. May cause asthmatic-like attack.

INHALATION :
Irritant to respiratory system. Causes asthmatic signs and symptoms in hyper-reactive individuals.

SYMPTOMS OF EXPOSURE :
Acute :
A review of available data does not identify any symptoms from exposure not previously mentioned.
Chronic :
A review of available data does not identify any symptoms from exposure not previously mentioned.

AGGRAVATION OF EXISTING CONDITIONS :
A review of available data does not identify any worsening of existing conditions.

HUMAN HEALTH HAZARDS - CHRONIC :
Ingestion of sulfite can cause a severe allergic reaction in asthmatics and some sulfite sensitive individuals. The resulting symptoms can include difficulty in breathing, flushed skin and a rash. Chronic exposure to sulfites may cause symptoms of upper respiratory disease and affect sense of taste and smell.

4. FIRST AID MEASURES

EYE CONTACT :
Immediately flush eye with water for at least 15 minutes while holding eyelids open. If irritation persists, repeat flushing. Get immediate medical attention.

SKIN CONTACT :
Immediately flush with plenty of water for at least 15 minutes. If symptoms persist, call a physician.

INGESTION :
Induce vomiting if the patient is fully conscious. If conscious, washout mouth and give water to drink. Get medical attention.

INHALATION :
Remove to fresh air, treat symptomatically. If breathing is difficult, administer oxygen. Get medical attention.

NOTE TO PHYSICIAN :
Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

5. FIRE FIGHTING MEASURES

FLASH POINT : None

EXTINGUISHING MEDIA :
This product would not be expected to burn unless all the water is boiled away. The remaining organics may be ignitable. Keep containers cool by spraying with water. Use extinguishing media appropriate for surrounding fire.

FIRE AND EXPLOSION HAZARD :
May evolve oxides of sulfur (SOx) under fire conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :
In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :
Restrict access to area as appropriate until clean-up operations are complete. Ensure clean-up is conducted by trained personnel only. Ensure adequate ventilation. Do not touch spilled material. Stop or reduce any leaks if it is safe to do so. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Notify appropriate government, occupational health and safety and environmental authorities.

METHODS FOR CLEANING UP :
SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. LARGE SPILLS: Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Wash site of spillage thoroughly with water. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :
Do not contaminate surface water.

7. HANDLING AND STORAGE

HANDLING :
Avoid eye and skin contact. Do not take internally. Do not get in eyes, on skin, on clothing. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Ensure all containers are labelled. Keep the containers closed when not in use. Use with adequate ventilation.

STORAGE CONDITIONS :
Store the containers tightly closed. Store in suitable labelled containers. Amine and sulphite products should not be stored within close proximity or resulting vapors may form visible airborne particles.

SUITABLE CONSTRUCTION MATERIAL :
HDPE (high density polyethylene), Compatibility with Plastic Materials can vary; we therefore recommend that compatibility is tested prior to use.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :
Exposure guidelines have not been established for this product. Available exposure limits for the substance(s) are shown below. Exposure limits are listed for sulfur dioxide (SO_2) since this product evolves SO_2 when open to the atmosphere.

ACGIH/TLV :
Substance(s)

Sodium Bisulfite	TWA: 5 mg/m3
Sulfur Dioxide	TWA: 2 ppm , 5.2 mg/m3 STEL: 5 ppm , 13 mg/m3

OSHA/PEL :
Substance(s)

Sodium Bisulfite	TWA: 5 mg/m3
Sulfur Dioxide	TWA: 2 ppm , 5 mg/m3 STEL: 5 ppm , 13 mg/m3

ENGINEERING MEASURES :
General ventilation is recommended. Local exhaust ventilation may be necessary when dusts or mists are generated.

RESPIRATORY PROTECTION :
If significant mists, vapors or aerosols are generated an approved respirator is recommended. An approved respirator must be worn if the occupational exposure limit is likely to be exceeded.

HAND PROTECTION :
Neoprene gloves, Nitrile gloves, Butyl gloves, PVC gloves

SKIN PROTECTION :
Wear standard protective clothing.

EYE PROTECTION :
Wear chemical splash goggles.

HYGIENE RECOMMENDATIONS :
If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse. Keep an eye wash fountain available. Keep a safety shower available.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	Yellow
ODOR	Pungent

SPECIFIC GRAVITY	1.37 @ 77 °F / 25 °C
DENSITY	11.4 lb/gal
BULK DENSITY	11.4 lb/ft3
SOLUBILITY IN WATER	Complete
pH (1 %)	4.1
VISCOSITY	2.8 cps @ 77 °F / 25 °C
FREEZING POINT	34 °F / 1.1 °C

BOILING POINT	219 °F / 104 °C
VAPOR PRESSURE	32 mm Hg @ 77 °F / 25 °C 76 mm Hg @ 99.9 °F / 37.7 °C
VAPOR DENSITY	2.2 (Air = 1)
VOC CONTENT	0.00 % EPA Method 24

Note: These physical properties are typical values for this product and are subject to change.

10. STABILITY AND REACTIVITY

STABILITY :
Stable under normal conditions.

HAZARDOUS POLYMERIZATION :
Hazardous polymerization will not occur.

CONDITIONS TO AVOID :
Freezing temperatures.

MATERIALS TO AVOID :
Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors. Contact with strong acids (e.g. sulfuric, phosphoric, nitric, hydrochloric, chromic, sulfonic) may generate heat, splattering or boiling and toxic vapors. SO2 may react with vapors from neutralizing amines and may produce a visible cloud of amine salt particles.

HAZARDOUS DECOMPOSITION PRODUCTS :
Under fire conditions: Oxides of sulfur

11. TOXICOLOGICAL INFORMATION

The following results are for a similar product.

ACUTE ORAL TOXICITY :

Species	LD50	Test Descriptor
Rat	4.1 g/kg	Similar Product

Rating : Non-Hazardous

ACUTE DERMAL TOXICITY :

Species	LD50	Test Descriptor
Rabbit	3 g/kg	Similar Product

Rating : Non-Hazardous

PRIMARY SKIN IRRITATION :

Draize Score	Test Descriptor
1.0 / 8.0	Similar Product

Rating : Slightly irritating

PRIMARY EYE IRRITATION :

Draize Score	Test Descriptor
9.4 / 110.0	Similar Product

Rating : Practically non-irritating

SENSITIZATION :
Sulfites can cause an allergic reaction in sensitive individuals.

CARCINOGENICITY :
None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

HUMAN HAZARD CHARACTERIZATION :
Based on our hazard characterization, the potential human hazard is: Low

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL EFFECTS :

The following results are for the product and a similar product.

ACUTE FISH RESULTS :

Species	Exposure	LC50	Test Descriptor
Rainbow Trout	96 hrs	> 100 mg/l	Product
Fathead Minnow	96 hrs	382 mg/l	Similar Product

Rating : Essentially non-toxic

ACUTE INVERTEBRATE RESULTS :

Species	Exposure	LC50	EC50	Test Descriptor
Daphnia magna	48 hrs	728 mg/l		Similar Product
Daphnia magna	48 hrs	275 mg/l		Product

Rating : Essentially non-toxic

MOBILITY :
The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM , provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models. If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	Water	Soil/Sediment
<5%	30 - 50%	50 - 70%

The portion in water is expected to be soluble or dispersible.

BIOACCUMULATION POTENTIAL
This preparation or material is not expected to bioaccumulate.

ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION
Based on our hazard characterization, the potential environmental hazard is: Low

If released into the environment, see CERCLA/SUPERFUND in Section 15.

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it is not a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.

As a non-hazardous waste, it is not subject to federal regulation. Consult state or local regulation for any additional handling, treatment or disposal requirements. For disposal, contact a properly licensed waste treatment, storage, disposal or recycling facility.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

LAND TRANSPORT :

Proper Shipping Name :	BISULFITES, AQUEOUS SOLUTION, N.O.S.
Technical Name(s) :	SODIUM BISULFITE
UN/ID No :	UN 2693
Hazard Class - Primary :	8
Packing Group :	III
Flash Point :	None
DOT Reportable Quantity (per package) :	12,500 lbs
DOT RQ Component :	SODIUM BISULFITE

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name :	BISULPHITES, AQUEOUS SOLUTION, N.O.S.
Technical Name(s) :	SODIUM BISULPHITE
UN/ID No :	UN 2693
Hazard Class - Primary :	8
Packing Group :	III
IATA Cargo Packing Instructions :	820
IATA Cargo Aircraft Limit :	60 L (Max net quantity per package)

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name :	BISULPHITES, AQUEOUS SOLUTION, N.O.S.
Technical Name(s) :	SODIUM BISULPHITE
UN/ID No :	UN 2693
Hazard Class - Primary :	8
Packing Group :	III

15. REGULATORY INFORMATION

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :
Based on our hazard evaluation, the following substance(s) in this product is/are hazardous and the reason(s) is/are shown below.

Sodium Bisulfite : Respiratory irritant

CERCLA/SUPERFUND, 40 CFR 117, 302 :
This product contains the following Reportable Quantity (RQ) Substance. Also listed is the RQ for the product.

RQ Substance	RQ
Sodium Bisulfite	12,000 lbs

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :
This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :
Our hazard evaluation has found this product to be hazardous. The product should be reported under the following indicated EPA hazard categories:

X	Immediate (Acute) Health Hazard
-	Delayed (Chronic) Health Hazard
-	Fire Hazard
-	Sudden Release of Pressure Hazard
-	Reactive Hazard

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :
This product does not contain substances on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA) :
The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

FOOD AND DRUG ADMINISTRATION (FDA) Federal Food, Drug and Cosmetic Act :
When use situations necessitate compliance with FDA regulations, this product is acceptable under : 21 CFR 173.310 Boiler Water Additives

Limitations: no more than required to produce intended technical effect.

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :
This product contains the following substances listed in the regulation:

Substance(s)	Citations
• Sodium Bisulfite	Sec. 311

CLEAN AIR ACT, Sec. 111 (40 CFR 60, Volatile Organic Compounds), Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :
None of the substances are specifically listed in the regulation.

CALIFORNIA PROPOSITION 65 :
This product does not contain substances which require warning under California Proposition 65.

MICHIGAN CRITICAL MATERIALS :
None of the substances are specifically listed in the regulation.

STATE RIGHT TO KNOW LAWS :
The following substances are disclosed for compliance with State Right to Know Laws:

Sodium Bisulfite	7631-90-5
Water	7732-18-5

NATIONAL REGULATIONS, CANADA :

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :
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.

WHMIS CLASSIFICATION :
E - Corrosive Material

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :
The substances in this preparation are listed on the Domestic Substances List (DSL), are exempt, or have been reported in accordance with the New Substances Notification Regulations.

INTERNATIONAL CHEMICAL CONTROL LAWS

AUSTRALIA
All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS) and are listed on the Australian Inventory of Chemical Substances (AICS).

CHINA
All substances in this product comply with the Chemical Control Law and are listed on the Inventory of Existing Chemical Substances China (IECSC).

EUROPE
The substances in this preparation have been reviewed for compliance with the EINECS or ELINCS inventories.

JAPAN
All substances in this product comply with the Law Regulating the Manufacture and Importation Of Chemical Substances and are listed on the Ministry of International Trade & Industry List (MITI).

KOREA
All substances in this product comply with the Toxic Chemical Control Law (TCCL) and are listed on the Existing Chemicals List (ECL)

NEW ZEALAND
This product's trade name is registered with the Environmental Risk Management Authority (ERMA).

THE PHILIPPINES
All substances in this product comply with the Republic Act 6969 (RA 6969) and are listed on the Philippine Inventory of Chemicals & Chemical Substances (PICCS).

16. OTHER INFORMATION

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight# (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department
Date issued : 02/23/2004
Version Number : 1.6

32.57 Ident 785 1 of 2

Material Safety Data Sheet

Genium Publishing Corporation
1145 Catalyn Street
Schenectady, NY 12303-1836 USA
(518) 377-8855

GENIUM PUBLISHING CORP.

No. 9
SULFURIC ACID, CONCENTRATED
Revision C
Issued: October 1980
Revised: February 1986

SECTION 1. MATERIAL IDENTIFICATION

MATERIAL NAME: SULFURIC ACID, CONCENTRATED

OTHER DESIGNATIONS: Oil of Vitriol, Hydrogen Sulfate; H_2SO_4; CAS #7664-93-9

MANUFACTURER/SUPPLIER: Available from many suppliers, including:
Allied Corporation, PO Box 2064R, Morristown, NJ 07960; Telephone: 800 631-8050

HMIS
H: 3
F: 0
R: 2
PPE: *
* See Sect. 8

R 1
I 3
S 4
K 0

SECTION 2. INGREDIENTS AND HAZARDS

	%	HAZARD DATA
Hydrogen Sulfate (H_2SO_4) Water * Material is obtained by the reaction of SO_3 and water. Can contain low impurity levels, such as 0.02% max of iron as Fe. Properties vary with H_2SO_4 content. Current OSHA standard and ACGIH (1985-86) TLV. NIOSH has a 10-hr TWA, 40-hr. work week, of 1 mg/m^3.	93-98 Balance*	8-hr TWA: 1 mg/m^3 Human, Mist Inhalation, TCLo: 3 mg/m^3, 24 wk. (Toxic Mouth Effects) Rat, Oral, LD_{50}: 2140 mg/kg

SECTION 3. PHYSICAL DATA

	93.19% H_2SO_4	98.33% H_2SO_4	100% H_2SO_4
Boiling Point, 1 atm, deg C	ca 281	ca 338	ca 330 (dc)
Specific Gravity (60/60°F)	1.8354	1.84	1.84
Volatiles, % @ 340°C	ca 100	ca 100	ca 100
Melting Point, deg C	ca -34	ca 3	10.4

Water Solubility ... Complete Miscible
Vapor Pressure, mm Hg @ 100°F ... <1 (93.19% H_2SO_4); Deg. Baume ... 66 (93.19% H_2SO_4) - Density of H_2SO_4 is often reported in degrees Baume Be). Formula is Be=145 [145/sp gr for liquids heavier than water].

Appearance and odor: Clear, colorless, hygroscopic, oily liquid with no odor. Mists greater than 1 mg/m^3 are easily recognizable. Those at 5 mg/m^3 are distinctly objectionable.

SECTION 4. FIRE AND EXPLOSION DATA

Flash Point and Method	Autoignition Temp.	Flammability Limits In Air	LOWER	UPPER
None - Nonflammable	NA	NA	NA	NA

Sulfuric acid is nonflammable; however, it is a strong oxidizing agent and may cause ignition by contact with combustible materials. Small fires may be smothered with suitable dry chemical. Cool exterior of storage tanks of H_2SO_4 with water to avoid rupture if exposed to fire. Do not add water or other liquid to the acid! The acid, especially when diluted with water, can react with metals to liberate flammable hydrogen gas.
Sulfuric acid mists and vapors from a fire area are corrosive (see sect. 5).
Fire fighters must wear self-contained breathing equipment and fully protective clothing.

SECTION 5. REACTIVITY DATA

Sulfuric acid is stable under normal conditions of use and storage. It does not undergo hazardous polymerization. It is a strong mineral acid reacting with bases and metals. The concentrated acid is also a dehydrating agent, picking up moisture readily from the air or other materials. Hydrogen gas may be generated within a H_2SO_4 container. Vent drums cautiously.

This material reacts exothermically with water. (Acid should always be added slowly to water. Water added to acid can cause boiling and uncontrolled splashing of the acid.) Sulfur oxides can result from decomposition and from oxidizing reactions of sulfuric acid.

No. 9 2/86 SULFURIC ACID, CONCENTRATED (Rev. C) Ident 725 aofa

SECTION 6. HEALTH HAZARD INFORMATION | TLV

Concentrated sulfuric acid is a strong mineral acid, an oxidizing agent, and a dehydrating agent that is rapidly damaging to all human tissue with which it comes in contact. Ingestion may cause severe injury or death. Eye contact produces severe or permanent injury. Inhalation of mists can damage both the upper respiratory tract and the lungs. Sulfuric acid is not listed as a carcinogen by the NTP, IARC, or OSHA.

FIRST AID: EYE CONTACT: Immediately flush eyes (including under eyelids) with plenty of running water for at least 15 minutes. Speed in diluting and rinsing out acid with water is extremely important if permanent eye damage is to be avoided. Obtain medical help as soon as possible.* SKIN CONTACT: Immediately flush affected areas with water, removing contaminated clothing while under the safety shower. Continue washing with water and get medical attention.*
INHALATION: Remove to fresh air. Restore breathing. Call a physician immediately. INGESTION: Dilute acid immediately with large amounts of milk or water, then give milk of magnesia to neutralize. Never give anything by mouth to an unconscious person. Do not induce vomiting; if it occurs spontaneously, continue to administer fluid. Obtain medical attention as soon as possible.*
Maintain observation of patient for possible delayed onset of pulmonary edema.

* GET MEDICAL HELP = In plant, paramedic, community.

SECTION 7. SPILL, LEAK, AND DISPOSAL PROCEDURES

Handle major spills by a predetermined plan. Contact supplier for assistance in this planning, in meeting local regulations, and for disposing of large amounts. Notify safety personnel. Provide optimum ventilation; vapors are extremely irritating. Stop leak if you can do so without risk.

Cleanup personnel need protection against inhalation or contact. Keep upwind. Contain spill. Minor leaks or spills can be diluted with much water and neutralized with soda ash or lime. If water is not available, cover contaminated area with sand, ashes, or gravel and neutralize cautiously with soda ash or lime.

DISPOSAL: Follow Federal, state, and local regulations. Runoff to sewer may create hydrogen gas, which is a fire or explosion hazard. EPA (CWA) RQ 1000 lbs. (40 CFR 117).

SECTION 8. SPECIAL PROTECTION INFORMATION

Provide general ventilation to meet current TLV requirements in the workplace. Where mists are up to 50 mg/m^3, a high-efficiency particulate respirator with full facepiece is warranted; a type-C supplier-air respirator with full facepiece operated in pressure-demand mode is used to 100 mg/m^3.
Avoid eye contact by use of chemical safety goggles or face shield where splashing may occur. Acid-resistant protective clothing, such as rubber gloves, aprons, boots, and suits, is recommended to avoid body contact.

Eyewash fountain and safety showers with deluge type of heads should be readily available where this material is handled or stored.

Contact lenses pose a special hazard; soft lenses may absorb and all lenses concentrate irritants.
Comprehensive preplacement and annual medical examinations with emphasis on dental erosion, cardiopulmonary system, and mucous membrane irritation and cough are indicated.

SECTION 9. SPECIAL PRECAUTIONS AND COMMENTS

Sulfuric acid in carboys or drums should be stored in clean, ventilated storage areas having acid-resistant floors with good drainage. Keep out of direct sunlight, do not store above 89.6°F (32°C). Storage facilities are to be separate from organic materials, metallic powders, chromates, chlorates, nitrates, carbides, oxidizables, etc. Soda ash, sand, or lime should be kept in general storage or work areas for emergency use. Protect containers against physical damage. Glass bottles need extra protection. Sulfuric acid is highly corrosive to most metals, especially below 77% H_2SO_4. Avoid breathing mist or vapors. Avoid contact with skin or eyes. Do not ingest. Do not add water to concentrated acid. Drums may contain hydrogen gas, so open cautiously. Use nonsparking tools free of oil, dirt, and grit and vapor-proof electrical fixtures

DOT Classification: Corrosive Material. ID No.: UN1830 Label: Corrosive

Data Source(s) Code: 1-12, 19, 20, 24, 26, 31, 37-39, 42, 82. CK

Approvals	J. Reinecke, 6/86.
Indust. Hygiene/Safety	6/86
Medical Review	July 86

MATERIAL SAFETY DATA BELLACIDE(R) 325

FMC

5915 - 41 -3 -2

U.S./CANADA VERSION EFFECTIVE: 06/28/95 PRINTED: 02/23/96

PRINTED FOR..... FMC CORPORATION

1. CHEMICAL PRODUCT/COMPANY IDENTIFICATION

PRODUCT NAME.....: BELLACIDE 325
ALGICIDE

SYNONYMS.....: 2-(TERT-BUTYLAMINO)-4-CHLORO-6-(ETHYLAMINO)-S-TRIAZINE; TERBUTHYLAZINE

INFORMATION PROVIDED BY..: FMC CORPORATION
PROCESS ADDITIVES DIVISION
1735 MARKET STREET
PHILADELPHIA, PA 19103
(800) 545-6532

EMERGENCY PHONE NUMBERS
CHEMTREC.....: (800) 424-9300
MEDICAL.....: (303) 595-9048 CALL COLLECT
PLANT/OTHER.....: (304) 755-6300 CALL COLLECT

2. COMPOSITION/INFORMATION ON INGREDIENTS

CAS # AND COMPONENTS.....: 2-(TERT-BUTYLAMINO)-4-CHLORO-6-(ETHYLAMINO)-S-TRIAZINE
CAS#: 5915-41-3
PERCENT: 4%
WATER
CAS#: 7732-18-5

3. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW.....: PRODUCT IS STABLE UNDER NORMAL CONDITIONS OF USE. UNDER FIRE CONDITIONS TOXIC SULFUR OXIDES AND CHLORINE COMPOUNDS MAY BE RELEASED.

HEALTH EFFECTS.....: PRODUCT IS SLIGHTLY TOXIC BY INGESTION.

4. FIRST AID MEASURES

EYES.....: FLUSH WITH PLENTY OF WATER. GET MEDICAL ATTENTION IF IRRITATION OCCURS AND PERSISTS.

SKIN.....: WASH WITH PLENTY OF SOAP AND WATER. GET MEDICAL ATTENTION IF IRRITATION OCCURS AND PERSISTS.

INHALATION.....: REMOVE TO FRESH AIR. IF BREATHING DIFFICULTY OR DISCOMFORT OCCURS AND PERSISTS, OBTAIN MEDICAL ATTENTION.

INGESTION.....: DRINK 1 OR 2 GLASSES OF WATER AND INDUCE VOMITING BY TOUCHING THE BACK OF THE THROAT WITH A FINGER OR BY GIVING SYRUP OF IPECAC. NEVER INDUCE VOMITING OR GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. CONTACT A MEDICAL DOCTOR.

NOTES TO PHYSICIAN.....: NOT AVAILABLE

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MATERIAL SAFETY DATA BELLACIDE(R) 325 FMC

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U.S./CANADA VERSION EFFECTIVE: 06/28/95 PRINTED: 02/23/96

5. FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA.....	CARBON DIOXIDE, FOAM, DRY CHEMICAL, WATER SPRAY
SPECIAL FIREFIGHTING PROCEDURES.....	USE-SELF CONTAINED BREATHING APPARATUS.
DEGREE OF FIRE AND EXPLOSION HAZARD.....	DECOMPOSITION AND COMBUSTION PRODUCTS MAY BE TOXIC.
HAZARDOUS DECOMPOSITION PRODUCTS..	THERMAL DECOMPOSITION AND BURNING MAY PRODUCE CARBON MONOXIDE, CARBON DIOXIDE, NITROGEN AND SULFUR OXIDES, CHLORINE COMPOUNDS AND OTHER TOXIC SPECIES.

6. ACCIDENTAL RELEASE MEASURES

PROCEDURE FOR RELEASE OR SPILL....	ISOLATE AREA. WEAR PRESCRIBED PROTECTIVE CLOTHING AND EQUIPMENT. DIKE TO CONFINE SPILL. ABSORB WITH AN ABSORBENT OR SHOVEL WASTE INTO AN APPROVED CONTAINER AND DISPOSE OF FOLLOWING THE METHOD OUTLINED UNDER THE "DISPOSAL CONSIDERATIONS" SECTION. TO DECONTAMINATE SPILL AREA, TOOLS AND EQUIPMENT WASH WITH WATER AND ADD TO DRUMS OF WASTE ALREADY COLLECTED.

7. HANDLING AND STORAGE

HANDLING.....	AVOID DIRECT CONTACT WHEN HANDLING THIS PRODUCT.
VENTILATION.....	USE WITH GENERAL ROOM VENTILATION WHEN AIRBORNE CONTAMINATION IS EXPECTED.
STORAGE.....	KEEP CONTAINERS CLOSED WHEN NOT IN USE. PROTECT FROM HEAT, FLAME AND PHYSICAL DAMAGE.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

CONTROL MEASURES.....	UNDER NORMAL CONDITIONS OF USE EXPOSURE SHOULD NOT BE A SIGNIFICANT CONCERN. UNDER UNUSUAL CONDITIONS THE PERSONAL PROTECTIVE EQUIPMENT INDICATED BELOW IS RECOMMENDED.
RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT	
RESPIRATORY.....	USE MSHA/NIOSH APPROVED ORGANIC RESPIRATORY PROTECTION WHEN AIRBORNE VAPOR IS EXPECTED.
EYES.....	USE CHEMICAL TYPE GOGGLES OR FACE SHIELD.
GLOVES.....	USE IMPERVIOUS GLOVES.
SPECIAL CLOTHING AND EQUIPMENT...	WEAR IMPERVIOUS APRON AND GAUNTLETS WHEN SPLASHING IS EXPECTED DURING LIQUID TRANSFER.
FOOTWEAR.....	NORMAL WORKSHOES EXCEPT IN CONDITIONS OF SPILLS WHERE RUBBER OVERSHOES OR BOOTS WOULD BE REQUIRED.

MATERIAL SAFETY DATA BELLACIDE(R)-325 FMC

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U.S./CANADA VERSION EFFECTIVE: 06/28/95 PRINTED: 02/23/96

9. PHYSICAL AND CHEMICAL PROPERTIES

MELTING/FREEZING POINT...	NOT AVAILABLE
BOILING POINT.....	NOT AVAILABLE
VAPOR PRESSURE.....	NOT AVAILABLE
VAPOR DENSITY (AIR=1)....	NOT APPLICABLE
ROOM TEMPERATURE..... APPEARANCE AND STATE	WHITE TO BEIGE AQUEOUS DISPERSION
ODOR.....	SLIGHT CHALKY ODOR
SPECIFIC GRAVITY (H2O=1).	1.0
SOLUBILITY IN H2O % BY WT	NOT AVAILABLE
% VOLATILES.....	NOT AVAILABLE
EVAPORATION RATE..... (BUTYL ACETATE=1)	NOT AVAILABLE
PH (AS IS).....	7-9
PH (1% SOLUTION).....	NOT AVAILABLE
ODOR THRESHOLD.....	NOT AVAILABLE
DENSITY (G/ML).....	NOT AVAILABLE
PARTITION COEFFICIENT.... N-OCTANOL/WATER	NOT AVAILABLE
FLASH POINT.....	NOT APPLICABLE
AUTOIGNITION TEMPERATURE.	NOT AVAILABLE
FLAMMABLE LIMITS UPPER..	NOT APPLICABLE
(AIR) LOWER..	NOT APPLICABLE
EXPLOSIVE PROPERTIES.....	NOT APPLICABLE
OXIDIZING PROPERTIES.....	NOT APPLICABLE
SOLUBILITY..... - FAT SOLUBILITY (SOLVENT - OIL)	NOT AVAILABLE

10. STABILITY AND REACTIVITY

STABILITY.....	STABLE
HAZARDOUS POLYMERIZATION.	WILL NOT OCCUR
CONDITIONS TO AVOID.....	AVOID STORAGE AT EXTREME TEMPERATURES.
MATERIALS TO AVOID.....	
MAJOR CONTAMINANTS THAT.. CONTRIBUTE TO INSTABILITY	NOT AVAILABLE
INCOMPATIBILITY.....	STRONG ACIDS AND ALKALIES
HAZARDOUS DECOMPOSITION.. PRODUCTS	THERMAL DECOMPOSITION AND BURNING MAY PRODUCE CARBON MONOXIDE, CARBON DIOXIDE, NITROGEN AND SULFUR OXIDES, CHLORINE COMPOUNDS AND OTHER TOXIC SPECIES.
SENSITIVITY TO MECH..... IMPACT	NONE
SENSITIVITY TO STATIC.... DISCHARGE	NONE

11. TOXICOLOGICAL INFORMATION

EYE CONTACT.....	NON-IRRITANT (RABBIT)

PAD

(CONTINUED) PAGE 03

11. TOXICOLOGICAL INFORMATION

SKIN CONTACT.....	NON-IRRITANT (RABBIT) NON-SENSITIZER (GUINEA PIG)
SKIN ABSORPTION.....	LD50 > 4400 MG/KG (RABBIT)
INHALATION.....	NO DATA AVAILABLE
INGESTION.....	LD50 = 1350 MG/KG (RAT)
ACUTE EFFECTS FROM..... OVEREXPOSURE	PRODUCT IS SLIGHTLY TOXIC BY INGESTION.
CHRONIC EFFECTS FROM..... OVEREXPOSURE (EFFECTS CONSIDERED INCLUDE: SENSITIVITIES, CARCINOGENICITY, TERATOGENICITY, MUTAGENICITY, SYNERGISTIC PRODUCTS, AND ANY MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE.)	ANIMAL STUDIES INDICATED EFFECTS ON THE LIVER, TESTES, THYMUS AND STOMACH WHEN PRODUCT WAS APPLIED DERMALLY. LONG-TERM ANIMAL STUDIES WITH THE ACTIVE INGREDIENT INDICATED TOXIC EFFECTS IN LYMPH NODES, THYMUS AND SPLEEN FOLLOWING ORAL AND DERMAL EXPOSURE; A SMALL INCREASED INCIDENCE OF MAMMORY TUMORS WAS NOTED IN RATS. INHALATION OR INGESTION OF ETYHLENE GLYCOL MAY RESULT IN CENTRAL NERVOUS SYSTEM DEPRESSION, LIVER AND KIDNEY DAMAGE AND FETOTOXICITY AND TERATOGENICITY.

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL FATE.....	SEWAGE BACTERIAL TOXICITY - INHIBITORY CONCENTRATION ON RESPIRATION OF AEROBIC WASTE WATER--IC20, IC50, IC80 > 100 PPM
ENVIRONMENTAL EFFECTS....	NO DATA AVAILABLE FOR THE PRODUCT. INFORMATION BELOW IS FOR TERBUTHYLAZINE, THE MAJOR INGREDIENT: FISH TOXICITY - BLUEGILL: 96 HR LC50 = 7.6 PPM RAINBOW TROUT: 96 HR LC50 = 3.8 PPM INVERTEBRATE TOXICITY - DAPHNIA MAGNA: 48 HR EC50 = 39 PPM AVIAN TOXICITY - MALLARD DUCK: ORAL LD50 > 2510 MG/KG BOBWHITE QUAIL: 8 DAY DIETARY LC50 > 5620 PPM MALLARD DUCK: 8 DAY DIETARY LC50 > 5620 PPM

13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD....	OPEN DUMPING OR BURNING OF THIS MATERIAL IS PROHIBITED. AN ACCEPTABLE METHOD OF DISPOSAL IS TO BURN IN AN INCINERATOR IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL ENVIRONMENTAL LAWS, RULES, STANDARDS AND REGULATIONS. THE APPROPRIATE REGULATORY AGENCIES SHOULD BE CONTACTED PRIOR TO DISPOSAL.

14. TRANSPORT INFORMATION

DOT PROPER SHIPPING NAME:	NOT REGULATED AS A HAZARDOUS MATERIAL BY U.S. DOT 49 CFR 172.101.
IATA:	NOT REGULATED
IMDG:	NOT REGULATED
DOT CLASSIFICATION:	NOT APPLICABLE
DOT LABELS:	NOT REQUIRED
DOT MARKING:	NOT REQUIRED
DOT PLACARD:	NOT REQUIRED
UN NUMBER:	NOT APPLICABLE
HAZARDOUS SUBSTANCE/RQ:	NOT APPLICABLE
49 STCC NUMBER:	NOT AVAILABLE
PRECAUTIONS TO BE TAKEN IN TRANSPORTATION:	KEEP CONTAINER TIGHTLY CLOSED. PROTECT AGAINST PHYSICAL DAMAGE.
OTHER SHIPPING INFORMATION:	NONE

15. REGULATORY INFORMATION

OSHA	
EXPOSURE LIMITS	
SUBSTANCE(S):	NONE
OSHA PEL-TWA:	NOT APPLICABLE
STEL:	NOT APPLICABLE
CEILING:	NOT APPLICABLE
SKIN DESIGNATION:	NOT APPLICABLE
ACGIH TLV-TWA:	NOT APPLICABLE
STEL:	NOT APPLICABLE
CEILING:	NOT APPLICABLE
SKIN DESIGNATION:	NOT APPLICABLE
TARGET ORGAN EFFECTS:	LIVER, TESTES, THYMUS, STOMACH, SPLEEN
CARCINOGENIC POTENTIAL:	NO
REGULATED BY OSHA:	NO
LISTED ON NTP REPORT:	NO
IARC GROUP 1, 2A, 2B:	NO
U.S. EPA REQUIREMENTS	
RELEASE REPORTING	
CERCLA (40 CFR 302)	
LISTED SUBSTANCE(S):	NONE
RQ:	NOT APPLICABLE
CATEGORY:	NOT APPLICABLE
RCRA WASTE NO:	NOT APPLICABLE
UNLISTED SUBSTANCE(S):	NONE
RQ:	NOT APPLICABLE
CHARACTERISTIC:	NOT APPLICABLE
RCRA WASTE NO:	NOT APPLICABLE
SARA TITLE III SEC 313 (40 CFR 372):	
LISTED TOXIC CHEMICAL:	NONE
INVENTORY REPORTING	

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MATERIAL SAFETY DATA BELLACIDE(R) 325 FMC

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15. REGULATORY INFORMATION

SARA TITLE III SEC 311/312 (40 CFR 370)	
SUBSTANCE(S).....	NOT APPLICABLE
HAZARD CATEGORY.....	DELAYED (CHRONIC) HEALTH HAZARD
PLANNING THRESHOLD.....	NOT APPLICABLE
EMERGENCY PLANNING	
SARA TITLE III SEC 302-303 (40 CFR 355)	
LISTED SUBSTANCE(S).....	NONE
RQ.....	NOT APPLICABLE
PLANNING THRESHOLD.....	NOT APPLICABLE
U.S. TSCA STATUS.....	YES (COMPONENTS)
CANADA	
INGREDIENT DISCLOSURE LIST	
SUBSTANCE(S).....	NOT EVALUATED FOR CANADA
CONTROLLED PRODUCT.....	NOT EVALUATED FOR CANADA
HAZARD SYMBOLS.....	NOT EVALUATED FOR CANADA
CLASS & DIVISION.....	NOT EVALUATED FOR CANADA
PRODUCT IDENTIFICATION NO:	NOT EVALUATED FOR CANADA
DOMESTIC SUBSTANCE LIST..:	NOT EVALUATED FOR CANADA
CEPA PRIORITY LIST.....	NOT EVALUATED FOR CANADA
CARCINOGENICITY	
ACGIH APPENDIX A.....	NO
A1 - CONFIRMED HUMAN.....	NO
A2 - SUSPECTED HUMAN.....	NO
IARC GROUP 1 OR 2.....	NO
LABEL LANGUAGE (US/CANADA)	FOR UNITED STATES ONLY
HEALTH.....	U.S.: CAUTION- HARMFUL IF SWALLOWED OR ABSORBED THROUGH THE SKIN. AVOID CONTACT WITH SKIN AND CLOTHING. WASH THOROUGHLY AFTER HANDLING. REMOVE AND WASH CONTAMINATED CLOTHING BEFORE REUSE.
PHYSICAL.....	NOT APPLICABLE
HANDLING AND STORAGE...	KEEP OUT OF REACH OF CHILDREN. DO NOT CONTAMINATE WATER, FOOD OR FEED BY STORAGE AND DISPOSAL. PROTECT FROM FREEZING.
FIRST AID.....	FIRST AID IN CASE OF CONTACT: EYES: FLUSH EYES WITH PLENTY OF WATER FOR AT LEASE 15 MINUTES. GET MEDICAL ATTENTION. SKIN: FLUSH SKIN WITH PLENTY OF WATER OR WASH WITH MILD SOAP AND WATER. INGESTION: IF CONSCIOUS, GIVE PLENTY OF WATER AND INDUCE VOMITING BY PLACING FINGER IN BACK OF THROAT. GET MEDICAL ATTENTION.
STATE REGULATIONS.....	NONE KNOWN

MATERIAL SAFETY DATA BELLACIDE(R) 325 FMC

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U.S./CANADA VERSION EFFECTIVE: 06/28/95 PRINTED: 02/23/96

16. OTHER INFORMATION

PRODUCT USES.....: ALGICIDE
REGISTERED UNDER EPA NO. 279-3139

IMPORTANT: THIS MATERIAL IS NOT INTENDED FOR USE IN PRODUCTS FOR WHICH PROLONGED CONTACT WITH MUCOUS MEMBRANES OR ABRADED SKIN, OR IMPLANTATION WITHIN THE HUMAN BODY, IS SPECIFICALLY INTENDED, UNLESS THE FINISHED PRODUCT HAS BEEN TESTED IN ACCORDANCE WITH THE FOOD AND DRUG ADMINISTRATION AND/OR OTHER APPLICABLE SAFETY TESTING REQUIREMENTS. BECAUSE OF THE WIDE RANGE OF SUCH POTENTIAL USES, FMC CORPORATION IS NOT ABLE TO RECOMMEND THIS MATERIAL AS SAFE AND EFFECTIVE FOR SUCH USES AND ASSUMES NO LIABILITY FOR ANY SUCH USES.

NFPA 704
HEALTH.....: 1
FLAMMABILITY.....: 1
REACTIVITY.....: 0
SPECIAL HAZARD.....:
(DEGREE OF HAZARD
0 = NO HAZARD
4 = SEVERE HAZARD)

THE CONTENTS AND FORMAT OF THIS MSDS ARE IN ACCORDANCE WITH OSHA HAZARD COMMUNICATION AND CANADA'S WORKPLACE HAZARDOUS MATERIAL INFORMATION SYSTEM (WHMIS).

Bayer

MATERIAL SAFETY DATA SHEET

BAYER CORPORATION
PRODUCT SAFETY & REGULATORY AFFAIRS
100 Bayer Road
Pittsburgh, PA 15205-9741

TRANSPORTATION EMERGENCY
CALL CHEMTREC: 800-424-9300
INTERNATIONAL: 703-527-3887

NON-TRANSPORTATION
BAYER EMERGENCY PHONE...: (412) 923-1800
BAYER INFORMATION PHONE.: (800) 662-2927

1. CHEMICAL PRODUCT IDENTIFICATION:

PRODUCT NAME.....: Bayhibit AM Inhibitor
PRODUCT CODE.....: V801
CHEMICAL FAMILY.....: Phosphonates
CHEMICAL NAME.....: 2-phosphono-1,2,4-butanetricarboxylic acid aqueous solution
SYNONYMS.....: PBTC
FORMULA.....: C7H11O9P in H2O

2. COMPOSITION/INFORMATION ON INGREDIENTS:

INGREDIENT NAME /CAS NUMBER	EXPOSURE LIMITS	CONCENTRATION (%)
***** HAZARDOUS INGREDIENTS *****		
2-phosphono-1,2,4-butanetricarboxylic acid 37971-36-1	OSHA : Not Established ACGIH: Not Established	Approx. 50 %

3. HAZARDS IDENTIFICATION:

****
* EMERGENCY OVERVIEW *
*
* CAUTION! Color: Colorless to yellowish; Form: Liquid; *
* Odor: Very slight odor; May cause eye irritation; Contact *
* with metals liberates flammable gas; Corrosive to steel or *
* aluminum; Use cold water spray to cool fire-exposed *
* containers to minimize the risk of rupture; Irritating *
* gases/fumes may be given off during burning or thermal *

Continued on next page

3. HAZARDS IDENTIFICATION (Continued)

* decomposition. *
****

POTENTIAL HEALTH EFFECTS:

ROUTE(S) OF ENTRY.....: Eye Contact; Skin Contact; Inhalation

HUMAN EFFECTS AND SYMPTOMS OF OVEREXPOSURE:
ACUTE EFFECTS OF EXPOSURE.....: On the basis of Animal Toxicity testing (see Section 11), we would expect this product to be moderately irritating to the eyes, with symptoms such as tearing, reddening and swelling. We would also expect this product to be non-irritating to the skin and to be essentially non-toxic by ingestion.
CHRONIC EFFECTS OF EXPOSURE...: Prolonged or repeated skin contact could result in skin irritation. Possible symptoms include itching, reddening, swelling, rash and scaling. Based on animal test results, no mutagenic or teratogenic effects are expected. Also, sub-chronic three (3) month animal feeding studies were conducted without any adverse effects.

CARCINOGENICITY.....: This product is not listed by NTP, IARC or regulated as a carcinogen by OSHA.

MEDICAL CONDITIONS
AGGRAVATED BY EXPOSURE.....: Persons with pre-existing eye conditions may be more susceptible to the effects of overexposure to this product.
EXPOSURE LIMITS.....: Not established for this product.

4. FIRST AID MEASURES:

FIRST AID FOR EYES.....: Flush eyes with water for at least 15 minutes. Consult a physician if irritation persists.
FIRST AID FOR SKIN.....: Wash thoroughly with soap and water. Consult a physician if irritation develops.
FIRST AID FOR INHALATION: Remove to fresh air. Consult a physician if breathing is difficult.
FIRST AID FOR INGESTION.: Consult a physician.

5. FIRE FIGHTING MEASURES:

FLASH POINT.....: Greater than 212 F (100 C); DIN 51758.
AUTO-IGNITION TEMPERATURE.....: Greater than 932 F (500 C); DIN 51794.
EXTINGUISHING MEDIA.....: Water; Foam; Carbon Dioxide

Continued on next page

5. FIRE FIGHTING MEASURES (Continued)

SPECIAL FIRE FIGHTING PROCEDURES: Under fire conditions irritating and/or toxic gases and aerosols may be present. Firefighters should wear full protective clothing and self-contained breathing apparatus.

6. ACCIDENTAL RELEASE MEASURES:

SPILL OR LEAK PROCEDURES.....: Utilize recommended protective clothing and equipment. Spills should be taken up with a suitable absorbent and placed in containers. Spill area can be washed with water. Collect wash water for approved disposal. Bayhibit AM may be eliminated from sewage water via precipitation by flocculation with iron (III) or aluminum salt.

7. HANDLING AND STORAGE:

STORAGE TEMPERATURE(MIN/MAX): Ambient/122 F (50 C).
SHELF LIFE.....: At least two (2) years.
SPECIAL SENSITIVITY.....: None known.
HANDLING/STORAGE PRECAUTIONS: Do not store in unlined steel containers as Bayhibit AM solution will dissolve steel and other metals, causing the generation of hydrogen gas (flammable). Steel or metal containers must have a complete polyethylene liner on sides, top and bottom. Repack only into approved containers. Store away from alkalis, food and beverages. Handle as any moderately strong acid would be handled. Freezing of this product will not effect its quality. Keep away from food, drink and animal feeds.

8. PERSONAL PROTECTION:

EYE PROTECTION REQUIREMENTS.....: Chemical workers splash goggles.
SKIN PROTECTION REQUIREMENTS.....: Rubber, PVC, Nitrile gloves, aprons and other splash protection as appropriate for the conditions of use. Employees should wash their hands and face before eating, drinking or using tobacco products.
VENTILATION REQUIREMENTS.....: Local exhaust ventilation at work area.
RESPIRATOR REQUIREMENTS.....: None required under normal conditions of use.
ADDITIONAL PROTECTIVE MEASURES.....: Safety showers and eyewash facilities should be available. Employees should be trained in the safe use and handling of hazardous chemicals.

Continued on next page

9. PHYSICAL AND CHEMICAL PROPERTIES:

PHYSICAL FORM.....: Liquid
COLOR.....: Colorless to yellowish
ODOR.....: Very slight odor
MOLECULAR WEIGHT.....: Approx. 270 for PBTC
pH .....: (10 % solution) Approx. 1.1 @ 68 F (20 C)
BOILING POINT.....: (Initial): 212 F (100 C)
MELTING/FREEZING POINT....: Approx. 5 F (-15 C)
VISCOSITY.....: (Dynamic): 15 to 25 mPas @ 68 F (20 C)
SOLUBILITY IN WATER .....: Miscible
SPECIFIC GRAVITY .....: 1.27 to 1.30 @ 68 F (20 C)
BULK DENSITY.....: Not Established
% VOLATILE BY VOLUME.....: 50 to 55 %
VAPOR PRESSURE .....: 19.6 mbar @ 68 F (20 C);
107 mbar @ 122 F (50 C)

10. STABILITY AND REACTIVITY:

STABILITY.....: Under normal conditions of use and storage, the product is stable.
HAZARDOUS POLYMERIZATION...: Will not occur.
INCOMPATIBILITIES.....: Steel, bases, sodium hypochlorite solution and strong alkalis (vigorous reaction which generates heat due to neutralization process). Bayhibit AM may be added safely to dilute alkali solutions under controlled conditions, i.e. adding slowly with constant mixing.
INSTABILITY CONDITIONS.....: (see INCOMPATIBLE MATERIALS).
DECOMPOSITION TEMPERATURE..: No decomposition below 212 F (100 C).
DECOMPOSITION PRODUCTS.....: Thermal decomposition may emit phosphoric acid, carbon monoxide, carbon dioxide and other unidentified by-products.

11. TOXICOLOGICAL INFORMATION:

ACUTE TOXICITY
ORAL LD50.....: Greater than 6,500 mg/kg (Rat). (1)
INHALATION LC50....: Aerosol concentrations of up to 3,000 mg/m3 were tolerated without development of symptoms. (2)
EYE EFFECTS.....: Moderately irritating to rabbit eyes. (1)
SKIN EFFECTS.....: Non-irritating to rabbit skin (24 hrs.). (1)
SUBCHRONIC TOXICITY...: Feeding experiment/test over a three month period: In tests, doses of up to 6,800 mg/kg were tolerated without any adverse effect. (2)

Continued on next page

11. TOXICOLOGICAL INFORMATION (Continued)

CHRONIC TOXICITY.....: Data not established for product.
MUTAGENICITY.....: Salmonella/microsome test (Ames test): No evidence of mutagenic effects. (2)
REPRODUCTION.....: Pregnant rats were administered doses of up to 1,000 mg/kg body weight; no evidence of possible embryotoxicity or teratogenicity were found. (2)

(1) Tests at the Institute for Toxicology of Bayer AG.
(2) Tests performed with Bayhibit S (sodium salts): Data recalculated to correspond with Bayhibit AM.

12. ECOLOGICAL INFORMATION:

AQUATIC TOXICITY.....: ACUTE BACTERIA TOXICITY: No harmful effects to Escherichia coli at 105,000 mg/l, 24 hrs. and Pseudomonas fluorescens at 105,000 mg/l, 24 hrs. (3); DAPHNIA TOXICITY: No harmful effects to daphnia magna Strauss at 300 mg/l, 24 hrs. (3); FISH TOXICITY: Rainbow trout (Salmo gairdneri) LCo = 5,300 mg/l, 48 hrs. (3); OTHER AQUATIC TOXICITY: No harmful effect to Scenedesmus quadricauda (green algae) at 1,300 mg/l, 24 hrs. (3); BIOLOGICAL DEGRADATION: 17 % after 28 days (Zahn-Wellens Test) (3) NOTE: Based on experience to date, no interference to biological purification installations if product is used appropriately. (4)

(3) Tests performed with neutralized solution - results recalculated for Bayhibit AM.
(4) Tests carried out in the biological laboratories of the Environmental Protection Department of Bayer AG.

13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD.....: May incinerate or dispose of in closed containers at suitable deposit site if in accordance with federal, state and local environmental control regulations. Empty packing materials should be disposed of at authorized incineration installations in accordance with applicable regulations.

14. TRANSPORTATION INFORMATION:

TECHNICAL SHIPPING NAME.....: 2-phosphono-1,2,4-butanetricarboxylic acid in water
FREIGHT CLASS BULK.....: Cleaning or Washing Compounds, NOI, Liquid
FREIGHT CLASS PACKAGE.....: Cleaning or Washing Compounds, NOI, Liquid

Continued on next page

14. TRANSPORTATION INFORMATION (Continued)

PRODUCT LABEL.....: Bayhibit AM Inhibitor

DOT (DOMESTIC SURFACE)

PROPER SHIPPING NAME.....: Corrosive Liquid, Acidic, Organic, N.O.S.
HAZARD CLASS OR DIVISION .....: 8
UN/NA NUMBER.....: UN3265
PACKING GROUP .....: III
DOT PRODUCT RQ lbs (kgs).....: None
HAZARD LABEL(s).....: Corrosive
HAZARD PLACARD(s).....: Corrosive

IMO / IMDG CODE (OCEAN)

PROPER SHIPPING NAME.....: Corrosive Liquid, Acidic, Organic, N.O.S.
HAZARD CLASS DIVISION NUMBER...: 8
UN NUMBER.....: UN3265
PACKAGING GROUP.....: III
HAZARD LABEL(s).....: Corrosive
HAZARD PLACARD(s).....: Corrosive

ICAO / IATA (AIR)

PROPER SHIPPING NAME.....: Corrosive Liquid, Acidic, Organic, N.O.S.
HAZARD CLASS DIVISION NUMBER...: 8
UN NUMBER.....: UN3265
SUBSIDIARY RISK.....: None
PACKING GROUP.....: III
HAZARD LABEL(s).....: Corrosive
RADIOACTIVE?.....: Non-Radioactive
PASSENGER AIR - MAX. QTY. .....: 5 L
PASSENGER PACKING INSTRUCTION..: 818
CARGO AIR - MAX. QTY. .....: 60 L
CARGO AIR PACKING INSTRUCTION..: 820

15. REGULATORY INFORMATION:

OSHA STATUS.....: This product is hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29 CFR 1910.1200.
TSCA STATUS.....: On TSCA Inventory
CERCLA REPORTABLE QUANTITY..: None.
SARA TITLE III:
SECTION 302 EXTREMELY
HAZARDOUS SUBSTANCES..: None.

Continued on next page

15. REGULATORY INFORMATION (Continued)

SECTION 311/312
HAZARD CATEGORIES.....: Immediate Health Hazard
SECTION 313
TOXIC CHEMICALS.....: None.
RCRA STATUS.....: When discarded in its purchased form, this product meets the criteria of corrosivity, and should be managed as a hazardous waste (EPA Hazardous Waste Number D002). (40 CFR 261.20-24) - pH is less than 2.

The following chemicals are specifically listed by individual states; other product specific health and safety data in other sections of the MSDS may also be applicable for state requirements. For details on your regulatory requirements you should contact the appropriate agency in your state.

COMPONENT NAME /CAS NUMBER	CONCENTRATION	STATE CODE
2-phosphono-1,2,4-butanetricarboxylic acid 37971-36-1	Approx. 50 %	PA3, NJ4
Water 7732-18-5	Approx. 50 %	PA3, NJ4
Cadmium 7440-43-9	< 0.02 ppm* (1)	CA
Lead 7439-92-1	< 0.02 ppm* (1)	CA
Mercury 7439-97-6	< 0.001 ppm* (1)	CA
Nickel 7440-02-0	0.2 ppm*	CA

CA = California Proposition 65
NJ4 = New Jersey Other - included in 5 predominant ingredients > 1%
PA3 = Pennsylvania Non-hazardous present at 3% or greater.

MASSACHUSETTS SUBSTANCE LIST (MSL)
Hazardous Substances and Extraordinarily Hazardous Substances on the MSL must be identified when present in products. To the best of our knowledge, this product contains no substances at a level which could require reporting under the statute.

* Please note that these were random sample analyses and content may vary from batch to batch.
(1) Value indicated is the detection limit.

Continued on next page

16. OTHER INFORMATION:

HMIS RATINGS:	Health	Flammability	Reactivity
	1	1	0

0=Minimal 1=Slight 2=Moderate 3=Serious 4=Severe

Bayer's method of hazard communication is comprised of Product Labels and Material Safety Data Sheets. HMIS ratings are provided by Bayer as a customer service.

REASON FOR ISSUE.....: Revise Emergency Overview Section
PREPARED BY.....: Ann M. Colo
APPROVED BY.....: J. M. Mostowy
APPROVAL DATE.....: 11/18/1998
SUPERSEDES DATE.....: 09/30/1996
MSDS NUMBER.....: 01998

This information is furnished without warranty, expressed or implied, except that it is accurate to the best knowledge of Bayer Corporation. The data on this sheet relates only to the specific material designated herein. Bayer Corporation assumes no legal responsibility for use or reliance upon these data.

1) CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : DEPOSITROL PY5206

PRODUCT APPLICATION AREA: WATER-BASED CORROSION INHIBITOR/DEPOSIT CONTROL AGENT.

COMPANY ADDRESS:
BetzDearborn Inc.
4636 Somerton Road, Trevose, Pa. 19053
Information phone number: (215) - 355-3300

EMERGENCY TELEPHONE (HEALTH/ACCIDENT): (800)-877-1940 (USA)

2) 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. This product is subject to the Pennsylvania and New Jersey Worker and Community Right to Know Law.

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 Pennsylvania thresholds for carcinogens.

NON-HAZARDOUS INGREDIENTS:

CAS#	CHEMICAL NAME
7732-18-5	WATER
	TRADE SECRET (N320) TSRN: 125438 - 6148

CONTINUED

3) HAZARDS 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
Emergency Response Guide is not applicable
Odor: Mild; Appearance: Pale 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.

INGESTION EFFECTS:
May cause gastrointestinal irritation with possible nausea, vomiting, abdominal discomfort and diarrhea.

TARGET ORGANS:
No evidence of potential chronic effects.

MEDICAL CONDITIONS AGGRAVATED:
Not known.

SYMPTOMS OF EXPOSURE:
May cause redness or itching of skin.

CONTINUED

4) FIRST AID MEASURES

SKIN CONTACT:
Remove contaminated clothing. Wash exposed area with a large quantity of soap solution or water for 15 minutes.

EYE CONTACT:
Immediately flush eyes with water for 15 minutes. Immediately contact a physician for additional treatment.

INHALATION:
Remove victim from contaminated area to fresh air. Apply appropriate first aid treatment as necessary.

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 3-4 glasses milk or water.

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:
Thermal decomposition (destructive fires) yields elemental oxides.

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:
Alkaline. Do not mix with acidic material.

STORAGE:
Keep containers closed when not in use. Protect from freezing. Do not store at elevated temperatures.

CONTINUED

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 a respirator with dust/mist filters.
SKIN PROTECTION:
neoprene gloves-- Wash off after each use. Replace as necessary.
EYE PROTECTION:
splash proof chemical goggles

9) PHYSICAL AND CHEMICAL PROPERTIES

Specific Grav.(70F,21C)	1.270	Vapor Pressure (mmHG)	~ 18.0
Freeze Point (F)	27	Vapor Density (air=1)	< 1.00
Freeze Point (C)	-3		
Viscosity(cps 70F,21C)	22	% Solubility (water)	100.0

Odor		Mild
Appearance		Pale Yellow
Physical State		Liquid
Flash Point	P-M(CC)	> 200F > 93C
pH As Is (approx.)		13.1
Evaporation Rate (Ether=1)		< 1.00

NA = not applicable ND = not determined

CONTINUED

10) STABILITY AND REACTIVITY

STABILITY:
Stable under normal storage conditions.
HAZARDOUS POLYMERIZATION:
Will not occur.
INCOMPATIBILITIES:
May react with strong oxidizers.
DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.
BETZDEARBORN INTERNAL PUMPOUT/CLEANOUT CATEGORIES:
"B"

11) TOXICOLOGICAL INFORMATION

Oral LD50 RAT:	3,050 mg/kg
28 Day Oral RAT:	1,000 mg/kg/day
NOTE - No clear indications of treatment related toxicity(dose adjusted to 100% active)	
Dermal LD50 RABBIT:	>1,000 mg/kg
NOTE - Estimated value	
Skin Irritation Score RABBIT:	0.3
NOTE - DOT HM181: noncorrosive	
Eye Irritation Score RABBIT:	3.3
NOTE - Maximum score at 48 hrs; completely reversible by day 4	
Non-Ames Mutagenicity MOUSE:	NEGATIVE
NOTE - In Vivo Bone Marrow Micronucleus Assay	

CONTINUED

12) ECOLOGICAL INFORMATION

AQUATIC TOXICOLOGY

Fathead Minnow 96 Hour Static Acute Bioassay

LC50: 1680 mg/L
No Effect Level: 1350 mg/L

Daphnia magna 48 Hour Static Acute Bioassay

LC50: 1635 mg/L
No Effect Level: 870 mg/L

Mysid Shrimp 48 Hour Static Renewal Bioassay

LC50: 9900 mg/L
5% Mortality: 4000 mg/L

Sheepshead Minnow 96 Hour Static Renewal Bioassay

LC50: 28300 mg/L
No Effect Level: 20000 mg/L

BIODEGRADATION

COD (mg/gm):	130
TOC (mg/gm):	70
BOD-5 (mg/gm):	9
BOD-28 (mg/gm):	9

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

DOT HAZARD:	Not Applicable
UN / NA NUMBER:	Not applicable
DOT EMERGENCY RESPONSE GUIDE #:	Not applicable

CONTINUED

5) REGULATORY INFORMATION

TSCA:
All components of this product are listed in the TSCA inventory.
CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):
No regulated constituent present at OSHA thresholds
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

ALIFORNIA REGULATORY INFORMATION

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65) CHEMICALS PRESENT:

No regulated constituent present at OSHA thresholds

MICHIGAN REGULATORY INFORMATION

No regulated constituent present at OSHA thresholds

6) OTHER INFORMATION

NFPA/HMIS	CODE TRANSLATION	
Health	1	Slight Hazard
Fire	1	Slight 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.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
MSDS status:	21-MAY-1997		** NEW **
	08-MAR-1999	12	21-MAY-1997

JAMM 32.135

Material Safety Data Sheet

EMERGENCY

FOR CHEMICAL EMERGENCY: SPILL, LEAK, FIRE, EXPOSURE OR ACCIDENT CALL
CHEMTREC - DAY or NIGHT - (800) 424-9300

Product Name: **AB AQUASHADE OA**

SECTION I - GENERAL INFORMATION

Manufacturer's Name: APPLIED BIOCHEMISTS
W175 N11163 Stonewood Drive
Suite 234
Germantown, WI 53022-4799
(800) 558-5106

Trade Name & Synonyms: AB AQUASHADE OA
Chemical Name & Synonyms: WATER SOLUBLE DYE
Generic Description: ORNAMENTAL APPLICATION DYE
Formula: PROPRIETARY
D.O.T, Proper Shipping Name: NOT REGULATED
U.N. or N.A. Identification #: NOT REGULATED
D.O.T. Hazard Class: NON-HAZARDOUS
D.O.T. Emergency Response Guide: N/A

Hazardous Mat'ls ID System Values (HMIS):	Health - 1	Flammability - 0	Reactivity - 0	Personal Protection - B
Nat'l Fire Protection Assn. (NFPA 704M):	Health - 0	Flammability - 0	Reactivity - 0	Specific Hazard:

SECTION II - HAZARDOUS INGREDIENTS

Hazardous Component(s) *	CAS#	PEL	TLV
Acid Blue 9	3844-45-9	NOT ESTABLISHED	NOT ESTABLISHED

* Ingredients listed in this section have been determined to be hazardous as defined in 29 CFR 1910.1200. Materials determined to be health hazards are listed if they comprise 1% or more of the composition. Materials identified as carcinogens are listed if they comprise 0.1% or more of the composition. Information on proprietary materials is available as provided in 29 CFR 1910.1200 (i) (1).

SECTION III - PHYSICAL DATA

Boiling Point (F):	212°F (100°C)	Specific Gravity (water = 1):	1.0-1.1
Vapor Pressure (mm Hg):	NOT DETERMINED	% Volatile (by Volume):	NOT DETERMINED
Vapor Density (air = 1):	>1	Evaporation Rate: (Water = 1)	<1
Melting Point (F):	32 °F	pH	6.0-7.0
Solubility in Water:	COMPLETE		
Appearance & Odor:	DEEP BLUE LIQUID, WITH NO NOTICEABLE ODOR		

SECTION IV - FIRE & EXPLOSION DATA

Flash Point (F): NON-FLAMMABLE Method:
Extinguishing Media: WATER, FOAM, CO_2
Special Fire Fighting Procedures: COOL AREA TO PREVENT PRODUCT CONTAINERS FROM BURSTING OR MELTING.
Unusual Fire & Explosion Hazards: FIRE FIGHTERS SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS.

SECTION V - REACTIVITY DATA

Stability - _____Unstable __X__Stable
Conditions to Avoid: NONE KNOWN
Incompatibility (Materials to Avoid): UNKNOWN
Hazardous Decomposition Products:
Hazardous Polymerization: _____Will Occur __X__Will Not Occur
Conditions to Avoid: NONE

SECTION VI - HEALTH HAZARD DATA

Acute Health Hazards: NONE KNOWN
Chronic Health Hazards: NONE KNOWN
Signs & Symptoms of Exposure: MAY CAUSE SLIGHT EYE IRRITATION AND REDNESS. MAY CAUSE SLIGHT SKIN IRRITATION. INHALATION MAY CAUSE SLIGHT NAUSEA. INGESTION MAY RESULT IN GASTRIC DISTURBANCES.
Medical Conditions Generally Aggravated by Exposure: NONE KNOWN

Chemical Listed as Carcinogen or Potential Carcinogen by:

National Toxicology Program:	Yes:	No:	✓
I.A.R.C. Monographs:***	Yes:	No:	✓
O.S.H.A.	Yes:	No:	✓

Emergency & First Aid Procedures: FOR PRINCIPLE ROUTE OF ENTRY, SEE APPROPRIATE EMERGENCY PROCEDURES BELOW.
NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON.

Inhalation: REMOVE TO FRESH AIR.

Eyes: FLUSH IMMEDIATELY WITH LARGE VOLUMES OF WATER FOR AT LEAST 15 MINUTES. CALL A DOCTOR.

Skin: WASH AREAS THOROUGHLY WITH SOAP & WATER.

Ingestion: INDUCE VOMITING, CALL A PHYSICIAN.

SECTION VII - SPILL OR LEAK PROCEDURES

Steps to be Taken in Case Material is Released or Spilled:
SOAK UP AND REMOVE TO AN APPROVE DISPOSAL CONTAINER. WASH AREA WITH SOAP AND WATER. CARE SHOULD BE TAKEN IN HANDLING PRODUCT AS IT CAN STAIN.

Waste Disposal Methods: DISPOSE OF IN ACCORDANCE WITH ALL STATE, LOCAL AND FEDERAL REGULATIONS.

SECTION VIII - SPECIAL PROTECTION AND CONTROL MEASURES

Respiratory Protection (Specify Type):

Ventilation - Local Exhaust:: MECHANICAL Special Exhaust: NONE
Mechanical Exhaust: NOT REQUIRED Other Exhaust::NONE

Protective Equipment - Gloves: RUBBER OR PLASTIC Eye Protection: GOGGLES

Other Protective Equipment: NONE

Work or Hygienic Practices: USE SAFE CHEMICAL HANDLING PROCEDURES SUITABLE FOR THE HAZARDS PRESENTED BY THIS MATERIAL.

SECTION IX - SPECIAL PRECAUTIONS

Precautions to be Taken in Handling and Storage:
KEEP AWAY FROM INTENSE HEAT AND OPEN FLAME.

Other Precautions: **KEEP OUT OF REACH OF CHILDREN**

THESE DATA ARE OFFERED IN GOOD FAITH AS TYPICAL VALUES AND NOT AS A PRODUCT SPECIFICATION. NO WARRANTY, EITHER EXPRESSED OR IMPLIED, IS HEREBY MADE. THE RECOMMENDED INDUSTRIAL HYGIENE AND SAFE HANDLING PROCEDURES ARE BELIEVED TO BE GENERALLY APPLICABLE. HOWEVER, EACH USER SHOULD REVIEW THESE RECOMMENDATIONS IN THE SPECIFIC CONTEXT OF THE INTENDED USE AND DETERMINE WHETHER THEY ARE APPROPRIATE.
DJK
Date of Last Revision: 5/29/98

SAMM A-10.29

MATERIAL SAFETY DATA SHEET

BBJ Environmental Solutions, Inc.
6802 Citicorp Blvd., Suite 500
Tampa, FL 33619
800-889-2251

I. PRODUCT IDENTIFICATION

PRODUCT NAME	PRODUCT CLASS
Power Coil Clean™	Industrial Cleaner

II. INGREDIENTS

INGREDIENT	% BY WT.	CAS REG. NO.
Ammonium Biflouride Balance-Trade Secret (non hazardous)	<4.00	1341-49-7

III. PHYSICAL DATA

BOILING POINT 212°F	SPECIFIC GRAVITY 1.00 – 1.10 at 25°C
FREEZING POINT 0°F	VAPOR PRESSURE (mm Hg) = 17.5
VAPOR DENSITY Not known	APPEARANCE Clear
PH@ 25°C 4.9 – 5.2	SOLUBILITY IN WATER BY WT. Complete
EVAPORATION RATE Not known	ODOR Mild

IV. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Not Combustible	FLAMMABLE LIMITS N/A
EXTINGUISHING MEDIA Water, water fog	SPECIAL FIRE HAZARDS None.

V. REACTIVITY DATA

STABLE [✔] UNSTABLE [ ]	HAZARDOUS POLYMERIZATION MAY OCCUR [ ] HAZARDOUS POLYMERIZATION WILL NOT OCCUR [✔]
INCOMPATIBILITY None known	
HAZARDOUS DECOMPOSITION PRODUCTS None expected	
CONDITIONS TO AVOID Do not use with any other cleaning agent or household chemicals, including ammonia, acids, alkalis, bleaches, or chlorine cleaners	

VI. SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	Flood with water
DISPOSAL METHOD	Flush into sewer or absorb and landfill (non hazardous)

VII. HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE	Oral > 1.9 grams per Kg of body weight
EFFECTS OF OVEREXPOSURE	Will irritate eyes. Will dry skin if frequent or prolonged contact
EYE	Flush with water for 15 minutes. Call a physician, if irritation persists.
SKIN	Rinse off with water following contact
INHALATION	N/A
INGESTION	Drink large quantities of water. Call a physician, if irritation persists.

VIII. PROTECTIVE EQUIPMENT

VENTILATION	Use with adequate ventilation
RESPIRATORY PROTECTION	None required
PROTECTIVE CLOTHING	Protective gloves (plastic or rubber) when exposure will be frequent or prolonged
EYE PROTECTION	Safety glasses where splash danger exists

IX. OTHER SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE	Keep from freezing
SPECIAL COMMENTS	None

PREPARED BY Herman Scriven II DATE August 18, 2000

MATERIAL SAFETY DATA SHEET- **COIL-RITE™**

MSDS1050
Ver. No.2
Ver. Date September 8, 1999

C-10.384.

SECTION 1 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Coil-Rite™
PRODUCT CODES: 82612, 82614, 82618
CHEMICAL FAMILY: Inorganic/Organic
USE: Coil Cleaner
MANUFACTURE / SUPPLIER
RectorSeal
2601 Spenwick
Houston, Texas 77055 USA

EMERGENCY TELEPHONE NUMBERS:
Chemtrec 24 hours: (800) 424-9300
RectorSeal: (713) 263-8001

NON EMERGENCY TELEPHONE NUMBERS:
Technical Service: (800) 231-3345

SECTION 2 COMPOSITION / INFORMATION ON INGREDIENTS

HAZARDOUS COMPONENTS	CAS NO.	APPROX %	OSHA PEL	ACGIH TLV	OTHER LIMITS	HMIS	NFPA
Glycol Ether EB	111-76-2	1-5	25 ppm	25 ppm	N/A	N/D	H2,F2,R0

SECTION 3 HAZARDS IDENTIFICATION

SUMMARY OF ACUTE HAZARDS Irritation to eyes, nose, and throat; drowsiness, narcosis, tremors, and other CNS effects at high concentrations. Skin irritation, dermatitis, and defatting.

ROUTE OF EXPOSURE	SIGNS AND SYMPTOMS	PRIMARY ROUTE(S)
INHALATION:	Nasal and respiratory irritation, dizziness, narcosis, headache, nausea, CNS depression, and unconsciousness.	Yes
EYE CONTACT:	Watering, blurred vision, inflammation, and irritation which can result in corneal injury.	Yes
SKIN CONTACT:	Irritation, dermatitis.	Yes
INGESTION:	Nausea, vomiting; CNS depression; irritation of gastrointestinal tract, liver and peritoneal wall; lung congestion.	No

SUMMARY OF CHRONIC HAZARDS: Skin irritation, dermatitis, and defatting. Possible liver and kidney damage.
MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: Individuals with pre-existing or chronic diseases of the eyes, skin, respiratory system, cardiovascular system, gastrointestinal system, liver, or kidneys may have increased susceptibility to excessive exposure.

SECTION 4 FIRST AID MEASURES

INHALATION: If overcome by exposure, remove victim to fresh air immediately. Give oxygen or artificial respiration as needed. Obtain emergency medical attention. Prompt action is essential.
EYE CONTACT: Immediately flush with large amounts of water for at least 15 minutes. Get prompt medical attention.
SKIN CONTACT: Wash with soap and water. Remove contaminated clothing.
INGESTION: Give large amounts of water, DO NOT induce vomiting. Keep at rest. Get prompt medical attention.

SECTION 5 FIRE FIGHTING MEASURES

FLASH POINT: None **FLAMMABILITY LIMITS:** LEL: N/D UEL: N/D
EXTINGUISHING MEDIA: Use agents suitable for surrounding fires.
SPECIAL FIRE FIGHTING PROCEDURES: Wear self-contained full face piece breathing apparatus and full body protective clothing. Hazardous decomposition products possible (see Section 10). Evacuate area. Dike area as run-off may create additional environmental contamination.
UNUSUAL FIRE AND EXPLOSION HAZARDS: Material will not sustain combustion.

SECTION 6 ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Remove all sources of ignition. Use absorbent materials to prevent footing hazard and to contain. Ventilate area with natural or explosion-proof, forced air ventilation. Avoid flushing into sewers, drains, waterways, and soil. Wear protective clothing and respiratory protection during cleanup. Also, if product is subject to CERCLA reporting (see Section 15) notify the National Response Center.

SECTION 7 STORAGE AND HANDLING

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Keep container closed and upright when not in use. Do not store near heat, sparks, or open flames. If transferring this material to other containers, ground all containers to avoid static electricity buildup and discharge which may ignite flammable vapors.
OTHER PRECAUTIONS: Avoid prolonged or repeated contact with skin or clothing. Empty containers may contain residues and vapors; treat as if full and observe all products precautions. Do not reuse empty containers. KEEP OUT OF REACH OF CHILDREN.

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

RESPIRATORY PROTECTION (SPECIFY TYPE): In confined, poorly ventilated areas, use NIOSH/MSHA approved air purifying or supplied air respirators.
VENTILATION – LOCAL EXHAUST: Acceptable
MECHANICAL (GENERAL): Preferable
Special: N/A
OTHER: N/A
PROTECTIVE GLOVES: Wear non-permeable gloves.
EYE PROTECTION: Chemical splash goggles (ANSI Z-87.1 or equivalent)
OTHER PROTECTIVE CLOTHING OR EQUIPMENT: Coveralls recommended.
WORK/HYGIENIC PRACTICES: Where use can result in skin contact, wash exposed areas thoroughly before eating, drinking, smoking, or leaving work area. Launder contaminated clothing before reuse.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT: 212°F (100°C) @ 760mm Hg
VAPOR PRESSURE (mm Hg): 17 @ 68°F (20°C)
VAPOR DENSITY (AIR = 1): N/A
SOLUBILITY IN WATER: Soluble
SPECIFIC GRAVITY (H_2O = 1): 0.99
MELTING POINT: N/A
EVAPORATION RATE (ETHYL ACETATE = 1): < 1
APPEARANCE/ODOR: Green Liquid

SECTION 10 STABILITY AND REACTIVITY

STABILITY: Stable
CONDITIONS TO AVOID: Heat, sparks, open flames, and strong oxidizers.
INCOMPATIBILITY (MATERIALS TO AVOID): Oxidizers, acids and bases.
HAZARDOUS DECOMPOSITION PRODUCTS: CO, CO_2, and fragmented hydrocarbons.
HAZARDOUS POLYMERIZATION: Will not occur.

SECTION 11 TOXICOLOGY INFORMATION

CARCINOGENICITY: NTP: No IARC MONOGRAPHS: No OSHA REGULATED: No

SUBSTANCE	CAS NO.	LD50	LC50
Glycol Ether EB	111-76-2	Oral-Rat LD50:470 mg/kg	Inhalation-Rat TCLo:200 ppm/6H

SECTION 12 ECOLOGICAL INFORMATION

SUBSTANCE	FOOD CHAIN CON POTENTIAL	WATERFOWL TOXICITY	BOD	AQUATIC TOXICITY
Glycol Ether EB	None	N/A	26%	1000 ppm/24 hr/brine shrimp/TLm

SECTION 13 DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD: Dispose of absorbed materials and liquid waste in accordance with all local, state and federal regulations.

SECTION 14 TRANSPORTATION INFORMATION

DOT: Non-Regulated
OCEAN (IMDG): Non-Regulated
AIR (IATA): Non-Regulated
WHMIS (CANADA): Non-Regulated

SECTION 15 REGULATORY INFORMATION

SUBSTANCE	SARA 313	TSCA INVENTORY	CERCLA RQ	RCRA CODE
Glycol Ether EB	Yes	Yes	N/A	N/A

SECTION 16 OTHER INFORMATION

This document is prepared pursuant to the OSHA Hazardous Communication Standard (29 CFR 1910.1200). The information herein is given in good faith, but no warranty, express or implied is made. Consult RectorSeal for further information: (713) 263-8001.

ACTI-KLEAN (revised July 2004)

Material Safety Data Sheet

SECTION I - COMPANY IDENTIFICATION

PRODUCT: ACTI-KLEAN

CAT. NO.: AK-1, AK-5, AK-55

MANUFACTURED BY:
Virginia KMP Corporation
4100 Platinum Way
Dallas, Texas 75237

TELEPHONE NUMBERS:
Office: 1-(214) 330-7731
Emergency Only: 1-(800) 424-9300

SECTION II - HAZARDOUS INGREDIENTS

OSHA Hazardous Components (29 CFR 1910.1200)	EXPOSURE LIMITS: 8 HR. TWA OSHA PEL	ACGIH TLV
Ethylene gylcol monobutyl ether (CAS# 111-76-2)	25 ppm (skin)	25 ppm (skin)
Dodecylbenzene sulfonic acid (CAS# 27176-87-0)	NE	NE

SECTION III - HAZARDS IDENTIFICATIONS

EMERGENCY OVERVIEW: WARNING! Eye and skin irritant. Harmful if swallowed or inhaled.
POTENTIAL HEALTH EFFECTS:
- **INHALATION:** Inhalation of vapors in high concentration may cause headache, nausea, vomiting.
- **EYE CONTACT:** Irritation develops immediately on contact.
- **SKIN CONTACT:** Irritation develops on contact.
- **INGESTION:** Harmful if swallowed. May cause headache, nausea, vomiting.
- **CHRONIC Effects:** Not established.
- **NOTE:**
- **CARCINOGENICITY:** LISTED IN NTP? No IARC? No OSHA Regulated? No

SECTION IV - FIRST AID MEASURES

INHALATION: Remove victim to fresh air and, if needed, immediately begin artificial respiration. Give oxygen if breathing is labored. Get emergency medical help. Contact a physician immediately.
EYE CONTACT: Flush eyes with water for 15 minutes. Get medical attention if symptoms develop and persist.
SKIN CONTACT: Flush with water or soap and water for 15 minutes or until all traces have been removed. Seek medical attention if symptoms develop and persist.
INGESTION: Do not induce vomiting. Rinse mouth out with water. Get immediate medical attention.

SECTION V - FIRE FIGHTING MEASURES

FLASHPOINT (TEST METHOD): Not flammable - aqueous solution.
FLAMMABLE LIMITS: NA **LOWER:** NA **UPPER:** NA
AUTOIGNITION TEMPERATURE: NE
GENERAL HAZARD:
FIRE FIGHTING INSTRUCTIONS: Approach fire from upwind side. Avoid breathing smoke, fumes, mist, or vapors on the downwind side. Firefighters wear protective clothing and self-contained breathing apparatus.
EXTINGUISHING MEDIA: Dry powder, carbon dioxide (CO_2), water fog or spray.
HAZARDOUS COMBUSTION PRODUCTS: Acrid smoke, irritating and toxic fumes of SO_x, H_2S, PO_x.

SECTION VI - ACCIDENTAL RELEASE MEASURES

LAND SPILL: SMALL SPILLS: Flush to sewer with large amounts of water. 10 parts water to 1 part product.
LARGE SPILLS: Pick up with absorbent media, place in non-leaking containers for proper disposal or reuse.
WATER SPILL: Notify proper authorities. Clean up leaks/spills immediately to prevent soil or water contamination.

SECTION VII - HANDLING AND STORAGE

HANDLING: Avoid contact with skin, eyes, and clothing. After handling this product, wash hands before eating, drinking, or smoking. If contact occurs, remove contaminated clothing. If needed, take first aid action shown in section IV. Launder contaminated clothing before reuse.
STORAGE: Store away from food stuffs.

SECTION VIII - EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: Local exhaust ventilation.
PERSONAL PROTECTION: Respiratory protection not normally needed under normal conditions of use. Use rubber or latex gloves, chemical goggles or full face shields. Use boots, aprons, drench showers, eye wash as needed for protection against spills and/or splashes.

SECTION IX - PHYSICAL AND CHEMICAL PROPERTIES

VAPOR PRESSURE: ND
SPECIFIC GRAVITY (H_2O=1): 1.02
SOLUBILITY IN WATER: Complete
pH: 11-12
BOILING POINT: 212 F
APPEARANCE & ODOR: Green liquid.

VAPOR DENSITY (Air=1): ND
EVAPORATION RATE (BuAc=1): <1
VOC (G/L):
FREEZING POINT: ND

SECTION X - STABILITY AND REACTIVITY

STABILITY: Stable.
CONDITIONS TO AVOID: High temperatures.
MATERIALS TO AVOID: Oxidizers.
HAZARDOUS DECOMPOSITION PRODUCTS: SO_x, H_2S, PO_x and from combustion - smoke and toxic fumes.
HAZARDOUS POLYMERIZATION: Will not occur.

SECTION XI - TOXICOLOGICAL INFORMATION

Ethylene Glycolmonobutylether		TDLo:		
		600 mg/kg	(oral - wmn)	
	TCLo:	195 ppm/8hr	(inh - human)	GIT
	TCLo:	100 ppm	(inh - human)	NOSE, EYE, CNS
	LD50:	470 mg/kg	(oral - rat)	
	LC50:	2900 mg/m^3	(inh - rat)	
Dodecyl benzene sulfonic acid	LD50:	50-500 mg/kg	(oral - mouse)	

SECTION XII - ECOLOGICAL INFORMATION

Harmful to aquatic life in very low concentrations.

Ethylene Glycolmonobutylether	1000 ppm / 24 hr / brine shrimp / TLm
Dodecyl benzene sulfonic acid	5 - 15 ppm / guppy / lethal conc.

SECTION XIII - DISPOSAL CONSIDERATIONS

Dispose as hazardous waste. Classification and documentation is required before disposal. Follow all local, state and federal regulations.

SECTION XIV - TRANSPORTATION INFORMATION

PROPER SHIPPING NAME: Non-regulated material, liquid
HAZARD CLASS:
IDENTIFICATION NUMBER:
DOT Emergency Guide #:
Reportable Quantity (RQ):
International: Non-regulated material, liquid

SECTION XV - REGULATORY INFORMATION

TSCA (Toxic Substance Control Act): Components of this product are listed on the TSCA Inventory.
CERCLA (Comprehensive Environmental Response, Compensation and Liability Act):
Reportable quantity is 1000 lbs. (dodecyl benzene sulfonic acid). Contact local authorities for other reporting requirements.
SARA TITLE III (Superfund Amendments and Reauthorization Act): Not listed.
CALIFORNIA PROPOSITION 65: Not listed.

SECTION XVI - OTHER INFORMATION

State Right-to-Know Programs: MA, NJ, PA
NFPA Ratings
- Health: 1
- Flammability: 0
- Reactivity: 0

HMIS Protective Equipment: X See your supervisor

Prepared by: Virginia KMP Corporation

J.D. # E-10-11
Ident. L47
1 of 2

Material Safety Data Sheet

May be used to comply with OSHA's Hazard Communication Standard, 29 CFR 1910.1200. Standard must be consulted for specific requirements.

U.S. Department of Labor
Occupational Safety and Health Administration
(Non-Mandatory Form)
Form Approved
OMB No. 1218-0072

IDENTITY (As Used on Label and List)
BY*PAS 1500 SERIES

Note: Blank spaces are not permitted. If any item is not applicable, or no information is available, the space must be marked to indicate that.

Section I

Manufacturer's Name BY*PAS INTERNATIONAL CORPORATION	Emergency Telephone Number 616-875-7234
Address (Number, Street, City, State, and ZIP Code) P.O. BOX 14	Telephone Number for Information 616-875-7234
HUDSONVILLE, MI 49426	Date Prepared 1-4-89
	Signature of Preparer (optional)

Section II — Hazardous Ingredients/Identity Information

Hazardous Components (Specific Chemical Identity; Common Name(s))	OSHA PEL	ACGIH TLV	Other Limits Recommended	% (optional)
ABOVE				

Section III — Physical/Chemical Characteristics

Boiling Point 212-F	98-C	Specific Gravity (H_2O = 1)	1.080
Vapor Pressure (mm Hg.)	100 C	Melting Point	N/A
Vapor Density (AIR = 1)	UNDET.	Evaporation Rate (Butyl Acetate = 1)	N/A

Solubility in Water
100%

Appearance and Odor
AQUA BLUE WITH MILD ODOR

Section IV — Fire and Explosion Hazard Data

Flash Point (Method Used) NONE	Flammable Limits	LEL N/A	UEL N/A

Extinguishing Media
N/A

Special Fire Fighting Procedures
N/A

Unusual Fire and Explosion Hazards
N/A

(Reproduce locally) OSHA 174, Sept. 1985

Ident. 647
2 of 2

Section V — Reactivity Data

Stability	Unstable		Conditions to Avoid IRRITATING TO EYES
	Stable	X	DRYING TO SKIN

Incompatibility (Materials to Avoid) STRONG ACIDS AND STRONG OXIDIZING AGENTS

Hazardous Decomposition or Byproducts NONE KNOWN

Hazardous Polymerization	May Occur		Conditions to Avoid N/A
	Will Not Occur	X	

Section VI — Health Hazard Data

Route(s) of Entry: Inhalation? NO Skin? POSSIBLE Ingestion? UNLIKELY

Health Hazards (Acute and Chronic)

Carcinogenicity: NONE NTP? NO IARC Monographs? NO OSHA Regulated? NO

Signs and Symptoms of Exposure MAY CAUSE REDNESS OF SKIN FOR SENSITIVE INDIVIDUALS

Medical Conditions Generally Aggravated by Exposure NONE KNOWN

Emergency and First Aid Procedures ON SKIN, WASH THROUGHLY WITH WATER, IN EYES, FLUSH WITH WAYER

IF SWALLOWED, DO NOT INDUCE VOMITING, GIVE LARGE AMOUNTS OF WATER, SEEK MEDICAL ATTENTION

Section VII — Precautions for Safe Handling and Use

Steps to Be Taken in Case Material is Released or Spilled

FLUSH THROUGH NORMAL SANITARY SEWER SYSTEM WITH LARGE AMOUNTS OF WATER

Waste Disposal Method SAME AS ABOVE. FOLLOW FEDERAL, STATE AND LOCAL LAWS

Precautions to Be Taken in Handling and Storing KEEP FROM FREEZING

STORE BETWEEN 35 AND 100 f

Other Precautions NONE

Section VIII — Control Measures

Respiratory Protection (Specify Type) NOT REQUIRED WHEN USED AS DIRECTED

Ventilation	Local Exhaust X	Special
	Mechanical (General)	Other

Protective Gloves RUBBER	Eye Protection SAFETY GLASSES

Other Protective Clothing or Equipment NOT REQUIRED

Work/Hygienic Practices NOT REQUIRED

MATERIAL SAFETY DATA SHEET SAMM E-10.35

ORGANIC ORANGE

SECTION I - IDENTIFICATION

COMPANY NAME..... O'Neill Industries, Inc.
5101 Comly St.
Phila., Pa. 19135
PHONE NUMBER..... (215) 333-5700
EMERGENCY PHONE NUMBER... 800-255-3924
EFFECTIVE DATE..... 9-1-02
REVISED DATE..... 9-1-02
CHEMICAL NAME..... Orange Distillate
TRADE NAME..... ORGANIC ORANGE

SECTION II - INGREDIENTS

COMPONENTS	PERCENT	TLV (Units)	PROD. CAS #
1,8(9)-p-Methadiene	>95%	Not established	5989-27-5
Nonylphenoxy-polyethoxyethanol	<5%	Not established	26027-38-3

SECTION III - PHYSICAL DATA

BOILING Point(F)..... 175.5° C
SOLUBILITY IN H20..... Emulsifiable
APPEARANCE/ODOR..... Clear colorless liquid, citrus odor
SPECIFIC GRAVITY (H20=1). .85
PH.....

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT..... 115° F Closed Cup
EXTINGUISH MEDIA..... Use foam, dry chemical, or ~~CO2~~
FOR FIRE..... Minimize breathing vapor or fumes. Cool fire exposed containers. Do not enter confined fire-spaces without proper protective clothing, including self contained air supply.
UNUSUAL FIRE HAZARD..... Burning liberates carbon monoxide, carbon dioxide and smoke.

SECTION V - HEALTH HAZARD DATA

OVER EXPOSURE EFFECTS.... Liquid may be irritating to eyes and skin. Vapor is irritating to throat and lungs.
FIRST AID PROCEDURES..... EYES; Immediately flush eyes with water for at least 15 minutes. Seek medical attention immediately. SKIN: Wash with water. If irritation develops or persists seek medical attention. INHALATION; Remove to fresh air. INGESTION: DO NOT INDUCE VOMITING. Give large quantities of water. Get medical attention immediately.

SECTION VI - REACTIVITY DATA

CHEMICAL STABILITY..... Stable

Post-it® Fax Note 7671	Date 1/14	# of pages ▶ 2
To KIM	From LU MARTIN	
Co./Dept. PPL	Co. O'NEILL INDUST	
Phone #	Phone #	
Fax # 570-542-3461	Fax # 215-535-6007	

MATERIAL SAFETY DATA SHEET

ORGANIC ORANGE

CONDITIONS TO AVOID..... Excessive heat and flames. Avoid strong oxidizing agents.
INCOMPATIBLE MATERIALS... Strong acids, strong oxidizers
DECOMPOSITION PRODUCTS... Carbon dioxide, carbon monoxide
HAZARDOUS POLYMERIZATION. Will not occur
POLYMERIZATION AVOID.....

SECTION VII - SPILL OR LEAK PROCEDURE

FOR SPILL ..... Absorb with inert material and dispose of in accordance with applicable regulations.
WASTE DISPOSAL METHOD.... Dispose of according to all local, state, and federal regulations.

SECTION VIII - SPECIAL PROTECTION

RESPIRATORY PROTECTION... None needed under normal conditions
VENTILATION..... Local
PROTECTIVE GLOVES..... Rubber
EYE PROTECTION..... Chemical goggles
OTHER PROTECTIVE EQUIPMENT.....
HANDLING AND STORAGE..... STORE IN A COOL, DRY, WELL VENTILATED AREA.
KEEP CONTAINER CLOSED WHEN NOT IN USE.
KEEP AWAY FROM HEAT AND FLAMES.
USE WITH ADEQUATE VENTILATION.
KEEP OUT OF REACH OF CHILDREN.
WEAR SAFETY GOGGLES AND RUBBER GLOVES WHEN HANDLING THIS PRODUCT.

SECTION IX - SPECIAL PRECAUTIONS

DOT SHIPPING NAME..... Combustible liquid, n.o.s., NA 1993, PG III
DOT LABEL REQUIRED..... None required
REPORTABLE QUANTITY (RQ). N/A
NA NUMBER..... NA 1993
UN NUMBER..... N/A

COMMENTS The information contained herein is furnished without warranty of any kind. Employers should use this information only as a supplement to other information gathered by them to assure proper use of these materials and the safety and health of employees.

E-10.29

MATERIAL SAFETY DATA SHEET

Penetone® Corporation, 74 Hudson Ave., Tenafly, NJ 07670

CITRIKLEEN®

Date Prepared: July 28, 1994
MSDS No.: 1850-407S

SECTION 1 PRODUCT IDENTIFICATION & EMERGENCY INFORMATION

PRODUCT NAME: CITRIKLEEN
GENERAL USE: Cleaning, degreasing
PRODUCT DESCRIPTION: Solvent emulsion
GENERIC INGREDIENTS: Water, d'limonene, surfactants, coupling agents, alkanolamine

EMERGENCY TELEPHONE NUMBERS: PENETONE 201-567-3000
CHEMTREC 800-424-9300

SECTION 2 HAZARDOUS INGREDIENT SECTION

This product is hazardous as defined in 29 CFR1910.1200.

OSHA HAZARD: FLAMMABLE, CORROSIVE

OSHA HAZARDOUS INGREDIENTS

	CAS#	EXPOSURE LIMITS 8 hrs. TWA (ppm) OSHA PEL	ACGIH TLV	Supplier
D'limonene	5989-27-5	not established	not established	—
Monoethanolamine	141-43-5	3	3	—

SECTION 3 HEALTH INFORMATION & PROTECTION

EMERGENCY OVERVIEW:

Clear amber liquid with citrus odor.
Flammable. Can be corrosive to eyes, skin, and respiratory tract.

POTENTIAL HEALTH EFFECTS:

EYE CONTACT:
May cause irritation or burns to eyes on prolonged contact. High vapor concentrations may be irritating.

SKIN CONTACT:
Frequent or prolonged contact may irritate or dry the skin, cause dermatitis or cause burns. Skin contact may aggravate an existing dermatitis condition.

INHALATION:
High vapor/aerosol concentrations are irritating or may cause burns to the respiratory tract, may cause headaches, dizziness, anesthesia, drowsiness, unconsciousness, and other central nervous system effects.

INGESTION:
Small amounts of this liquid may be drawn into the lungs by either swallowing or vomiting. This may cause severe and delayed health effects such as inflammation of the lungs and infection of the bronchi. Ingestion may cause irritation of or burns to the digestive tract.

CHRONIC:
Inflammation of mucous membranes and respiratory tract may occur upon prolonged breathing of mist. Ingestion of large amounts of d'limonene has caused kidney and liver damage in male rats but not in female rats or mice of both species. Ingestion of large amounts of monoethanolamine has caused kidney and liver damage in laboratory animals.

FIRST AID MEASURES:

EYE CONTACT:
Flush eyes with large amounts of water. See physician immediately.

SKIN CONTACT:
Flush skin with large amounts of water. Remove contaminated clothing and launder before reuse. If skin irritation develops or persists, consult physician.

INHALATION:
Remove person to fresh air. Administer oxygen or artificial respiration as needed. Call a physician immediately.

INGESTION:
If swallowed, give plenty of milk or water. DO NOT INDUCE VOMITING. Use a stomach pump. Call a physician immediately.

WORKPLACE EXPOSURE CONTROLS:

PERSONAL PROTECTION:
Safety glasses are recommended for all workplace conditions. Solvent resistant gloves should be used. Other protective gear, including splash proof goggles or face shield, rubber boots, apron, gauntlets, or rain gear should be worn depending on how the product is used.

VENTILATION:
None needed under normal use conditions. For enclosed areas, or where large amounts of the product are being used, the use of fans or other mechanical ventilation is recommended. An organic vapor mask should be used if the TLV is exceeded and a particle mask if the product is sprayed. DO NOT MIST THIS PRODUCT. Use coarse spray only.

SECTION 4 FIRE & EXPLOSION HAZARDS

FLASH POINT: 125°F PMCC, 165°F COC
FLAMMABLE LIMITS: not determined
AUTOIGNITION TEMPERATURE: not determined

GENERAL HAZARD:
Flammable liquid. Can form flammable mixtures at or above the flash point.
Containers can rupture and explode under fire conditions due to pressure and vapor buildup.

FIRE FIGHTING:
Either allow fire to burn out under controlled conditions or extinguish with water, foam, or dry chemical.
Cool exposed containers with water spray.

HAZARDOUS COMBUSTION PRODUCTS:
Smoke, fumes, and oxides of carbon, nitrogen, and sulfur.

SECTION 5 SPILL CONTROL MEASURES

LAND SPILL:
Eliminate sources of ignition. For small spills, use absorbent material such as towels or absorbent powders. Put all material into proper waste disposal container with lid tightly covered. Solvent soaked materials may spontaneously combust. For larger spills, dike spill, recover free liquid, and use absorbent material to dry area. Rinse area with water. Put all material into appropriate waste containers.

WATER SPILL:

Remove product from water surface by skimming or with suitable absorbents. This product contains surfactants which will cause it to disperse in water. Localized high concentrations of this product may cause fish kills, but no persistent or long term effects will result. Check with local environmental regulatory agencies for reporting requirements.

SECTION 6 HANDLING & STORAGE

STORAGE TEMPERATURE, °F: ambient. DO NOT STORE ABOVE 120 Deg. F. KEEP FROM FREEZING.

GENERAL: Keep away from heat sources, open flames, and other ignition sources. Do not store near strong oxidants.

SECTION 7 TYPICAL PHYSICAL & CHEMICAL PROPERTIES

BOILING POINT, °F:
About 212

EVAPORATION RATE, Acetone = 1:
equal to water

SOLUBILITY IN WATER:
emulsifies

SPECIFIC GRAVITY at 75°F:
0.98

ODOR AND APPEARANCE:
clear amber liquid with citrus odor

VAPOR PRESSURE, mm Hg at 20°C:
equal to water

VAPOR DENSITY (Air = 1):
equal to water

WT% ORGANIC VOLATILES:
about 30

pH:
10.2

SECTION 8 REACTIVITY DATA

GENERAL:

This product is stable and hazardous polymerization will not occur.

INCOMPATIBLE MATERIALS AND CONDITIONS TO AVOID:

Strong oxidizing agents.

SECTION 9 REGULATORY INFORMATION

DEPARTMENT OF TRANSPORTATION (DOT):

PROPER SHIPPING NAME:
FLAMMABLE LIQUID, CORROSIVE, N.O.S.
(contains d'limonene and ethanolamine)

HAZARD CLASS: 3

IDENTIFICATION NUMBER: UN 2924 **PACKING GROUP:** III

LABEL: FLAMMABLE, CORROSIVE

FLASH POINT: 125°F TCC **pH:** 10.2

TSCA: The ingredients in this product are listed on the TSCA inventory.

CERCLA:

This product contains no CERCLA reportable materials. Contact local authorities to determine if there may be other local reporting requirements.

RCRA HAZARD CLASS:

D001 Ignitable hazardous waste
D002 Corrosive hazardous waste

SARA TITLE III:

311/312 HAZARD CATEGORIES:
Acute health, Chronic health, Fire

313 REPORTABLE INGREDIENTS:
Diethylene glycol monobutyl ether CAS# 112-34-5 : <5 wt%

NEW JERSEY RIGHT-TO-KNOW INFORMATION:

This product contains water (CAS# 7732-18-5), d'limonene (CAS# 5989-27-5), monoethanolammonium dodecylbenzene sulfonate (CAS# 26836-07-7), nonylphenol ethoxylate (CAS# 9016-45-9), diethylene glycol monobutyl ether (CAS# 112-34-5), and monoethanolamine (CAS# 141-43-5).

CALIFORNIA PROPOSITION 65 INFORMATION:

This product does not contain any chemicals recognized by the state of California to cause cancer and/or birth defects or reproductive harm.

SCAQMD INFORMATION:

Is there a photochemically reactive material present? Yes
What is the % by volume of photochemically reactive material? about 30
What is the VOC content? 310 g/l
What is the vapor pressure of VOC's? 0.14 mm Hg @ 20°C

SECTION 10 NOTES

HAZARD RATING SYSTEMS:

	HMIS	NFPA
HEALTH	1	1
FLAMMABILITY	2	2
REACTIVITY	0	0

KEY
4 = Severe
3 = Serious
2 = Moderate
1 = Slight
0 = Minimal

REVISION SUMMARY:

Change in Section 6

SUPERSEDES ISSUE DATE:

September 28, 1993

FOR ADDITIONAL PRODUCT INFORMATION, CONTACT YOUR SALES ENGINEER
FOR ADDITIONAL HEALTH/SAFETY INFORMATION, CALL 201-567-3000

MATERIAL SAFETY DATA SHEET

1 of 2

(Essentially Similar to Form OSHA-20)

J.D. & E-10.8
✓ Idrot. L44

SECTION I

PRODUCT NAME	MSA CLEANER-SANITIZER II		
MANUFACTURER	Mine Safety Appliances Company 600 Penn Center Boulevard Pittsburgh, PA 15235	FORMULA CODE	8599-03
		COMPLETED BY	L. P. Dewosky
		TITLE	Mgr. Product Safety
EMERGENCY PHONE NO.	412-273-5500	DATE	3-17-81

SECTION II - INGREDIENTS

	CAS NUMBER	WEIGHT, %
ACTIVE INGREDIENTS:		54.7
SODIUM CARBONATE	497-19-8	42.2
TRISODIUM PHOSPHATE	7601-54-9	10.0
ALKYL (C14, 50%; C12, 40%; C16, 10%) DIMETHYL BENZYL AMMONIUM CHLORIDES	139-08-2	2.5
INERT INGREDIENTS:		45.3
SODIUM TRIPOLYPHOSPHATE	7758-29-4	
SODIUM BICARBONATE	144-55-8	
WATER	7732-18-5	
ISOMERIC LINEAR ALCOHOLS (C11-C15) POLYETHOXY ETHANOLS	68131-40-8*	
ETHANOL	64-17-5	
ISOBORNYL ACETATE	125-12-2	

SECTION III - PHYSICAL DATA

BOILING POINT (° F.)	NA	SPECIFIC GRAVITY (H_2O=1)	0.8
VAPOR PRESSURE (mm Hg.)	NA	%VOLATILE BY VOLUME	NA
VAPOR DENSITY (AIR=1)	NA	EVAPORATION RATE (_____=1)	NA
SOLUBILITY IN WATER	20%	pH 1% AQUEOUS SOLUTION	9.5 - 10.5
APPEARANCE AND ODOR	FRAGRANT BLEND OF WHITE POWDERS		

SECTION IV - FIRE AND EXPLOSION DATA

FLASH POINT (Method used)	NO FLASH TO 240 F	FLAMMABLE LIMITS	Lel NA	Uel NA
EXTINGUISHING MEDIA	WATER SPRAY (FOG), FOAM, DRY CHEMICAL, CARBON DIOXIDE			
SPECIAL FIRE FIGHTING PROCEDURES	BLANKET FIRE WITH EXTINGUISHING MEDIUM			
UNUSUAL FIRE AND EXPLOSION HAZARDS	PRODUCT IS NONREACTIVE AND DOES NOT READILY SUPPORT COMBUSTION			

SECTION V - HEALTH HAZARD DATA

2 of 2
DOE ENT 6444

SKIN CONTACT WITH POWDER MAY CAUSE BURNS. FLUSH AFFECTED AREA WITH CLEAN WATER.
EYE CONTACT WITH POWDER MAY CAUSE CORNEAL BURNS. AVOID RUBBING EYES BECAUSE WATER INSOLUBLE PARTICLES MAY SCRATCH CORNEA. IMMEDIATELY FLUSH EYES WITH CLEAN WATER WHILE HOLDING EYELIDS APART. CONTINUE FLUSHING FOR AT LEAST 15 MINUTES OR UNTIL IRRITATION SUBSIDES. CONSULT PHYSICIAN AS SOON AS POSSIBLE.
INHALATION OF A LARGE ENOUGH QUANTITY TO POSE A SIGNIFICANT HEALTH HAZARD IS IMPROBABLE.
INGESTION OF POWDER IS HARMFUL OR FATAL. SHOULD INGESTION OCCUR, DRINK MILK, RAW EGG WHITE, OR GELATIN SOLUTION, OR LARGE QUANTITIES OF WATER. AVOID ALCOHOL. CONSULT PHYSICIAN AS SOON AS POSSIBLE.

SECTION VI - REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID	NONE
	STABLE	X		
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID	NONE
	WILL NOT OCCUR	X		
HAZARDOUS DECOMPOSITION PRODUCTS	UNDETERMINED			
INCOMPATIBILITY (MATERIALS TO AVOID)	OXIDIZING AGENTS SOAP AND ANIONIC SURFACTANTS DEACTIVATE GERMICIDE			

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	SWEEP UP
WASTE DISPOSAL METHOD	REMOVE TO SANITARY LANDFILL AWAY FROM WATER SUPPLIES DESTROY EMPTY CONTAINERS

SECTION VIII - SPECIAL PROTECTION INFORMATION

SPECIAL RESPIRATORY PROTECTION	NOT REQUIRED
SPECIAL SKIN PROTECTION	NOT REQUIRED
SPECIAL EYE PROTECTION	NOT REQUIRED

SECTION IX - SPECIAL PRECAUTIONS

SPECIAL HANDLING PRECAUTIONS	NOT REQUIRED
SPECIAL STORAGE PRECAUTIONS	NOT REQUIRED. MINIMUM SHELF LIFE 6 MONTHS. FOR MAXIMUM SHELF LIFE AVOID HIGH HUMIDITY AND STORE IN A CLEAN, DRY PLACE.
OTHER SPECIAL	NOT REQUIRED

32.68

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: INTRACID RHODAMINE WT LIQUID
PRODUCT CODE: A34517L100
CHEMICAL FAMILY: Xanthene dye

PREPARER: Health & Safety Department
DATE PRINTED: 10/19/1999
REVISION DATE: 09/20/1999

SUPPLIED BY:
Crompton & Knowles Colors Inc.
P. O. Box 341
Reading, PA 19603
Phone: 610-582-8765

24 Hr. Emergency Phone:

CHEMTREC 1-800-424-9300

CANUTEC: For chemical emergencies in Canada, call CANUTEC at 1-613-996-6666.

2. COMPOSITION/INFORMATION ON INGREDIENTS

HAZARDOUS COMPONENTS

Component	Percent	ACGIH TLV:	ACGIH Short Term Exposure Limit (STEL) value:	OSHA PEL:	OSHA Short Term Exposure Limit (STEL) value:	NJ Trade Secret Registration Number: 18881400-
Trimellitic acid 528-44-9	3	N.E.	N.E.	N.E.	N.E.	

NON-HAZARDOUS COMPONENTS

Component	Percent	ACGIH TLV:	ACGIH Short Term Exposure Limit (STEL) value:	OSHA PEL:	OSHA Short Term Exposure Limit (STEL) value:	NJ Trade Secret Registration Number: 18881400-
Sodium chloride 7647-14-5	7	N.E.	N.E.	N.E.	N.E.	
Trade Secret: Dye compound	10 to 20	N.E.	N.E.	N.E.	N.E.	5646P, 5647P

PRODUCT:
A34517L100 INTRACID RHODAMINE WT LIQUID

Water 7732-18-5	70	N.E.	N.E.	N.E.	N.E.	

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Warning: Causes eye irritation. May cause skin irritation.

EFFECTS FROM ACUTE EXPOSURE:

EYE CONTACT: Irritating to the eyes

SKIN CONTACT: May be irritating to the skin.

INHALATION: None known.

INGESTION: None known

CHRONIC OVEREXPOSURE EFFECTS:
Not known.

CARCINOGENICITY: NTP - No, IARC - No, OSHA Regulated - No

PRINCIPLE ROUTES OF EXPOSURE: None known.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Not known.

4. FIRST AID MEASURES

EYES: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

SKIN: In case of contact, immediately flush skin with plenty of soap and water for at least 15 minutes. Get medical attention.

INHALATION: If inhaled, remove to fresh air. If not breathing give artificial respiration, preferably mouth-to-mouth. If breathing is difficult give oxygen. Get medical attention.

INGESTION: If swallowed, induce vomiting immediately by giving two glasses of water and sticking fingers down throat; never give anything to an unconscious person. Get medical attention.

5. FIRE FIGHTING MEASURES

PRODUCT:
A34517L100 INTRACID RHODAMINE WT LIQUID

FLASH POINT: N.A.
METHOD: N.A.
IGNITION TEMP: N.D.
FLAMMABLE LIMITS IN AIR - LOWER (%): N.A.
FLAMMABLE LIMITS IN AIR - UPPER (%): N.A.
EXTINGUISHING MEDIA: Carbon Dioxide, Dry Chemical, Water Fog
FIRE FIGHTING PROCEDURES: Cool exposed containers with water spray after extinguishing fire.
UNUSUAL HAZARDS: None known.
ADDITIONAL FIRE AND EXPLOSION DATA: As in any fire, wear self-contained breathing apparatus and full protective equipment.

6. ACCIDENTAL RELEASE MEASURES

ACTION TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Wear appropriate safety equipment. Contain and clean up spill immediately. Prevent from entering floor drains. Sweep powders carefully minimizing dusting. Shovel all spill materials into disposal drums and follow disposal instructions. Scrub spill area with detergent and flush with copious amounts of water.

7. HANDLING AND STORAGE

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Keep container closed when not in use.
OTHER STORAGE AND HANDLING DATA: In accord with good industrial practice, handle with care and avoid personal contact.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

EXPOSURE CONTROLS: Local exhaust ventilation may be necessary to control air contaminants during the use of this product.
RESPIRATORY PROTECTION: If exposure to dust, mist, and/or vapors is likely, a NIOSH approved respirator with a protection factor of 10 is recommended. See MSDS section 2 for information on the hazardous ingredients.
PROTECTIVE GLOVES: Wear chemical resistant rubber gloves and long sleeved clothing.
EYES: Wear safety glasses or goggles to protect against exposure.
CLOTHING: Wear overalls, apron, or other protective clothing to minimize skin contact.
OTHER PERSONAL PROTECTION DATA: None known.
HYGIENIC PRACTICES: Avoid contact with eyes and skin. Avoid inhalation of dusts and vapors. Wash thoroughly after handling. Keep containers closed when not in use.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: LIQUID
COLOR: RED
ODOR: NONE
SOLUBILITY IN WATER (20°C): MISCIBLE

PRODUCT:
A34517L100 INTRACID RHODAMINE WT LIQUID

SPECIFIC GRAVITY: 1.13
DENSITY @ 25°C: N.D.
pH: 10.5 @ 1.0%
MELTING POINT: N.D.
BOILING POINT: N.A.
FREEZING POINT: N.D.
VAPOR DENSITY (AIR=1): IS HEAVIER THAN AIR
EVAP. RATE (BUTYL ACETATE=1): SLOWER THAN BUTYL ACETATE
VOC CONTENT (%): N.D.
VAPOR PRESSURE (mm/Hg @ 20°C): N.D.

10. STABILITY AND REACTIVITY

STABILITY DATA: STABLE
POLYMERIZATION: Will not occur
HAZARDOUS DECOMPOSITION PRODUCTS: Burning will produce oxides of carbon, nitrogen and/or sulfur.
INCOMPATIBILITY (MATERIALS TO AVOID): None known.
CONDITIONS/HAZARDS TO AVOID: None known.

11. TOXICOLOGICAL INFORMATION

ACUTE ORAL LD50 (mg/kg): No Data
ACUTE DERMAL LD50 (mg/kg): No Information
ACUTE INHALATION LC50 (mg/L): No Data

IRRITATION TO (skin, eyes, respiratory): None.

ADDITIONAL TOXICOLOGY INFORMATION: None known.

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION: No data is available at this time.

13. DISPOSAL CONSIDERATIONS

DISPOSAL OF WASTE METHOD: Bury or incinerate according to federal, state, and local regulations.
CONTAINER DISPOSAL: Containers should be triple rinsed, according to federal regulations and/or good waste management practice.

14. TRANSPORT INFORMATION

DOT Proper Shipping Name: Not DOT Regulated
DOT Technical Name: N.A.
DOT Primary Hazard Class: N.A.

PRODUCT:
A34517L100 INTRACID RHODAMINE WT LIQUID

DOT Secondary Hazard Class: N.A.
UN/NA NUMBER: N.A.
DOT PACKING GROUP: N.A.
DOT EMERGENCY RESPONSE INFORMATION: Keep unnecessary people away. Isolate area and deny entry. Stay upwind. Keep out of low areas. Call CHEMTREC at 1-800-424-9300 for emergency assistance.

For chemical emergencies in Canada, call CANUTEC at 1-613-996-6666.

15. REGULATORY INFORMATION

SARA SECTION 302: None Found

SARA (311, 312) HAZARD CLASS:
IMMEDIATE HEALTH HAZARD

SARA (313) CHEMICALS: THIS PRODUCT DOES NOT CONTAIN A TOXIC CHEMICAL FOR ROUTINE ANNUAL 'TOXIC CHEMICAL RELEASE REPORTING' UNDER SECTION 313 (40 CFR 372)

AMOUNT OF SARA (313) REPORTABLE CHEMICAL (%): No SARA (313) Reportable Chemicals.

METAL CONTENT: This product is not a metallized dye.

TSCA INVENTORY STATUS: All components of this product are included on the TSCA Section 8 Inventory.

CALIFORNIA PROPOSITION 65 CHEMICALS: None

TSCA SECTION 12(B) EXPORT REGULATIONS: This product is not subject to TSCA 12(b) Export Regulations.

GERMAN AMINES/EUROPEAN UNION AMINES: This product does not contain any compounds that would be prohibited under the current German/European Union regulations regarding cleavable amine compounds.

16. OTHER INFORMATION

HAZARD RATING SYSTEMS

HMIS: FLAMMABILITY 1 , REACTIVITY 0 , HEALTH 2

ADDITIONAL INFORMATION:
NONE

PRODUCT:
A34517L100 INTRACID RHODAMINE WT LIQUID

REASON FOR UPDATE: Product review.

DISCLAIMER: Crompton & Knowles warrants that this product conforms to the chemical description on the label and is reasonably fit for the specific purposes referred to in its directions for use, subject to inherent risks referred to in the Material Safety Data Sheet for this product. Crompton & Knowles makes no other express or implied warranty. In no case shall Crompton & knowles be liable for consequential, special, or indirect damages resulting from the use or handling of this product.

***** END OF MSDS *****

J.D.# C-10.467
Ident 522
1 of 2

SPARTAN CHEMICAL CO., INC.
MATERIAL SAFETY DATA SHEET

SECTION I
PRODUCT IDENTIFICATION

PRODUCT NAME OR NUMBER (as it appears on label)
SD-20 (BULK)

MANUFACTURER'S NAME
Spartan Chemical Co., Inc.

EMERGENCY TELEPHONE NO.
(419) 531-5551

ADDRESS (NUMBER, STREET, CITY, STATE AND ZIP CODE)
110 N. Westwood Ave., Toledo, OH 43607

MANUFACTURER'S D-U-N-S NO.
00-503-6728

SECTION II
HAZARDOUS INGREDIENTS

CAS REGISTRY NO.	%W	CHEMICAL NAME(S)	- Table Z-1-A - TWA mg/M³	STEL mg/M³	Ceiling mg/M³	CARCINOGEN

NO HAZARDOUS INGREDIENTS AT 1% OR GREATER CONCENTRATION

SECTION III
PHYSICAL DATA

BOILING POINT
212 °F ___ °C

SPECIFIC GRAVITY (H_2O = 1)
1.074

VAPOR PRESSURE - 18
@ 75 °F ___ °C X mm Hg ___ psi

PERCENT SOLID BY WEIGHT (%)
15-17

VAPOR DENSITY (AIR = 1)
Unknown

EVAPORATION RATE (but. ace. = 1)
<1

SOLUBILITY IN WATER
Complete

APPEARANCE AND ODOR
Blue, citrus odor

pH
Concentrate 11.0-11.5

IS MATERIAL: (LIQUID) SOLID
GAS PASTE POWDER

SECTION IV
FIRE AND EXPLOSION HAZARD DATA

FLASH POINT - None METHOD USED - ASTM - D92 FLAMMABLE LIMITS - n/a

EXTINGUISHING MEDIA
n/a

SPECIAL FIRE FIGHTING PROCEDURES
n/a

UNUSUAL FIRE AND EXPLOSION HAZARDS
n/a

SECTION V - HEALTH HAZARD DATA

EFFECTS OF OVEREXPOSURE - CONDITIONS TO AVOID
Avoid eye contact; may cause eye irritation.

THRESHOLD LIMIT VALUE - Not established

PRIMARY ROUTES OF ENTRY INHALATION ___ SKIN CONTACT ___ OTHER (SPECIFY)

CONDITIONS AGGRAVATED BY USE
Unknown

EMERGENCY AND FIRST AID PROCEDURES - In case of contact immediately flush eyes with plenty of water for at least 15 minutes; call a physician. Flush skin with water. Wash clothing before reuse. If swallowed, give large quantities of water or fruit juice. Call a physician immediately.

SECTION VI - REACTIVITY DATA

STABILITY: UNSTABLE ___
STABLE X
INCOMPATIBILITY (MATERIALS TO AVOID)
None
HAZARDOUS DECOMPOSITION PRODUCTS
None
HAZARDOUS MAY OCCUR ___
POLYMERIZATION: WILL NOT OCCUR X

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Flush with water to sanitary sewer system.

WASTE DISPOSAL METHOD
Same as above.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (SPECIFY TYPE)
Nothing special

VENTILATION - Good general ventilation should be sufficient for most conditions. Local exhaust ventilation may be necessary for some operations.

PROTECTIVE GLOVES (SPECIFY TYPE)
If desired

EYE PROTECTION (SPECIFY TYPE)
If desired

OTHER PROTECTIVE EQUIPMENT
n/a

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Nothing special
OTHER PRECAUTIONS
Nothing special

Spartan Chemical Co., Inc.
SO-20 (BULK)
Ref: 29 CFR 1910:1200 (OSHA)

NAME Thomas J. Mitchell
TITLE Director of Research
DATE June 1, 1990
SUPERCEDES September 20, 1985

SynTech Products Corporation
520 E. Woodruff Avenue
Toledo, Ohio 43624
(419) 241-1215

SAMM
E-10.4

Material Safety Data Sheet
24 Hour - Call INFOTRAC 1-800-535-5053
HMIS Rating H-1 F-0 R-0

Section I - Product Identification

Product Name: Touch It Up® De-Contaminant*
Effective Date: 02.02
* Do NOT use this product as a skin de-contaminant

Section II - Hazardous Ingredients

Chemical Name	CAS#	WT%	PEL	TLV	CARCIG
2 Butoxy Ethanol	111-76-2	1% +	50ppm	50 Skin contact	No
Other ingredients - Trade Secret					
Propane/Butane	74-98-6/106-97-8	6-10%	1000ppm	1000ppm	No

***All constituents are listed on the TSCA inventory.**

Section III - Physical Data

Boiling Range: N.D.
Vapor Pressure (psig) in Can @ 75°F: 65
Solubility in Water of Concentrate: Complete
Specific Gravity of Concentrate: 1.036
% Volatile: 7.49
Flash Point of Spray: None to 150°F, Tag Open Cup
Appearance and Odor of Spray: White foam, perfume odor
pH: 11-12

Section IV - Fire and Explosion Hazard Data

Flammability as per CPSC Flame Extension Test: Non-Flammable
Flammable Limits: LEL: N/A UEL: N/A
Extinguishing Media: Foam, dry chemical, carbon dioxide.
Special Fire Fighting Procedures: Keep containers cool. Use equipment to protect personnel against rupturing, or venting containers.
Fire and Explosion Hazards: Above 120°F, containers may vent, rupture, or burst.

Section V - Reactivity Data

Chemical Stability: Stable
Conditions to Avoid: Do not expose to temperatures above 120°F.
Incompatibility (Materials to Avoid): Strong oxidizers, acids or bases, selected amines.
Hazardous Decomposition Products: Thermal decomposition may produce carbon monoxide and/or carbon dioxide.
Hazardous Polymerization: Will NOT occur

Section VI - Health Hazard Data

Effects of Overexposure

Eyes:	Minor irritation
Skin:	No evidence of adverse effect from available information
Ingestion:	Can cause gastrointestinal irritation, vomiting, and diarrhea.
Inhalation:	Product exists as foam. Inhalation of the foam could cause asphyxiation.

Emergency and First Aid Procedures*

*Caution!	Do NOT use this product as a skin de-contaminant
Eyes:	Flush with water for at least 15 minutes.
Skin:	Wash exposed area with water and soap.
Ingestion:	Do not induce vomiting. Get medical attention.
Inhalation:	Treat for asphyxiation.

Section VII - Spill or Leak Procedures

Steps to be taken in case container is punctured and material is released:
Clean up area by mopping or with absorbent materials and place in closed containers for disposal. Consult federal, state, or local disposal authorities for approved disposal procedures.

Waste Disposal Method:
When used properly aerosol products do not generate hazardous waste. Empty de-pressurized containers can not be reused and should be wrapped an put in trash collection. Cans which are pressurized or contain liquid must be disposed of in a permitted waste management facility. Consult federal, state, and local disposal authorities for approved procedures.

Section VIII - Special Protection Information

Specific Personal Protective Equipment

Respiratory Protection:	Under normal conditions no respiratory protection is required.
Ventilation:	Normal venitlation adequate.
Protective Gloves:	None required, protective gloves may be worn.
Eye Protection:	None required, chemical splash goggles may be worn.

Section IX - Special Precautions

Keep from freezing **Keep away from children**

Special precautionary statement: Please read and follow the directions on the product label. They are you best guide to using this product in the most effective way, and give the necessary safety precautions to protect your health.

The above information pertains to this product as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to this product may substantially alter the composition. We make no warranties, express or implied, and assume no liability in connection with any use of the information.

Prepared by J. Rose **Signature**_____
MSDS -Touch It Up®

SAMM C-10.74

1-800-527-5722

NAMICO, Inc.
4601 Flat Rock Road
P.O. Box 4684
Philadelphia, PA 19127
215-482-9182

30592 Tracy Road
Walbridge, OH 434
419-666-8610

IIAL SAFETY DATA SHEET

NAMI-LO NON-PHOSPHATE

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Section I - IDENTIFICATION

NAMICO Proprietary Name: 601 NAMI-LO NON-PHOSPHATE
Chemical Name: NA

DOT Proper Shipping Name: Compound, Cleaning, Solid
DOT Hazard I.D. No:
DOT Hazard Description:
DOT Hazard Label Required:

Date of Issue: JUN 21 91
Supercedes MSDS dated: MAR 22 90
Prepared by: George Sas

HMIS RATINGS	
Health	2
Flammability	0.
Reactivity	0

4 = Severe hazard
3 = Serious hazard
2 = Moderate hazard
1 = Slight hazard
0 = Minimal hazard

Section II - INGREDIENT INFORMATION

Chemical/Common Name	CAS No.	Weight %	ACGIH TLV (mg/m3)	OSHA PEL (mg/m3)
Sodium carbonate	497-19-8	10-50	NE	NE
Na-A-Zeolite	68989-22-0	10-50	NE	NE
Sodium carbonate	497-19-8	10-50	NE	NE
Sodium metasilicate	6834-92-0	10-50	NE	NE
Sodium chloride	7647-14-5	10-50	NE	NE

*These materials are subject to the reporting requirements under the Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III, Section 313 and 40 CFR Part 372.

Section III - PHYSICAL DATA

Boiling Point (F)	NA	Specific Gravity (Water=1)	NA
Vapor Pressure (mm Hg)	NA	% Volatile by Volume	NA
Vapor Density (Air=1)	NA	Evaporation Rate (Water=1)	NA
Solubility in Water	Complete	pH	NA
Appearance & Odor	White free-flowing powder		

Section IV - FIRE & EXPLOSION HAZARD DATA

Flash Point(F)	NA	Method Used NA
LEL (Lower Explosion Limit)	NA	
UEL (Upper Explosion Limit)	NA	
Extinguishing Media	NA	
Special Procedures	NA	
Unusual Fire and Explosion Hazards	NA	

-continued on additional page(s)-

NAMICO, Inc.
4601 Flat Rock Road
P.O. Box 4684
Philadelphia, PA 19127

30692 Tracy Road
Walbridge, OH 43465
419-666-8610

MATERIAL SAFETY DATA SHEET
601 NAMI-LO NON-PHOSPHATE

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Section V - HEALTH HAZARD DATA

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Threshold Limit Value	NA
Routes of Exposure	Eye or skin contact, ingestion.
Effects of Overexposure	Contact with eyes or skin can cause severe irritation.
Carcinogenicity	This product is not considered to be a carcinogen by the NTP, IARC, or OSHA.

EMERGENCY FIRST AID PROCEDURES

Eyes	Thoroughly irrigate at once with running water for at least 15 minutes. Get immediate medical attention.
Skin	Flush with plenty of water.
Ingestion	Have victim drink large quantities of water or milk to dilute the product. DO NOT INDUCE VOMITING. Get IMMEDIATE medical attention. NOTE: Never give anything by mouth to an unconscious or convulsing victim.
Inhalation	NA
Other	NA

Section VI - REACTIVITY DATA

Stability	Stable
Conditions to Avoid	None known
Incompatible Materials	None known
Hazardous Decomposition Products	None known
Hazardous Polymerization	Will not occur
Conditions to Avoid	None known

-continued on additional page(s)-

NAMICO, Inc.
4601 Flat Rock Road
P.O. Box 4684
Philadelphia, PA 19127

30692 Tracy Road
Walbridge, OH 43465
419-666-8610

MATERIAL SAFETY DATA SHEET

501 NAMI-LO NON-PHOSPHATE

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Section VII - SPILL OR LEAK PROCEDURES

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Steps to be taken in case material is released or spilled	Sweep up. Rinse spill area well with water.
Waste Disposal Method	DISPOSER MUST COMPLY WITH ALL FEDERAL, STATE, AND LOCAL DISPOSAL AND DISCHARGE LAWS.

Section VIII - SPECIAL PROTECTION INFORMATION

Respiratory Protection	None required
Ventilation	Adequate
Gloves	Rubber or neoprene
Eye Protection	Safety goggles
Other Protective Equipment	None required

Section IX - SPECIAL PRECAUTIONS

Precautions in Handling and Storage	Store in a tightly closed container.
Other Precautions	KEEP OUT OF REACH OF CHILDREN.

NA = Not Applicable, NE = Not Established, ND = Not Determined for this product
The information herein is given in good faith and is compiled from Material Safety Data Sheets furnished by our suppliers. No warranty, express or implied, is made or intended. Any use of this information must be determined by the user to be in accordance with applicable Federal, State, and local laws and regulations.

32.90

1) CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : POWERLINE INHIBITOR- PPL10

PRODUCT APPLICATION AREA: WATER-BASED CORROSION INHIBITOR.

COMPANY ADDRESS:
BetzDearborn
4636 Somerton Road , Trevose , PA 19053
Information phone number: 215 355-3300

EMERGENCY TELEPHONE (HEALTH/ACCIDENT): (800)-877-1940 (USA)

2) 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
7632-00-0	SODIUM NITRITE Oxidizer; toxic (by ingestion); potential blood toxin

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.

CONTINUED

3) HAZARDS IDENTIFICATION

****

EMERGENCY OVERVIEW

WARNING

May cause moderate irritation to the skin. Severe irritant to the eyes. Mists/aerosols cause irritation to the upper respiratory tract.

DOT hazard: ORS (when container > RQ)
Emergency Response Guide #31
Odor: Mild; Appearance: Light Yellow, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: Flood with water. Use of CO_2 or foam may not be effective.

****

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:
Primary route of exposure; May cause moderate irritation to the skin.

ACUTE EYE EFFECTS:
Severe irritant to the eyes.

ACUTE RESPIRATORY EFFECTS:
Mists/aerosols cause irritation to the upper respiratory tract.

INGESTION EFFECTS:
May cause gastrointestinal irritation with possible nausea, vomiting, diarrhea, incoordination, mental confusion, dizziness and lethargy.

TARGET ORGANS:
Prolonged or repeated exposures may cause CNS depression and/or toxicity to the blood.

MEDICAL CONDITIONS AGGRAVATED:
Not known.

SYMPTOMS OF EXPOSURE:
Causes irritation of the skin, eyes, and/or respiratory system.

CONTINUED

4) FIRST AID MEASURES

SKIN CONTACT:
Remove contaminated clothing. Wash exposed area with a large quantity of soap solution or water for 15 minutes.

EYE CONTACT:
Immediately flush eyes with water for 15 minutes. Immediately contact a physician for additional treatment.

INHALATION:
Remove victim from contaminated area to fresh air. Apply appropriate first aid treatment as necessary.

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 3-4 glasses milk or water.

5) FIRE FIGHTING MEASURES

FIRE FIGHTING INSTRUCTIONS:
Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

EXTINGUISHING MEDIA:
Flood with water. Use of CO2 or foam may not be effective.

HAZARDOUS DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.

FLASH POINT:
> 200F > 93C P-M(CC)

MISCELLANEOUS:
ORS (when container > RQ)
NA3082;Emergency Response Guide #31

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:
Contains an oxidizer. Avoid all contact with reducing agents, oils, greases, organics and acids. Do not allow to dry.

STORAGE:
Keep containers closed when not in use. Do not freeze. If frozen, thaw and mix completely prior to use.

CONTINUED

8) EXPOSURE CONTROLS/PERSONAL PROTECTION

CHEMICAL NAME	EXPOSURE LIMITS
SODIUM NITRITE	
	PEL (OSHA): NOT DETERMINED
	TLV (ACGIH): NOT DETERMINED

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 dust/mist filters.

SKIN PROTECTION:
rubber gloves-- Wash off after each use. Replace as necessary.

EYE PROTECTION:
splash proof chemical goggles

9) PHYSICAL AND CHEMICAL PROPERTIES

Specific Grav.(70F,21C)	1.107	Vapor Pressure (mmHG)	~ 18.0
Freeze Point (F)	19	Vapor Density (air=1)	< 1.00
Freeze Point (C)	-7		
Viscosity(cps 70F,21C)	8	% Solubility (water)	100.0

Odor		Mild
Appearance		Light Yellow
Physical State		Liquid
Flash Point	P-M(CC)	> 200F > 93C
pH As Is (approx.)		9.0
Evaporation Rate (Ether=1)		< 1.00

NA = not applicable ND = not determined

CONTINUED

10) STABILITY AND REACTIVITY

STABILITY:
Stable under normal storage conditions.
HAZARDOUS POLYMERIZATION:
Will not occur.
INCOMPATIBILITIES:
May react with strong oxidizers.
DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.
BETZDEARBORN INTERNAL PUMPOUT/CLEANOUT CATEGORIES:
"B".

11) TOXICOLOGICAL INFORMATION

Oral LD50 RAT:	570 mg/kg
NOTE - Estimated value	
Dermal LD50 RABBIT:	>5,000 mg/kg
NOTE - Estimated value	

12) ECOLOGICAL INFORMATION

AQUATIC TOXICOLOGY
No Data Available.

BIODEGRADATION

COD (mg/gm):	42 Calculated
TOC (mg/gm):	Inorganic, N/A
BOD-5 (mg/gm):	Inorganic, N/A
BOD-28 (mg/gm):	Inorganic, N/A

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

DOT HAZARD:	ORS (when container > RQ)
UN / NA NUMBER:	NA3082
DOT EMERGENCY RESPONSE GUIDE #:	31

CONTINUED

15) REGULATORY INFORMATION

TSCA:
All components of this product are listed in the TSCA inventory.
CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):
72 gallons due to SODIUM NITRITE;
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
7632-00-0	SODIUM NITRITE	11.0-15.0%

CALIFORNIA REGULATORY INFORMATION

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65) CHEMICALS PRESENT:

No regulated constituent present at OSHA thresholds

MICHIGAN REGULATORY INFORMATION

No regulated constituent present at OSHA thresholds

16) OTHER INFORMATION

NFPA/HMIS	CODE TRANSLATION	
Health	2	Moderate 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.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
MSDS status:	22-AUG-1995	REVISED FORMAT	** NEW **

MATERIAL SAFETY DATA SHEET

COBRATEC® TT-50S
PRODUCT CODE: X18WT7440
Page 1 of 7
August 16, 1999

32.87

SECTION 1 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MANUFACTURER:	PMC SPECIALTIES GROUP, INC.
ADDRESS:	501 Murray Road Cincinnati, OH 45217
EMERGENCY TELEPHONE:	(513) 242-3300 (USA)
FOR TRANSPORTATION EMERGENCY:	(800) 424-9300 (USA)
CHEMICAL NAME AND SYNONYMS:	Sodium Tolyltriazole, 50% Water Solution
TRADE NAMES AND SYNONYMS:	COBRATEC® TT-50S
CHEMICAL FAMILY:	Triazole
FORMULA:	$C_7H_6N_3Na$

SECTION 2 COMPOSITION/INFORMATION ON INGREDIENTS

Material	CAS No.	Wt. %
Sodium Tolyltriazole	64665-57-2	49.5-51.0
Water	7732-18-5	48.5-50.0
Sodium Hydroxide	1310-73-2	<0.5

Please request a copy of Technical Bulletin #: COR4333 for additional information.

081699

SECTION 3 HAZARDS IDENTIFICATION

POTENTIAL HEALTH EFFECTS:

ROUTES OF ENTRY

Eye contact, skin contact/absorption, ingestion and inhalation.

(ACUTE)

EYES

Material is corrosive. Contact with the eyes may severely damage delicate eye tissue.

SKIN

Material is corrosive. Prolonged contact can be destructive to tissue.

INGESTION

Material is corrosive. Harmful if swallowed.

INHALATION

Material is corrosive. Harmful if inhaled.

CHRONIC EFFECTS/CARCINOGENICITY

CARCINOGENICITY: None of the components in this material are listed by IARC, NTP, OSHA, or ACGIH as a carcinogen.

SECTION 4 FIRST AID MEASURES

IF INHALED

If affected, remove from exposure. Restore breathing. Keep warm and quiet. Get medical attention.

IF ON SKIN

Wash affected area thoroughly with soap and water. Remove contaminated clothing, jewelry, etc. Get medical attention.

IF IN EYES

Flush eyes with large amounts of water for 15 minutes. Get medical attention.

IF SWALLOWED

Never give anything by mouth to an unconscious person. DO NOT INDUCE VOMITING. Give large amounts of water. Get medical attention.

SECTION 5 FIRE FIGHTING MEASURES

FLASH POINT:	Not Applicable
AUTOIGNITION TEMPERATURE:	Not Applicable
FLAMMABLE LIMITS IN AIR:	Not Applicable
EXTINGUISHING MEDIA:	Not Applicable

SPECIAL FIRE FIGHTING PROCEDURES: Full protective equipment including self-contained breathing apparatus should be used. During emergency conditions overexposure to decomposition products may cause a health hazard. Symptoms may not be immediately apparent. Get medical attention. Water may be used to cool and protect closed containers exposed to extreme heat.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Closed containers may explode (due to the build-up of pressure) when exposed to extreme heat.

SECTION 6 ACCIDENTAL RELEASE MEASURERS

Use proper personal protective equipment. Isolate and secure the area and follow the appropriate emergency guidelines. Collect the material with inert absorbent and place in a covered waste disposal container.

SECTION 7 HANDLING AND STORAGE

STORAGE INFORMATION

CORROSIVE MATERIAL Avoid contact with skin, eyes and clothing. DO NOT TAKE INTERNALLY. Clean up spills immediately.

Keep containers tightly closed when not in use. Store only in containers which are resistant to caustic solutions.

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

NFPA BASED RATINGS: Health: 3, Flammability: 0, Reactivity: 0
HMIS RATINGS: Health: 3, Flammability: 0, Reactivity: 0, PPE: F
WHMIS CLASSIFICATION: D-2-(B),E

RESPIRATORY PROTECTION: If personal exposure cannot be controlled below applicable exposure limits by ventilation, wear respiratory devices approved by NIOSH/MSHA for protection against mists and vapors.

VENTILATION: Local exhaust is recommended.

PROTECTIVE GLOVES: Rubber, vinyl or other impervious material if skin contact can not be avoided.

EYE PROTECTION: Use safety glasses with unperforated side shields, or full face shield when danger of splashing is great.

OTHER PROTECTIVE EQUIPMENT: Rubber apron or similar protective clothing to prevent contact with skin or clothes.

EXPOSURE GUIDELINES

Sodium Hydroxide TWA = 2 mg/m^3

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT:	100°C
FREEZING POINT:	-8°C
SPECIFIC GRAVITY:	1.19 @ 24°C
BULK DENSITY:	Not Applicable
VAPOR PRESSURE AT 20° C:	0.04 mm Hg
VAPOR DENSITY (air=1):	Not Applicable
SOLUBILITY IN WATER % BY WT at 20° C:	Miscible in all proportions
% VOLATILES BY VOLUME:	50% as water
EVAPORATION RATE:	Not Applicable
APPEARANCE AND ODOR:	Clear yellow to amber solution, characteristic odor, pH=13.5

SECTION 10 STABILITY AND REACTIVITY

STABILITY: Stable
INCOMPATIBILITY: Strong Oxidizing Agents, Strong Acids.
HAZARDOUS DECOMPOSITION PRODUCTS: BY FIRE: Carbon Dioxide, Carbon Monoxide, Nitrogen oxides, HCN possible in reducing atmospheres.
HAZARDOUS POLYMERIZATION: Will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

Oral LD_{50} (rat)	920 mg/kg (Male) 640 mg/kg (Female)
Eye and Skin Irritant	Can cause severe irritation

SECTION 12 ECOLOGICAL INFORMATION

Bluegill Sunfish (96 hr. LC_{50})	191.2 mg/l
Daphnia Magna (48 hr. LC_{50})	245.7 mg/l
Rainbow Trout (96 hr. LC_{50})	23.7 mg/l

SECTION 13 DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD: Dispose of in accordance with federal, state and local disposal regulations.

SECTION 14 TRANSPORT INFORMATION

D.O.T. SHIPPING NAME:	Caustic Alkali Liquids, n.o.s. (Sodium Hydroxide)
D.O.T. HAZARD CLASS:	8
U.N. NUMBER:	UN1719
PACKAGING GROUP:	PGII
PRODUCT RQ (LBS):	1,000 lbs as Sodium Hydroxide
D.O.T. LABEL:	Corrosive
D.O.T. PLACARD:	Corrosive

SECTION 15 REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS:

Sodium Tolyltriazole (CAS No. 64665-57-2) is contained on the following chemical lists:

1. TSCA Inventory List

SECTION 15 REGULATORY INFORMATION (CONT.)

Sodium Hydroxide (CAS No. 1310-73-2) is contained on the following chemical lists:

1. Clean Water Act Section 311 Hazardous Substances (ref.: Suspect Chemicals Sourcebook 1997)
2. CERCLA Hazardous Substances (ref.: Suspect Chemicals Sourcebook 1997)
3. OSHA Air Contaminants (ref.: Suspect Chemicals Sourcebook 1997)
4. American Council of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value Chemicals (ref.: Suspect Chemicals Sourcebook 1997)
5. OSHA Table Z-1-A [revoked] (ref.: Suspect Chemicals Sourcebook 1997)
6. DOT Hazardous Materials (ref.: Suspect Chemicals Sourcebook 1997)
7. DOT Hazardous Substances Other Than Radionuclides; and Radionuclides (ref.: Suspect Chemicals Sourcebook 1997)
8. Massachusetts Substance List (ref.: Suspect Chemicals Sourcebook 1997)
9. New Jersey Right To Know Hazardous Substance List (ref.: Suspect Chemicals Sourcebook 1997)
   NJ1S = Special Health Hazard (ref.: Suspect Chemicals Sourcebook 1997)
10. Pennsylvania Hazardous Substance List (ref.: Suspect Chemicals Sourcebook 1997)
    PA1E=Environmental Hazard

INTERNATIONAL REGULATIONS:

SodiumTolyltriazole (CAS No. 64665-57-2) is contained on the following chemical lists:

1. Canadian Domestic Substance List

Sodium Hydroxide (CAS No. 1310-73-2) is contained on the following chemical lists:

1. Canadian Workplace Hazardous Materials Information System (WHMIS)
   CN1 = Ingredient must be disclosed at concentration of 1% (ref.: Suspect Chemicals Sourcebook 1997)
2. Canadian Domestic Substance List

SECTION 16 OTHER INFORMATION

REASON FOR ISSUE:	New format and verification of information.
MSDS NUMBER:	X18WT7440
PREPARED:	August 16, 1999
SUPERSEDES:	March 3, 1998

SAMM 32.42

BRIGHT DYES™ MATERIAL SAFETY DATA SHEET
FLT YELLOW/GREEN™ LIQUID CONCENTRATE

MSDS PREPARATION INFORMATION

PREPARED BY: T. P. MULDOON
(937) 886-9100

DATE PREPARED: 1/01/02

PRODUCT INFORMATION

MAUNFACTURED BY: KINGSCOTE CHEMICALS
3334 S. TECH BLVD.
MIAMISBURG, OHIO 45342

CHEMICAL NAME ..... NOT APPLICABLE
CHEMICAL FORMULA ..... NOT APPLICABLE
CHEMICAL FAMILY ..... AQUEOUS DYE PRODUCT

HAZARDOUS INGREDIENTS

NONE PER 29 CFR 1910.1200

PHYSICAL DATA

PHYSICAL STATE ..... LIQUID
ODOR AND APPEARANCE ..... YELLOW/GREEN, WITH NO APPARENT ODOR
SPECIFIC GRAVITY ..... APPROXIMATELY 1.05
VAPOR DENSITY (mm Hg @ 25° C) ..... ~23.75
VAPOR DENSITY (AIR =1) ..... ~0.6
EVAPORATION RATE (Butyl Acetate = 1) ..... ~1.8
BOILING POINT ..... 100 degrees C (212 degrees F)
FREEZING POINT ..... 0 degrees C (32 degrees F)
pH ..... 8.0 OR ABOVE
SOLUBILITY IN WATER ..... HIGHLY SOLUBLE

FIRE HAZARD

CONDITION OF FLAMMABILITY ..... NON-FLAMABLE
MEANS OF EXTINCTION ..... WATER FOG, CARBON DIOXIDE, OR DRY CHEMICAL
FLASH POINT AND METHOD ..... NOT APPLICABLE
UPPER FLAMABLE LIMIT ..... NOT APPLICABLE
LOWER FLAMABLE LIMIT ..... NOT APPLICABLE
AUTO-IGNITION TEMPERATURE ..... NOT APPLICABLE
HAZARDOUS COMBUSTION PRODUCTS ..... NOT APPLICABLE
UNUSUAL FIRE HAZARD ..... NOT APPLICABLE

EXPLOSION HAZARD

SENSITIVITY TO STATIC DISCHARGE ..... NOT APPLICABLE
SENSITIVITY TO MECHANICAL IMPACT ..... NOT APPLICABLE

REACTIVITY DATA

PRODUCT STABILITY ..... STABLE
PRODUCT INCOMPATIBILITY ..... NONE KNOWN
CONDITIONS OF REACTIVITY ..... NOT APPLICABLE
HAZARDOUS DECOMPOSITION PRODUCTS ..... NONE KNOWN

TOXICOLOGICAL PROPERTIES

SYMPTOMS OF OVER EXPOSURE FOR EACH POTENTIAL ROUTE OF ENTRY:

INHALLATION, ACUTE ..... NO HARMFUL EFFECTS EXPECTED.
INHALATION, CHRONIC ..... NO HARMFUL EFFECTS EXPECTED.
SKIN CONTACT ..... WILL TEMPORARILY GIVE SKIN A YELLOW/GREEN COLOR.
EYE CONTACT ..... NO HARMFUL EFFECTS EXPECTED.
INGESTION ..... URINE MAY BE A YELLOW/GREEN COLOR UNTIL THE DYE HAS BEEN WASHED THROUGH THE SYSTEM.
EFFECTS OF ACUTE EXPOSURE ..... NO HARMFUL EFFECTS EXPECTED
EFFECTS OF CHRONIC EXPOSURE ..... NO HARMFUL EFFECTS EXPECTED
THRESHOLD OF LIMIT VALUE ..... NOT APPLICABLE
CARCINOGENICITY ..... NOT LISTED AS A KINOWN OR SUSPECTED CARCINOGEN BY IARC, NTP OR OSHA.
TERATOGENICITY ..... NONE KNOWN
TOXICOLOGY SYNERGISTIC PRODUCTS ..... NONE KNOWN

PREVENTATIVE MEASURES

PERSONAL PROTECTIVE EQUIPMENT
GLOVES ..... RUBBER
RESPIRATORY ..... USE NISOH APPROVED DUST MASK IF DUSTY CONDITIONS EXIST.
CLOTHING ..... PROTECTIVE CLOTHING SHOULD BE WORN WHERE CONTACT IS UNAVOIDABLE.
OTHER ..... HAVE ACCESS TO EMERGENCY EYEWASH.

PREVENTATIVE MEASURES (CONT.)

ENGINEERING CONTROLS	NOT NECESSARY UNDER NORMAL CONDITIONS, USE LOCAL VENTILATION IF DUSTY CONDITIONS EXIST.
SPILL OR LEAK RESPONSE	CLEAN UP SPILLS IMMEDIATELY, PREVENT FROM ENTERING DRAIN. USE ABSORBANTS AND PLACE ALL SPILL MATERIALS IN WASTE DISPOSAL CONTAINER. FLUSH AFFECTED AREA WITH WATER.
WASTE DISPOSAL	INCINERATE OR REMOVE TO A SUITABLE SOLID WASTE DISPOSAL SITE, DISPOSE OF ALL WASTES IN ACCORDANCE WITH FEDERAL, STATE AND LOCAL REGULATIONS.
HANDELING PROCEDURES AND EQUIPMENT	NO SPECIAL REQUIREMENTS.
STORAGE REQUIREMENTS	STORE AT ROOM TEMPERATURE BUT ABOVE THE FREEZING POINT OF WATER.
SHIPPING INFORMATION	KEEP FROM FREEZING

FIRST AID MEASURES

FIRST AID EMERGENGY PROCEDURES

EYE CONTACT	FLUSH EYES WITH WATER FOR AT LEAST 15 MINUTES. GET MEDICAL ATTENTION IF IRRITATION PERSISTS.
SKIN CONTACT	WASH SKIN THOROUGHLY WITH SOAP AND WATER. GET MEDICAL ATTENTION IF IRRITATION DEVELOPS.
INHALATION	IF DUST IS INHALED, MOVE TO FRESH AIR. IF BREATHING IS DIFFICULT GIVE OXYGEN AND GET IMMEDIATE MEDICAL ATTENTION.
INGESTION	DRINK PLENTY OF WATER AND INDUCE VOMITING. GET MEDICAL ATTENTION IF LARGE QUANTITIES WERE INGESTED OR IF NAUSEA OCCURS. NEVER GIVE FLUIDS OR INDUCE VOMITING IF THE PERSON IS UNCONSCIOUS OR HAS CONVULSIONS.

SPECIAL NOTICE

ALL INFORMATION, RECOMMENDATIONS AND SUGGESTIONS APPEARING HEREIN CONCERNING THIS PRODUCT ARE BASED UPON DATA OBTAINED FROM MANUFACTURER AND/OR RECOGNIZED TECHNICAL SOURCES; HOWEVER, KINGSCOTE CHEMICALS MAKES NO WARRANTY, REPRESENTATION OR GUARANTEE AS TO THE ACCURACY, SUFFICIENCY OR COMPLETENESS OF THE MATERIAL SET FORTH HEREIN. IT IS THE USER'S RESPONSIBILITY TO DETERMINE THE SAFETY, TOXICITY AND SUITABILITY OF HIS OWN USE, HANDLING, AND DISPOSAL OF THE PRODUCT. ADDITIONAL PRODUCT LITERATURE MAY BE AVAILABLE UPON REQUEST. SINCE ACTUAL USE BY OTHERS IS BEYOND OUR CONTROL, NO WARRANTY, EXPRESS OR IMPLIED, IS MADE BY KINGSCOTE CHEMICALS AS TO THE EFFECTS OF SUCH USE, THE RESULTS TO BE OBTAINED OR THE SAFETY AND TOXICITY OF THE PRODUCT, NOR DOES KINGSCOTE CHEMICALS ASSUME ANY LIABILITY ARISING OUT OF USE BY OTHERS OF THE PRODUCT REFERRED TO HEREIN. THE DATA IN THE MSDS RELATES ONLY TO SPECIFIC MATERIAL DESIGNATED HEREIN AND DOES NOT RELATE TO USE IN COMBINATION WITH ANY OTHER MATERIAL OR IN ANY PROCESS.

END OF MATERIAL SAFETY DATA SHEET

MATERIAL SAFETY DATA SHEET

POLYPURE INC.

Clarifloc® C-9490 Polymer

One Gatehall Drive
Parsippany, New Jersey 07054
Phone Number: (201) 292-2900

32.109

EMERGENCY CONTACTS: CHEMTREC (800) 424-9300

Date Issued January 25, 1995 Supersedes MSDS Dated July 15, 1991

HMIS Health 1 Fire 2 Reactivity 0 NFPA Health 1 Fire 2 Reactivity 0

I. Identification and Physical Data

Product Name C-9490 Polymer

Product Class Cationic Polyacrylamide

DOT Hazard Class Combustible Liquid for bulk shipments only; see Sec. XIV

ID Number NA 1993

Shipping Name Combustible Liquid, n.o.s., NA 1993, PG III, (Contains Petroleum Distillate)

Appearance and Odor White liquid emulsion with slight organic odor

Vapor Pressure at 20° C	Not determined
Vapor Density	Heavier than air
Volatile Org. Compounds	Not determined
% Volatile By Volume	50 - 70%
Boiling Range	100° C and above
Specific Gravity	1.0 (approximately)
Solubility in Water	~10 % (forms gel)
Evaporation Rate	Not determined
Melting Point	Not applicable

II. Hazardous Ingredients

Chemical Name	CAS Number	TWA TLV	OSHA PEL	STEL TLV
Light Hydrotreated Petroleum Distillate	64742-47-8	##	—	—
Ethoxylated Nonylphenol, Branched	68412-54-4	—	—	—

— Not Established

TWA TLV for similar materials is about 100 ppm.

III. Fire and Explosion Data

LEL 0.9% (estimate) Flashpoint > 65 °C (Setaflash Closed Cup)

Extinguishing Media

Use carbon dioxide or dry chemical for small fires and fog or foam for large fires.

Unusual Fire and Explosion Hazards

When exposed to extreme heat, closed containers may rupture due to buildup of pressure and release ignitable vapors. Water ca cause extremely slippery floor surfaces.

Special Fire Fighting Procedures

Wear self-contained breathing apparatus and complete personal protective equipment when entering confined areas where there potential for exposure to vapors or combustion products.

IV. Reactivity Data

Stable yes **Hazardous Polymerization?** no

Conditions To Avoid
Avoid open flames, hot surfaces or other ignition sources.

Materials To Avoid
Strong oxidizing agents

Hazardous Decomposition Products
Normally stable. Combustion products may include ammonia and oxides of carbon and nitrogen.

V. Health Hazard Data

Effects of Overexposure

Ingestion
Contains materials that may be slightly toxic. May cause irritation of gastrointestinal tract. Contains materials that, if aspirated into the lungs during ingestion or vomiting, may cause pulmonary injury and possibly death.

Inhalation
Breathing vapors or mists may irritate respiratory system and cause breathing difficulties. Effects on the central nervous system may include headaches, weakness, dizziness and drowsiness.

Skin Absorption
Product contains trace amounts of acrylamide. Prolonged exposure to liquid or dried product may cause numbness, tingling or weakness in extremities.

Skin Contact
Contains materials that may cause moderate skin irritation. Prolonged exposure may cause drying or defatting and cracking of the skin.

Eye Contact
Product contains materials which can cause severe eye irritation. Permanent damage is possible if contact is prolonged.

Chronic Effects
Breathing vapors or mist may aggravate pre-existing symptoms of asthma or other lung disorders. Repeated exposure to trace amounts of acrylamide in liquid or dried product may cause development of neurotoxicological effects.

Emergency and First Aid Procedures

Eye Contact
Immediately flush with water for 15 minutes or longer. Lift upper and lower eye lids to ensure removal of chemical. Get medical attention.

Skin Contact
Wash skin with soap and water. Remove and launder contaminated clothing before reuse. Get medical attention if irritation persists.

Ingestion
DO NOT INDUCE VOMITING. If victim is conscious and alert, give 2 - 3 glasses of water to drink. GET IMMEDIATE MEDICAL ATTENTION.

Inhalation
Move subject to fresh air. Administer artificial respiration if required. Get medical assistance.

VI. Spill Or Leak Procedures

Steps to Be Taken In Case Material is Released or Spilled

Ventilate area and remove ignition sources. Dike spill and collect for disposal or reuse. Absorb residues with inert material and collect for disposal. Flu area with water. Prevent polymer and washings from entering surface waters. Wet polymer may cause very slippery conditions.

Waste Disposal Method

Incinerate or place in chemical landfill in accordance with federal, state and local regulations. The material, as sold, is not a hazardous waste under curre RCRA regulations.

VII. Special Protection Information

Respiratory Protection

If misting conditions exist, wear NIOSH approved mist respirator.

Ventilation

Natural or general ventilation is adequate for normal conditions.

Local ventilation is recommended to control exposure from operations that can generate aerosols, mists or vapors.

Protective Gloves

Neoprene, polyvinyl, butyl rubber or nitrile rubber gloves are recommended.

Eye Protection

Chemical splash goggles.

Other Protective Equipment

For operations where contact can occur, coveralls, apron and rubber foot coverings are recommended. A safety shower and eye wash facility should be available.

VIII. Special Precautions

Spills of product or solutions may cause slippery floor surfaces. Store at temperatures between 0 and 40°C. Keep container closed when not in use.

IX. State R-T-K Information

Chemical Name	CAS Number	Comment
Light Hydrotreated Petroleum Distillate	64742-47-8	
Ethoxylated Nonylphenol, Branched	68412-54-4	
Cationic Polyacrylamide	69418-26-4	
Nonionic Surfactant	1338-43-8	
Water	7732-18-5	
Acrylamide	79-06-1	< 0.1 %

X. SARA Title III Section 313 Information

Not Applicable

XI. RCRA Information

Not regulated as a hazardous waste. **Disposal Code** None

XII. CERCLA Information

Not Applicable

XIII. California Proposition 65 Information

Product contains detectable amounts of acrylamide (CAS# 79-06-1) which is known to the State of California to be a carcinogen.

XIV. Other Information

All components of this product are listed in the TSCA inventory.

Acrylamide is described as reasonably anticipated to be a carcinogen by the National Toxicology Program (NTP) and as a probable carcinogen by the International Agency for Research on Cancer (IARC).

The D.O.T. defines Combustible Liquid as a hazard class only for bulk packagings, i.e. when a single packaging has a minimum capacity greater than 450 L (119 gallons).

SAMM 32.81

NALCO

MATERIAL SAFETY DATA SHEET

PRODUCT

OPTIMER® 9905

EMERGENCY TELEPHONE NUMBER(S)
(800) 424-9300 (24 Hours) CHEMTREC

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : **OPTIMER® 9905**

APPLICATION : FLOCCULANT

COMPANY IDENTIFICATION : Nalco Company
1601 W. Diehl Road
Naperville, Illinois
60563-1198

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING
HEALTH : 0 / 1 FLAMMABILITY : 1 / 1 INSTABILITY : 0 / 0 OTHER :
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

2. COMPOSITION/INFORMATION ON INGREDIENTS

Based on our hazard evaluation, none of the substances in this product are hazardous.

3. HAZARDS IDENTIFICATION

****EMERGENCY OVERVIEW****

CAUTION
May cause irritation with prolonged contact. Toxic to aquatic organisms.
Do not get in eyes, on skin, on clothing. Do not take internally. Do not breathe dust. Water in contact with the product will cause slippery floor conditions. Wear suitable protective clothing. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of soap and water.
May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) under fire conditions. Water in contact with the product will cause slippery floor conditions.

PRIMARY ROUTES OF EXPOSURE :
Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :
May cause irritation with prolonged contact.

SKIN CONTACT :
May cause irritation with prolonged contact.

INGESTION :
Not a likely route of exposure. No adverse effects expected.

INHALATION :
Repeated or prolonged exposure may irritate the respiratory tract.

SYMPTOMS OF EXPOSURE :
Acute :
A review of available data does not identify any symptoms from exposure not previously mentioned.
Chronic :
A review of available data does not identify any symptoms from exposure not previously mentioned.

AGGRAVATION OF EXISTING CONDITIONS :
A review of available data does not identify any worsening of existing conditions.

4. FIRST AID MEASURES

EYE CONTACT :
Flush affected area with water. If symptoms develop, seek medical advice.

SKIN CONTACT :
Remove contaminated clothing. Wash off affected area immediately with plenty of water. If symptoms develop, seek medical advice.

INGESTION :
Do not induce vomiting without medical advice. If conscious, washout mouth and give water to drink. If symptoms develop, seek medical advice.

INHALATION :
Remove to fresh air, treat symptomatically. If symptoms develop, seek medical advice.

NOTE TO PHYSICIAN :
Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

5. FIRE FIGHTING MEASURES

FLASH POINT : Not applicable

EXTINGUISHING MEDIA :
Not expected to burn. Use extinguishing media appropriate for surrounding fire.

FIRE AND EXPLOSION HAZARD :
May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) under fire conditions. Water in contact with the product will cause slippery floor conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :
In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :
Notify appropriate government, occupational health and safety and environmental authorities. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection).

METHODS FOR CLEANING UP :
Remove as much as possible with broom, scoop or vacuum, as the addition of water causes slippery floor conditions. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :
This product is toxic to fish. It should not be directly discharged into lakes, ponds, streams, waterways or public water supplies.

7. HANDLING AND STORAGE

HANDLING :
Do not take internally. Ensure all containers are labelled. Avoid eye and skin contact. Avoid generating dusts.

STORAGE CONDITIONS :
Store separately from oxidizers. Keep in dry place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :
Exposure guidelines have not been established for this product. Available exposure limits for the substance(s) are shown below.

ACGIH/TLV :

Substance(s)	
Respirable Nuisance Particulates	TWA: 3 mg/m3
Inhalable (Total) Nuisance Particulates	TWA: 10 mg/m3

OSHA/PEL :

Substance(s)	
Respirable Nuisance Particulates	TWA: 5 mg/m3
Inhalable (Total) Nuisance Particulates	TWA: 15 mg/m3 (total dust)

ENGINEERING MEASURES :
General ventilation is recommended. Local exhaust ventilation may be necessary when dusts or mists are generated.

RESPIRATORY PROTECTION :
Respiratory protection is not normally needed. An approved respirator must be worn if the occupational exposure limit is likely to be exceeded. A dust respirator may be used.

HAND PROTECTION :
Nitrile gloves, PVC gloves, Neoprene gloves, Rubber gloves, Butyl gloves, Cloth gloves

SKIN PROTECTION :
Wear standard protective clothing.

EYE PROTECTION :
Wear safety glasses with side-shields.

HYGIENE RECOMMENDATIONS :
Keep an eye wash fountain available. Keep a safety shower available.

HUMAN EXPOSURE CHARACTERIZATION :
Based on our recommended product application and personal protective equipment, the potential human exposure is: Moderate

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Granular, Solid
APPEARANCE	White
ODOR	Slight, Ammoniacal
SOLUBILITY IN WATER	Partial
pH (5 %)	2.5 - 4.5

Note: These physical properties are typical values for this product and are subject to change.

10. STABILITY AND REACTIVITY

STABILITY :
Stable under normal conditions.

HAZARDOUS POLYMERIZATION :
Hazardous polymerization will not occur.

CONDITIONS TO AVOID :
Moisture

MATERIALS TO AVOID :
Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors.

HAZARDOUS DECOMPOSITION PRODUCTS :
Under fire conditions: Oxides of carbon, Oxides of nitrogen

11. TOXICOLOGICAL INFORMATION

The following results are for the product.

ACUTE ORAL TOXICITY :

Species	LD50	Test Descriptor
Rat	> 5,000 mg/kg	Product

Rating : Non-Hazardous

SENSITIZATION :
The results of testing on guinea pigs showed this material to be non-sensitizing.

CARCINOGENICITY :
None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

HUMAN HAZARD CHARACTERIZATION :
Based on our hazard characterization, the potential human hazard is: Low

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL EFFECTS :

The following results are for the product and a similar product.

ACUTE FISH RESULTS :

Species	Exposure	LC50	Test Descriptor
Rainbow Trout	96 hrs	0.21 mg/l	Similar Product

Rating : Very toxic

ACUTE INVERTEBRATE RESULTS :

Species	Exposure	LC50	EC50	Test Descriptor
Daphnia magna	48 hrs	0.34 mg/l	0.26 mg/l	Similar Product

Rating : Very toxic

PERSISTENCY AND DEGRADATION :

Chemical Oxygen Demand (COD) : 225,000 mg/l

Biological Oxygen Demand (BOD) :

Incubation Period	Value	Test Descriptor
	5,000 mg/l	Product

ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION
Based on our hazard characterization, the potential environmental hazard is: High
Based on our recommended product application and the product's characteristics, the potential environmental exposure is: Low

If released into the environment, see CERCLA/SUPERFUND in Section 15.

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it is not a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.

As a non-hazardous waste, it is not subject to federal regulation. Consult state or local regulation for any additional handling, treatment or disposal requirements. For disposal, contact a properly licensed waste treatment, storage, disposal or recycling facility.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

LAND TRANSPORT :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

15. REGULATORY INFORMATION

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :
Based on our hazard evaluation, none of the substances in this product are hazardous.

CERCLA/SUPERFUND, 40 CFR 117, 302 :
Notification of spills of this product is not required.

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :
This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :
Our hazard evaluation has found that this product is not hazardous under 29 CFR 1910.1200.

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :
This product does not contain substances on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA) :
The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

FOOD AND DRUG ADMINISTRATION (FDA) Federal Food, Drug and Cosmetic Act :
When use situations necessitate compliance with FDA regulations, this product is acceptable under : 21 CFR 176.170 Components of paper and paperboard in contact with aqueous and fatty foods and 21 CFR 176.180 Components of paper and paperboard in contact with dry foods.

It is limited to use as a retention aid and flocculant employed prior to the sheet forming operation in the manufacture of paper and paperboard in amounts no greater than those required to produce its intended technical effect.

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :
None of the substances are specifically listed in the regulation.

CLEAN AIR ACT, Sec. 111 (40 CFR 60, Volatile Organic Compounds), Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :
None of the substances are specifically listed in the regulation.

CALIFORNIA PROPOSITION 65 :
Substances known to the State of California to cause cancer are present as an impurity or residue.

MICHIGAN CRITICAL MATERIALS :
None of the substances are specifically listed in the regulation.

STATE RIGHT TO KNOW LAWS :
None of the substances are specifically listed in the regulation.

NATIONAL REGULATIONS, CANADA :

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :
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.

WHMIS CLASSIFICATION :
Not considered a WHMIS controlled product.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :
The substances in this preparation are listed on the Domestic Substances List (DSL), are exempt, or have been reported in accordance with the New Substances Notification Regulations.

16. OTHER INFORMATION

Due to our commitment to Product Stewardship, we have evaluated the human and environmental hazards and exposures of this product. Based on our recommended use of this product, we have characterized the product's general risk. This information should provide assistance for your own risk management practices. We have evaluated our product's risk as follows:

* The human risk is: Low

* The environmental risk is: Low

Any use inconsistent with our recommendations may affect the risk characterization. Our sales representative will assist you to determine if your product application is consistent with our recommendations. Together we can implement an appropriate risk management process.

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight# (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department
Date issued : 02/22/2004
Version Number : 1.8

J.D. # 16.20
Incent. 1698
1 of 4

MATERIAL SAFETY DATA S

BASF Corporation Chemicals Division
100 Cherry Hill Road, Parsippany, New Jersey 07054, (201) 316-3000

BASF

PRODUCT I ... lation

Registered Trademark

TRADE NAI

CHEMICAL

SYNONYMS: ... ULA: Mixture

CHEMICAL ... MOL. WGT.: N/A

info.service@basf-ag.de

... EDIENTS

		%	PEL/TLV - SOURCE
241-7 Anti		100	Not established
Contains:			
Ethylene Glycol	107-21-1	~95	50 ppm Ceiling OSHA
Proprietary additives		< 5	Not established

SARA Title III Sect. 313: Listed.

SECTION III - PHYSICAL DATA

BOILING/MELTING POINT @760 mm Hg: 330°F/ N/A	pH: 10.0-11.0
VAPOR PRESSURE mm Hg @20 C: 18	
SPECIFIC GRAVITY OR BULK DENSITY: 1.123	
SOLUBILITY IN WATER: Complete	

APPEARANCE: Clear, Dyed Liquid ODOR: Glycol INTENSITY: Slight

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (TEST METHOD): 282°F C.O.C.	AUTOIGNITION TEMP: 775°F

FLAMMABILITY LIMITS IN AIR (% BY VOL) LOWER: N/A UPPER: N/A

EXTINGUISHING MEDIUM	Use water fog, alcohol foam, CO2 or dry chemical extinguishing media. NFPA: 1/1/0
SPECIAL FIREFIGHTING PROCEDURES	Firefighters should be equipped with self-contained breathing apparatus and turnout gear. Avoid breathing vapors of heated or burning antifreeze.
UNUSUAL FIRE AND EXPLOSION HAZARDS	Vapors from heated (above flash point) product may travel to a source of ignition and flash back.

EMERGENCY TELEPHONE NUMBER

CHEMTREC 800-424-9300 201-316-3000

THIS NUMBER IS AVAILABLE DAYS, NIGHTS, WEEKENDS AND HOLIDAYS

Ident. 1698
2 of 4

PRODUCT NUMBER: 881770 241-7 Antifreeze Formulation

SECTION V - HEALTH DATA

TOXICOLOGICAL TEST DATA:	RESULT:
241-7 Antifreeze Formulation	
Ethylene Glycol	
Rat, Oral LD50	5.8 g/kg.
Human, Reported Lethal Dose	100 c.c.
Silicates	Eye and skin irritant
Borates	Moderately toxic by ingestion

EFFECTS OF OVEREXPOSURE:

Contact with this product causes eye and skin irritation.
Inhalation of vapors or mists may be irritating to the respiratory tract.
Ingestion of about 100 ml. of ethylene glycol may result in acute poisoning, which is characterized by severe abdominal disturbances, central nervous system depression and possible respiratory or renal failure.
Prolonged inhalation of the vapors may cause unconsciousness and increased lymphocyte counts.
Chronic overexposure may lead to liver degeneration and severe renal damage.
Animal studies indicate that ethylene glycol may be embryotoxic and teratogenic by the oral and inhalation routes.

FIRST AID PROCEDURES:

Eyes-Immediately wash eyes with running water for 15 minutes. If irritation develops, consult a physician.
Skin-Wash affected areas with soap and water. Remove and launder contaminated clothing before reuse. If irritation develops, consult a physician.
Ingestion-If swallowed, dilute with water and immediately induce vomiting. Never give fluids or induce vomiting if the victim is unconscious or having convulsions. Get immediate medical attention.
Inhalation-Move to fresh air. Aid in breathing, if necessary, and get immediate medical attention.

SECTION VI - REACTIVITY DATA

STABILITY: Stable.
CONDITIONS TO AVOID: N/A

CHEMICAL INCOMPATIBILITY: N/A.

HAZARDOUS DECOMPOSITION PRODUCTS: N/A

HAZARDOUS POLYMERIZATION: Does not occur
CONDITIONS TO AVOID: N/A

CORROSIVE TO METAL: No | OXIDIZER: No

SECTION VII - SPECIAL PROTECTION

RESPIRATORY PROTECTION:
If vapors or mists are generated, wear a NIOSH/MSHA approved organic vapor/mist respirator.

EYE PROTECTION: If splashing can occur, use chemical goggles or full face shield.

PROTECTIVE CLOTHING: Use rubber gloves, apron and shoes.
Remove contaminated clothing immediately and wash before reuse.

VENTILATION: Local exhaust to control vapors or mists.

OTHER: N/A

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3 of 4

PRODUCT NUMBER: 581770 241-7 Antifreeze Formulation

SECTION VIII - ENVIRONMENTAL DATA

ENVIRONMENTAL TOXICITY DATA:

Aquatic toxicity rating: TLm96 1000-100 ppm.

SPILL AND LEAK PROCEDURES:

Spills should be contained, solidified, and placed in suitable containers for disposal. This material is not regulated under RCRA or CERCLA ("Superfund"). Clean up quickly as spills are a slipping hazard.

HAZARDOUS SUBSTANCE SUPERFUND: No RQ (lbs):

WASTE DISPOSAL METHOD:

Incinerate or bury in a licensed facility.
Do not discharge into waterways. Discharge to sewer systems with prior approvals is acceptable.

HAZARDOUS WASTE 40CFR261: No HAZARDOUS WASTE NUMBER:

CONTAINER DISPOSAL:

Dispose of in licensed facility.
Recommend crushing or other means to prevent unauthorized reuse.

SECTION IX - SHIPPING DATA

D.O.T. PROPER SHIPPING NAME (49CFR172.101-102)	HAZARDOUS SUBSTANCE (49CFR CERCLA LIST)
None	No
	REPORTABLE QUANTITY (RQ) None

D.O.T. HAZARD CLASSIFICATION (CFR172.101-102) PRIMARY	SECONDARY
None	N/A

D.O.T. LABELS REQUIRED (49CFR172.101-102)	D.O.T. PLACARDS REQUIRED (CFR172.504)	POISON CONSTITUENT (49CFR172.203(K))
None	None	N/A

BILL OF LADING DESCRIPTION

Antifreeze Preparations, Proprietary
(Ethylene Glycol Base)

CC NO. 332	UN/NA CODE None

DATE PREPARED: 2 / 5 / 86 UPDATED: 2 / 24 / 89

Ident. 1698
4 of 4

PRODUCT NUMBER: 581770 241-7 Antifreeze Formulation

SECTION X - PRODUCT LABEL

241-7 Antifreeze Formulation

WARNING:
CONTAINS ETHYLENE GLYCOL (CAS No.: 107-21-1).
CONTACT MAY CAUSE TEMPORARY EYE AND SKIN IRRITATION.
INGESTION MAY RESULT IN ACUTE POISONING, CHARACTERIZED BY SEVERE ABDOMINAL DISTURBANCES, CENTRAL NERVOUS SYSTEM DEPRESSION AND POSSIBLE RESPIRATORY OR RENAL FAILURE. PROLONGED INHALATION OF VAPORS MAY RESULT IN IRRITATION OR UNCONSCIOUSNESS. CHRONIC OVEREXPOSURE MAY LEAD TO LIVER AND KIDNEY DAMAGE. ETHYLENE GLYCOL WAS TERATOGENIC IN LABORATORY ANIMAL STUDIES.

FIRST AID:
Eyes-Immediately wash eyes with running water for 15 minutes. If irritation develops, consult a physician.
Skin-Wash affected areas with soap and water. Remove and launder contaminated clothing before reuse. If irritation develops, consult a physician.
Ingestion-If swallowed, dilute with water and immediately induce vomiting. Never give fluids or induce vomiting if the victim is unconscious or having convulsions. Get immediate medical attention.
Inhalation-Move to fresh air. Aid in breathing, if necessary, and get immediate medical attention.

HANDLING AND STORAGE: Keep containers closed. In case of spill, clean up quickly as product is slippery. Wash away small amounts with cool water. Absorb large amounts with absorbent material or dike and pump into drums for proper disposal. Incinerate or bury in an approved landfill under guidance of local EPA. Prevent run-off onto public land or into waterways.

IN CASE OF FIRE: Use water fog, alcohol foam, CO2 or dry chemical extinguishing media. Firefighters should be equipped with self-contained breathing apparatus and turnout gear. Vapors from heated product can travel to source of ignition and flash back. Moderate explosion hazard when exposed to flame.

EMPTY CONTAINERS: All labeled precautions must be observed when handling, storing and transporting empty containers due to product residues. Do not reuse this container unless it is professionally cleaned and reconditioned.

DISPOSAL: Spill material, unused contents and empty containers must be disposed of in accordance with local, state and federal regulations. Refer to our Material Safety Data Sheet for specific disposal instructions.

IN CASE OF CHEMICAL EMERGENCY: Call CHEMTREC day or night for assistance and information concerning spilled material, fire, exposure and other chemical accidents. 800-424-9300.

ATTENTION: This product is sold solely for use by industrial institutions.

Refer to our Technical Bulletin and Material Safety Data Sheet regarding safety, usage, applications, hazards, procedures and disposal of this product. Consult your supervisor for additional information.

CAS No.: 107-21-1.
Made in U.S.A.
Industrial and Performance Chemicals
0289

SAMM 32.129

PRMI

MATERIAL SAFETY DATA SHEET

24 HR. EMERGENCY PHONE NO: CHEM-TREC 1-800-424-9300

Manufacturer: ProChem, Inc.
826 Roosevelt Road
Rockford, IL 61109

Phone: (815) 398-1788
Fax: (815) 398-1810
E-Mail: Prochem1@aol.com

SECTION 1 Product Identification

CHEMICAL NAME: Iron (III) Oxalate, 20% Solution
CAS REGISTRY NUMBER: Not assigned

SECTION 2 Composition and Information on Ingredients

INGREDIENT:	CAS#	%	ACGIH (TWA)	OSHA (PEL)
Title Compound	None assigned	100	No data	No data

SECTION 3 Hazards Identification

EMERGENCY OVERVIEW: Causes respiratory tract irritation. Harmful if inhaled. Causes eye irritation. Harmful if swallowed.
PRIMARY ROUTES OF EXPOSURE: Ingeston, inhalation, skin, eyes.
EYE CONTACT: Dust may cause severe irritation of the eyes and could cause permanent damage to cornea.
SKIN CONTACT: Causes irritation of the skin.
INHALATION: Inhalation ofvapor/mist can lead to irritation of the respiratory tract. May be harmful inhaled.
INGESTION: Moderately toxic if ingested.
ACUTE HEALTH EFFECTS: Severely irritating to eyes. Moderately toxic by ingestion. Causes skin irritation. Irritating to respiratory system.
CHRONIC HEALTH EFFECTS: Damage to kidneys, nerves.

SECTION 4 First Aid Measures

EYE EXPOSURE: Immediately flush the eyes with copious amounts of water (lukewarm if possible) for at least 15 minutes. Assure flushing under eyelids. A victim may need assistance in keeping their eyelids open. Get immediate medical attention.
SKIN EXPOSURE: Wash affected area with water. Remove contaminated clothes if necessary. Seek medical assistance if irritation or redness persists.
INHALATION: Remove victim to fresh air. Closely monitor the victim for signs of respiratory problems, such as difficulty in breathing, coughing, wheezing, or pain. In such cases seek immediate medical assistance.
INGESTION: Seek medical assistance immediatley. Keep the victim calm. Induce vomiting only if directed by medical personnel.

SECTION 5 Firefighting Measures

FLASH POINT: not applicable
AUTOIGNITION TEMPERATURE: no data
EXPLOSION LIMITS: no data
EXTINGUISHING MEDIUM: Water spray or carbon dioxide.
SPECIAL FIREFIGHTING PROCEDURES: If this product is involved in a fire, fire fighters should be equiped with a NIOSH approved positive pressure self-contained breathing apparatus and full protective clothing.
HAZARDOUS COMBUSTION AND DECOMPOSITION PRODUCTS: If involved in a fire this material may emit toxic and irritating fumes.
UNUSUAL FIRE OR EXPLOSTION HAZARDS: None known

SECTION 6 Accidental Release Measures

SPILL AND LEAD PROCEDURES: In the case of a spill, recover and place in a well-marked container for disposal. Use all safety precautions for clean up. After removal flush contaminated area with water. Collect wash waterfor approved disposal. Keep form entering water or ground water.
DISPOSAL: Dispose of in accordance with all waste disposal regulations.

SECTION 7 Handling and Storage

HANDLING AND STORAGE: Store in a tightlysealed container.

SECTION 8 Exposure Controls and Personal Protection

EYE PROTECTION: Always wear approved safety glasses w/side shields, or safety goggles or face shiels. when handling a chemicals substance in the laboratory.
SKIN PROTECTION: pvc, rubber chemical reclstane
VENTILATION: If possible, handle the material in a local exhaust hood.
RESPIRATOR: If ventilation if not available, a respirator should be worn. The use of respirators requires a Respirator Protection Program to be in compliance with 29CFR 1910.34.
ADDITIONAL PROTECTION: Protection to avoid contact with clothing, shoes.

SECTION 9 Physical and Chemical Properties

COLOR AND FORM: Brownish-yellowish liquid
pH: acidic
MOLECULAR WEIGHT: No Data
MELTING POINT (DEG. C.): No Data
SPECIFIC GRAVITY (WATER = 1): 1.12 - 1.14 @ 20 deg. C.
BOILING POINT: Not applicable
VAPOR PRESSURE: Not applicable
VAPOR DENSITY (AIR = 1): Not applicable
% VOLATILE BY VOLUME: Non volatile
SOLUBILITY IN WATER: Soluble

SECTION 10 Stability and Reactivity

STABILITY: Stable
HAZARDOUS POLYMERIZATION: Will not occur
CONDITIONS TO AVOID: No Data
INCOMPATIBILITY: Strong oxidizing agents
DECOMPOSITION PRODUCTS: May product toxic fumes of Carbon monoxide, carbon dioxide.

SECTION 11 Toxicological Information

CARCINOGENIC EFFECTS: No Data
MUTAGENIC EFFECTS: No Data
TETRATOGENIC EFFECTS: no Data

To the best of our knowledge the toxicological effects of this compound have not been fully investigated.

SECTION 12 Ecological Information

ECOLOGICAL INFORMATION: No information available

SECTION 13 Disposal Considerations

DISPOSAL: Dispose of in according to local state and federal regulations.

SECTION 14 Transportation Information

Corrosive liquid,acidic, inorganic, n.o.s. Class 8, UN3264 , PG III, Corrosive label

SECTION 15 Other Information

DISCLAIMER: The information herein is believed to be accurate and reliable as of the date compiled. However, ProChem, Inc. makes no representation, warranty, or guarantee of any kind with respect to the information in this document or any use of the product based on the information.
DATE PREPARED: 04/04

Material Safety Data Sheet

ProChem, Inc.
826 Roosevelt Rd.
Rockford, IL 61109

CHEM-TREC: 1-800-424-9300
EMERGENCY: 1-815-398-1788

SECTION I IDENTIFICATION

Product Name: **IRON (III) OXALATE**
Formula: $Fe_2(C_2O_4)_3 \cdot 6H_2O$
CAS #19469-07-9

SECTION II HAZARDOUS INGREDIENTS

HAZARDOUS INGREDIENTS	%	HAZARD DATA OSHA PEL:	ACGIH TLV:
IRON (III) OXALATE	100	Not Established	Not Established

SECTION III PHYSICAL DATA

Boiling Point: No Data
Specific Gravity (Water=1): No Data
Vapor Pressure (mm Hg): Not Applicable
Precent Volatile by Volume: Not Applicable
Vapor Density (Air=1): Not Applicable
Molecular Weight: 483.85
Melting Point (C°): 100 deg. C. (decomposes)
Solubility in Water: Soluble in hot water
Appearance, Odor, and Other: Light green powder

SECTION IV FIRE AND EXPLOSION HAZARD DATA

Flash point	Autoignition Temp.	Flammablie limits
Non-combustible	Not applicable	Not applicable

EXTINGUISHING METHOD: Use extinguishing agents suitable for surrounding fire.
FIRE/EXPLOSION HAZARDS:
No special firefighting procedures needed. Use normal conditions which include wearing NIOSH/MSHA approved self-contained breathing apparatus, flame and chemical resistant clothing; hats, boots and gloves. If without risk remove material from fire area.
SPECIAL FIREFIGHTING: None Known
UNUSUAL FIRE AND EXPLOSION HAZARDS:
Upon decomposition toxic fumes of Carbon monoxide and Carbon dioxide can be released. Combustible when exposed to prolonged heat or flame.

SECTION V HEALTH DATA

TOXICITY: To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.

EFFECTS OF OVEREXPOSUE: Irritant via inhalation and ingestion, has a caustic effect on the mouth,esophagus and stomach. May cause severe damage to kidneys.

EYE CONTACT: This material causes a severe irritant /burns to eyes.

SKIN CONTACT: Causes irritation to skin. May be harmful is absorbed thru skin.

INHALATION: Causes irritation/caustic effect to nose, throat and respiratory tract.

INGESTION: Results in irritation and/or burns of the mouth and gastro intestinal tract.

EMERGENCY AND FIRST AID PROCEDURES: Remove from exposure.
EYES: Flush with copious amounts of water for at least 15 minutes while removing any contaminated clothing and shoes. Assure adequate flushing of the eyes by separating eyelids with fingers. Get medical attention by physician immediately. SKIN: Remove any contaminated clothing. Wash skin with soap and water.If redness or irritation persists, seek medical attention. INHALATION: Move patient to fresh air. If not breathing give CPR. Administer oxygen is breathing is difficult and seek medical attention immediately. INGESTION : Seek immediate competent medical attention. Never give anything by mouth to an unconscious person. Do not induce vomiting.

SECTION VI REACTIVITY DATA

GENERAL REACTIVITY: Stable
INCOMPATIBILITY: Oxidizing Agents
CONDITIONS TO AVOID: None Known
HAZARDOUS DECOMPOSITION OR BYPRODUCTS: Carbon monoxide and Carbon Dioxide
HAZARDOUS POLYMERIZATION: Will not occur

SECTION VII SPILL PROCEDURES, DISPOSAL REQUIREMENTS

Wear appropriate respiratory and protective equipment.
Try not to raise dust. Absorb spill with inert material, then place in applicable chemical waste container tightly sealed. Label drum for disposal. Clean up spills immediately, observing all precautions. Retain all contaminated soilage for removal and treatment.
WASTE DISPOSAL: Consult waste disposal facility capable of handling this type of chemical.

SECTION VIII SPECIAL PROTECTION INFORMATION

PROTECTIVE EQUIPMENT SUMMARY:
RESPIRATORY PROTECTION: NIOSH/MSHA approved dust respirator. when proper ventilation is not available.
VENTILATION: Chemical Fume Hood designed to have an average face velocity of at least 100 ft. per minute.
PROTECTIVE GLOVES: Rubber
EYE PROTECTION: ANSI approved safety goggles, glasses with side shields, or face shield.
OTHER: Protective gear suitable to prevent contamination and contact with material.

WORK/HYGIENE/MAINTENANCE PRACTICES: Safety shower/eye bath should be readily available. Use in a controlled environment. Maintain good housekeeping and sanitation practices to avoid contact and contamination of area. Do not eat or drink in work area. Wash thoroughly after using. Do not smoke in area.

STORAGE: Make sure lid is tightly on bottle after use.Store in a cool, dry well ventilated area. Store away from oxidizing agents.
PRECAUTIONS: IRRITANT. Causes severe irritation to eyes. Irritant to skin and respiratory system. Wear adequate protection to avoid contact with skin, eyes, clothing. Use with adequate ventilation (chemical fume hood), or if adequate ventilation is not available use with approved dust respirator to keep below TLV limits. Use in a controlled environment.

Date Prepared: 09/31/03
Safety Dept.

Employers/employees should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this informatin to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product or process, is the responsibility of the user.

SAMM 32.130

GE Betz

GE Betz, Inc.
4636 Somerton Road
Trevose, PA 19053
Business telephone: (215) 355-3300

Material Safety Data Sheet

Issue Date: 24-AUG-2000

EMERGENCY TELEPHONE (Health/Accident): (800) 877-1940

1 PRODUCT IDENTIFICATION

PRODUCT NAME:

POLYFLOC CP1160

PRODUCT APPLICATION AREA:

FLOCCULANT.

2 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. This product is subject to the Pennsylvania and New Jersey Worker and Community Right to Know Law.

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 Pennsylvania thresholds for carcinogens.

NON-HAZARDOUS INGREDIENTS:

CAS#	CHEMICAL NAME
7732-18-5	WATER
69418-26-4	ETHANAMINIUM,N,N,N-TRIMETHYL-2-[(1-OXO-2-PROPENYL)OXY] - CHLORIDE, POLYMER WITH 2-PROPENAMIDE

3 HAZARDS IDENTIFICATION

****

EMERGENCY OVERVIEW

CAUTION

May cause slight irritation to the skin. Potential eye irritant due

to mechanical action only. Dusts may cause irritation to the upper respiratory tract.

DOT hazard is not applicable
Emergency Response Guide is not applicable
Odor: None; Appearance: White, Powder

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:
Potential eye irritant due to mechanical action only.

ACUTE RESPIRATORY EFFECTS:
Dusts may cause irritation to the upper respiratory tract.

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.

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 3-4 glasses 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:
Thermal decomposition (destructive fires) yields elemental oxides.

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 & STORAGE

HANDLING:
Normal chemical handling.

STORAGE:
Keep containers closed when not in use. Keep dry.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMITS

This product is not hazardous as defined by OSHA regulations.

ENGINEERING CONTROLS:
Adequate ventilation to maintain dust concentrations below the exposure limit of 10 mg/m3(PEL/TLV) for nuisance dusts.

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 dust/mist filters.

SKIN PROTECTION:
rubber gloves-- Wash off after each use. Replace as necessary.

EYE PROTECTION:
airtight chemical goggles

9 PHYSICAL & CHEMICAL PROPERTIES

Density	43.200 lb/cu.	Vapor Pressure (mmHG)	< 0.1
Freeze Point (F)	NA	Vapor Density (air=1)	< 1.00
Freeze Point (C)	NA		
Viscosity(cps 70F,21C)	NA	% Solubility (water)	~ 2.0

Odor		None
Appearance		White
Physical State		Powder
Flash Point	P-M(CC)	> 200F > 93C
pH 0.5% Sol. (approx.)		4.2
Evaporation Rate (Ether=1)		< 1.00

NA = not applicable ND = not determined

10 STABILITY & REACTIVITY

STABILITY:
Stable under normal storage conditions.
HAZARDOUS POLYMERIZATION:
Will not occur.
INCOMPATIBILITIES:
May react with strong oxidizers.
DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.
INTERNAL PUMPOUT/CLEANOUT CATEGORIES:
"A"

11 TOXICOLOGICAL INFORMATION

Oral LD50 RAT: >5,000 mg/kg
Carcinogenicity DOG: NEGATIVE
NOTE - One year dog study had no adverse effects.
Carcinogenicity RAT: NEGATIVE
NOTE - Two year rat study had no adverse effects.
Dermal LD50 RABBIT: >2,000 mg/kg
NOTE - Non-toxic even at high dose levels
Eye Irritation Score RABBIT:
NOTE - Mechanical irritation
Skin Sensitization G.PIG: NEGATIVE

12 ECOLOGICAL INFORMATION

AQUATIC TOXICOLOGY
Daphnia magna 48 Hour Static Renewal Bioassay
LC50= 158; No Effect Level= 15 mg/L
Fathead Minnow 96 Hour Static Renewal Bioassay
LC50= 5.9; No Effect Level= 2.3 mg/L

BIODEGRADATION
BOD-28 (mg/g): 165
BOD-5 (mg/g): 122
COD (mg/g): 1100
TOC (mg/g): 200

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

DOT HAZARD:	Not Applicable
UN / NA NUMBER:	Not applicable
DOT EMERGENCY RESPONSE GUIDE #:	Not applicable

15 REGULATORY INFORMATION

TSCA:
All components of this product are listed in the TSCA inventory.

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)

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

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65) CHEMICALS PRESENT:

No regulated constituent present at OSHA thresholds

MICHIGAN REGULATORY INFORMATION

No regulated constituent present at OSHA thresholds

16 OTHER INFORMATION

NFPA/HMIS		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.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
MSDS status:	11-FEB-1998		** NEW **

20-APR-1998	;EDIT:9	11-FEB-1998
26-MAY-1999	12	20-APR-1998
01-JUN-1999	15	26-MAY-1999
24-AUG-2000	4	01-JUN-1999

SAMM 32.131

GE Betz

GE Betz, Inc.
4636 Somerton Road
Trevose, PA 19053
Business telephone: (215) 355-3300

Material Safety Data Sheet

Issue Date: 24-AUG-2000

EMERGENCY TELEPHONE (Health/Accident): (800) 877-1940

1 PRODUCT IDENTIFICATION

PRODUCT NAME:

POLYFLOC AP1100

PRODUCT APPLICATION AREA:

FLOCCULANT.

2 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. This product is subject to the Pennsylvania and New Jersey Worker and Community Right to Know Law.

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 Pennsylvania thresholds for carcinogens.

NON-HAZARDOUS INGREDIENTS:

CAS#	CHEMICAL NAME
7732-18-5	WATER
25085-02-3	ACRYLAMIDE/SODIUM ACRYLATE COPOLYMER

3 HAZARDS IDENTIFICATION

****

EMERGENCY OVERVIEW

CAUTION

May cause slight irritation to the skin. May cause moderate irritation to the eyes. Dusts may cause irritation to the upper respiratory tract.

DOT hazard is not applicable
Emergency Response Guide is not applicable
Odor: None; Appearance: White, Powder

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; May cause slight irritation to the skin.

ACUTE EYE EFFECTS:
May cause moderate irritation to the eyes.

ACUTE RESPIRATORY EFFECTS:
Dusts may cause irritation to the upper respiratory tract.

INGESTION EFFECTS:
May cause slight gastrointestinal irritation with possible nausea, vomiting, abdominal discomfort and diarrhea.

TARGET ORGANS:
No evidence of potential chronic effects.

MEDICAL CONDITIONS AGGRAVATED:
Not known.

SYMPTOMS OF EXPOSURE:
May cause redness or itching of skin.

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 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 3-4 glasses 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/CO2/foam or water--slippery condition; use sand/grit.

HAZARDOUS DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.

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 & STORAGE

HANDLING:
Normal chemical handling.

STORAGE:
Keep containers closed when not in use. Reasonable and safe chemical storage. Keep dry.

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 a respirator with dust/mist filters.

SKIN PROTECTION:
neoprene gloves-- Wash off after each use. Replace as necessary.

EYE PROTECTION:
airtight chemical goggles

9 PHYSICAL & CHEMICAL PROPERTIES

Density	42.000 lb/cu.	Vapor Pressure (mmHG)	< 0.1
Freeze Point (F)	NA	Vapor Density (air=1)	< 1.00
Freeze Point (C)	NA		
Viscosity(cps 70F,21C)	NA	% Solubility (water)	1.0

Odor		None
Appearance		White
Physical State		Powder
Flash Point	P-M(CC)	> 200F > 93C
pH 5% Sol. (approx.)		7.0
Evaporation Rate (Ether=1)		< 1.00

NA = not applicable ND = not determined

10 STABILITY & REACTIVITY

STABILITY:
Stable under normal storage conditions.
HAZARDOUS POLYMERIZATION:
Will not occur.
INCOMPATIBILITIES:
May react with strong oxidizers.
DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.
INTERNAL PUMPOUT/CLEANOUT CATEGORIES:
"A"

11 TOXICOLOGICAL INFORMATION

Oral LD50 RAT:	>5,000 mg/kg
28 Day Oral RAT/DOG:	NEGATIVE

NOTE - Rat two-year feed: no adverse effects. Dog one-year feed: no adverse effects.

Dermal LD50 RABBIT:	>2,000 mg/kg

NOTE - Non-toxic at high dose levels

Skin Irritation Score RABBIT:	NEGATIVE
Eye Irritation Score RABBIT:	SLIGHT
Skin Sensitization G.PIG:	NEGATIVE

12 ECOLOGICAL INFORMATION

AQUATIC TOXICOLOGY

Bluegill Sunfish 96 Hour Static Screen
0% Mortality= 300 mg/L
Ceriodaphnia 48 Hour Static Acute Bioassay
LC50= 5; No Effect Level= 1.6 mg/L
Daphnia magna 48 Hour Static Screen
0% Mortality= 500 mg/L
Fathead Minnow 96 Hour Static Screen
0% Mortality= 500 mg/L
Rainbow Trout 72 Hour Static Screen
0% Mortality= 100 mg/L

BIODEGRADATION

BOD-28 (mg/g): 22
BOD-5 (mg/g): 1
COD (mg/g): 2970
TOC (mg/g): 680

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

DOT HAZARD:	Not Applicable
UN / NA NUMBER:	Not applicable
DOT EMERGENCY RESPONSE GUIDE #:	Not applicable

15 REGULATORY INFORMATION

TSCA:
All components of this product are listed in the TSCA inventory.
CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):
No regulated constituent present at OSHA thresholds
FOOD AND DRUG ADMINISTRATION:
21 CFR 176.110 (acrylamide - acrylic acid resins)
All ingredients comprising this product are authorized by FDA for the manufacture of paper and paperboard that may contact aqueous and fatty foods as per 21 CFR 176.170(a) (4).
USDA FEDERALLY INSPECTED MEAT AND POULTRY PLANTS:
SEC.G6,L1
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

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65) CHEMICALS PRESENT:

No regulated constituent present at OSHA thresholds
MICHIGAN REGULATORY INFORMATION

No regulated constituent present at OSHA thresholds

16 OTHER INFORMATION

NFPA/HMIS		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.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
MSDS status:	16-MAR-1998		** NEW **
	27-MAY-1999	15	16-MAR-1998
	24-AUG-2000	4	27-MAY-1999

From : WARREN DIST. PHONE No. : 4022895306 Apr. 25 1995 7:40AM P01

1995 16.36 PG. 1 of 3

2584

Post-it® Fax Note 7671	Date 4/24	# of pages ▶ 3
To Craig Peace	From Jason K	
Co./Dept.	Co.	
Phone #	Phone #	
Fax #	Fax #	

SAFE BRANDS CORPORATION
727 South 13th Street
Omaha, Nebraska 68102

800-432-9306
FAX 402-341-8654

MATERIAL SAFETY DATA SHEET

IDENTITY (As used on label and list):
SIERRA ANTIFREEZE-COOLANT

PRODUCT CODE: SI01AF6P

NFPA Hazard Identification

	0 - Least
Health: 0	1 - Slight
Fire: 1	2 - Moderate
Reactivity: 0	3 - High
	4 - Extreme

Section I - General Information

Safe Brands Corporation
2849 River Road
Council Bluffs, IA 51501
Emergency (402) 341-9397
Information (800) 432-9306
Chemtrec (800) 424-9300
Revised: 08-18-94

Section II - Composition/Information on Ingredients

COMPONENT NAME	%	CAS
PEL MIST PEL VAPOR		
Sodium Nitrate	< 1	7631-99-4
none established		
Sodium Silicate	< 1	1344-09-8
none established		

NON-HAZARDOUS INGREDIENTS > 1 %

Propylene Glycol	94	57-55-6
none established		
Water	3	
Proprietary additives	3	

(Does not contain IARC, NTP, OSHA and ACGIH listed carcinogens greater than 0.1%)

Section III - Hazards Identification

EYE CONTACT: May cause minor eye irritation.

SKIN CONTACT: No significant adverse effects are expected under anticipated conditions of normal use. Repeated, prolonged exposure may cause slight flaking, tenderness, and softening of skin.

INHALATION: No significant adverse effects are expected under anticipated conditions of normal use. If effects do occur, refer to FIRST AID section.

INGESTION: No significant adverse effects are expected under anticipated conditions of normal use. Excessive ingestion may cause central nervous system effects.

SIGNS AND SYMPTOMS OF OVEREXPOSURE: as above

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: Material and/or its emissions may aggravate preexisting eye disease.

OTHER HEALTH INFORMATION: none

Section IV - First Aid Procedures

EYE CONTACT: Immediately rinse with clean water for 20-30 minutes. Retract eyelids often. Obtain medical attention if pain, blinking, tears or redness persist.

SKIN CONTACT: Product is not expected to present a significant skin hazard under anticipated conditions of normal use.

INHALATION: If overcome by exposure, remove victim to fresh air immediately. Give oxygen or artificial respiration as needed. Obtain emergency medical attention. Prompt action is essential.

INGESTION: If large quantity is swallowed, give a pint of lukewarm water if victim is completely conscious and alert. If large quantities are consumed, induce vomiting. Obtain emergency medical attention.

CARCINOGENICITY: n/a

Section V - Fire and Explosion Hazard Data

Flash Point (deg F): 211

Flammable or Explosive Limits (approximate % by volume in air) LEL: 2.4 UEL: 17.4

EXTINGUISHING MEDIA: carbon dioxide, dry chemical, alcohol type foam, water spray, water fog

SPECIAL FIRE FIGHTING PROCEDURES: Wear positive pressure, self contained breathing apparatus and other protective apparatus as warranted. Fight fire from distance or protected location - heat may build up pressure and rupture closed containers. Liquid may form slippery film. Use water spray or fog for cooling, solid stream may spread fire as burning liquid will float on water. Avoid frothing/steam explosion. Notify authorities if liquid enters sewers/public waters.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Heat from fire can generate flammable vapor. When mixed with air and exposed to ignition source, vapors can burn in open or explode if confined. Vapors may be heavier than air and travel long distances along ground before igniting and flashing back. Fine sprays and mists may be combustible at temperatures below normal flash point.

Section VI - Accidental Release Measures

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Prevent flow to sewers and public waters as it may contaminate said water. Restrict water usage to prevent slip/fall hazard. Soak up small spills with inert solids. Dike and recover large land spills. Notify appropriate authorities if product enters any waterway.

Section VII - Handling and Storage

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Store in tightly closed and properly vented containers, away from heat, sparks, open flame, and strong oxidizing agents.

Section VIII - Exposure Controls/Personal Protection

RESPIRATORY PROTECTION: No special respiratory protection equipment is recommended under normal conditions of anticipated use with adequate ventilation.

VENTILATION: Adequate general ventilation is required, local exhaust is recommended if possible.

PROTECTIVE GLOVES: not required

EYE PROTECTION: Chemical splash goggles or full face shield must be worn when possibility exists for eye contact due to splashing or spraying liquid, airborne particles, or vapor. Contact lenses should not be worn.

OTHER PROTECTIVE EQUIPMENT: none

WORK PRACTICES/ENGINEERING CONTROLS: Keep containers closed when not in use.

PERSONAL HYGIENE: If product handling results in skin contact, wash hands and other exposed areas with mild soap and water before eating, drinking, smoking, or using toilet facilities. Promptly remove soiled clothing and wash thoroughly before reuse.

Section IX - Physical/Chemical Characteristics

Boiling Point (deg F): 365
Specific Gravity (H_2O=1): 1.04
Vapor Pressure (mm Hg): <0.1
Melting Point (deg F): -76
Vapor Density (Air=1): 2.6
Solubility in Water : complete
Evaporation Rate (n-butyl Acetate=1): slight

APPEARANCE AND ODOR: dark green, slightly viscous almost odorless liquid

Section X - Reactivity Data

STABILITY: stable
CONDITIONS TO AVOID: heat, sparks, open flame

INCOMPATIBILITY (MATERIALS TO AVOID): strong alkalis, strong oxidizing agents
HAZARDOUS DECOMPOSITION OR BYPRODUCTS: carbon monoxide and other toxic vapors

HAZARDOUS POLYMERIZATION: not expected to occur

CONDITIONS TO AVOID: n/a

Section XI - Toxicological Information

See Section IV

Section XII - Ecological Information

No chemicals in this product are subject to the reporting requirements of CERCLA.

Section XIII - Disposal Considerations

WASTE DISPOSAL METHOD: Landfill solids at permitted sites using registered transporters. Burn concentrated liquids, avoiding flameouts, and assuring emissions comply with applicable regulations. Dilute aqueous waste may biodegrade, but avoid overloading plant biomass and assuring effluent complies with applicable regulations.

Section XIV - Transport Information

This product is not regulated by DOT

Section XV - Regulatory Information

WHMIS classification for product: n/a

This product has been classified in accordance with the hazard criteria of the CFR and the MSDS contains all the information required by the CFR.

This material safety data sheet and the information it contains is offered to you in good faith as accurate. We have reviewed any information contained in the data sheet which we received from sources outside our company and we believe that information to be correct, but cannot guarantee its accuracy or completeness. Health and safety precautions in this data sheet may not be adequate for all individuals and/or situations. It is the user's obligation to evaluate and use this product safely and to comply with all applicable laws and regulations. No statement made in this data sheet shall be construed as permission or recommendation for the use of any product in a manner that might infringe existing patents. No warranty is made, either expressed or implied.

WCI
WESTERN CHEMICAL INTERNATIONAL, INC.
2939 N. 67TH PLACE, SCOTTSDALE, AZ 85251 (602) 990-9487

B-10.27

MAY BE USED TO COMPLY WITH OSHA'S HAZARD COMMUNICATION STANDARD (HSCS) 29 CFR 1910.1200 STANDARD & MUST BE CONSULTED FOR SPECIFIC REQUIREMENTS

HAZARD RATING

HEALTH	1	REACTIVITY	0
FLAMMABILITY	1	SPECIAL	0

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COMPOUND, CLEANING LIQUID/COMBUS. LIQ. NA 1270 D.O.T. CLASSIFICATION:

I - IDENTIFICATION

PRODUCT NAME	"EPA 2000" WCI-140	EMERGENCY PHONE	(602) 990-9487
PREPARER	M. Michaels	DATE PREPARED	8/18/92

NONE OF THE INGREDIENTS IN THIS FORMULATION ARE FOUND ON ANY LISTS OF HAZARDOUS, CARCINOGENIC OR BANNED CHEMICAL AGENTS OR MATERIALS GENERATED BY THEM. AGENCIES INVESTIGATED INCLUDE THE E.P.A., F.D.A., NATIONAL CANCER INSTITUTE, NATIONAL SCIENCE FOUNDATION, O.S.H.A. (FEDERAL AND CALIFORNIA), THE CONSUMER PRODUCT SAFETY COMMISSION, D.O.T. (SAFETY INSTITUTE AND SPECIAL PROGRAMS ADMINISTRATION), AND THE NATIONAL TOXICOLOGY PROGRAM. THE FORMULATION IS A TRADE SECRET AND COMPLIES WITH 29CFR XVII-1910.1200, SECTION(i), "TRADE SECRETS."

II - HAZARDOUS INGREDIENTS

PRINCIPLE COMPONENT(S) (CHEMICAL NAMES)	CAS#	TLV	PEL
ALIPHATIC HYDROCARBONS - C_{10}-C_{14}	64742-47-8	200	200
PARAFFINIC HYDROCARBONS	64742-88-8	200	200
D-LIMONENE	5989-27-5	None	None

"EPA 2000" formula is a trade secret and complies with 29 CFR 1910.1200, Section (i) Trade Secrets. VOC (Volatile Organic Compounds is within Air Quality Emission Standards (California-All Districts). No ingredients listed under Cal. State Drinking & Toxic Chemical Enforcement Act (1986). OSHA Hazard Class 29 CFR 1910.1200 - NON HAZARDOUS LIQUID; RCRA Hazardous Waste Class 40 CFR 261.2 - NON HAZARDOUS WASTE; TCLP Waste Class 40 CFR 261.4 - NON HAZARDOUS WASTE

III - PHYSICAL DATA

BOILING POINT (°F)	320-290°F	SPECIFIC GRAVITY (H_2O=1)	0.810
VAPOR PRESSURE (psig)mm Hg.	@25°C 1	Ph	N/D
VAPOR DENSITY (Air=1)	3	EVAPORATION RATE	Butyl Acetate=1 <1
SOLUBILITY IN WATER	Insoluble	APPEARANCE AND ODOR	Non viscous liquid, clear color, pleasant odor

IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	154°F (open cup) 143°F (TCC/Pensky-Martens)	FLAMMABLE LIMITS	Lower N/A Upper N/A
EXTINGUISHING MEDIA	CO_2, Dry Powder, Foam		
SPECIAL FIRE FIGHTING PROCEDURES	Class B Procedures		
UNUSUAL FIRE AND EXPLOSION HAZARDS	Keep away from sparks and open flames. Do not use welding torch on or near drum.		

V - REACTIVITY DATA

CHEMICAL STABILITY	UNSTABLE		CONDITIONS TO AVOID: Open flames, welding arcs, or other high temperature sources.
	STABLE	XX	
INCOMPATABILITY (Materials to avoid)	Oxidizing agents		
HAZARDOUS DECOMPOSITION OR BYPRODUCTS	None Known		
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID: None Known
	WILL NOT OCCUR	X	

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VI - HEALTH HAZARD DATA

ROUTE(S) OF ENTRY: INHALATION? Unlikely	SKIN? Possible	INGESTION? Unlikely

HEALTH HAZARDS *(ACUTE AND CHRONIC)*

Product has low vapor pressure and should not present a hazard under normal working conditions.

SIGNS AND SYMPTOMS OF EXPOSURE Product considered safe under normal usage. Over exposure, however, may result in the following: INHALATION: Dizziness; SKIN/EYES: Irritation; INGESTION: Gastro-intestinal irritation.

CARCINOGINICITY.	NTP? No	IARC MONOGRAPHS? No	OSHA REGULATED? No

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE None Known

EMERGENCY AND FIRST AID PROCEDURES INHALATION: Remove to fresh air; SKIN: Wash with soap and water; EYES: Flush with water for 15 minutes. If irritation persists, seek medical attention. INGESTION: Do not induce vomiting, get medical attention.

VII - PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED. Allow small spills to evaporate. Larger spills should be collected and disposed of properly in accordance with regulations.

WASTE DISPOSAL METHOD: EPA 2000 has a high BTU value. Waste product can, therefore, be mixed with normal waste oil for burning as industrial fuel. It can also be recycled or reclaimed.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING:
Store in cool, dry area away from heat. Keep container tightly closed when product is not being used.

VIII - CONTROL MEASURES

RESPIRATORY PROTECTION *(SPECIFY TYPE)* Not required if TLV kept below PPM

VENTILATION	LOCAL EXHAUST Adequate	SPECIAL None
	MECHANICAL *(GENERAL)* Adequate	OTHER None

PROTECTIVE GLOVES Nitrile /PVC	EYE PROTECTION Goggles/Safety Glasses

OTHER PROTECTIVE CLOTHING OR EQUIPMENT None required

WORK/HYGIENIC PRACTICES Keep eye wash in vicinity. Wash with soap & water before handling food.

A-10.24

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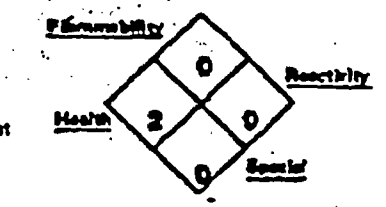
SAVOGRAN

P.O. Box 130, Norwood, Mass. 02062
Emergency Telephone: (617) 762-5400

DATA FOR HAZARDS INFORMATION LABEL

Hazard Code
4 = Extreme
3 = High
2 = Moderate
1 = Slight
0 = Insignificant



MATERIAL SAFETY DATA SHEET

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TRADE NAME: SAVOGRAN TSP with trisodium phosphate EFFECTIVE DATE: March, 1991
CHEMICAL NAME: Mixture C.A.S. No.: Not Applicable Class: DETERGENT
DOT SHIPPING NAME AND LABELING: Cleaning Compound - Not regulated under 5000 pounds

SECTION 2 HAZARDOUS INGREDIENTS

	C.A.S. No	Wt %	Exposure Guidelines
Sodium Phosphate, Tribasic, crystalline	10101-89-0	>80	Not established
Sodium Sesquicarbonate, crystalline	533-96-0	<20	Not established

Average elemental phosphorous content 7.3% in the form of phosphates. Equivalent of 17 grams per cup of powder.

SECTION 3 PHYSICAL DATA

Boiling Point: > 500°C
Melting Point: NA
Vapor Pressure: NA
Specific Gravity: NA
Density: 60 - 75 lbs/ft^3

% Volatile: NA
Evaporation Rate: NA
Solubility in water: Moderate
pH (1% in H_2O): 11 - 12
Appearance: White crystalline solid

SECTION 4 FIRE AND EXPLOSION DATA

FLASH POINT: Not applicable
FLAMMABLE LIMITS: Not applicable
EXTINGUISHING MEDIA: Nonflammable
HAZARDOUS DECOMPOSITION PRODUCTS: May form toxic materials: carbon dioxide, carbon monoxide, etc. when heated to high temperature.
SPECIAL FIREFIGHTING PROCEDURES: Solutions in water are moderately to strong alkaline. Wear full protective clothing.
UNUSUAL FIRE AND EXPLOSION HAZARDS: Not applicable

SECTION 5 HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE: See Section 2
EFFECTS OF EXPOSURE - Routes of Entry - ACUTE (immediate)
Eyes: Can cause severe irritation and burning and transient injury to cornea.
Skin: Irritating, may cause chemical burns and dermatitis.
Inhalation: Inhalation of dust can cause nasal and respiratory irritation.
Swallowing: May cause irritation and chemical burns to the gastrointestinal tract.
EFFECTS OF EXPOSURE - CHRONIC (delayed): None known
Carcinogenicity: NTP? No IARC MONOGRAPHS? No OSHA REGULATED? No
FIRST AID:
Eyes: Flush eyes with plenty of running water for at least 15 minutes. Hold eyelids apart to ensure complete irrigation of all tissue. Get medical attention promptly.
Skin: Remove contaminated clothing and wash skin thoroughly with water. If irritation occurs get medical attention promptly. Thoroughly wash contaminated clothing before reuse.
Inhalation: If illness occurs, remove patient to fresh air. If breathing is difficult, give oxygen. If breathing has stopped, start artificial respiration. Get medical attention promptly.
Swallowing: Never give anything by mouth to an unconscious person. If swallowed DO NOT INDUCE VOMITING. Give large quantities of water (if available give several glasses of milk). If vomiting occurs spontaneously keep airway clear and give more water. Get medical attention promptly. If symptoms indicate, apply treatment as appropriate for corrosive alkali substance.

Quality Products Since 1875
SAVOGRAN
P.O BOX 130 NORWOOD MASS. 02062
Telephone: From Massachusetts: (617) 762-5400
All others except Western Region: (800) 225-9872
FAX (617) 762-1085

From Western Region, Alaska, Arizona, California, Hawaii, Idaho, Nevada, New Mexico, Oregon, Utah, and Washington, write to:
P. O. Box 23400, Los Angeles, CA 90023
Telephone: From California, Alaska and Hawaii: (213) 261-5111
All others: (800) 421-6002

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MSDS SAVOGRAN TSP

SECTION 6 REACTIVITY DATA

STABILITY: Stable
HAZARDOUS POLYMERIZATION: Will not occur.
INCOMPATIBILITY (materials to avoid): Solutions in water are highly alkaline and may produce hydrogen gas when in contact with aluminum. Will react with acids to form carbon dioxide. Material is hygroscopic and tends to cake.
CONDITIONS TO AVOID: See "SECTION 4 - UNUSUAL FIRE AND EXPLOSION HAZARDS."

SECTION 7 SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Review "SECTION 6 - UNUSUAL FIRE AND EXPLOSION HAZARDS."
SMALL SPILLS: Sweep up material and transfer to containers. Thoroughly sweep area to clean up residue. Remaining residue may be washed away with water.
LARGE SPILLS: Same as for small spills.
DISPOSAL OF WASTE: Small quantities may be deposited in general trash and residue flushed down drain with water. Large spills - Deposit containers in posted toxic substances land-fill in accordance with local, state and federal regulations. Trisodium phosphate has a reportable quantity (RQ) of 5000 lbs.

SECTION 8 SPECIAL PROTECTION INFORMATION

VENTILATION: Use local exhaust to control dust formation
RESPIRATORY PROTECTION: Wear NIOSH/MSHA approved dust respirator, if dust is formed
GLOVES: Industrial quality cotton lined neoprene gloves with close fitting wristlets.
EYE PROTECTION: Chemical goggles or safety glasses with side shield.
OTHER PROTECTIVE EQUIPMENT: No special protective clothing needed; however, wear long sleeved shirts with long pants to protect skin against splashes and spills.

SECTION 9 SPECIAL PRECAUTIONS

EMPTIED CONTAINERS: Empty containers may be incinerated or discarded with general trash. Large containers should be completely emptied before disposal. Because empty containers may contain residues which are hazardous, all precautions given on this sheet should be observed.
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Store in dry place. Moisture can cause caking. Keep away from acids of all types. Water solutions can be corrosive to aluminum and generate hydrogen.

NOTE: Judgement of potential hazards of this mixture is based on information available about individual components listed under SECTION 2 - HAZARDOUS INGREDIENTS. Direct testing of mixture has not been done.

Information given herein is believed to be accurate and is given in good faith; however, no warranty either expressed or implied is made. It is strongly suggested that users confirm in advance of need that the information is current and applicable to their situations.

Note: The sale or use of cleaners containing Phosphates is prohibited in some states and localities.

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OxyChem®

MATERIAL SAFETY DATA SHEET

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MSDS NUMBER : M5389

MSDS DATE : 04-09-90

PRODUCT NAME : 50% CAUSTIC SODA SOLUTION

24 HOUR EMERGENCY PHONE: (716) 278-7021

I. PRODUCT IDENTIFICATION

HMIS HAZARD RATINGS

HEALTH HAZARD 3 FIRE HAZARD 0 REACTIVITY 2
Based on the National Paint & Coatings Association HMIS rating system.

SARA/TITLE III HAZARD CATEGORIES (See Section X)

Immediate (ACUTE) Health: YES Reactive Hazard: YES
Delayed (Chronic) Health: NO Sudden Release of Pressure: NO
Fire Hazard: NO

MANUFACTURER'S NAME AND ADDRESS : Occidental Chemical Corporation
Customer Service, Occidental Tower,
P O Box 809050, Dallas, Texas 75380
Telephone (1-800-752-5151)

CHEMICAL NAME: Sodium Hydroxide CAS NUMBER: 1310-73-2

SYNONYMS/COMMON NAMES: Sodium Hydroxide; NaOH

CHEMICAL FORMULA: NaOH

DOT PROPER SHIPPING NAME: Sodium Hydroxide, Liquid

DOT HAZARD CLASS: Corrosive Material

DOT I.D. NUMBER: UN1824

DOT HAZARDOUS SUBSTANCE: RQ 1000#

II. HEALTH HAZARD INFORMATION

EMERGENCY AND FIRST AID PROCEDURES

EYES:
OBJECT IS TO FLUSH MATERIAL OUT IMMEDIATELY. THEN SEEK MEDICAL ATTENTION. IMMEDIATELY flush eyes with large amounts of water for at least 15 minutes forcibly holding lids apart to ensure flushing of entire surface. Washing eyes within several seconds is essential to achieve maximum effectiveness. SEEK MEDICAL ATTENTION IMMEDIATELY.

II. HEALTH HAZARD INFORMATION (Continued)

SKIN:
IMMEDIATELY wash with plenty of water for at least 15 minutes. Remove contaminated clothing and footwear. Wash clothing before reuse and discard footwear which cannot be decontaminated. SEEK MEDICAL ATTENTION IMMEDIATELY.

INHALATION:
Remove to fresh air; if breathing is difficult have trained person administer oxygen. If respiration stops, give mouth-to-mouth resuscitation. GET MEDICAL ATTENTION.

INGESTION:
NEVER give anything by mouth to an unconscious person. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. If available, give several glasses of milk. If vomiting occurs spontaneously, keep airway clear. SEEK MEDICAL ATTENTION IMMEDIATELY.

ROUTES OF EXPOSURE

INHALATION:
Airborne concentrations of dust, mist, or spray of this product may cause damage to the upper respiratory tract and lung tissue proper which could produce chemical pneumonia, depending upon severity of exposure.

SKIN:
This product is destructive to tissue contacted and produces severe burns. A latent period may exist between exposure and sense of irritation.

EYE CONTACT:
This product is destructive to eye tissues on contact. Will cause severe burns that result in damage to the eyes and even blindness.

INGESTION:
This product, if swallowed, can cause severe burns and complete tissue perforation of mucous membranes of the mouth, throat, esophagus, and stomach.

EFFECTS OF OVEREXPOSURE

ACUTE:
Corrosive to all body tissues with which it comes in contact. The effect of local dermal exposure may consist of multiple areas of superficial destruction of the skin or of primary irritant dermatitis. Similarly, inhalation of dust, spray, or mist may result in varying degrees of irritation or damage to the respiratory tract tissues and an increased susceptibility to respiratory illness. These effects occur only when the TLV is exceeded.

CHRONIC:
No known chronic effects.

TOXICOLOGY DATA:
Caustic soda is a corrosive material.
Acute Oral LD50 = 140-340 mg/kg (rat)
Acute Dermal LD50 = 1350 mg/kg (rabbit)

Human Dermal Exposure
Regardless of concentrations, the severity of damage and extent of its irreversibility increases with length of contact time. Prolonged contact with even dilute sodium hydroxide solution can cause a high degree of tissue destruction. The latent period, following skin contact during which no sensation of irritation occurs, varies from several hours for 0.4 - 4% solution to 3 minutes with 25 - 50% solution.

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III. IMPORTANT COMPONENTS

CAS NUMBER / NAME
1310732 Sodium hydroxide (Na(OH))

EXPOSURE LIMITS
PEL=2 mg/m3, Ceiling
TLV=2 mg/m3, Ceiling

PERCENTAGE
VOL ND
WT 48.50-51

COMMON NAMES:
CAUSTIC SODA

Listed On(List Legend Below):
13 18 21

7647145 Sodium chloride (NaCl)

EXPOSURE LIMITS
PEL=None established
TLV=None established

PERCENTAGE
VOL ND
WT 0.80-1.30

COMMON NAMES:
SALT

Listed On(List Legend Below):
23

7732185 Water

EXPOSURE LIMITS
PEL=Not Established
TLV=Not Established

PERCENTAGE
VOL ND
WT 49-51.50

COMMON NAMES:

Listed On(List Legend Below):
19 23

See Section II
All components of this product that are required to be on the TSCA Inventory are listed on the inventory.
Not listed as carcinogen - IARC, NTP, OSHA

LIST LEGEND
13 PA ENVIROMENTAL HAZ SUBSTANCE
19 PA REQUIREMENT- 3% OR GREATER
23 NJ REQUIREMENT- 1% OR GREATER
18 NY HAZARDOUS SUBSTANCES
21 NJ SPECIAL HEALTH HAZ SUB

IV. FIRE AND EXPLOSION DATA

FLASH POINT: NA AUTOIGNITION TEMPERATURE: Nonflammable

FLAMMABLE LIMITS IN AIR, % BY VOLUME- UPPER: NA
LOWER: NA

EXTINGUISHING MEDIA:
This product is not combustible. Water spray, foam, carbon dioxide or dry chemical may be used where this product is stored.

SPECIAL FIRE FIGHTING PROCEDURES:
Wear full protective clothing. Avoid direct contact of this product with water as this can cause a violent exothermic reaction.

UNUSUAL FIRE AND EXPLOSION HAZARD:
None. See Reactivity (Section VII).

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V. SPECIAL PROTECTION

VENTILATION REQUIREMENTS:
Special ventilation is not required under normal use. Use local exhaust ventilation where dust, mist, or spray may be generated. NOTE: Where carbon monoxide or other reaction products may be generated, special ventilation may be required.

SPECIFIC PERSONAL PROTECTIVE EQUIPMENT

RESPIRATORY:
Respiratory protection is not required under normal use. Use NIOSH/MSHA approved respirators where dust, mist, or spray may be generated.

EYE:
Wear chemical safety goggles plus full face shield to protect against splashing.

GLOVES:
Chemical resistant gloves should be worn. Gloves may be decontaminated by washing with mild soap and water. Natural and butyl rubber have been suggested.

OTHER CLOTHING AND EQUIPMENT:
Impervious protective clothing and chemically resistant safety shoes should be worn to minimize contact. Wash contaminated clothing with soap and water and dry before reuse. Showers and eyewash facilities should be accessible.

MONITORING EXPOSURE

BIOLOGICAL:
NA

PERSONAL/AREA:
Use NIOSH Analytical Method No. 7401.

VI. PHYSICAL DATA

BOILING POINT @ 760 mm Hg: 143°C (289°F)

FREEZING POINT: 12.1°C (54°F)

VAPOR PRESSURE: 13 mm Hg @ 60°C

SPECIFIC GRAVITY (H_2O=1): 1.54 @ 15.6°C

SOLUBILITY IN H_2O % BY WT: Completely soluble

VAPOR DENSITY (Air=1): NA

APPEARANCE AND ODOR: Clear liquid with no distinct odor.

pH: 7.5% solution has pH 14.0

DENSITY: 12.8 lb/gal

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VII. REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY:
Under normal conditions, this product is stable.

INCOMPATIBILITY:
See Handling and Storage (Section VIII). Avoid direct contact with water. This product may be added slowly to water or acids with dilution and agitation to avoid a violent exothermic reaction. When handling this product, avoid contact with aluminum, tin, zinc, and alloys containing these metals. Do not mix with strong acids without dilution and agitation to prevent violent or explosive reaction. Avoid contact with leather, wool, acids, organic halogen compounds and organic nitro compounds.

HAZARDOUS DECOMPOSITION PRODUCTS:
None known.

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION:
Material is not known to polymerize.

VIII. HANDLING AND STORAGE

HANDLING AND STORAGE PRECAUTIONS:

Do not get into eyes, on skin, on clothing.
Avoid breathing dust, mists, or spray.
Do not take internally.
Use with adequate ventilation and employ respiratory protection when exposure to dust, mist or spray is possible.
When handling, wear chemical splash goggles, face shield, rubber gloves and protective clothing.
Wash thoroughly after handling or contact - exposure can cause burns which are not immediately painful or visible.
Keep container closed.
Product can react violently with water, acids, and other substances - read Special Mixing and Handling Instructions below carefully before using.
Product is corrosive to tin, aluminum, zinc and alloys containing these metals, and will react violently with these metals in powder form.
Hazardous carbon monoxide gas can form upon contact with food and beverage products in enclosed spaces and can cause death. Follow appropriate tank entry procedures (ANSI Z117.1-1977).

SPECIAL MIXING AND HANDLING INSTRUCTIONS

Product can react violently with water. Considerable heat is generated when product is mixed with water. Therefore, when making solutions always carefully follow these steps:

ALWAYS wear ALL protective clothing described above. NEVER add water to product. ALWAYS add product - with constant stirring - slowly to surface of lukewarm (80-100°F) water, to assure product is being completely dissolved as it is added.

If product is added too rapidly, or without stirring, and becomes concentrated at bottom of mixing vessel, excessive heat may be generated, resulting in DANGEROUS boiling and spattering, and a possible IMMEDIATE AND VIOLENT ERUPTION of highly caustic solution.

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VIII. HANDLING AND STORAGE (Continued)

SPECIAL MIXING AND HANDLING INSTRUCTIONS (Continued)

NOTE: Never add more product than can be absorbed by solution while maintaining temperature below 200°F (@ sea level) to prevent boiling and spattering.

Product can react EXPLOSIVELY with acids, aldehydes, and many other organic chemicals - when mixing product with solutions containing such chemicals, follow all of above mixing instructions, and add product very gradually, while stirring constantly.

ALWAYS empty and clean containers of all residues before adding product, to avoid possible EXPLOSIVE reaction between product and unknown residue.

Returnable containers should be shipped in accordance with supplier's recommendations. Return shipments should comply with all federal, state, and DOT regulations. All residual caustic soda should be removed from containers prior to disposal.

IX. ENVIRONMENTAL PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:

Leaks should be stopped. Spills should be contained, and cleaned up immediately. Spills should be removed by using a vacuum truck. Neutralize remaining traces of material with any dilute inorganic acid such as hydrochloric, sulfuric, nitric, phosphoric, and acetic acid. The spill area should then be flushed with water followed by liberal covering of sodium bicarbonate. All clean-up material should be removed and placed in approved containers, labeled and stored in a safe place to await proper treatment or disposal. Spills on areas other than pavement, e.g., dirt or sand, may be handled by removing the affected soils and placing in approved containers. Persons performing clean-up work should wear adequate personal protective equipment and clothing. Spills or releases should be reported, if required, to the appropriate local, state and federal regulatory agencies.

CAUTION: Caustic soda may react violently with acids and water.

WASTE DISPOSAL METHOD:

The materials resulting from clean-up operations may be hazardous wastes and, therefore, subject to specific regulations. Package, store, transport, and dispose of all clean-up materials and any contaminated equipment in accordance with all applicable federal, state, and local health and environmental regulations. Shipments of waste materials may be subject to manifesting requirements per applicable regulations. Appropriate disposal will depend on the nature of each waste material and should be performed by competent and properly permitted contractors. Ensure that all responsible federal, state, and local agencies receive proper notification of spill and disposal methods.

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X. ADDITIONAL INFORMATION

OSHA Standard 29CFR 1910.1200 requires that information be provided to employees regarding the hazards of chemicals by means of a hazard communication program including labeling, material safety data sheets, training and access to written records. We request that you, and it is your legal duty to, make all information in this Material Safety Data Sheet available to your employees.

To aid our customers in complying with regulatory requirements, SARA Title III hazard categories for this product are indicated in Section I. If the word "YES" appears next to any category, this product may be reportable by you under the requirements of 40 CFR Part 370. Please consult those regulations for details.

XI. PREPARATION INFORMATION

For additional Non-Emergency health, safety, or environmental information telephone (716) 286-3081, or write to:

Occidental Chemical Corporation
Product Stewardship Department
Suite 400
360 Rainbow Boulevard South
Niagara Falls, NY 14302

For Emergencies: 24 HOUR EMERGENCY PHONE: (716) 278-7021

This MSDS replaces MSDS Number M5389 dated 07-14-89.

WARNING LABEL INFORMATION

SIGNAL WORD: DANGER!

STATEMENT OF HAZARDS:
CAUSES SEVERE BURNS TO SKIN, EYES AND MUCOUS MEMBRANES.
CONTACT WITH EYES CAN CAUSE PERMANENT EYE DAMAGE.
INHALATION OF DUST, MIST, OR SPRAY CAN CAUSE SEVERE LUNG DAMAGE.
CAN REACT VIOLENTLY WITH WATER, ACIDS, AND OTHER SUBSTANCES.

PRECAUTIONARY STATEMENTS:
Do not get into eyes, on skin, on clothing.
Avoid breathing dust, mist, or spray.
Do not take internally.
Use with adequate ventilation and employ respiratory protection when exposure to dust, mist, or spray is possible.
When handling, wear chemical splash goggles, face shield, rubber gloves and protective clothing.
Wash thoroughly after handling or contact - exposure can cause burns which are not immediately painful or visible.
Keep container closed.
Product can react violently with water, acids, and other substances - read Handling and Storage instructions carefully before using.
Product is corrosive to tin, aluminum, zinc, and alloys containing these metals, and will react violently with these metals in powder form.
Hazardous carbon monoxide gas can form upon contact with food and beverage products in enclosed spaces and can cause death. Follow appropriate tank entry procedures (ANSI Z117.1-1977).

FIRST AID:
IN CASE OF CONTACT:

FOR EYES:
OBJECT IS TO FLUSH MATERIAL OUT IMMEDIATELY THEN SEEK MEDICAL ATTENTION. IMMEDIATELY flush eyes with large amounts of water for at least 15 minutes forcibly holding lids apart to ensure flushing of entire surface. Washing eyes within several seconds is essential to achieve maximum effectiveness. SEEK MEDICAL ATTENTION IMMEDIATELY.

FOR SKIN:
IMMEDIATELY wash with plenty of water for at least 15 minutes. Remove contaminated clothing and footwear. Wash clothing before reuse and discard footwear which cannot be decontaminated. SEEK MEDICAL ATTENTION IMMEDIATELY.

IF INHALED:
Remove to fresh air. If breathing is difficult, have trained person administer oxygen. If respiration stops, give mouth-to-mouth resuscitation. GET MEDICAL ATTENTION.

IF SWALLOWED:
NEVER give anything by mouth to an unconscious person. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. If available, give several glasses of milk. If vomiting occurs spontaneously, keep airway clear. SEEK MEDICAL ATTENTION IMMEDIATELY.

IN CASE OF:
SPILL OR LEAK:
Leaks should be stopped. Spills, after containment, should be shoveled up or removed by vacuum truck (if liquid) to chemical waste area. Neutralize residue with dilute acid, flush spill area with water followed by liberal covering of sodium bicarbonate. Dispose of wash water and spill by-products according to federal, state, and local regulations.

WARNING LABEL INFORMATION (Continued)

HANDLING AND STORAGE:

Considerable heat is generated when product is mixed with water. Therefore, when making solutions always carefully follow these steps:

ALWAYS wear ALL prescribed protective clothing. NEVER add water to product. ALWAYS add product - with constant stirring - slowly to surface of lukewarm (80-100°F) water, to assure product is being completely dissolved as it is added.

If product is added too rapidly, or without stirring, and becomes concentrated at bottom of mixing vessel, excessive heat may be generated, resulting in DANGEROUS boiling and spattering, and a possible IMMEDIATE AND VIOLENT ERUPTION of highly caustic solution.

NOTE: Never add more product than can be absorbed by solution while maintaining temperature below 200°F (@ sea level) to prevent boiling and spattering.

Product can react EXPLOSIVELY with acids, aldehydes, and many other organic chemicals - when mixing product with solutions containing such chemicals, follow all of above mixing instructions, and add product very gradually, while stirring constantly.

ALWAYS empty and clean containers of all residues before adding product, to avoid possible EXPLOSIVE reaction between product and unknown residue.

Returnable containers should be shipped in accordance with supplier's recommendations. Return shipments should comply with all federal, state, and DOT regulations. All residual caustic soda should be removed from containers prior to disposal.

DISPOSAL:

The materials resulting from clean-up operations may be hazardous wastes and, therefore, subject to specific regulations. Package, store, transport, and dispose of all clean-up materials and any contaminated equipment in accordance with all applicable federal, state, and local health environmental regulations. Shipments of waste materials may be subject to manifesting requirements per applicable regulations. Appropriate disposal will depend on the nature of each waste material and should be performed by competent and properly permitted contractors. Ensure that all responsible federal, state, and local agencies receive proper notification of disposal.

INFORMATION REQUIRED BY FEDERAL, STATE OR LOCAL REGULATIONS:

This product contains:

CAS#	NAME
1310732	Sodium hydroxide (Na(OH))
7647145	Sodium chloride (NaCl)
7732185	Water

HMIS RATING SYSTEM: HEALTH 3 FLAMMABILITY 0 REACTIVITY 2

FOR INDUSTRIAL USE ONLY LABEL 040M5389

Material Safety Data Sheet
Sodium Nitrite

ACC# 21410

Section 1 - Chemical Product and Company Identification

MSDS Name: Sodium Nitrite
Catalog Numbers: S80187, NC9757363, S338-3, S347-10, S347-250, S347-3, S347-500, WESS347500
Synonyms: Nitrous acid, sodium salt.
Company Identification:
Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410
For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
7632-00-0	Sodium nitrite	>97	231-555-9

Hazard Symbols: T O N
Risk Phrases: 25 8 50

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: white to light yellow crystals. May cause methemoglobinemia. **Danger!** May be fatal if inhaled. Strong oxidizer. Contact with other material may cause a fire. Hygroscopic. Harmful if swallowed. Causes eye and skin irritation. This substance has caused adverse reproductive and fetal effects in animals. Air sensitive. Causes respiratory tract irritation.
Target Organs: Blood, cardiovascular system, smooth muscle.

Potential Health Effects
Eye: Causes eye irritation. May cause conjunctivitis. May cause permanent corneal opacification.
Skin: Causes skin irritation. May be absorbed through the skin.
Ingestion: Harmful if swallowed. May cause methemoglobinemia, cyanosis (bluish discoloration of skin due to deficient oxygenation of the blood), convulsions, and death. Causes digestive tract irritation. Ingestion may cause weakness, muscular incoordination, fine tremors, loss of reflexes, convulsions and possible death from circulatory collapse. Ingestion may cause a decrease in blood pressure, rapid pulse and visual disturbances.
Inhalation: May be fatal if inhaled. May cause methemoglobinemia, cyanosis, convulsions, tachycardia, dyspnea (labored breathing), and death. May cause acute pulmonary edema, asphyxia, chemical pneumonitis, and upper airway obstruction caused by edema.
Chronic: May cause reproductive and fetal effects. Laboratory experiments have resulted in mutagenic effects. Animal studies have reported the development of tumors. Sodium nitrate may react with secondary or tertiary amines to form nitrosamines (certain nitrosamines are cancer suspect agents).

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Section 4 - First Aid Measures

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. Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.
Ingestion: Call a poison control center. If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical aid.
Inhalation: Remove from exposure to fresh air immediately. If breathing is difficult, give oxygen. Do NOT use mouth-to-mouth resuscitation. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask. SPEED IS ESSENTIAL, OBTAIN MEDICAL AID IMMEDIATELY.
Notes to Physician: Absorption of this product into the body may cause cyanosis (bluish discoloration of skin due to deficient oxygenation of the blood). Moderate degrees of cyanosis need to be treated only by supportive measures: bed rest and oxygen inhalation. If cyanosis is severe, intravenous injection of Methylene blue, 1mg/kg of body weight may be of value.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Strong oxidizer. Contact with combustible materials may cause a fire. Use water with caution and in flooding amounts. May explode from heat or contamination. May accelerate burning if involved in a fire.
Extinguishing Media: Use water only! Contact professional fire-fighters immediately. Cool containers with flooding quantities of water until well after fire is out. For large fires, flood fire area with water from a distance. Do NOT use dry chemicals, CO2, Halon or foams.
Flash Point: Not applicable.
Autoignition Temperature: Not available.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 3; Flammability: 0; Instability: 1; Special Hazard: OX

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Clean up spills immediately, observing precautions in the Protective Equipment section. Avoid generating dusty conditions. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Avoid contact with clothing and other combustible materials. Do not ingest or inhale. Handle under an inert atmosphere. Store protected from air. Use only in a chemical fume hood.
Storage: Do not store near combustible materials. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Do not expose to air. Store protected from moisture. Store under an inert atmosphere.

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Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use only under a chemical fume hood.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Sodium nitrite	none listed	none listed	none listed

OSHA Vacated PELs: Sodium nitrite: No OSHA Vacated PELs are listed for this chemical.

Personal Protective Equipment

Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant a respirator's use.

Section 9 - Physical and Chemical Properties

Physical State: Crystals
Appearance: white to light yellow
Odor: odorless
pH: ~ 9
Vapor Pressure: Not available.
Vapor Density: Not available.
Evaporation Rate: Not available.
Viscosity: Not available.
Boiling Point: 320 deg C
Freezing/Melting Point:271 deg C
Decomposition Temperature:320 deg C
Solubility: Soluble.
Specific Gravity/Density:2.168
Molecular Formula:$NaNO_2$
Molecular Weight:69.00

Section 10 - Stability and Reactivity

Chemical Stability: Stable at room temperature in closed containers under normal storage and handling conditions. Unstable if heated, may explode at temperatures greater than 533°C.

Conditions to Avoid: Unstable if heated, may explode at temperatures greater than 533°C., incompatible materials, ignition sources, dust generation, exposure to air, combustible materials, reducing agents, exposure to moist air or water, temperatures above 320°C.

Incompatibilities with Other Materials: Reducing agents, acids, amines, chlorates, permanganates, cyanides (e.g. potassium cyanide, sodium cyanide), metals as powders (e.g. hafnium, raney nickel), hypophosphites, sulfites, tannic acid, organic matter, antipyrine, ammonium salts, acetanilide, iodides, mercury salts, moisture, air, activated carbon, vegetable astringents.

Hazardous Decomposition Products: Oxides of nitrogen, irritating and toxic fumes and gases.

Hazardous Polymerization: Will not occur.

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Section 11 - Toxicological Information

RTECS#:
CAS# 7632-00-0: RA1225000
LD50/LC50:
CAS# 7632-00-0:
Draize test, rabbit, eye: 500 mg/24H Mild;
Inhalation, rat: LC50 = 5500 ug/m3/4H;
Oral, mouse: LD50 = 175 mg/kg;
Oral, rabbit: LD50 = 186 mg/kg;
Oral, rat: LD50 = 180 mg/kg;
Carcinogenicity:
CAS# 7632-00-0: Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.
Epidemiology: Oral, rat: TDLo = 2190 gm/kg/2Y-C (Tumorigenic - Carcinogeni c by RTECS criteria - Gastrointestinal - tumors).; Ora l, rat: TD = 91 gm/kg/2Y-C (Tumorigenic - equivocal tumo rigenic agent by RTECS criteria - Skin and Appendage s - tumors and Reproductive - Tumorigenic effects - testicular tumors).; Oral, rat: TD = 40 gm/kg/56W- C - (Tumorigenic - neoplastic by RTECS criteria - Liver - tumors).
Teratogenicity: Oral, rat: TDLo = 660 mg/kg (female 1-22 day(s) after conception) Effects on Embryo or Fetus - fetal death and Effects on Newborn - growth statistics (e.g.%, reduced weight gain).; Oral, rat: TDLo = 10280 mg/kg (female 1-22 day(s) after conception and lactating female 20 day(s) post-birth) Effects on Newborn - weaning or lactation index (e.g., # alive at weaning per # alive at day 4).; Oral,mouse: TDLo = 280 mg/kg (female 1-14 day(s) after conception) Specific Developmental Abnormalities - blood and lymphatic systems (including spleen and marrow).
Reproductive Effects: Oral, mouse: TDLo = 1200 mg/kg (female 6-15 day(s) after conception) Fertility - pre-implantation mortality (e.g. reduction in number of implants per female; total number of implants per corpora lutea).; Oral, mouse: TDLo = 1680 mg/kg (male 14 day(s) pre-mating) Fertility - male fertility index (e.g. # males impregnating females per # males exposed to fertile nonpregnant females).; Oral, mouse: TDLo = 840 mg/kg (male 14 day(s) pre-mating) Paternal Effects - spermatogenesis (incl. genetic material, sperm morphology, motility, and count).
Neurotoxicity: No information available.
Mutagenicity: Unscheduled DNA Synthesis: Human, HeLa cell = 6 mmol/L.; DNA Inhibition: Human, Fibroblast = 2000 ppm.; DNA Inhibition: Human Cells - not otherwise specified = 725 umol/L.
Other Studies: Standard Draize Test: Administration into the eye (rabbit) = 500 mg/24H (Mild).

Section 12 - Ecological Information

Ecotoxicity: Fish: Rainbow trout: LC50 = 0.19-0.39 mg/L; 96 Hr; Flow-through bioassay Mosquito Fish: TLm =8.1 ppm; 24 Hr; Highly turbid water Creek chub: Critical range = 400-2000 ppm; 24 Hr; Detroit River No data available.
Environmental: In water sodium nitrite dissociates completely and under aerobic conditions the nitrite ions are oxidized to nitrates.
Physical: No information available.
Other: Harmful to aquatic life in very low concentrations.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	IATA	RID/ADR	IMO	Canada TDG
Shipping Name:	SODIUM NITRITE				SODIUM NITRITE
Hazard Class:	5.1				5.1(6.1)
UN Number:	UN1500				UN1500
Packing Group:	III				III

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 7632-00-0 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
CAS# 7632-00-0: 5a2/12b
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
SARA

CERCLA Hazardous Substances and corresponding RQs
CAS# 7632-00-0: 100 lb final RQ; 45.4 kg final RQ
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
SARA Codes
CAS # 7632-00-0: acute, chronic, flammable.
Section 313
This material contains Sodium nitrite (CAS# 7632-00-0, 97%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.
Clean Air Act:
This material does not contain any hazardous air pollutants. This material does not contain any Class 1 Ozone depletors. This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
CAS# 7632-00-0 is listed as a Hazardous Substance under the CWA. None of the chemicals in this product are listed as Priority Pollutants under the CWA. None of the chemicals in this product are listed as Toxic Pollutants under the CWA.
OSHA:
None of the chemicals in this product are considered highly hazardous by OSHA.
STATE
CAS# 7632-00-0 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Massachusetts.
California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations
European Labeling in Accordance with EC Directives
Hazard Symbols:
T O N
Risk Phrases:
R 25 Toxic if swallowed.
R 8 Contact with combustible material may cause

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fire.
R 50 Very toxic to aquatic organisms.

Safety Phrases:
S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S 61 Avoid release to the environment. Refer to special instructions/Safety data sheets.

WGK (Water Danger/Protection)
CAS# 7632-00-0: 2
Canada - DSL/NDSL
CAS# 7632-00-0 is listed on Canada's DSL List.
Canada - WHMIS
This product has a WHMIS classification of C, D1B, D2B.
Canadian Ingredient Disclosure List
CAS# 7632-00-0 is listed on the Canadian Ingredient Disclosure List.
Exposure Limits
CAS# 7632-00-0: OEL-CZECHOSLOVAKIA:TWA 1 mg/m3;STEL 5 mg/m3 OEL-HUNGARY:STEL 1 mg/m3;Skin

Section 16 - Additional Information

MSDS Creation Date: 7/02/1999
Revision #5 Date: 12/03/2002

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MSDS Number: N3660 --- Effective Date: 06/30/98

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 202-483-7616

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

NITRIC ACID, 50-70%

MSDS Number: N3660 — *Effective Date: 06/30/98*

1. Product Identification

Synonyms: Aqua Fortis; Azotic Acid; Nitric Acid 50%; Nitric Acid 65%; nitric acid 69-70%
CAS No.: 7697-37-2
Molecular Weight: 63.00
Chemical Formula: HNO3
Product Codes:
J.T. Baker: 5371, 5555, 5801, 5876, 9597, 9598, 9600, 9601, 9602, 9604, 9606, 9607, 9616
Mallinckrodt: 1409, 2703, 2704, 6623, V069, V077, V336, V561

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Nitric Acid	7697-37-2	50 - 70%	Yes
Water	7732-18-5	30 - 50%	No

3. Hazards Identification

Emergency Overview

POISON! DANGER! STRONG OXIDIZER. CONTACT WITH OTHER MATERIAL MAY CAUSE FIRE. CORROSIVE. LIQUID AND MIST CAUSE SEVERE BURNS TO ALL BOD TISSUE. MAY BE FATAL IF SWALLOWED OR INHALED. INHALATION MAY CAUSE LUNG AND TOOTH DAMAGE.

J.T. Baker SAF-T-DATA (tm) Ratings (Provided here for your convenience)

Health Rating: 3 - Severe (Poison)
Flammability Rating: 0 - None
Reactivity Rating: 3 - Severe (Oxidizer)
Contact Rating: 4 - Extreme (Corrosive)
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES
Storage Color Code: Yellow (Reactive)

Potential Health Effects

Nitric acid is extremely hazardous; it is corrosive, reactive, an oxidizer, and a poison.

Inhalation:
Corrosive! Inhalation of vapors can cause breathing difficulties and lead to pneumonia and pulmonary edema, which may be fatal. Other symptoms may include coughing, choking, and irritation of the nose, throat, and respiratory tract.
Ingestion:
Corrosive! Swallowing nitric acid can cause immediate pain and burns of the mouth, throat, esophagus and gastrointestinal tract.
Skin Contact:
Corrosive! Can cause redness, pain, and severe skin burns. Concentrated solutions cause deep ulcers and stain skin a yellow or yellow-brown color.
Eye Contact:
Corrosive! Vapors are irritating and may cause damage to the eyes. Contact may cause severe burns and permanent eye damage.
Chronic Exposure:
Long-term exposure to concentrated vapors may cause erosion of teeth and lung damage. Long-term exposures seldom occur due to the corrosive properties of the acid.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders, eye disease, or cardiopulmonary diseases may be more susceptible to the effects of this substance.

4. First Aid Measures

Immediate first aid treatment reduces the health effects of this substance.
Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

Ingestion:
DO NOT INDUCE VOMITING! Give large quantities of water or milk if available. Never give anything by mouth to an unconscious person. 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. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

5. Fire Fighting Measures

Fire:
Not combustible, but substance is a strong oxidizer and its heat of reaction with reducing agents or combustibles may cause ignition. Can react with metals to release flammable hydrogen gas.
Explosion:
Reacts explosively with combustible organic or readily oxidizable materials such as: alcohols, turpentine, charcoal, organic refuse, metal powder, hydrogen sulfide, etc. Reacts with most metals to release hydrogen gas which can form explosive mixtures with air.
Fire Extinguishing Media:
Water spray may be used to keep fire exposed containers cool. Do not get water inside container.
Special Information:
Increases the flammability of combustible, organic and readily oxidizable materials. In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Neutralize with alkaline material (soda ash, lime), then absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! 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.

J. T. Baker NEUTRASORB(tm) or TEAM(tm) 'Low Na+' acid neutralizers are recommended for spills of this product.

7. Handling and Storage

Store in a cool, dry, ventilated storage area with acid resistant floors and good drainage. Protect from physical damage. Keep out of direct sunlight and away from heat, water, and incompatible materials. Do not wash out container and use it for other purposes. When diluting, the acid should always be added slowly to water and in small amounts. Never use hot water and never add water to the acid. Water added to acid can cause uncontrolled boiling and splashing. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
-OSHA Permissible Exposure Limit (PEL):
2 ppm (TWA), 4 ppm (STEL)
-ACGIH Threshold Limit Value (TLV):
2 ppm (TWA); 4 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, wear a supplied air, full-facepiece respirator, airlined hood, or full-facepiece self-contained breathing apparatus. Nitric acid is an oxidizer and should not come in contact with cartridges and canisters that contain oxidizable materials, such as activated charcoal. Canister-type respirators using sorbents are ineffective.
Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.
Eye Protection:
Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:
Colorless to yellowish liquid.
Odor:
Suffocating, acrid.

Solubility:
Infinitely soluble.
Specific Gravity:
1.41
pH:
1.0 (0.1M solution)
% Volatiles by volume @ 21C (70F):
100 (as water and acid)
Boiling Point:
122C (252F)
Melting Point:
-42C (-44F)
Vapor Density (Air=1):
2-3
Vapor Pressure (mm Hg):
48 @ 20C (68F)
Evaporation Rate (BuAc=1):
No information found.

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage. Containers may burst when heated.
Hazardous Decomposition Products:
When heated to decomposition, emits toxic nitrogen oxides fumes and hydrogen nitrate. Will react with water or steam to produce heat and toxic and corrosive fumes.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
A dangerously powerful oxidizing agent, concentrated nitric acid is incompatible with most substances, especially strong bases, metallic powders, carbides, hydrogen sulfide, turpentine, and combustible organics.
Conditions to Avoid:
Light and heat.

11. Toxicological Information

Nitric acid: Inhalation rat LC50: 244 ppm (NO2)/30M; Investigated as a mutagen, reproductive effector. Oral (human) LDLo: 430 mg/kg.

--------\Cancer Lists\----------
---NTP Carcinogen---

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Ingredient	Known	Anticipated	IARC Category
Nitric Acid (7697-37-2)	No	No	None
Water (7732-18-5)	No	No	None

12. Ecological Information

Environmental Fate:
No information found.
Environmental Toxicity:
No information found.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste facility. Although not a listed RCRA hazardous waste, this material may exhibit one or more characteristics of a hazardous waste and require appropriate analysis to determine specific disposal requirements. 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

Domestic (Land, D.O.T.)

Proper Shipping Name: NITRIC ACID (WITH NOT MORE THAN 70% NITRIC ACID)
Hazard Class: 8
UN/NA: UN2031
Packing Group: II
Information reported for product/size: 150LB

International (Water, I.M.O.)

Proper Shipping Name: NITRIC ACID (WITH NOT MORE THAN 70% NITRIC ACID)
Hazard Class: 8
UN/NA: UN2031
Packing Group: II
Information reported for product/size: 150LB

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

Proper Shipping Name: NITRIC ACID (WITH NOT MORE THAN 70% NITRIC ACID)
Hazard Class: 8
UN/NA: UN2031
Packing Group: I
Information reported for product/size: 150LB

15. Regulatory Information

--------\Chemical Inventory Status - Part 1\--------

Ingredient	TSCA	EC	Japan	Australia
Nitric Acid (7697-37-2)	Yes	Yes	Yes	Yes
Water (7732-18-5)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\--------

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Nitric Acid (7697-37-2)	Yes	Yes	No	Yes
Water (7732-18-5)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\--------

Ingredient	-SARA 302- RQ	TPQ	------SARA 313----- List	Chemical Catg
Nitric Acid (7697-37-2)	1000	1000	Yes	No
Water (7732-18-5)	No	No	No	No

--------\Federal, State & International Regulations - Part 2\--------

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Nitric Acid (7697-37-2)	1000	No	No
Water (7732-18-5)	No	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: Yes Fire: Yes Pressure: No
Reactivity: No (Mixture / Liquid)

Australian Hazchem Code: 2PE
Poison Schedule: S6
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: 3 Flammability: 0 Reactivity: 0 Other: Oxidizer
Label Hazard Warning:
POISON! DANGER! STRONG OXIDIZER. CONTACT WITH OTHER MATERIAL MAY CAUSE FIRE. CORROSIVE. LIQUID AND MIST CAUSE SEVERE BURNS TO ALL BODY TISSUE. MAY BE FATAL IF SWALLOWED OR INHALED. INHALATION MAY CAUSE LUNG AND TOOTH DAMAGE.
Label Precautions:
Do not get in eyes, on skin, or on clothing.
Do not breathe vapor or mist.
Use only with adequate ventilation.
Wash thoroughly after handling.
Keep from contact with clothing and other combustible materials.
Do not store near combustible materials.
Store in a tightly closed container.
Remove and wash contaminated clothing promptly.
Label First Aid:
In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In all cases get medical attention immediately.
Product Use:
Laboratory Reagent.
Revision Information:
MSDS Section(s) changed since last revision of document include: 1, 2.
Disclaimer:

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Prepared by: Strategic Services Division
Phone Number: (314) 539-1600 (U.S.A.)

Information Only

LD # 32.62
Ident. 731
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U.S. BORAX

MATERIAL SAFETY DATA SHEET

Meeting OSHA Standard 29CFR § 1910.1200 (g)
CAL OSHA Standard Title 26 § 8—5194 (g)

EFFECTIVE DATE: August 31, 1990

SECTION I — PRODUCT IDENTIFICATION

PRODUCT TRADE NAME: Borax

TSCA NO.: 1303-96-4

CHEMICAL NAME AND SYNONYMS:
Sodium tetraborate decahydrate

CAS NO.: 1303-96-4

CHEMICAL FAMILY: Borate

FORMULA: $Na_2B_4O_7 \cdot 10H_2O$

PHYSICAL HAZARD RATING: National Fire Protection Association

Health	0
Flammability	0
Reactivity	0

SECTION II — HAZARDOUS INGREDIENTS

MATERIAL OR COMPONENT %:

Sodium tetraborate decahydrate >99% CAS No. 1303-96-4

Appears on CAL OSHA Directors' List of Hazardous Substances:
Does not appear on any EPA List of Hazardous Substances.

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

SECTION III — PHYSICAL DATA

APPEARANCE: White, odorless, crystalline solid
SPECIFIC GRAVITY: 1.73
MELTING POINT: 62°C
VAPOR PRESSURE: Negligible
SOLUBILITY IN WATER: 20°C 5.8%
100°C 65.6%

HEAT OFSOLUTION: - 222 BTU/lb.

FORMULA WEIGHT: 381.37

pH 3% SOLUTION: 9.25 @ 20°C

24 HOUR EMERGENCY TELEPHONE NUMBER: (714) 774-2673

CONTACT: P.L. Strong; Manager, Product Safety

The information and recommendations contained herein are based upon data believed to be correct. However, no guarantee or warranty of any kind expressed or implied is made with respect to the information contained herein.

SECTION IV - HEALTH HAZARD INFORMATION

EFFECTS OF ACUTE EXPOSURE

INGESTION:

ACUTE ORAL LD_{50} : 4.5-5.0 gram/kg of body weight (Sprague-Dawley rats).

HUMAN ACCIDENTAL EXPOSURE: Anticipated symptons: nausea, vomiting, diarrhea. After 24 hours, erythema; macular skin rash, and dizziness may occur.

EYE: Irritant (rabbits - per 16 CFR $1500.42). Probable human eye irritant.

DERMAL:

ACUTE DERMAL LD_{50}: Greater than 10 gram/kg of body weight (rabbits - per 16 CFR $1500.40)

PRIMARY SKIN IRRITATION INDEX: 0 - no effect (rabbits - per 16 CFR $1500.41)

SKIN: No known adverse effects to humans with intact skin. May be absorbed through damaged skin.

CORROSIVE: This product is non-corrosive.

INHALATION: May cause sneezing and coughing if exposed to high concentrations (>10 mg/m^3).

EFFECTS OF CHRONIC OVEREXPOSURE

INGESTION: Animal testing for carcinogenicity of boric acid has been negative.

Animal studies show that ingestion of large amounts of borates over prolonged periods of time causes a decrease in sperm production and testicle size in male laboratory animals and developmental effects in fetuses of pregnant female laboratory animals. No evidence of such effects in humans.

EYE: Possible irritant to human eye.

DERMAL: No evidence of effect from exposure on intact human skin.

INHALATION: As with any nuisance dusts, may aggravate chronic respiratory ailments such as asthma, bronchitis, etc.

HEALTH HAZARD INFORMATION (cont. from page 2)

REGULATORY INFORMATION

OSHA PERMISSIBLE EXPOSURE LIMIT (PEL): 10 mg/m^3 29CFR§1910 SUBPART Z

ACGIH RECOMMENDED THRESHOLD LIMIT VALUE: 5 mg/m^3

CAL OSHA PERMISSIBLE EXPOSURE LIMIT (PEL): 5 mg/m^3

NOT LISTED IN THE NATIONAL TOXICOLOGY PROGRAM ANNUAL REPORT ON CARCINOGENS (1989)

NOT LISTED IN THE INTERNATIONAL AGENCY FOR RESEARCH ON CANCER (IARC) MONOGRAPH

NOT LISTED ON THE OSHA CARCINOGENS LIST

EMERGENCY AND FIRST AID PROCEDURES:

EYES: Flush with tepid water for 15 minutes. Consult a physician.

SKIN: Rinse with water.

INHALATION: Remove to fresh air.

INGESTION: Drink large amounts of water or milk. Consult a physician.

NOTE TO PHYSICIAN:

Gastric lavage with 5% sodium bicarbonate is suggested. This should be followed by saline catharsis. Assure adequate hydration. Borax is not considered an acute poison. After ingestion or absorption into the bloodstream of large amounts (15 grams or more), symptoms may appear after 24-72 hours. Borates are readily dissipated through the urine (70% in the first 24 hours). Complimentary blood analysis is available for physicians and emergency rooms. Medical consultation is also available. Call (714) 774-2673.

SECTION V - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED): N/A

FLAMMABLE LIMITS: N/A

EXTINGUISHING MEDIA: None required. Product is an inherent fire retardant.

SPECIAL FIREFIGHTING PROCEDURES: None are required. No potential for fire or explosion hazard. Product is an inherent fire retardant.

UNUSUAL FIRE AND EXPLOSION HAZARDS: None

SECTION VI - REACTIVITY DATA

STABILITY: Borax is a stable product.

INCOMPATIBILITY (MATERIALS TO AVOID): Elemental Zirconium (hot)

HAZARDOUS DECOMPOSITION PRODUCTS: None

HAZARDOUS POLYMERIZATION: Will not occur

CONDITIONS TO AVOID: Contact with elemental zirconium (mixture explodes when heated).

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Sweep or vacuum followed by water rinse.

WASTE DISPOSAL METHOD: Refer to local disposal requirements and regulations for waste disposal methods. Not regulated under §313 of SARA Title III or RCRA (40 CFR 261.33)

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATON PROTECTION (SPECIFY TYPE): Recommend use of light duty dust mask (such as 3M model 5800) in areas of airborne concentrations greater than $10mg/m^3$.

VENTILATION: Local exhaust is sufficient.

PROTECTIVE GLOVES: None needed unless skin is abraded. Leather, cloth or rubber gloves.

EYE PROTECTION: Avoid eye contact. To avoid eye contact, dust goggles are recommended in areas of high airborne concentrations.

OTHER PROTECTIVE EQUIPMENT: None

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Dry indoor storage.

OTHER PRECAUTIONS: Retain package integrity.

DATE: Aug 31, 1990 SIGNATURE: Philip L. Strong

P.L. Strong, Manager, Product Safety

Information Only

/ I.D. # 32.61
Ideal. 730

1 of 5

MATERIAL SAFETY DATA SHEET

Meeting OSHA Standard 29CFR § 1910.1200 (g)
CAL OSHA Standard Title 26 § 8—5194 (g)

EFFECTIVE DATE: August 31, 1990

SECTION I — PRODUCT IDENTIFICATION

PRODUCT TRADE NAME: Boric Acid

TSCA NO.: 10043-35-3

CHEMICAL NAME AND SYNONYMS:
Boric acid, Orthoboric acid

CAS NO.: 10043-35-3

CHEMICAL FAMILY: Borate

FORMULA: H_3BO_3

PHYSICAL HAZARD RATING: National Fire Protection Association

Health	0
Flammability	0
Reactivity	0

SECTION II — HAZARDOUS INGREDIENTS

MATERIAL OR COMPONENT %:

Boric Acid >99% CAS No. 10043-35-3

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

SECTION III — PHYSICAL DATA

APPEARANCE:	White, odorless, crystalline solid
SPECIFIC GRAVITY:	1.5128
MELTING POINT:	170.9°C (340°F)
SOLUBILITY IN WATER:	20°C 4.7%
	100°C 27.5%
HEAT OF SOLUTION:	157 BTU/lb. @ 18°C
FORMULA WEIGHT:	61.84
pH at 20°C:	0.1% solution 6.1
	1.0% solution 5.1
	4.7% solution 3.7

24 HOUR EMERGENCY TELEPHONE NUMBER: (714) 774-2673

CONTACT: P.L. Strong; Manager, Product Safety

SECTION IV - HEALTH HAZARD INFORMATION

EFFECTS OF ACUTE EXPOSURE

INGESTION:

ACUTE ORAL LD_{50} : 3.5-4.1 gram/kg of body weight (Sprague-Dawley rats).

HUMAN ACCIDENTAL EXPOSURE: Anticipated symptons: nausea, vomiting, diarrhea. After 24 hours, erythema; macular skin rash, and dizziness may occur.

EYE: Is a mild eye irritant (rabbits - per 16 CFR $1500.42)

DERMAL:

ACUTE DERMAL LD_{50}: Greater than 2.0 gram/kg of body weight (rabbits - per 16 CFR $1500.40)

PRIMARY SKIN IRRITATION INDEX: 0 (rabbits - per 16 CFR $1500.41)

SKIN: No known adverse effects to humans with intact skin. May be absorbed through damaged skin.

CORROSIVE: This product is non-corrosive.

INHALATION: May cause sneezing and coughing if exposed to high concentrations (>10 mg/m^3).

EFFECTS OF CHRONIC OVEREXPOSURE

INGESTION: Animal testing for carcinogenicity of boric acid has been negative.

Animal studies show that ingestion of large amounts of borates over prolonged periods of time causes a decrease in sperm production and testicle size in male laboratory animals and developmental effects in fetuses of pregnant female laboratory animals. No evidence of such effects in humans.

EYE: May cause slight reversible conjunctivitis

DERMAL: No evidence of effect from exposure on intact human skin.

INHALATION: As with any nuisance dusts, may aggravate chronic respiratory ailments suc.. as asthma, bronchitis, etc.

HEALTH HAZARD INFORMATION (cont. from page 2)

REGULATORY INFORMATION

OSHA PERMISSIBLE EXPOSURE LIMIT (PEL): Not listed 29CFR§1910 SUBPART Z

ACGIH RECOMMENDED THRESHOLD LIMIT VALUE: Not listed

NOT LISTED IN THE NATIONAL TOXICOLOGY PROGRAM ANNUAL REPORT ON CARCINOGENS (1989)

NOT LISTED IN THE INTERNATIONAL AGENCY FOR RESEARCH ON CANCER (IARC) MONOGRAPH

NOT LISTED ON THE OSHA CARCINOGENS LIST

EMERGENCY AND FIRST AID PROCEDURES:

EYES: Flush with tepid water for 15 minutes. Consult a physician.

SKIN: Rinse with water.

INHALATION: Remove to fresh air.

INGESTION: Drink large amounts of water or milk. Consult a physician.

NOTE TO PHYSICIAN:

Gastric lavage with 5% sodium bicarbonate is suggested. this should be followed by saline catharsis. Assure adequate hydration. Boric acid is not considered an acute poison. After ingestion or absorption into the bloodstream of large amounts (15 grams or more), symptoms may appear after 24-72 hours. Borates are readily dissipated through the urine (70% in the first 24 hours). Complimentary blood analysis is available for physicians and emergency rooms. Medical consultation is also available. Call (714) 774-2673.

SECTION V - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METH. 'JSED): N/A

FLAMMABLE LIMITS: N/A

EXTINGUISHING MEDIA: None required. Product is an inherent fire retardant.

SPECIAL FIREFIGHTING PROCEDURES: None are required. No potential for fire or explosion hazard. Product is an inherent fire retardant.

UNUSUAL FIRE AND EXPLOSION HAZARDS: None

SECTION VI - REACTIVITY DATA

STABILITY: Boric acid is a stable product.

INCOMPATIBILITY (MATERIALS TO AVOID): Acetic anhydride; elemental potassium

HAZARDOUS DECOMPOSITION PRODUCTS: None

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Contact with acetic anhydride or elemental potassium may result in explosion.

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Sweep or vacuum followed by water rinse.

WASTE DISPOSAL METHOD: Refer to local disposal requirements and regulations for waste disposal methods. Not regulated under §313 of SARA Title III or RCRA (40 CFR 261.33)

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATON PROTECTION (SPECIFY TYPE): Recommend use of light duty dust mask (such as 3M model 5800) in areas ofhign airborne concentra tions.

VENTILATION: Local exhaust is sufficient.

PROTECTIVE GLOVES: Leather, cloth or rubber gloves

EYE PROTECTION: To avoid eye contact, dust goggles are recommended in areas of high airborne concentrations.

OTHER PROTECTIVE EQUIPMENT: None

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Dry indoor storage.

OTHER PRECAUTIONS: Retain package integrity.

DATE: Sept 5, 1990 SIGNATURE: P.L. Strong

P.L. Strong, Manager, Product Safety

Applicant Name: PPL Susquehanna, LLC

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER SUPPLY AND WASTEWATER MANAGEMENT

WASTEWATER TREATMENT TECHNOLOGIES
MODULE 2

APPLICANT NAME	PPL Susquehanna, LLC	
Outfall Number	Treatment Unit Description (list in sequence)	Method for Handling and Disposal of Solid or Liquid Residue Resulting from Treatment (list in sequence)
070	Sedimentation (setting)	Cleanfill
	Discharge to Surface Water	N/A
071	Sedimentation	Landfill, or soil amendment
	Disinfection (chlorination)	N/A
	Dechlorination	N/A
	Discharge to Surface Water	N/A
171	Filtration	Radioactive Waste Landfill
	Ion Exchange	Radioactive Waste Landfill
	Neutralization	N/A
371	Neutralization	N/A
571	**Requesting to be eliminated** (see attached additional	
	support information for Module 3, Outfall 571)	
072	Oil & Grease Removal	Recycled
	Discharge to Surface Water	N/A
073	Oil & Grease Removal	Recycled
	Discharge to Surface Water	N/A
074	Oil & Grease Removal	Recycled
	Discharge to Surface Water	N/A
075	Sedimentation (Settling)	Cleanfill
	Discharge to Surface Water	N/A

079	Grinding	NA
	Screening	Landfill
	Equalization	NA
	Activated Sludge	Aerobic Digestion / Landfill
	Neutralization	N/A
	Disinfection (Chlorine)	N/A
	Dechlorination	N/A
	Discharge to Surface Water	N/A
080	Sedimentation (Settling)	Cleanfill
	Discharge to Surface Water	N/A

Applicant Name: PPL Susquehanna, LLC
Outfall: 070

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SOURCES OF WASTEWATER
MODULE 3

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME	PPL Susquehanna, LLC
OUTFALL NUMBER	070 S-2 Pond

1. Process Wastewater N/A

a. Describe process and type of wastewater.

b. Production Rate.

Referring to the instructions in Appendix 1 for this question, provide the production data as an attachment for each process contributing wastewater to this outfall. The most recent 5 years of production data must be provided.

c. Discharge Occurs. _____ hrs/day; _____ days/wk; _____ days/yr; _____ months/yr.
During which months?

Report the discharge rate as:

The maximum daily discharge rate.	_____ MGD
The monthly average discharge rate.	_____ MGD
The long-term average discharge rate.	_____ MGD

For batch discharges report:

Number of decant cycles.	_____ Cycles/day
Length of each decant cycle.	_____ MIN.
Average decant discharge rate.	_____ GPM

2. All Other Wastewater Contributing to this Outfall N/A

a. Describe the wastewater.

b. Source(s).

c. Discharge Occurs. _____ hrs/day; _____ days/wk; _____ days/yr; _____ months/yr.
During which months?

Report the discharge rate as:

The maximum daily discharge rate.	_____ MGD
The monthly average discharge rate.	_____ MGD
The long-term average discharge rate.	_____ MGD

For batch discharges report:

Number of decant cycles.	_____ Cycles/day
Length of each decant cycle.	_____ MIN.
Average decant discharge rate.	_____ GPM

3. Total Process, Miscellaneous Noncontact Cooling, and Sanitary Wastewater	
a. Source(s). Stormwater only	
b. Discharge Occurs. _____ hrs/day; _____ days/wk; _____ days/yr; _____ months/yr. During which months?	
Report the discharge rate as:	
The maximum daily discharge rate.	_____ MGD
The monthly average discharge rate.	_____ MGD
The long-term average discharge rate.	_____ MGD
4. Stormwater	
Complete Module 12 or Module 14 for the stormwater contribution.	

Applicant Name: PPL Susquehanna, LLC
Outfall: 071

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BUREAU OF WATER SUPPLY AND WASTEWATER MANAGEMENT

SOURCES OF WASTEWATER
MODULE 3

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME	PPL Susquehanna, LLC
OUTFALL NUMBER	071 Cooling Tower Blowdown

1. Process Wastewater

a. Describe process and type of wastewater.

Cooling Water Blowdown from Circulating Water and Emergency Service Water (ESW) System operation. Includes ESW Pond overflow to blowdown.

b. Production Rate. Continuous Operation

Referring to the instructions in Appendix 1 for this question, provide the production data as an attachment for each process contributing wastewater to this outfall. The most recent 5 years of production data must be provided.

c. Discharge Occurs. 24 hrs/day; 7 days/wk; 365 days/yr; 12 months/yr.

During which months? All

Report the discharge rate as:

The maximum daily discharge rate.	(Based on last 3 years)	18.31*	MGD
The monthly average discharge rate.	(Based on last 3 years)	12.09*	MGD
The long-term average discharge rate.	(Based on last 3 years)	12.09*	MGD

For batch discharges report:

Number of decant cycles.	____	Cycles/day
Length of each decant cycle.	____	MIN.
Average decant discharge rate.	____	GPM

2. All Other Wastewater Contributing to this Outfall

a. Describe the wastewater.

Outfall 171 – Liquid Radwaste Discharge to CT Blowdown, 371 Neutralization Basin internal discharge to Circ Water and 571 Circ Water Pumphouse sump return to Circ Water (Outfall 571 is requested to be eliminated. See additional Module 3 information, Outfall 571 description).

b. Source(s). Volume of Liquid Radwaste discharge 171 to Cooling Tower Blowdown.

c. Discharge Occurs. 0-6 hrs/day; 1-7 days/wk; 60 days/yr; 12 months/yr.

During which months? All

Report the discharge rate as:

The maximum daily discharge rate.	(Based on last 3 years)	0.049	MGD
The monthly average discharge rate.	(Based on last 3 years)	0.011	MGD
The long-term average discharge rate.	(Based on last 3 years)	0.011	MGD

For batch discharges report:

Number of decant cycles.	____	Cycles/day

Length of each decant cycle.	____	MIN.
Average decant discharge rate.	____	GPM

3. Total Process, Miscellaneous Noncontact Cooling, and Sanitary Wastewater

a. Source(s). Cooling Tower Blowdown, ESW Spray Pond over flow and Liquid Radwaste Discharge

b. Discharge Occurs. 24 hrs/day; 7 days/wk; 365 days/yr; 12 months/yr.
During which months? All

Report the discharge rate as:

The maximum daily discharge rate.	18.36	MGD
The monthly average discharge rate.	12.10	MGD
The long-term average discharge rate.	12.10	MGD

4. Stormwater

Complete Module 12 or Module 14 for the stormwater contribution.

*Includes 3% Emergency Spray Pond overflow. See Module 3 additional Outfall 071 description for details.

Applicant Name: PPL Susquehanna, LLC
Outfall: 072

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SOURCES OF WASTEWATER
MODULE 3

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME	PPL Susquehanna, LLC
OUTFALL NUMBER	072 S&A Sump

1. Process Wastewater N/A

a. Describe process and type of wastewater.

b. Production Rate.

Referring to the instructions in Appendix 1 for this question, provide the production data as an attachment for each process contributing wastewater to this outfall. The most recent 5 years of production data must be provided.

c. Discharge Occurs. _____ hrs/day; _____ days/wk; _____ days/yr; _____ months/yr.

During which months?

Report the discharge rate as:

The maximum daily discharge rate.	_____	MGD
The monthly average discharge rate.	_____	MGD
The long-term average discharge rate.	_____	MGD

For batch discharges report:

Number of decant cycles.	_____	Cycles/day
Length of each decant cycle.	_____	MIN.
Average decant discharge rate.	_____	GPM

2. All Other Wastewater Contributing to this Outfall

a. Describe the wastewater.

Miscellaneous stormwater collected around Emergency Transformers, Diesel Generator oil unloading area and equipment and S&A oil storage area berm downstream of O&G separator.

b. Source(s). Containments around oil containing equipment.

c. Discharge Occurs. 1 hrs/day; - days/wk; 33 days/yr; 12 months/yr.

During which months? All

Report the discharge rate as:

The maximum daily discharge rate.	(Based on last 3 years)	0.020	MGD
The monthly average discharge rate.	(Based on last 3 years)	0.011	MGD
The long-term average discharge rate.	(Based on last 3 years)	0.011	MGD

For batch discharges report:

Number of decant cycles.	_____	Cycles/day
Length of each decant cycle.	_____	MIN.

Average decant discharge rate.	____ GPM

3. Total Process, Miscellaneous Noncontact Cooling, and Sanitary Wastewater

a. Source(s). S&A Sump

b. Discharge Occurs. 1 hrs/day; - days/wk; 33 days/yr; 12 months/yr.

During which months? All

Report the discharge rate as:

The maximum daily discharge rate.	0.020	MGD
The monthly average discharge rate.	0.011	MGD
The long-term average discharge rate.	0.011	MGD

4. Stormwater

Complete Module 12 or Module 14 for the stormwater contribution.

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SOURCES OF WASTEWATER
MODULE 3

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME	PPL Susquehanna, LLC
OUTFALL NUMBER	073 U-1 Transformer Sump

1. Process Wastewater N/A

a. Describe process and type of wastewater.

b. Production Rate.

Referring to the instructions in Appendix 1 for this question, provide the production data as an attachment for each process contributing wastewater to this outfall. The most recent 5 years of production data must be provided.

c. Discharge Occurs. _____ hrs/day; _____ days/wk; _____ days/yr; _____ months/yr.

During which months?

Report the discharge rate as:

The maximum daily discharge rate.	_____	MGD
The monthly average discharge rate.	_____	MGD
The long-term average discharge rate.	_____	MGD

For batch discharges report:

Number of decant cycles.	_____	Cycles/day
Length of each decant cycle.	_____	MIN.
Average decant discharge rate.	_____	GPM

2. All Other Wastewater Contributing to this Outfall

a. Describe the wastewater.

Miscellaneous stormwater collected around U-1 Transformer(s), Lube oil storage tank berm, and oil filled circuit breakers downsteam of O&G separator.

b. Source(s). Containments around oil containing equipment.

c. Discharge Occurs. 1 hrs/day; - days/wk; 18 days/yr; 12 months/yr.

During which months? All

Report the discharge rate as:

The maximum daily discharge rate.	(Based on last 3 years)	0.032	MGD
The monthly average discharge rate.	(Based on last 3 years)	0.008	MGD
The long-term average discharge rate.	(Based on last 3 years)	0.008	MGD

For batch discharges report:

Number of decant cycles.	_____	Cycles/day
Length of each decant cycle.	_____	MIN.

Average decant discharge rate.	____ GPM

3. Total Process, Miscellaneous Noncontact Cooling, and Sanitary Wastewater

a. Source(s). U-1 Transformer Sump

b. Discharge Occurs. 1 hrs/day; - days/wk; 18 days/yr; 12 months/yr.

During which months? All

Report the discharge rate as:

The maximum daily discharge rate.	0.032	MGD
The monthly average discharge rate.	0.008	MGD
The long-term average discharge rate.	0.008	MGD

4. Stormwater

Complete Module 12 or Module 14 for the stormwater contribution.

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SOURCES OF WASTEWATER
MODULE 3

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME	PPL Susquehanna, LLC
OUTFALL NUMBER	074 U-2 Transformer Sump

1. Process Wastewater N/A

a. Describe process and type of wastewater.

b. Production Rate.

Referring to the instructions in Appendix 1 for this question, provide the production data as an attachment for each process contributing wastewater to this outfall. The most recent 5 years of production data must be provided.

c. Discharge Occurs. _____ hrs/day; _____ days/wk; _____ days/yr; _____ months/yr.
During which months?

Report the discharge rate as:

The maximum daily discharge rate.	_____	MGD
The monthly average discharge rate.	_____	MGD
The long-term average discharge rate.	_____	MGD

For batch discharges report:

Number of decant cycles.	_____	Cycles/day
Length of each decant cycle.	_____	MIN.
Average decant discharge rate.	_____	GPM

2. All Other Wastewater Contributing to this Outfall

a. Describe the wastewater.

Miscellaneous stormwater collected around U-2 Transformer(s), and lube oil storage tank berm downsteam of O&G separator.

b. Source(s). Containments around cil containing equipment.

c. Discharge Occurs. 1 hrs/day; - days/wk; 22 days/yr; 12 months/yr.
During which months? All

Report the discharge rate as:

The maximum daily discharge rate.	(Based on last 3 years)	0.016	MGD
The monthly average discharge rate.	(Based on last 3 years)	0.007	MGD
The long-term average discharge rate.	(Based on last 3 years)	0.007	MGD

For batch discharges report:

Number of decant cycles.	_____	Cycles/day
Length of each decant cycle.	_____	MIN.

Average decant discharge rate.	____ GPM

3. Total Process, Miscellaneous Noncontact Cooling, and Sanitary Wastewater

a. Source(s). U-2 Transformer Sump

b. Discharge Occurs. 1 hrs/day; - days/wk; 22 days/yr; 12 months/yr.

During which months? All

Report the discharge rate as:

The maximum daily discharge rate.	0.016	MGD
The monthly average discharge rate.	0.007	MGD
The long-term average discharge rate.	0.007	MGD

4. Stormwater

Complete Module 12 or Module 14 for the stormwater contribution.

Applicant Name: PPL Susquehanna, LLC
Outfall: 075

COMMONWEALTH OF PENNSYLVANIA
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SOURCES OF WASTEWATER
MODULE 3

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME	PPL Susquehanna, LLC
OUTFALL NUMBER	075 Peach Stand Pond

1. Process Wastewater N/A

a. Describe process and type of wastewater.

b. Production Rate.

Referring to the instructions in Appendix 1 for this question, provide the production data as an attachment for each process contributing wastewater to this outfall. The most recent 5 years of production data must be provided.

c. Discharge Occurs. _____ hrs/day; _____ days/wk; _____ days/yr; _____ months/yr.

During which months?

Report the discharge rate as:

The maximum daily discharge rate. _____ MGD

The monthly average discharge rate. _____ MGD

The long-term average discharge rate. _____ MGD

For batch discharges report:

Number of decant cycles. _____ Cycles/day

Length of each decant cycle. _____ MIN.

Average decant discharge rate. _____ GPM

2. All Other Wastewater Contributing to this Outfall N/A

a. Describe the wastewater.

b. Source(s).

c. Discharge Occurs. _____ hrs/day; _____ days/wk; _____ days/yr; _____ months/yr.

During which months?

Report the discharge rate as:

The maximum daily discharge rate. _____ MGD

The monthly average discharge rate. _____ MGD

The long-term average discharge rate. _____ MGD

For batch discharges report:

Number of decant cycles. _____ Cycles/day

Length of each decant cycle. _____ MIN.

Average decant discharge rate. _____ GPM

3. Total Process, Miscellaneous Noncontact Cooling, and Sanitary Wastewater	
a. Source(s). Stormwater only	
b. Discharge Occurs. _____ hrs/day; _____ days/wk; _____ days/yr; _____ months/yr. During which months?	
Report the discharge rate as:	
The maximum daily discharge rate.	_____ MGD
The monthly average discharge rate.	_____ MGD
The long-term average discharge rate.	_____ MGD
4. Stormwater	
Complete Module 12 or Module 14 for the stormwater contribution.	

Applicant Name: PPL Susquehanna, LLC
Outfall: 079

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SOURCES OF WASTEWATER
MODULE 3

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME	PPL Susquehanna, LLC
OUTFALL NUMBER	079 Sewage Treatment Plant

1. Process Wastewater N/A

a. Describe process and type of wastewater.

b. Production Rate.

Referring to the instructions in Appendix 1 for this question, provide the production data as an attachment for each process contributing wastewater to this outfall. The most recent 5 years of production data must be provided.

c. Discharge Occurs. _____ hrs/day; _____ days/wk; _____ days/yr; _____ months/yr.

During which months?

Report the discharge rate as:

The maximum daily discharge rate.	_____ MGD
The monthly average discharge rate.	_____ MGD
The long-term average discharge rate.	_____ MGD

For batch discharges report:

Number of decant cycles.	_____ Cycles/day
Length of each decant cycle.	_____ MIN.
Average decant discharge rate.	_____ GPM

2. All Other Wastewater Contributing to this Outfall

a. Describe the wastewater.

Sanitary wastewater effluent from extended aeration sewage treatment plant

b. Source(s). Gravity Collection System and Grinder Pump Stations

c. Discharge Occurs. 24 hrs/day; 7 days/wk; 365 days/yr; 12 months/yr.

During which months? All

Report the discharge rate as:

The maximum daily discharge rate.	(Based on last 3 years)	0.069	MGD
The monthly average discharge rate.	(Based on last 3 years)	0.025	MGD
The long-term average discharge rate.	(Based on last 3 years)	0.025	MGD

For batch discharges report:

Number of decant cycles.	_____ Cycles/day
Length of each decant cycle.	_____ MIN.
Average decant discharge rate.	_____ GPM

3. Total Process, Miscellaneous Noncontact Cooling, and Sanitary Wastewater	
a. Source(s). Sewage Treatment Plant Effluent	
b. Discharge Occurs. 24 hrs/day; 7 days/wk; 365 days/yr; 12 months/yr. During which months? All	
Report the discharge rate as:	
The maximum daily discharge rate.	0.069 MGD
The monthly average discharge rate.	0.025 MGD
The long-term average discharge rate.	0.025 MGD
4. Stormwater	
Complete Module 12 or Module 14 for the stormwater contribution.	

COMMONWEALTH OF PENNSYLVANIA
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BUREAU OF WATER SUPPLY AND WASTEWATER MANAGEMENT

SOURCES OF WASTEWATER
MODULE 3

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME	PPL Susquehanna, LLC
OUTFALL NUMBER	080 C-1 Pond

1. Process Wastewater N/A

a. *Describe process and type of wastewater.*

b. Production Rate.

Referring to the instructions in Appendix 1 for this question, provide the production data as an attachment for each process contributing wastewater to this outfall. The most recent 5 years of production data must be provided.

c. Discharge Occurs. _____ hrs/day; _____ days/wk; _____ days/yr; _____ months/yr.

During which months?

Report the discharge rate as:

The maximum daily discharge rate. _____ MGD

The monthly average discharge rate. _____ MGD

The long-term average discharge rate. _____ MGD

For batch discharges report:

Number of decant cycles. _____ Cycles/day

Length of each decant cycle. _____ MIN.

Average decant discharge rate. _____ GPM

2. All Other Wastewater Contributing to this Outfall N/A

a. Describe the wastewater.

b. Source(s).

c. Discharge Occurs. _____ hrs/day; _____ days/wk; _____ days/yr; _____ months/yr.

During which months?

Report the discharge rate as:

The maximum daily discharge rate. _____ MGD

The monthly average discharge rate. _____ MGD

The long-term average discharge rate. _____ MGD

For batch discharges report:

Number of decant cycles. _____ Cycles/day

Length of each decant cycle. _____ MIN.

Average decant discharge rate. _____ GPM

3. Total Process, Miscellaneous Noncontact Cooling, and Sanitary Wastewater	
a. Source(s). Stormwater only	
b. Discharge Occurs. _____ hrs/day; _____ days/wk; _____ days/yr; _____ months/yr. During which months?	
Report the discharge rate as:	
The maximum daily discharge rate.	_____ MGD
The monthly average discharge rate.	_____ MGD
The long-term average discharge rate.	_____ MGD
4. Stormwater Complete Module 12 or Module 14 for the stormwater contribution.	

ADDITIONAL INFORMATION FOR MODULE 3

ADDITIONAL OUTFALL DESCRIPTIONS

070 - The S-2 Pond, located on the South side of the Susquehanna SES site, is a storm water runoff outfall (SWRO). This SWRO outfall may contain occasional discharges of clarified water, demineralized water, well water, fire protection water, and other miscellaneous water. These discharges may also contain small amounts of chlorine, which will dissipate upon mixing with storm water in the pond, before the discharge reaches Lake Took-a-while. Due to the similarity of this outfall and Outfalls 075 and 080, only Outfall 075 was sampled for this NPDES permit application.

071 - Cooling Tower Blowdown includes input from the Unit 1 and Unit 2 Cooling Towers, internal discharges, and Emergency Spray Pond (Spray Pond) overflow, and other miscellaneous water. The Cooling Towers and Spray Pond contain river water used for cooling station main condensers and heat exchangers. Spray Pond discharge is based on pond level, and is dependent on make-up to the pond and rainfall. Assuming an estimated Spray Pond discharge of 250 gpm (0.36 MGD) and an average two-unit Cooling Tower discharge of 8,333 gpm (12-MGD), then the pond discharge adds only an additional 3.0% to the station blowdown. This amount however, is not captured in the blowdown flow recorders located upstream of the Spray Pond. Therefore, it may be more accurate to revise the permit to require an Estimated Flow and not Recording Instrumentation for Outfall 071. We will continue to provide recorded readings from blowdown excluding the additional 250 gpm from the Spray Pond. Turbulence and river debris in the blowdown line downstream of the Spray Pond discharge have made flow recorders inoperable.

Evaporative losses in the Cooling Towers generally result in the cooling water being cycled 3 to 5 times the concentration of river water. Cooling Tower Basins each contain approximately 7 million gallons of water and the Spray Pond 25 million gallons.

In order to reduce fouling and corrosion in the Service Water and Circulating Water Systems, PPL utilizes a chemical treatment program. Chemicals included in present and proposed treatment are listed in Module 1 / Item #7 / Section a., "*Information and Analysis of Effluent Quality*," in this permit renewal application.

By definition closed cooling systems are not routinely discharged to the environment. When maintenance is performed on these systems, batch discharges can be directed to the Cooling Tower blowdown (Outfall 071), Sewage Treatment Plant (Outfall 079), or other storm water outfall as described in this permit application. The following Table 1, lists Station Closed Cooling Systems and volumes.

TABLE 1
CLOSED COOLING SYSTEMS

SYSTEMS	NO. OF SYSTEMS	SYSTEM VOLUME (gal)
Units 1 & 2 Reactor Building Closed Cooling Water	2	4,750
Units 1 & 2 Turbine Building Closed Cooling Water	2	1,130
Units 1 & 2 Common Gaseous Radwaste Recombiner Closed Cooling Water	3	3,080
Units 1 & 2 Reactor Building Chilled Water	2	4,750
Units 1 & 2 Turbine Building Chilled Water	2	6,200
Temporary Drywell Chiller		550
Learning Center Closed Cooling Water Loop	1	650
Control Structure Chilled Water	1	1,200
Radwaste Building Chilled Water	1	860
A-D Emergency Diesel Generator Jacket Cooling Water	4	710
E Emergency Diesel Generator Jacket Cooling Water	1	1,500

To date, no Zebra mussels or Asiatic clams have been found in the river near the Susquehanna SES. Zebra mussel young were observed during years past in the Johnson City, New York area, about 150 miles upriver. Asiatic clam adults have been observed in the river near Bloomsburg, Pennsylvania, approximately 18 miles downriver from Susquehanna SES. In 2001, a single Asiatic clam was collected from a heat exchanger within the plant, however since that time no additional Asiatic clams have been found.

If such species do eventually impact the plant, PPL plans to utilize a non-oxidizing biocide listed in Module 1, Item #7, to periodically eliminate these mollusks from the plant intake piping as well as the Cooling Tower and Spray Pond. This material will be added over a 12-24 hr. period at a frequency of 2-4 times or as needed annually. This biocide will be detoxified with bentonite clay, which will be continuously added to the Cooling Tower Blowdown Line during treatment. The bentonite clay absorbs the biocide, deactivating the biocide. Extensive studies of the biocide and its detoxified by-products have been conducted by the vendor and MSDSs for these products are attached as additional information to Module 1.

During refueling outages Cooling Tower basin sediment is removed and dewatered by belt filter press. A flocculant is used to enhance the dewatering process. The filtrate from the dewatering process is discharged to the Cooling tower blowdown line. The dewatered sediment is currently transported offsite for disposal.

PPL Susquehanna, LLC has received PaDEP approval to dry Cooling and Spray Pond sediment onsite as a coproduct. This coproduct can be used to control site erosion and/or support warm season grasses on PPL lands in the vicinity of the Susquehanna SES. Runoff from the sediment may enter the SWROs, however, this additional runoff would be negligible compared to present site runoff volume. To date we have not utilized this option to dry cooling tower and spray pond sediment.

Included in the Cooling Tower Blowdown is miscellaneous wastewater such as tanker discharges of rainwater from the Condensate Storage Tank bermed areas, water from clean system drains in the Radiological Controlled Area (RCA) and peripheral facilities associated with the station and also mop water collections near the RCA exits 100 - 300 gal/week.

During periodical maintenance (or malfunctions) at the River Intake Structure screen wash water may be returned temporarily to the river from the Debris Handling Pit. This occurs infrequency and is recorded in station operating logs, work orders and tracking records as appropriate. Previous occurrences have been evaluated as non-impacting, (i.e. no detrimental chemicals are added at the Intake Structure) and were reported to the PaDEP in DMR cover letters for information only. For consistency these occurrences will be noted in our operating records and the PaDEP notified only if deleterious affects on the environment are suspected in accordance with appropriate sections of the NPDES Permit.

During operation of the Clarified Water System, which uses river water makeup, (typically used only during outages to augment well water use) there is a minimum flow of clarified water (approximately 150 gpm) back to the circulating water system to maintain consistent clarifier operation. This clarified water has no impact of circ water as min flow or as pumped out of the clarified during shut down. It is clean water typically <2.0 NTUs. Solids removed as underflow during clarifier operation are collected and removed for offsite disposal. Filter backwash water is returned/recycled to the clarifier inlet for treatment. Following clarifier shutdown low volume waste is pumped to the neutralization basin (Outfall 371) for processing prior to discharge.

INTERNAL OUTFALLS

171 - Liquid Radwaste discharge includes leakage and wastewater from the radiologically controlled area and the in plant chem lab. Prior to combining with Outfall 071, this wastewater is passed through various treatment processes to reduce the concentration of radioactive materials. Approximately 90% of liquid radwaste are treated by one of two processes: filtration followed by ion-exchange demineralization, or ion-exchange demineralization followed by microstraining.

Approximately 10% of liquid radwaste is processed through the laundry drain system, which receives wastewater from equipment washdown stations and personnel decontamination facilities in the radiologically controlled area. PPL-supplied clothing is sent to an outside contractor for cleaning. Miscellaneous wastes discharged through this system also include service water leakage, mop water from cleaning, and leakage from various pumps and valves. This water passes through microstraining filters prior to sampling for discharge.

271 - Waste Filter Bypass was previously eliminated from this NPDES permit since it is no longer in operation.

371 - Neutralization Basin internal discharge includes inputs from the demineralizer rinse water, chemical waste inputs from Circulating Water Pumphouse Building equipment and floor drains and clarifier sludge holdup sump decant water. There are two neutralization basins each with a capacity of approximately 18,000 gallons. The basins are used alternately and the contents are air sparged, recirculated, and sampled prior to being directed to the suction side of the circulating water pumps.

471 - Waste Filter was previously eliminated from this NPDES permit since it is no longer in operation.

571 - Request elimination of the Circulating Water Pumphouse Building sump outfall from the NPDES permit since it receives only circulating water and seal water (well water) from circ water/service water pump operation and is not impacted by station operation. This sump automatically pumps to the circulating water system suction and is correctly included within the limits of the cooling tower system operation. Historic monitoring has only documented elevated solids during river water makeup turbidity excursions during periods of high river solids (reference attached August 2003 DMR Letter PLE-0023359 dated September 16, 2003). It does not meet the definition of Low Volume Waste; it is miscellaneous cooling water that should not require monitoring.

072 - The Service and Administration (S&A) Sump receives stormwater from the emergency start-up transformer bermed areas, the diesel generator oil unloading areas and equipment, and S&A Oil Storage bermed area. The sump contains two cells, each with approximately 10,000-gallon capacity. An oil and grease separator is provided upstream of the sump to remove any fuel or transformer oil leakage. **Request reduction in the monitoring frequency of this outfall to be consistent (currently quarterly) with outfalls 073 and 074 below.** Adequate controls, treatment, and visual confirmation are in place. Historical monitoring at increased frequency for a long period of time has consistently shown minimal oil & grease and total suspended solids and has not indicated any challenges to the monitored parameters.

073 - Unit 1 Transformer Water Sump collects stormwater from the transformers, turbine lube oil, and oil circuit breaker bermed areas. This sump has two cells of approximately 8,100 gallons each. The storm water collected in this sump passes through an oil and grease separator prior to entering the sump and is visibly inspected prior to discharge.

074 - Unit 2 Transformer Water sump is similar to Outfall 073. It collects stormwater from the Unit 2 transformers and lube oil storage tank berm. Due to the similarity between these outfalls only Outfall 073 was sampled to represent this discharge for the NPDES permit renewal application.

075 - The Peach Stand Pond is a SWRO that collects and conveys runoff from North drainage area including site sumps and buildings. This outfall may contain occasional discharges of clarified water, demineralized water, well water, fire protection water, and other miscellaneous water. These discharges may contain small amounts of chlorine, which will dissipate upon mixing with storm water before entering Lake Took-a-while. Discharge from this outfall goes into Lake Took-a-while located east of US Route 11. Because this outfall and Outfalls 070 and 080 are similar, only this outfall was sampled for this NPDES permit renewal application.

079 - The Sewage Treatment Plant (STP) is designed to treat 80,000 gallons per day of sanitary wastes from the gravity collection system onsite and from grinder pump stations at the Learning Center, Riverlands Recreation Area, Environmental Lab, West Building, and Vehicle Maintenance Garage. In certain circumstances discharges from various sumps and drains may be routed to the Sewage Treatment Plant to meet NPDES permit limits. Sanitary wastes may contain small amounts of miscellaneous waste water, cleaning agents, and other chemicals. Material Safety Data Sheets for these chemicals recommend treatment at STPs prior to discharge (Susquehanna River).

080 - The C-1 Pond is a SWRO outfall located in the Central Drainage Area just East of the station's protected area. This outfall may contain occasional discharges of clarified water, demineralized water, well water, fire protection water, and other miscellaneous water. These discharges may contain small amounts of chlorine, which will dissipate upon mixing with storm water before entering Lake Took-a-while. Due to the similarity of this outfall and outfalls 070 and 075, only Outfall 075 was sampled for this permit application.

September 16, 2003

Ms. Kate Crowley
Water Quality Regional Manager
Bureau of Water Quality Management
Pennsylvania Department of Environmental Protection
Two Public Square
Wilkes-Barre, PA 18711-0790

SUSQUEHANNA STEAM ELECTRIC STATION
DISCHARGE MONITORING REPORT – AUGUST 2003
NPDES PERMIT NO. PA 0047325
PLE – 0023359

Dear Ms. Crowley:

Pursuant to Part A,3.b.(1) of NPDES Permit No. PA 00477325, enclosed is the Susquehanna Steam Electric Station (SES) Discharge Monitoring Report (DMR) for August. Also enclosed is the Monthly Facility Report Form (01-112).

On August 13, 2003 a total suspended solids excursion (191.1 mg/L) occurred at the circulating water pumphouse sump (internal outfall 571) due to elevated Susquehanna River turbidity from significant rainfall events. Although there are no solids limits on circulating water (cooling water) a given amount of circulating water typically passes through the circulating water pump seals contributing to sump solids levels whenever river solids are elevated. Additional sump samples collected by the end of the month resulted in the monthly average permit limit for this internal outfall being met.

If you have any questions, please call Curt Saxton (570) 542-1879 or Jerrold McCormick at (570) 542-3014.

Respectfully yours,

David J. Morgan
Sr. Staff Engineer/Scientist

CHS/raa

Enclosure 1 – August 2003 DMR (8 pages)
Enclosure 2 – Monthly Facility Report Form (1 page)

Copy to:
Ms. N. Green, EPA Region III

Applicant Name: PPL Susquehanna, LLC

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER SUPPLY AND WASTEWATER MANAGEMENT

ANALYSIS RESULTS TABLE POLLUTANT GROUP 1
MODULE 4

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME: PPL Susquehanna, LLC

- ☐ Outfall Number _____ (Show location of sampling point on Line Drawing)
- ☒ Intake Sampling Results - Optional (Specify Source: Susquehanna River)
- ☐ Background Sampling Results - Optional (Specify Location of Sample: _____)
- ☐ Treatment Facility Influent Sampling Results (Show location of sampling point on Line Drawing)
- ☐ New Discharge (Basis for Information: _____)
- ☐ Bypass or Sewer System Overflow (Describe: _____)

POLLUTANT GROUP 1	1. LEVEL PRESENT					2. UNITS		3. Coefficient of Effluent Variability (CV)
	a. Maximum Daily Value		b. Average of Analysis		c. No. of Analysis	a. Concentration	b. Mass	
	(1) Concentration	(2) Mass	(1) Concentration	(2) Mass				
Biochemical Oxygen Demand, BOD	3.3		2.6		3	mg/l		
Chemical Oxygen Demand, COD	16		15.3		3	mg/l		
Hardness ($CaCO_3$)	107		89.4		3	mg/l		
Total Suspended Solids, TSS	45		22.3		3	mg/l		
Total Dissolved Solids, TDS	208		173		3	mg/l		
Ammonia as N	.12		.07		3	mg/l		
Nitrate-Nitrite (as N)	.67		47		3	mg/l		
Total Kjeldahl Nitrogen (TKN)	ND		ND		3	mg/l		
Phosphorus (as P), Total	ND		ND		3	mg/l		
Temperature winter	0° Value		23 Value		Numerous	(°C)		
Temperature summer	28.9° Value		23 Value		Numerous	(°C)		
pH	Min. 7.39	Max. 8.32			3	Standard units	Standard units	

1.a. Maximum Daily Value - Report the highest daily value or daily average value from the last year of data. Report both mass and concentration.
1.b. Average of Analysis - The average of all values within the last year and report both the mass and concentration.
1.c. A minimum of 3 Sampling Events required for process wastewater discharges, and a minimum of 1 Sampling Event for all other discharges, treatment facility influent, intake water and background.

Applicant Name: PPL Susquehanna, LLC

POLLUTANT GROUP 1	Believed Absent	1. MDL Used* (µg/L)	2. EPA Method Number Used	3. Level Present					4. Units		5. Coefficient of Effluent Variability (CV)
				a. Max Daily Value		b. Average of Analysis		c. Number of Analysis			
				Concentration	Mass	Concentration	Mass		Concentration	Mass	
Color	☐	5	SM18-2120B	40		35		3	CU		
Fecal Coliform	☐										
Fluoride	☐	100	300.0	.12		0.07		3	mg/l		
Oil and Grease	☐	2200	1664	ND		ND		3	mg/l		
Bromide	☐	300	300	ND		ND		3	mg/l		
Chlorine, Total Residual	☐	50	330.1	ND		ND		3	mg/l		
Sulfate	☐	1000	300.0	37.2		22.4		3	mg/l		
Sulfide	☐	1000	376.1	ND		No		3	mg/l		
Sulfite	☐	2000	377.1	2.0		.67		3	mg/l		
Surfactants	☐	25	SM18-5540C	.057		.019		3	mg/l		
Aluminum, Total	☐	50	200.7	.65		.31		3	mg/l		
Barium, Total	☐	10	200.7	.033		.030		3	mg/l		
Boron, Total	☐	50	200.7	.19		.06		3	mg/l		
Cobalt, Total	☐	3	200.7	ND		ND		3	mg/l		
Iron, Total	☐	30	200.7	1.23		.78		3	mg/l		
Iron, Dissolved	☐	60	200.7	.13		.06		3	mg/l		
Manganese, Total	☐	3	200.7	.092		.087		3	mg/l		
Radioactivity GR-A	☐	1.55	900	ND		ND		3	pCi/l		
Total Organic Carbon, TOC	☐	1000	SM185310B	3.6		2.5		3	mg/l		
Radioactivity GR-B	☐	2.36	900	4.90		1.63		3	pCi/l		
Magnesium	☐	50	200.7	7.83		6.16		3	mg/l		
Molybdenum	☐	10	200.7	ND		ND		3	mg/l		
Tin, Total	☐	10	200.7	ND		ND		3	mg/l		
Titanium, Total	☐	10	200.7	.01		.003		3	mg/l		

3. If other data is available (i.e., DMR data, etc.), the past year of data may be used to determine 3a, 3b, 3c, and 5.

3.a. Maximum Daily Value – Report the highest daily value or daily average value from the last year of data. Report both mass and concentration.

3.b. Average of Analysis – Determine the average of all samples taken within the past year. Report both mass and concentration.

3.c. A minimum of 3 Sampling Events required for process wastewater discharges, and a minimum of 1 Sampling Event for all other discharges, treatment facility influent, intake water and background.

* It is in the applicant's interest to achieve the lowest level of detection possible. This will minimize uncertainty and therefore the need for additional analysis or potential for establishing a large number of effluent limits and/or monitoring requirements in the final NPDES permit.

Applicant Name: PPL Susquehanna, LLC

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER SUPPLY AND WASTEWATER MANAGEMENT

ANALYSIS RESULTS TABLE POLLUTANT GROUP 2
MODULE 5

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME: PPL Susquehanna, LLC

- ☐ Outfall Number _____ (Show location of sampling point on Line Drawing)
- ☒ Intake Sampling Results - Optional (Specify Source: Susquehanna River)
- ☐ Background Sampling Results - Optional (Specify Location: _____)
- ☐ Treatment Facility Influent Sampling Results (Show location of sampling point on Line Drawing)
- ☐ New Discharge (Basis for Information: _____)
- ☐ Bypass or Sewer System Overflow (Describe: _____)

POLLUTANT GROUP 2 Metals		1: MDL Used* (µg/L)	2. EPA Method Number Used	3. Level Present a. Max Daily Value Concentration	a. Max Daily Value Mass	b. Average of Analysis Concentration	b. Average of Analysis Mass	c. Number of Analysis	4. Units Concentration	4. Units Mass	5. Coefficient of Effluent Variability (CV)
1M	Antimony, Total	10	200.7	ND		ND		3	mg/l		
2M	Arsenic, Total	4	200.7	ND		ND		3	mg/l		
3M	Beryllium, Total	3	200.7	ND		ND		3	mg/l		
4M	Cadmium, Total	1	200.7	ND		ND		3	mg/l		
5M	Chromium III	1	200.7	ND		ND		3	mg/l		
5M	Chromium VI	10	SM18-3500-CrD	ND		ND		3	mg/l		
6M	Copper, Total	10	200.7	.016		.015		3	mg/l		
7M	Lead, Total	3	200.7	ND		ND		3	mg/l		
8M	Mercury, Total	.2	245.1	ND		ND		3	mg/l		
9M	Nickel, Total	10	200.7	ND		ND		3	mg/l		
10M	Selenium, Total	10	200.7	ND		ND		3	mg/l		
11M	Silver, Total	2	200.7	ND		ND		3	mg/l		

3. If other data is available (i.e., DMR data, etc.), the past year of data may be used to determine 3a, 3b, 3c, and 5.
3.a. Maximum Daily Value – Report the highest daily value or daily average value from the last year of data. Report both mass and concentration.
3.b. Average of Analysis – Determine the average of all samples taken within the past year. Report both mass and concentration.
3.c. A minimum of 3 Sampling Events required for process wastewater discharges, and a minimum of 1 Sampling Event for all other discharges, treatment facility influent, intake water and background.
* It is in the applicant's interest to achieve the lowest level of detection possible. This will minimize uncertainty and therefore the need for additional analysis or potential for establishing a large number of effluent limits and/or monitoring requirements in the final NPDES permit.

Applicant Name: PPL Susquehanna, LLC

POLLUTANT GROUP 2		1. MDL Used* (µg/L)	2. EPA Method Number Used	3. Level Present					4. Units		5. Coefficient of Effluent Variability (CV)
				a. Max Daily Value		b. Average of Analysis		c. Number of Analysis			
	Metals			Concentration	Mass	Concentration	Mass		Concentration	Mass	
12M	Thallium, Total	10	200.7	ND		ND		3	mg/l		
13M	Zinc, Total	5	200.7	.028		.026		3	mg/l		
14M	Cyanide, Total	5	335.3	ND		ND		3	mg/l		
14M	Cyanide, Free	5	SM4500CNI	ND		ND		3	mg/l		
15M	Phenols, Total	5	420.4	ND		ND		3	mg/l		

3. If other data is available (i.e., DMR data, etc.), the past year of data may be used to determine 3a, 3b, 3c, and 5.

3.a. Maximum Daily Value – Report the highest daily value or daily average value from the last year of data. Report both mass and concentration.

3.b. Average of Analysis – Determine the average of all samples taken within the past year. Report both mass and concentration.

3.c. A minimum of 3 Sampling Events required for process wastewater discharges, and a minimum of 1 Sampling Event for all other discharges, treatment facility influent, intake water and background.

* It is in the applicant's interest to achieve the lowest level of detection possible. This will minimize uncertainty and therefore the need for additional analysis or potential for establishing a large number of effluent limits and/or monitoring requirements in the final NPDES permit.

Applicant Name: PPL Susquehanna, LLC

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER SUPPLY AND WASTEWATER MANAGEMENT

ANALYSIS RESULTS TABLE POLLUTANT GROUP 3
MODULE 6

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME: PPL Susquehanna, LLC

- ☐ Outfall Number _____ (Show location of sampling point on Line Drawing)
- ☒ Intake Sampling Results - Optional (Specify Source: Susquehanna River)
- ☐ Background Sampling Results - Optional (Specify Location: _____)
- ☐ Treatment Facility Influent Sampling Results (Show location of sampling point on Line Drawing)
- ☐ New Discharge (Basis for Information: _____)
- ☐ Bypass or Sewer System Overflow (Describe: _____)

POLLUTANT GROUP 3		1. MDL Used* (µg/L)	2. EPA Method Number Used	3. Level Present					4. Units		5. Coefficient of Effluent Variability (CV)
				a. Max Daily Value		b. Average of Analysis		c. Number of Analysis			
	Volitales			Concentration	Mass	Concentration	Mass		Concentration	Mass	
1V	Acrolein	20	624	ND		ND		3	ug/l		
2V	Acrylonitrile	4	624	ND		ND		3	ug/l		
3V	Benzene	1	624	ND		ND		3	ug/l		
5V	Bromoform	1	624	ND		ND		3	ug/l		
6V	Carbon Tetrachloride	1	624	ND		ND		3	ug/l		
7V	Chlorobenzene	1	624	ND		ND		3	ug/l		
8V	Chlorodibromomethane	1	624	ND		ND		3	ug/l		
9V	Chloroethane	1	624	ND		ND		3	ug/l		
10V	2-Chloroethylvinyl Ether	2	624	ND		ND		3	ug/l		

3. If other data is available (i.e., DMR data, etc.), the past year of data may be used to determine 3a, 3b, 3c, and 5.
3.a. Maximum Daily Value – Report the highest daily value or daily average value from the last year of data. Report both mass and concentration.
3.b. Average of Analysis – Determine the average of all samples taken within the past year. Report both mass and concentration.
3.c. A minimum of 3 Sampling Events required for process wastewater discharges, and a minimum of 1 Sampling Event for all other discharges, treatment facility influent, intake water and background.

* It is in the applicant's interest to achieve the lowest level of detection possible. This will minimize uncertainty and therefore the need for additional analysis or potential for establishing a large number of effluent limits and/or monitoring requirements in the final NPDES permit.

Applicant Name: PPL Susquehanna, LLC

POLLUTANT GROUP 3		1. MDL Used* (µg/L)	2. EPA Method Number Used	3. Level Present					4. Units		5. Coefficient of Effluent Variability (CV)
				a. Max Daily Value		b. Average of Analysis		c. Number of Analysis			
Volitales				Concentration	Mass	Concentration	Mass		Concentration	Mass	
11V	Chloroform	1	624	ND		ND		3	ug/l		
12V	Dichlorobromomethane	1	624	ND		ND		3	ug/l		
14V	1,1-Dichloroethane	1	624	ND		ND		3	ug/l		
15V	1,2-Dichloroethane	1	624	ND		ND		3	ug/l		
16V	1,1-Dichloroethylene	1	624	ND		ND		3	ug/l		
17V	1,2 Dichloropropane	1	624	ND		ND		3	ug/l		
18V	1, 3-Dichloropropylene	2	624	ND		ND		3	ug/l		
19V	Ethylebenzene	1	624	ND		ND		3	ug/l		
20V	Methyl Bromide	1	624	ND		ND		3	ug/l		
21V	Methyl Chloride	1	624	ND		ND		3	ug/l		
22V	Methylene Chloride	2	624	ND		ND		3	ug/l		
23V	1,1,2,2-Tetrachloroethane	1	624	ND		ND		3	ug/l		
24V	Tetrachloroethylene	1	624	ND		ND		3	ug/l		
25V	Toluene	1	624	ND		ND		3	ug/l		
26V	1,2-Trans-dichloroethylene	1	624	ND		ND		3	ug/l		
27V	1,1,1-Trichloroethane	1	624	ND		ND		3	ug/l		
28V	1,1,2-Trichloroethane	1	624	ND		ND		3	ug/l		
29V	Trichloroethylene	1	624	ND		ND		3	ug/l		
31V	Vinyl Chloride	1	624	ND		ND		3	ug/l		

3. If other data is available (i.e., DMR data, etc.), the past year of data may be used to determine 3a, 3b, 3c, and 5.
3.a. Maximum Daily Value – Report the highest daily value or daily average value from the last year of data. Report both mass and concentration.
3.b. Average of Analysis – Determine the average of all samples taken within the past year. Report both mass and concentration.
3.c. A minimum of 3 Sampling Events required for process wastewater discharges, and a minimum of 1 Sampling Event for all other discharges, treatment facility influent, intake water and background.

It is in the applicant's interest to achieve the lowest level of detection possible. This will minimize uncertainty and therefore the need for additional analysis or potential for establishing a large number of effluent limits and/or monitoring requirements in the final NPDES permit.

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Applicant Name: PPL Susquehanna, LLC

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER SUPPLY AND WASTEWATER MANAGEMENT

ANALYSIS RESULTS TABLE POLLUTANT GROUP 4
MODULE 7

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME: PPL Susquehanna, LLC

- ☐ Outfall Number _____ (Show location of sampling point on Line Drawing)
- ☒ Intake Sampling Results - Optional (Specify Source: Susquehanna River)
- ☐ Upstream Background Sampling Results - Optional (Specify Location: _____)
- ☐ Treatment Facility Influent Sampling Results (Show location of sampling point on Line Drawing)
- ☐ New Discharge (Basis for Information: _____)
- ☐ Bypass or Sewer System Overflow (Describe: _____)

POLLUTANT GROUP 4		1. MDL Used* (µg/L)	2. EPA Method Number Used	3. Level Present					4. Units		5. Coefficient of Effluent Variability (CV)
				a. Max Daily Value		b. Average of Analysis		c. Number of Analysis			
	Acid Compounds			Concentration	Mass	Concentration	Mass		Concentration	Mass	
1A	2-Chlorophenol	10	625	ND		ND		3	ug/l		
2A	2,4-Dichlorophenol	10	625	ND		ND		3	ug/l		
3A	2,4-Dimethylphenol	10	625	ND		ND		3	ug/l		
4A	4,6-Dinitro-o-cresol	19	625	ND		ND		3	ug/l		
5A	2,4-Dinitrophenol	24	625	ND		ND		3	ug/l		
6A	2-Nitrophenol	10	625	ND		ND		3	ug/l		
7A	4-Nitrophenol	11	625	ND		ND		3	ug/l		
8A	P-chloro-m-cresol	10	625	ND		ND		3	ug/l		
9A	Pentachlorophenol	24	625	ND		ND		3	ug/l		
10A	Phenol	10	625	ND		ND		3	ug/l		
11A	2,4,6-Trichlorophenol	10	625	ND		ND		3	ug/l		

3. If other data is available (i.e., DMR data, etc.), the past year of data may be used to determine 3a, 3b, 3c, and 5.
3.a. Maximum Daily Value – Report the **highest** daily value or daily average value from the last year of data. Report both mass and concentration.
3.b. Average of Analysis – Determine the average of all samples taken within the past year. Report both mass and concentration.
3.c. A minimum of 3 Sampling Events required for process wastewater discharges, and a minimum of 1 Sampling Event for all other discharges, treatment facility influent, intake water and background.
* It is in the applicant's interest to achieve the lowest level of detection possible. This will minimize uncertainty and therefore the need for additional analysis or the potential for establishing a large number of effluent limits and/or monitoring requirements in the final NPDES permit.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER SUPPLY AND WASTEWATER MANAGEMENT

ANALYSIS RESULTS TABLE POLLUTANT GROUP 5
MODULE 8

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME: PPL Susquehanna, LLC

- ☐ Outfall Number _____ (Show location of sampling point on Line Drawing)
- ☒ Water Supply Sampling Results - Optional (Specify Source: Susquehanna River)
- ☐ Background Sampling Results - Optional (Specify Location: _____)
- ☐ Treatment Facility Influent Sampling Results (Show location of sampling point on Line Drawing)
- ☐ New Discharge (Basis for Information: _____)
- ☐ Bypass or Sewer System Overflow (Describe: _____)

POLLUTANT GROUP 5 Base Compounds		1. MDL Used* (µg/L)	2. EPA Method Number Used	3. Level Present					4. Units		5. Coefficient of Effluent Variability (CV)
				a. Max Daily Value		b. Annual Average of Analysis		c. Number of Analysis			
				Concentration	Mass	Concentration	Mass		Concentration	Mass	
1B	Acenaphthene	3	625	ND		ND		3	µg/L		
2B	Acenaphthylene	3	625	ND		ND		3	µg/L		
3B	Anthracene	2	625	ND		ND		3	µg/L		
4B	Benzidine	19	625	ND		ND		3	µg/L		
5B	Benzo(*a*)anthracene	2	625	ND		ND		3	µg/L		
6B	Benzo(*a*)pyrene	2	625	ND		ND		3	µg/L		
7B	3,4-Benzofluoranthene	2	625	ND		ND		3	µg/L		
8B	Benzo(*ghi*)perylene	2	625	ND		ND		3	µg/L		
9B	Benzo(*k*)fluoranthene	2	625	ND		ND		3	µg/L		
10B	Bis(2-*Chloro-ethoxy*)methane	3	625	ND		ND		3	µg/L		
11B	Bis(*2-Chloroethyl*)ether	3	625	ND		ND		3	µg/L		
12B	Bis(*2-Chloro-Isopropyl*)ether	2	625	ND		ND		3	µg/L		
13B	Bis(*2-Ethylhexyl*)phthalate	2	625	ND		ND		3	µg/L		
14B	4-Bromophenyl Phenyl Ether	3	625	ND		ND		3	µg/L		
15B	Butylbenzyl Phthalate	5	625	ND		ND		3	µg/L		
16B	2-Chloronaphthalene	5	625	ND		ND		3	µg/L		
17B	4-Chlorophenyl Phenyl Ether	5	625	ND		ND		3	µg/L		

3.a. Maximum Daily Value – Report the highest daily value or daily average value from the last year of data. Report both mass and concentration.
3.b. Average of Analysis – Determine the average of all samples taken within the past year. Report both mass and concentration.
3.c. A minimum of 3 Sampling Events required for process wastewater discharges, and a minimum of 1 Sampling Event for all other discharges, treatment facility influent, intake water and background.

* It is in the applicant's interest to achieve the lowest level of detection possible. This will minimize uncertainty and therefore the need for additional analysis or the potential for establishing a large number of effluent limits and/or monitoring requirements in the final NPDES permit.

POLLUTANT GROUP 5 Base Compounds		1. MDL Used* (µg/L)	2. EPA Method Number Used	3. Level Present a. Max Daily Value Concentration	a. Max Daily Value Mass	b. Annual Average of Analysis Concentration	b. Annual Average of Analysis Mass	c. Number of Analysis	4. Units Concentration	4. Units Mass	5. Coefficient of Effluent Variability (CV)
18B	Chrysene	2	625	ND		ND		3	µg/L		
19B	Dibenzo(*a,h*)anthracene	2	625	ND		ND		3	µg/L		
20B	1,2-Dichlorobenzene	5	625	ND		ND		3	µg/L		
21B	1,3- Dichlorobenzene	5	625	ND		ND		3	µg/L		
22B	1,4- Dichlorobenzene	5	625	ND		ND		3	µg/L		
23B	3,3'-Dichlorobenzidine	10	625	ND		ND		3	µg/L		
24B	Diethyl Phthalate	10	625	ND		ND		3	µg/L		
25B	Dimethyl Phthalate	10	625	ND		ND		3	µg/L		
26B	Di-n-butyl Phthalate	5	625	ND		ND		3	µg/L		
27B	2,4-Dinitrotoluene	2	625	ND		ND		3	µg/L		
28B	2,6-Dinitrotoluene	2	625	ND		ND		3	µg/L		
29B	Di-n-octyl Phthalate	5	625	ND		ND		3	µg/L		
30B	1,2-Diphenylhydrazine (as *Azobenzene*)	5	625	ND		ND		3	µg/L		
31B	Fluoranthene	2	625	ND		ND		3	µg/L		
32B	Fluorene	3	625	ND		ND		3	µg/L		
33B	Hexachlorobenzene	2	625	ND		ND		3	µg/L		
34B	Hexechlorobutadiene	5	625	ND		ND		3	µg/L		
35B	Hexachlorocyclopentadiene	10	625	ND		ND		3	µg/L		
36B	Hexachloroethane	5	625	ND		ND		3	µg/L		
37B	Indeno(*1,2,3-cd*)pyrene	2	625	ND		ND		3	µg/L		
38B	Isophorone	3	625	ND		ND		3	µg/L		
39B	Naphthalene	3	625	ND		ND		3	µg/L		
40B	Nitrobenzene	3	625	ND		ND		3	µg/L		
41B	N-Nitrosodimethylamine	3	625	ND		ND		3	µg/L		
42B	N-Nitrosodi-n-propylamine	3	625	ND		ND		3	µg/L		
43B	N-Nitrosodiphenylamine	3	625	ND		ND		3	µg/L		
44B	Phenanthrene	3	625	ND		ND		3	µg/L		
45B	Pyrene	2	625	ND		ND		3	µg/L		
46B	1,2,4-Trichlorobenzene	5	625	ND		ND		3	µg/L		

3.a. Maximum Daily Value – Report the <u>highest</u> daily value or daily average value from the last year of data. Report both mass and concentration.
3.b. Average of Analysis – Determine the average of all samples taken within the past year. Report both mass and concentration.
3.c. A minimum of 3 Sampling Events required for process wastewater discharges, and a minimum of 1 Sampling Event for all other discharges, treatment facility influent, intake water and background.

* It is in the applicant's interest to achieve the lowest level of detection possible. This will minimize uncertainty and therefore the need for additional analysis or the potential for establishing a large number of effluent limits and/or monitoring requirements in the final NPDES permit.

Applicant Name: PPL Susquehanna, LLC

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER SUPPLY AND WASTEWATER MANAGEMENT

ANALYSIS RESULTS TABLE POLLUTANT GROUP 6
MODULE 9

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME: PPL Susquehanna, LLC

- ☐ Outfall Number _____ (Show location of sampling point on Line Drawing)
- ☒ Intake Sampling Results - Optional (Specify Source: Susquehanna River)
- ☐ Upstream Background Sampling Results - Optional (Specify Location: _____)
- ☐ Treatment Facility Influent Sampling Results (Show location of sampling point on Line Drawing)
- ☐ New Discharge (Basis for Information: _____)
- ☐ Bypass or Sewer System Overflow (Describe: _____)

POLLUTANT GROUP 6		1. MDL Used* (µg/L)	2. EPA Method Number Used	3. Level Present					4. Units		5. Coefficient of Effluent Variability (CV)
				a. Max Daily Value		b. Average of Analysis		c. Number of Analysis			
	Pesticides			Concentration	Mass	Concentration	Mass		Concentration	Mass	
1P	Aldrin										
2P	Alpha-BHC										
3P	Beta-BHC										
4P	Gamma-BHC										
5P	Delta-BHC										
6P	Chlordane										
7P	4,4'-DDT										
8P	4,4'-DDE										
9P	4,4'-DDD										
10P	Dieldrin										
11P	Alpha-endosulfan										

3. If other data is available (i.e., DMR data, etc.), the past year of data may be used to determine 3a, 3b, 3c, and 5.
3.a. Maximum Daily Value – Report the highest daily value or daily average value from the last year of data. Report both mass and concentration.
3.b. Average of Analysis – Determine the average of all samples taken within the past year. Report both mass and concentration.
3.c. A minimum of 3 Sampling Events required for process wastewater discharges, and a minimum of 1 Sampling Event for all other discharges, treatment facility influent, intake water and background.

* It is in the applicant's interest to achieve the lowest level of detection possible. This will minimize uncertainty and therefore the need for additional analysis or the potential for establishing a large number of effluent limits and/or monitoring requirements in the final NPDES permit.

Applicant Name: PPL Susquehanna, LLC

POLLUTANT GROUP 6		1. MDL Used* (µg/L)	2. EPA Method Number Used	3. Level Present					4. Units		5. Coefficient of Effluent Variability (CV)
				a. Max Daily Value		b. Average of Analysis		c. Number of Analysis			
	Pesticides			Concentration	Mass	Concentration	Mass		Concentration	Mass	
12P	Beta-endosulfan										
13P	Endosulfan Sulfate										
14P	Endrin										
15P	Endrin Aldehyde										
16P	Heptachlor										
17P	Heptachlor Epoxide										
18P	PCB-1242	.96	608	ND		ND		3	µg/L		
19P	PCB-1254	.96	608	ND		ND		3	µg/L		
20P	PCB-1221	.96	608	ND		ND		3	µg/L		
21P	PCB-1232	.96	608	ND		ND		3	µg/L		
22P	PCB-1248	.96	608	ND		ND		3	µg/L		
23P	PCB-1260	.96	608	ND		ND		3	µg/L		
24P	PCB-1016	.96	608	ND		ND		3	µg/L		
25P	Toxaphene										
26P	DIOXIN: 2,3,7, 8-Tetrachlorodibenzo-P-Dioxin (TCDD)			Describe Results:							

3. If other data is available (i.e., DMR data, etc.), the past year of data may be used to determine 3a, 3b, 3c, and 5.

3.a. Maximum Daily Value – Report the highest daily value or daily average value from the last year of data. Report both mass and concentration.

3.b. Average of Analysis – Determine the average of all samples taken within the past year. Report both mass and concentration.

3.c. A minimum of 3 Sampling Events required for process wastewater discharges, and a minimum of 1 Sampling Event for all other discharges, treatment facility influent, intake water and background.

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Applicant Name: PPL Susquehanna, LLC

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER SUPPLY AND WASTEWATER MANAGEMENT

ANALYSIS RESULTS TABLE POLLUTANT GROUP 1
MODULE 4

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME: PPL Susquehanna, LLC

- ☒ **Outfall Number** 071 (Show location of sampling point on Line Drawing) Flows = 6/3, 12.63 MGD, 6/17, 14.58 MGD, & 7/1, 15.38 MGD
- ☐ Intake Sampling Results - Optional (Specify Source: _____)
- ☐ Background Sampling Results - Optional (Specify Location of Sample: _____)
- ☐ Treatment Facility Influent Sampling Results (Show location of sampling point on Line Drawing)
- ☐ New Discharge (Basis for Information: _____)
- ☐ Bypass or Sewer System Overflow (Describe: _____)

POLLUTANT GROUP 1	1. LEVEL PRESENT					2. UNITS		3. Coefficient of Effluent Variability (CV)
	a. Maximum Daily Value		b. Average of Analysis		c. No. of Analysis	a. Concentration	b. Mass	
	(1) Concentration	(2) Mass	(1) Concentration	(2) Mass				
Biochemical Oxygen Demand, BOD	5.4	573	2.7	338	3	mg/l	lb/day	
Chemical Oxygen Demand, COD	49.0	5960	43.6	5160	3	mg/l	lb/day	
Hardness ($CaCO_3$)	377	48700	324.0	38400	3	mg/l	lb/day	
Total Suspended Solids, TSS	42	4460	21.3	2520	3	mg/l	lb/day	
Total Dissolved Solids, TDS	696	89300	608.7	72100	3	mg/l	lb/day	
Ammonia as N	1.23	150	.47	55.7	3	mg/l	lb/day	
Nitrate-Nitrite (as N)	2.38	251	1.93	241	3	mg/l	lb/day	
Total Kjeldahl Nitrogen (TKN)	2.20	282	1.63	193	3	mg/l	lb/day	
Phosphorus (as P), Total	1.01	106	.93	110	3	mg/l	lb/day	
Temperature winter	13 Value		13 Value		Numerous	(°C)	NA	
Temperature summer	32 Value		29 Value		Numerous	(°C)	NA	
pH	Min. 8.58	Max. 8.64			3	Standard units	Standard units	

1.a. Maximum Daily Value - Report the highest daily value or daily average value from the last year of data. Report both mass and concentration.
1.b. Average of Analysis - The average of all values within the last year and report both the mass and concentration.
1.c. A minimum of 3 Sampling Events required for process wastewater discharges, and a minimum of 1 Sampling Event for all other discharges, treatment facility influent, intake water and background.

Applicant Name: PPL Susquehanna, LLC

POLLUTANT GROUP 1	Believed Absent	1. MDL Used* (µg/L)	2. EPA Method Number Used	3. Level Present					4. Units		5. Coefficient of Effluent Variability (CV)
				a. Max Daily Value		b. Average of Analysis		c. Number of Analysis			
				Concentration	Mass	Concentration	Mass		Concentration	Mass	
Color	☐	5	sm18-2120b	150		70		3	CU		
Fecal Coliform	☐										
Fluoride	☐	100	300	.25	30.4	.25	29.6	3	mg/l	lb/day	
Oil and Grease	☐	2100	1664	ND	ND	ND	ND	3	mg/l	lb/day	
Bromide	☐	300	300	1.8	219	1.3	154	3	mg/l	lb/day	
Chlorine, Total Residual	☐	50	330.1	ND	ND	ND	ND	3	mg/l	lb/day	
Sulfate	☐	5000	300	121	15500	96.6	11400	3	mg/l	lb/day	
Sulfide	☐	1000	376.1	ND	ND	ND	ND	3	mg/l	lb/day	
Sulfite	☐	2000	377.1	ND	ND	ND	ND	3	mg/l	lb/day	
Surfactants	☐	25	sm18-5540c	.145	18.6	.072	8.53	3	mg/l	lb/day	
Aluminum, Total	☐	50	200.7	2.93	309	1.26	149	3	mg/l	lb/day	
Barium, Total	☐	10	200.7	.128	16.4	.117	13.9	3	mg/l	lb/day	
Boron, Total	☐	50	200.7	.08	10.3	.07	8.29	3	mg/l	lb/day	
Cobalt, Total	☐	3	200.7	ND	ND	ND	ND	3	mg/l	lb/day	
Iron, Total	☐	30	200.7	3.49	368	2.17	256	3	mg/l	lb/day	
Iron, Dissolved	☐	60	200.7	.28	29.5	.20	23.7	3	mg/l	lb/day	
Manganese, Total	☐	3	200.7	.263	27.7	.198	23.4	3	mg/l	lb/day	
Radioactivity GR-A	☐	2.36	900	ND	ND	ND	ND	3	pCi/l	N/A	
Total Organic Carbon, TOC	☐	1000	sm18-5310b	10.6	1116	9.2	1090	3	mg/l	lb/day	
Radioactivity GR-B	☐	2.56	900	12.4	N/A	10.7	N/A	3	pCi/l	N/A	
Magnesium	☐	50	200.7	27.1	3476	21.7	2570	3	mg/l	lb/day	
Molybdenum	☐	10	200.7	ND	ND	ND	ND	3	mg/l	lb/day	
Tin, Total	☐	10	200.7	ND	ND	ND	ND	3	mg/l	lb/day	
Titanium, Total	☐	10	200.7	.03	3.16	.01	1.18	3	mg/l	lb/day	

3. If other data is available (i.e., DMR data, etc.), the past year of data may be used to determine 3a, 3b, 3c, and 5.

3.a. Maximum Daily Value – Report the highest daily value or daily average value from the last year of data. Report both mass and concentration.

3.b. Average of Analysis – Determine the average of all samples taken within the past year. Report both mass and concentration.

3.c. A minimum of 3 Sampling Events required for process wastewater discharges, and a minimum of 1 Sampling Event for all other discharges, treatment facility influent, intake water and background.

* It is in the applicant's interest to achieve the lowest level of detection possible. This will minimize uncertainty and therefore the need for additional analysis or potential for establishing a large number of effluent limits and/or monitoring requirements in the final NPDES permit.

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Applicant Name: PPL Susquehanna, LLC

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER SUPPLY AND WASTEWATER MANAGEMENT

ANALYSIS RESULTS TABLE POLLUTANT GROUP 2
MODULE 5

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME: PPL Susquehanna, LLC

- ☒ Outfall Number 071 (Show location of sampling point on Line Drawing)
- ☐ Intake Sampling Results - Optional (Specify Source: _____)
- ☐ Background Sampling Results - Optional (Specify Location: _____)
- ☐ Treatment Facility Influent Sampling Results (Show location of sampling point on Line Drawing)
- ☐ New Discharge (Basis for Information: _____)
- ☐ Bypass or Sewer System Overflow (Describe: _____)

POLLUTANT GROUP 2 Metals		1. MDL Used* (µg/L)	2. EPA Method Number Used	3. Level Present a. Max Daily Value Concentration	a. Max Daily Value Mass	b. Average of Analysis Concentration	b. Average of Analysis Mass	c. Number of Analysis	4. Units Concentration	4. Units Mass	5. Coefficient of Effluent Variability (CV)
1M	Antimony, Total	10	200.7	ND	ND	ND	ND	3	mg/L	lb/day	
2M	Arsenic, Total	4	200.7	ND	ND	ND	ND	3	mg/L	lb/day	
3M	Beryllium, Total	3	200.7	ND	ND	ND	ND	3	mg/L	lb/day	
4M	Cadmium, Total	1	200.7	ND	ND	ND	ND	3	mg/L	lb/day	
5M	Chromium III	3	200.7	.003	.32	.001	.11	3	mg/L	lb/day	
5M	Chromium VI	10	sm18-3500-Cr-D	ND	ND	ND	ND	3	mg/L	lb/day	
6M	Copper, Total	10	200.7	.012	1.25	.008	.947	3	mg/L	lb/day	
7M	Lead, Total	3	200.7	.005	.645	.0017	.201	3	mg/L	lb/day	
8M	Mercury, Total	.2	200.7	ND	ND	ND	ND	3	mg/L	lb/day	
9M	Nickel, Total	10	200.7	ND	ND	ND	ND	3	mg/L	lb/day	
10M	Selenium, Total	10	200.7	ND	ND	ND	ND	3	mg/L	lb/day	
11M	Silver, Total	2	200.7	ND	ND	ND	ND	3	mg/L	lb/day	

3. If other data is available (i.e., DMR data, etc.), the past year of data may be used to determine 3a, 3b, 3c, and 5.
3.a. Maximum Daily Value – Report the highest daily value or daily average value from the last year of data. Report both mass and concentration.
3.b. Average of Analysis – Determine the average of all samples taken within the past year. Report both mass and concentration.
3.c. A minimum of 3 Sampling Events required for process wastewater discharges, and a minimum of 1 Sampling Event for all other discharges, treatment facility influent, intake water and background.
* It is in the applicant's interest to achieve the lowest level of detection possible. This will minimize uncertainty and therefore the need for additional analysis or potential for establishing a large number of effluent limits and/or monitoring requirements in the final NPDES permit.

Applicant Name: PPL Susquehanna, LLC

POLLUTANT GROUP 2		1. MDL Used* (µg/L)	2. EPA Method Number Used	3. Level Present					4. Units		5. Coefficient of Effluent Variability (CV)
				a. Max Daily Value		b. Average of Analysis		c. Number of Analysis			
	Metals			Concentration	Mass	Concentration	Mass		Concentration	Mass	
12M	Thallium, Total	10	200.7	ND	ND	ND	ND	3	mg/L	lb/day	
13M	Zinc, Total	5	200.7	.027	3.47	.019	2.25	3	mg/L	lb/day	
14M	Cyanide, Total	5	335.4	ND	ND	ND	ND	3	mg/L	lb/day	
14M	Cyanide, Free	5	SM4500CNI	ND	ND	ND	ND	3	mg/L	lb/day	
15M	Phenols, Total	5	420.4	ND	ND	ND	ND	3	mg/L	lb/day	

3. If other data is available (i.e., DMR data, etc.), the past year of data may be used to determine 3a, 3b, 3c, and 5.
3.a. Maximum Daily Value – Report the highest daily value or daily average value from the last year of data. Report both mass and concentration.
3.b. Average of Analysis – Determine the average of all samples taken within the past year. Report both mass and concentration.
3.c. A minimum of 3 Sampling Events required for process wastewater discharges, and a minimum of 1 Sampling Event for all other discharges, treatment facility influent, intake water and background.

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Applicant Name: PPL Susquehanna, LLC

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER SUPPLY AND WASTEWATER MANAGEMENT

ANALYSIS RESULTS TABLE POLLUTANT GROUP 3
MODULE 6

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME: PPL Susquehanna, LLC

- ☒ Outfall Number 071 (Show location of sampling point on Line Drawing)
- ☐ Intake Sampling Results - Optional (Specify Source: _____)
- ☐ Background Sampling Results - Optional (Specify Location: _____)
- ☐ Treatment Facility Influent Sampling Results (Show location of sampling point on Line Drawing)
- ☐ New Discharge (Basis for Information: _____)
- ☐ Bypass or Sewer System Overflow (Describe: _____)

POLLUTANT GROUP 3		1. MDL Used* (µg/L)	2. EPA Method Number Used	3. Level Present					4. Units		5. Coefficient of Effluent Variability (CV)
				a. Max Daily Value		b. Average of Analysis		c. Number of Analysis			
Volitales				Concentration	Mass	Concentration	Mass		Concentration	Mass	
1V	Acrolein	20	624	ND	ND	ND	ND	3	ug/l	lb/day	
2V	Acrylonitrile	4	624	ND	ND	ND	ND	3	ug/l	lb/day	
3V	Benzene	1	624	ND	ND	ND	ND	3	ug/l	lb/day	
5V	Bromoform	1	624	ND	ND	ND	ND	3	ug/l	lb/day	
6V	Carbon Tetrachloride	1	624	ND	ND	ND	ND	3	ug/l	lb/day	
7V	Chlorobenzene	1	624	ND	ND	ND	ND	3	ug/l	lb/day	
8V	Chlorodibromomethane	1	624	ND	ND	ND	ND	3	ug/l	lb/day	
9V	Chloroethane	1	624	ND	ND	ND	ND	3	ug/l	lb/day	
10V	2-Chloroethylvinyl Ether	2	624	ND	ND	ND	ND	3	ug/l	lb/day	

3. If other data is available (i.e., DMR data, etc.), the past year of data may be used to determine 3a, 3b, 3c, and 5.
3.a. Maximum Daily Value – Report the highest daily value or daily average value from the last year of data. Report both mass and concentration.
3.b. Average of Analysis – Determine the average of all samples taken within the past year. Report both mass and concentration.
3.c. A minimum of 3 Sampling Events required for process wastewater discharges, and a minimum of 1 Sampling Event for all other discharges, treatment facility influent, intake water and background.

* It is in the applicant's interest to achieve the lowest level of detection possible. This will minimize uncertainty and therefore the need for additional analysis or potential for establishing a large number of effluent limits and/or monitoring requirements in the final NPDES permit.

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Applicant Name: PPL Susquehanna, LLC

POLLUTANT GROUP 3		1. MDL Used* (µg/L)	2. EPA Method Number Used	3. Level Present					4. Units		5. Coefficient of Effluent Variability (CV)
				a. Max Daily Value		b. Average of Analysis		c. Number of Analysis			
	Volitales			Concentration	Mass	Concentration	Mass		Concentration	Mass	
11V	Chloroform	1	624	ND	ND	ND	ND	3	ug/l	lb/day	
12V	Dichlorobromomethane	1	624	ND	ND	ND	ND	3	ug/l	lb/day	
14V	1,1-Dichloroethane	1	624	ND	ND	ND	ND	3	ug/l	lb/day	
15V	1,2-Dichloroethane	1	624	ND	ND	ND	ND	3	ug/l	lb/day	
16V	1,1-Dichloroethylene	1	624	ND	ND	ND	ND	3	ug/l	lb/day	
17V	1,2 Dichloropropane	1	624	ND	ND	ND	ND	3	ug/l	lb/day	
18V	1, 3-Dichloropropylene	1	624	ND	ND	ND	ND	3	ug/l	lb/day	
19V	Ethylebenzene	1	624	ND	ND	ND	ND	3	ug/l	lb/day	
20V	Methyl Bromide	1	624	ND	ND	ND	ND	3	ug/l	lb/day	
21V	Methyl Chloride	1	624	ND	ND	ND	ND	3	ug/l	lb/day	
22V	Methylene Chloride	2	624	ND	ND	ND	ND	3	ug/l	lb/day	
23V	1,1,2,2-Tetrachloroethane	1	624	ND	ND	ND	ND	3	ug/l	lb/day	
24V	Tetrachloroethylene	1	624	ND	ND	ND	ND	3	ug/l	lb/day	
25V	Toluene	1	624	ND	ND	ND	ND	3	ug/l	lb/day	
26V	1,2-Trans-dichloroethylene	1	624	ND	ND	ND	ND	3	ug/l	lb/day	
27V	1,1,1-Trichloroethane	1	624	ND	ND	ND	ND	3	ug/l	lb/day	
28V	1,1,2-Trichloroethane	1	624	ND	ND	ND	ND	3	ug/l	lb/day	
29V	Trichloroethylene	1	624	ND	ND	ND	ND	3	ug/l	lb/day	
31V	Vinyl Chloride	1	624	ND	ND	ND	ND	3	ug/l	lb/day	

3. If other data is available (i.e., DMR data, etc.), the past year of data may be used to determine 3a, 3b, 3c, and 5.
3.a. Maximum Daily Value – Report the highest daily value or daily average value from the last year of data. Report both mass and concentration.
3.b. Average of Analysis – Determine the average of all samples taken within the past year. Report both mass and concentration.
3.c. A minimum of 3 Sampling Events required for process wastewater discharges, and a minimum of 1 Sampling Event for all other discharges, treatment facility influent, intake water and background.

It is in the applicant's interest to achieve the lowest level of detection possible. This will minimize uncertainty and therefore the need for additional analysis or potential for establishing a large number of effluent limits and/or monitoring requirements in the final NPDES permit.

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Applicant Name: PPL Susquehanna, LLC

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER SUPPLY AND WASTEWATER MANAGEMENT

ANALYSIS RESULTS TABLE POLLUTANT GROUP 4
MODULE 7

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME: PPL Susquehanna, LLC

- ☒ Outfall Number 071 (Show location of sampling point on Line Drawing)
- ☐ Intake Sampling Results - Optional (Specify Source: _____)
- ☐ Upstream Background Sampling Results - Optional (Specify Location: _____)
- ☐ Treatment Facility Influent Sampling Results (Show location of sampling point on Line Drawing)
- ☐ New Discharge (Basis for Information: _____)
- ☐ Bypass or Sewer System Overflow (Describe: _____)

POLLUTANT GROUP 4 Acid Compounds		1. MDL Used* (µg/L)	2. EPA Method Number Used	3. Level Present a. Max Daily Value Concentration	a. Max Daily Value Mass	b. Average of Analysis Concentration	b. Average of Analysis Mass	c. Number of Analysis	4. Units Concentration	4. Units Mass	5. Coefficient of Effluent Variability (CV)
1A	2-Chlorophenol	10	625	ND	ND	ND	ND	3	ug/l	lb/day	
2A	2,4-Dichlorophenol	10	625	ND	ND	ND	ND	3	ug/l	lb/day	
3A	2,4-Dimethylphenol	10	625	ND	ND	ND	ND	3	ug/l	lb/day	
4A	4,6-Dinitro-o-cresol	20	625	ND	ND	ND	ND	3	ug/l	lb/day	
5A	2,4-Dinitrophenol	25	625	ND	ND	ND	ND	3	ug/l	lb/day	
6A	2-Nitrophenol	10	625	ND	ND	ND	ND	3	ug/l	lb/day	
7A	4-Nitrophenol	12	625	ND	ND	ND	ND	3	ug/l	lb/day	
8A	P-chloro-m-cresol	10	625	ND	ND	ND	ND	3	ug/l	lb/day	
9A	Pentachlorophenol	25	625	ND	ND	ND	ND	3	ug/l	lb/day	
10A	Phenol	10	625	ND	ND	ND	ND	3	ug/l	lb/day	
11A	2,4,6-Trichlorophenol	10	625	ND	ND	ND	ND	3	ug/l	lb/day	

3. If other data is available (i.e., DMR data, etc.), the past year of data may be used to determine 3a, 3b, 3c, and 5.
3.a. Maximum Daily Value – Report the highest daily value or daily average value from the last year of data. Report both mass and concentration.
3.b. Average of Analysis – Determine the average of all samples taken within the past year. Report both mass and concentration.
3.c. A minimum of 3 Sampling Events required for process wastewater discharges, and a minimum of 1 Sampling Event for all other discharges, treatment facility influent, intake water and background.
* It is in the applicant's interest to achieve the lowest level of detection possible. This will minimize uncertainty and therefore the need for additional analysis or the potential for establishing a large number of effluent limits and/or monitoring requirements in the final NPDES permit.

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COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER SUPPLY AND WASTEWATER MANAGEMENT

ANALYSIS RESULTS TABLE POLLUTANT GROUP 5
MODULE 8

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME: PPL Susquehanna, LLC

- ☒ Outfall Number 071 (Show location of sampling point on Line Drawing)
- ☐ Water Supply Sampling Results - Optional (Specify Source: ____)
- ☐ Background Sampling Results - Optional (Specify Location: ____)
- ☐ Treatment Facility Influent Sampling Results (Show location of sampling point on Line Drawing)
- ☐ New Discharge (Basis for Information: ____)
- ☐ Bypass or Sewer System Overflow (Describe: ____)

POLLUTANT GROUP 5 Base Compounds		1. MDL Used* (µg/L)	2. EPA Method Number Used	3. Level Present a. Max Daily Value Concentration	a. Max Daily Value Mass	b. Annual Average of Analysis Concentration	b. Annual Average of Analysis Mass	c. Number of Analysis	4. Units Concentration	4. Units Mass	5. Coefficient of Effluent Variability (CV)
1B	Acenaphthene	3	625	ND	ND	ND	ND	3	ug/l	lb/day	
2B	Acenaphthylene	3	625	ND	ND	ND	ND	3	ug/l	lb/day	
3B	Anthracene	2	625	ND	ND	ND	ND	3	ug/l	lb/day	
4B	Benzidine	20	625	ND	ND	ND	ND	3	ug/l	lb/day	
5B	Benzo(*a*)anthracene	2	625	ND	ND	ND	ND	3	ug/l	lb/day	
6B	Benzo(*a*)pyrene	2	625	ND	ND	ND	ND	3	ug/l	lb/day	
7B	3,4-Benzofluoranthene	2	625	ND	ND	ND	ND	3	ug/l	lb/day	
8B	Benzo(*ghi*)perylene	2	625	ND	ND	ND	ND	3	ug/l	lb/day	
9B	Benzo(*k*)fluoranthene	5	625	ND	ND	ND	ND	3	ug/l	lb/day	
10B	Bis(2-*Chloro-ethoxy*)methane	3	625	ND	ND	ND	ND	3	ug/l	lb/day	
11B	Bis(*2-Chloroethyl*)ether	2	625	ND	ND	ND	ND	3	ug/l	lb/day	
12B	Bis(*2-Chloro-Isopropyl*)ether	2	625	ND	ND	ND	ND	3	ug/l	lb/day	
13B	Bis(*2-Ethylhexyl*)phthalate	2	625	ND	ND	ND	ND	3	ug/l	lb/day	
14B	4-Bromophenyl Phenyl Ether	3	625	ND	ND	ND	ND	3	ug/l	lb/day	
15B	Butylbenzyl Phthalate	5	625	ND	ND	ND	ND	3	ug/l	lb/day	
16B	2-Chloronaphthalene	5	625	ND	ND	ND	ND	3	ug/l	lb/day	
17B	4-Chlorophenyl Phenyl Ether	5	625	ND	ND	ND	ND	3	ug/l	lb/day	

3.a. Maximum Daily Value – Report the highest daily value or daily average value from the last year of data. Report both mass and concentration.
3.b. Average of Analysis – Determine the average of all samples taken within the past year. Report both mass and concentration.
3.c. A minimum of 3 Sampling Events required for process wastewater discharges, and a minimum of 1 Sampling Event for all other discharges, treatment facility influent, intake water and background.

* It is in the applicant's interest to achieve the lowest level of detection possible. This will minimize uncertainty and therefore the need for additional analysis or the potential for establishing a large number of effluent limits and/or monitoring requirements in the final NPDES permit.

Applicant Name: PPL Susquehanna, LLC

POLLUTANT GROUP 5 Base Compounds		1. MDL Used* (µg/L)	2. EPA Method Number Used	3. Level Present a. Max Daily Value Concentration	a. Max Daily Value Mass	b. Annual Average of Analysis Concentration	b. Annual Average of Analysis Mass	c. Number of Analysis	4. Units Concentration	4. Units Mass	5. Coefficient of Effluent Variability (CV)
18B	Chrysene	2	625	ND	ND	ND	ND	3	ug/l	lb/day	
19B	Dibenzo(*a,h*)anthracene	2	625	ND	ND	ND	ND	3	ug/l	lb/day	
20B	1,2-Dichlorobenzene	5	625	ND	ND	ND	ND	3	ug/l	lb/day	
21B	1,3- Dichlorobenzene	5	625	ND	ND	ND	ND	3	ug/l	lb/day	
22B	1,4- Dichlorobenzene	5	625	ND	ND	ND	ND	3	ug/l	lb/day	
23B	3,3'-Dichlorobenzidine	10	625	ND	ND	ND	ND	3	ug/l	lb/day	
24B	Diethyl Phthalate	10	625	ND	ND	ND	ND	3	ug/l	lb/day	
25B	Dimethyl Phthalate	10	625	ND	ND	ND	ND	3	ug/l	lb/day	
26B	Di-n-butyl Phthalate	5	625	ND	ND	ND	ND	3	ug/l	lb/day	
27B	2,4-Dinitrotoluene	2	625	ND	ND	ND	ND	3	ug/l	lb/day	
28B	2,6-Dinitrotoluene	2	625	ND	ND	ND	ND	3	ug/l	lb/day	
29B	Di-n-octyl Phthalate	5	625	ND	ND	ND	ND	3	ug/l	lb/day	
30B	1,2-Diphenylhydrazine (as *Azobenzene)*	5	625	ND	ND	ND	ND	3	ug/l	lb/day	
31B	Fluoranthene	2	625	ND	ND	ND	ND	3	ug/l	lb/day	
32B	Fluorene	3	625	ND	ND	ND	ND	3	ug/l	lb/day	
33B	Hexachlorobenzene	2	625	ND	ND	ND	ND	3	ug/l	lb/day	
34B	Hexechlorobutadiene	5	625	ND	ND	ND	ND	3	ug/l	lb/day	
35B	Hexachlorocyclopentadiene	10	625	ND	ND	ND	ND	3	ug/l	lb/day	
36B	Hexachloroethane	5	625	ND	ND	ND	ND	3	ug/l	lb/day	
37B	Indeno(*1,2,3-cd*)pyrene	2	625	ND	ND	ND	ND	3	ug/l	lb/day	
38B	Isophorone	3	625	ND	ND	ND	ND	3	ug/l	lb/day	
39B	Naphthalene	3	625	ND	ND	ND	ND	3	ug/l	lb/day	
40B	Nitrobenzene	3	625	ND	ND	ND	ND	3	ug/l	lb/day	
41B	N-Nitrosodimethylamine	3	625	ND	ND	ND	ND	3	ug/l	lb/day	
42B	N-Nitrosodi-n-propylamine	3	625	ND	ND	ND	ND	3	ug/l	lb/day	
43B	N-Nitrosodiphenylamine	3	625	ND	ND	ND	ND	3	ug/l	lb/day	
44B	Phenanthrene	3	625	ND	ND	ND	ND	3	ug/l	lb/day	
45B	Pyrene	2	625	ND	ND	ND	ND	3	ug/l	lb/day	
46B	1,2,4-Trichlorobenzene	5	625	ND	ND	ND	ND	3	ug/l	lb/day	

3.a. Maximum Daily Value – Report the <u>highest</u> daily value or daily average value from the last year of data. Report both mass and concentration.
3.b. Average of Analysis – Determine the average of all samples taken within the past year. Report both mass and concentration.
3.c. A minimum of 3 Sampling Events required for process wastewater discharges, and a minimum of 1 Sampling Event for all other discharges, treatment facility influent, intake water and background.

* It is in the applicant's interest to achieve the lowest level of detection possible. This will minimize uncertainty and therefore the need for additional analysis or the potential for establishing a large number of effluent limits and/or monitoring requirements in the final NPDES permit.

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Applicant Name: PPL Susquehanna, LLC

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER SUPPLY AND WASTEWATER MANAGEMENT

ANALYSIS RESULTS TABLE POLLUTANT GROUP 6
MODULE 9

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME: PPL Susquehanna, LLC

- ☒ Outfall Number 071 (Show location of sampling point on Line Drawing)
- ☐ Intake Sampling Results - Optional (Specify Source: _____)
- ☐ Upstream Background Sampling Results - Optional (Specify Location: _____)
- ☐ Treatment Facility Influent Sampling Results (Show location of sampling point on Line Drawing)
- ☐ New Discharge (Basis for Information: _____)
- ☐ Bypass or Sewer System Overflow (Describe: _____)

POLLUTANT GROUP 6	Pesticides	1. MDL Used* (µg/L)	2. EPA Method Number Used	3. Level Present					4. Units		5. Coefficient of Effluent Variability (CV)
				a. Max Daily Value		b. Average of Analysis		c. Number of Analysis			
				Concentration	Mass	Concentration	Mass		Concentration	Mass	
1P	Aldrin										
2P	Alpha-BHC										
3P	Beta-BHC										
4P	Gamma-BHC										
5P	Delta-BHC										
6P	Chlordane										
7P	4,4'-DDT										
8P	4,4'-DDE										
9P	4,4'-DDD										
10P	Dieldrin										
11P	Alpha-endosulfan										

3. If other data is available (i.e., DMR data, etc.), the past year of data may be used to determine 3a, 3b, 3c, and 5.
3.a. Maximum Daily Value – Report the highest daily value or daily average value from the last year of data. Report both mass and concentration.
3.b. Average of Analysis – Determine the average of all samples taken within the past year. Report both mass and concentration.
3.c. A minimum of 3 Sampling Events required for process wastewater discharges, and a minimum of 1 Sampling Event for all other discharges, treatment facility influent, intake water and background.

* It is in the applicant's interest to achieve the lowest level of detection possible. This will minimize uncertainty and therefore the need for additional analysis or the potential for establishing a large number of effluent limits and/or monitoring requirements in the final NPDES permit.

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Applicant Name: PPL Susquehanna, LLC

POLLUTANT GROUP 6		1. MDL Used* (µg/L)	2. EPA Method Number Used	3. Level Present					4. Units		5. Coefficient of Effluent Variability (CV)
				a. Max Daily Value		b. Average of Analysis		c. Number of Analysis			
	Pesticides			Concentration	Mass	Concentration	Mass		Concentration	Mass	
12P	Beta-endosulfan										
13P	Endosulfan Sulfate										
14P	Endrin										
15P	Endrin Aldehyde										
16P	Heptachlor										
17P	Heptachlor Epoxide										
18P	PCB-1242	.95	608	ND	ND	ND	ND	3	µg/L	lb/day	
19P	PCB-1254	.95	608	ND	ND	ND	ND	3	µg/L	lb/day	
20P	PCB-1221	.95	608	ND	ND	ND	ND	3	µg/L	lb/day	
21P	PCB-1232	.95	608	ND	ND	ND	ND	3	µg/L	lb/day	
22P	PCB-1248	.95	608	ND	ND	ND	ND	3	µg/L	lb/day	
23P	PCB-1260	.95	608	ND	ND	ND	ND	3	µg/L	lb/day	
24P	PCB-1016	.95	608	ND	ND	ND	ND	3	µg/L	lb/day	
25P	Toxaphene										
26P	DIOXIN: 2,3,7, 8-Tetrachlorodibenzo-P-Dioxin (TCDD)			Describe Results:							

3. If other data is available (i.e., DMR data, etc.), the past year of data may be used to determine 3a, 3b, 3c, and 5.
3.a. Maximum Daily Value – Report the highest daily value or daily average value from the last year of data. Report both mass and concentration.
3.b. Average of Analysis – Determine the average of all samples taken within the past year. Report both mass and concentration.
3.c. A minimum of 3 Sampling Events required for process wastewater discharges, and a minimum of 1 Sampling Event for all other discharges, treatment facility influent, intake water and background.

* It is in the applicant's interest to achieve the lowest level of detection possible. This will minimize uncertainty and therefore the need for additional analysis or potential for establishing a large number of effluent limits and/or monitoring requirements in the final NPDES permit.

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Applicant Name: PPL Susquehanna, LLC

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER SUPPLY AND WASTEWATER MANAGEMENT

ANALYSIS RESULTS TABLE POLLUTANT GROUP 1
MODULE 4

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME PPL Susquehanna, LLC

- ☒ **Outfall Number** 072 (Show location of sampling point on Line Drawing) Flow = 7/13, 0.0098 MGD
- ☐ Intake Sampling Results - Optional (Specify Source: ____)
- ☐ Background Sampling Results - Optional (Specify Location of Sample: ____)
- ☐ Treatment Facility Influent Sampling Results (Show location of sampling point on Line Drawing)
- ☐ New Discharge (Basis for Information: ____)
- ☐ Bypass or Sewer System Overflow (Describe: ____)

POLLUTANT GROUP 1	1. LEVEL PRESENT					2. UNITS		3. Coefficient of Effluent Variability (CV)
	a. Maximum Daily Value		b. Average of Analysis		c. No. of Analysis	a. Concentration	b. Mass	
	(1) Concentration	(2) Mass	(1) Concentration	(2) Mass				
Biochemical Oxygen Demand, BOD	ND	ND	ND	ND	1	mg/L	lb/day	
Chemical Oxygen Demand, COD	ND	ND	ND	ND	1	mg/L	lb/day	
Hardness ($CaCO_3$)								
Total Suspended Solids, TSS	7	0.57	7	0.57	1	mg/L	lb/day	
Total Dissolved Solids, TDS								
Ammonia as N								
Nitrate-Nitrite (as N)	0.44	0.036	0.44	0.036	1	mg/L	lb/day	
Total Kjeldahl Nitrogen (TKN)	ND	ND	ND	ND	1	mg/L	lb/day	
Phosphorus (as P), Total	ND	ND	ND	ND	1	mg/L	lb/day	
Temperature winter	Value		Value					
Temperature summer	Value		Value					
pH	Min. 7.45	Max. 7.45			1	Standard units	Standard units	

1.a. Maximum Daily Value - Report the **highest** daily value or daily average value from the last year of data. Report both mass and concentration.
1.b. Average of Analysis - The average of all values within the last year and report both the mass and concentration.
1.c. A minimum of 3 Sampling Events required for process wastewater discharges, and a minimum of 1 Sampling Event for all other discharges, treatment facility influent, intake water and background.

Applicant Name: PPL Susquehanna, LLC

POLLUTANT GROUP 1	Believed Absent	1. MDL Used* (µg/L)	2. EPA Method Number Used	3. Level Present					4. Units		5. Coefficient of Effluent Variability (CV)
				a. Max Daily Value		b. Average of Analysis		c. Number of Analysis			
				Concentration	Mass	Concentration	Mass		Concentration	Mass	
Color	☐										
Fecal Coliform	☐										
Fluoride	☐										
Oil and Grease	☐	2100	1664	ND	ND	ND	ND	1	mg/L	lb/day	
Bromide	☐										
Chlorine, Total Residual	☐										
Sulfate	☐										
Sulfide	☐										
Sulfite	☐										
Surfactants	☐										
Aluminum, Total	☐										
Barium, Total	☐										
Boron, Total	☐										
Cobalt, Total	☐										
Iron, Total	☐										
Iron, Dissolved	☐										
Manganese, Total	☐										
Radioactivity	☐										
Total Organic Carbon, TOC	☐										
Radioactivity	☐										
Magnesium	☐										
Molybdenum	☐										
Tin, Total	☐										
Titanium, Total	☐										

3. If other data is available (i.e., DMR data, etc.), the past year of data may be used to determine 3a, 3b, 3c, and 5.

3.a. Maximum Daily Value – Report the highest daily value or daily average value from the last year of data. Report both mass and concentration.

3.b. Average of Analysis – Determine the average of all samples taken within the past year. Report both mass and concentration.

3.c. A minimum of 3 Sampling Events required for process wastewater discharges, and a minimum of 1 Sampling Event for all other discharges, treatment facility influent, intake water and background.

* It is in the applicant's interest to achieve the lowest level of detection possible. This will minimize uncertainty and therefore the need for additional analysis or potential for establishing a large number of effluent limits and/or monitoring requirements in the final NPDES permit.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER SUPPLY AND WASTEWATER MANAGEMENT

ANALYSIS RESULTS TABLE POLLUTANT GROUP 1
MODULE 4

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME: PPL Susquehanna, LLC

- ☒ Outfall Number 073 (Show location of sampling point on Line Drawing) Flow = 7/12, 0.0081 MGD
- ☐ Intake Sampling Results - Optional (Specify Source: _____)
- ☐ Background Sampling Results - Optional (Specify Location of Sample: _____)
- ☐ Treatment Facility Influent Sampling Results (Show location of sampling point on Line Drawing)
- ☐ New Discharge (Basis for Information: _____)
- ☐ Bypass or Sewer System Overflow (Describe: _____)

POLLUTANT GROUP 1	1. LEVEL PRESENT					2. UNITS		3. Coefficient of Effluent Variability (CV)
	a. Maximum Daily Value		b. Average of Analysis		c. No. of Analysis	a. Concentration	b. Mass	
	(1) Concentration	(2) Mass	(1) Concentration	(2) Mass				
Biochemical Oxygen Demand, BOD	ND	ND	ND	ND	1	mg/L	lb/day	
Chemical Oxygen Demand, COD	19	1.28	19	1.28	1	mg/L	lb/day	
Hardness ($CaCO_3$)								
Total Suspended Solids, TSS	7	0.47	7	0.47	1	mg/L	lb/day	
Total Dissolved Solids, TDS								
Ammonia as N								
Nitrate-Nitrite (as N)	0.4	0.027	0.4	0.027	1	mg/L	lb/day	
Total Kjeldahl Nitrogen (TKN)	1.4	0.095	1.4	0.095	1	mg/L	lb/day	
Phosphorus (as P), Total	ND	ND	ND	ND	1	mg/L	lb/day	
Temperature winter	Value		Value		Numerous			
Temperature summer	Value		Value		Numerous			
pH	Min. 7.86	Max. 7.86			1	Standard units	Standard units	

1.a. Maximum Daily Value - Report the highest daily value or daily average value from the last year of data. Report both mass and concentration.
1.b. Average of Analysis - The average of all values within the last year and report both the mass and concentration.
1.c. A minimum of 3 Sampling Events required for process wastewater discharges, and a minimum of 1 Sampling Event for all other discharges, treatment facility influent, intake water and background.

Applicant Name: PPL Susquehanna, LLC

POLLUTANT GROUP 1	Believed Absent	1. MDL Used* (µg/L)	2. EPA Method Number Used	3. Level Present					4. Units		5. Coefficient of Effluent Variability (CV)
				a. Max Daily Value		b. Average of Analysis		c. Number of Analysis			
				Concentration	Mass	Concentration	Mass		Concentration	Mass	
Color	☐										
Fecal Coliform	☐										
Fluoride	☐										
Oil and Grease	☐	2100	1664	ND	ND	ND	ND	1	mg/L	lb/day	
Bromide	☐										
Chlorine, Total Residual	☐										
Sulfate	☐										
Sulfide	☐										
Sulfite	☐										
Surfactants	☐										
Aluminum, Total	☐										
Barium, Total	☐										
Boron, Total	☐										
Cobalt, Total	☐										
Iron, Total	☐										
Iron, Dissolved	☐										
Manganese, Total	☐										
Radioactivity	☐										
Total Organic Carbon, TOC	☐										
Radioactivity	☐										
Magnesium	☐										
Molybdenum	☐										
Tin, Total	☐										
Titanium, Total	☐										

3. If other data is available (i.e., DMR data, etc.), the past year of data may be used to determine 3a, 3b, 3c, and 5.

3.a. Maximum Daily Value – Report the highest daily value or daily average value from the last year of data. Report both mass and concentration.

3.b. Average of Analysis – Determine the average of all samples taken within the past year. Report both mass and concentration.

3.c. A minimum of 3 Sampling Events required for process wastewater discharges, and a minimum of 1 Sampling Event for all other discharges, treatment facility influent, intake water and background.

* It is in the applicant's interest to achieve the lowest level of detection possible. This will minimize uncertainty and therefore the need for additional analysis or potential for establishing a large number of effluent limits and/or monitoring requirements in the final NPDES permit.

Applicant Name: PPL Susquehanna, LLC

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DEPARTMENT OF ENVIRONMENTAL PROTECTION
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ANALYSIS RESULTS TABLE POLLUTANT GROUP 1
MODULE 4

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME: PPL Susquehanna, LLC

- ☒ **Outfall Number** 079 (Show location of sampling point on Line Drawing) Flow = 5/27, 0.02482 MGD
- ☐ Intake Sampling Results - Optional (Specify Source: _____)
- ☐ Background Sampling Results - Optional (Specify Location of Sample: _____)
- ☐ Treatment Facility Influent Sampling Results (Show location of sampling point on Line Drawing)
- ☐ New Discharge (Basis for Information: _____)
- ☐ Bypass or Sewer System Overflow (Describe: _____)

POLLUTANT GROUP 1	1. LEVEL PRESENT					2. UNITS		3. Coefficient of Effluent Variability (CV)
	a. Maximum Daily Value		b. Average of Analysis		c. No. of Analysis	a. Concentration	b. Mass	
	(1) Concentration	(2) Mass	(1) Concentration	(2) Mass				
Biochemical Oxygen Demand, BOD	4.2	.869	4.2	.869	1	mg/l	lb/day	
Chemical Oxygen Demand, COD	25	5.17	25	5.17	1	mg/l	lb/day	
Hardness ($CaCO_3$)	82.4	17.1	82.4	17.1	1	mg/l	lb/day	
Total Suspended Solids, TSS	ND	ND	ND	ND	1	mg/l	lb/day	
Total Dissolved Solids, TDS	648	134	648	134	1	mg/l	lb/day	
Ammonia as N	1.36	.282	1.36	.282	1	mg/l	lb/day	
Nitrate-Nitrite (as N)	31.3	6.48	31.3	6.48	1	mg/l	lb/day	
Total Kjeldahl Nitrogen (TKN)	2.1	.435	2.1	.435	1	mg/l	lb/day	
Phosphorus (as P), Total	6.46	1.34	6.46	1.34	1	mg/l	lb/day	
Temperature winter	3 Value		5 Value		Numerous	°C	N/A	
Temperature summer	23 Value		21 Value		Numerous	°C	N/A	
pH	Min. 7.34	Max. 7.34			1	Standard units	Standard units	

1.a. Maximum Daily Value - Report the highest daily value or daily average value from the last year of data. Report both mass and concentration.
1.b. Average of Analysis - The average of all values within the last year and report both the mass and concentration.
1.c. A minimum of 3 Sampling Events required for process wastewater discharges, and a minimum of 1 Sampling Event for all other discharges, treatment facility influent, intake water and background.

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Applicant Name: PPL Susquehanna, LLC

POLLUTANT GROUP 1	Believed Absent	1. MDL Used* (µg/L)	2. EPA Method Number Used	3. Level Present					4. Units		5. Coefficient of Effluent Variability (CV)
				a. Max Daily Value		b. Average of Analysis		c. Number of Analysis			
				Concentration	Mass	Concentration	Mass		Concentration	Mass	
Color	☐	5	sm18-2120b	45		45		1	cu		
Fecal Coliform	☐		922d	32		32		1	col/100ml		
Fluoride	☐	200	300	ND	ND	ND	ND	1	mg/l	lb/day	
Oil and Grease	☐	2100	1664	ND	ND	ND	ND	1	mg/l	lb/day	
Bromide	☐	300	300	ND	ND	ND	ND	1	mg/l	lb/day	
Chlorine, Total Residual	☐	50	330.1	ND	ND	ND	ND	1	mg/l	lb/day	
Sulfate	☐	2000	300	79	16.3	79	16.3	1	mg/l	lb/day	
Sulfide	☐	1000	376.1	ND	ND	ND	ND	1	mg/l	lb/day	
Sulfite	☐	2000	377.1	4	.827	4	.827	1	mg/l	lb/day	
Surfactants	☐	25	sm18-5540c	.044	.0091	.044	.0091	1	mg/l	lb/day	
Aluminum, Total	☐	50	200.7	ND	ND	ND	ND	1	mg/l	lb/day	
Barium, Total	☐	10	200.7	ND	ND	ND	ND	1	mg/l	lb/day	
Boron, Total	☐	50	200.7	ND	ND	ND	ND	1	mg/l	lb/day	
Cobalt, Total	☐	3	200.7	ND	ND	ND	ND	1	mg/l	lb/day	
Iron, Total	☐	30	200.7	.06	.012	.06	.012	1	mg/l	lb/day	
Iron, Dissolved	☐	60	200.7	ND	ND	ND	ND	1	mg/l	lb/day	
Manganese, Total	☐	3	200.7	.018	.0037	.018	.0037	1	mg/l	lb/day	
Radioactivity GR-A	☐	1.45	900	ND	ND	ND	ND	1	pCi/l	N/A	
Total Organic Carbon, TOC	☐	1000	sm18-5310b	8.9	1.84	8.9	1.84	1	mg/l	lb/day	
Radioactivity GR-B	☐	2.66	900	22.6	N/A	22.6	N/A	1	pCi/l	N/A	
Magnesium	☐	50	200.7	5.7	1.17	5.7	1.17	1	mg/l	lb/day	
Molybdenum	☐	10	200.7	ND	ND	ND	ND	1	mg/l	lb/day	
Tin, Total	☐	10	200.7	ND	ND	ND	ND	1	mg/l	lb/day	
Titanium, Total	☐	10	200.7	ND	ND	ND	ND	1	mg/l	lb/day	

3. If other data is available (i.e., DMR data, etc.), the past year of data may be used to determine 3a, 3b, 3c, and 5.

3.a. Maximum Daily Value – Report the highest daily value or daily average value from the last year of data. Report both mass and concentration.

3.b. Average of Analysis – Determine the average of all samples taken within the past year. Report both mass and concentration.

3.c. A minimum of 3 Sampling Events required for process wastewater discharges, and a minimum of 1 Sampling Event for all other discharges, treatment facility influent, intake water and background.

* It is in the applicant's interest to achieve the lowest level of detection possible. This will minimize uncertainty and therefore the need for additional analysis or potential for establishing a large number of effluent limits and/or monitoring requirements in the final NPDES permit.

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DEPARTMENT OF ENVIRONMENTAL PROTECTION
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HAZARDOUS SUBSTANCE TABLE
MODULE 10

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME: PPL Susquehanna, LLC

1. Name of Table 3 Substance	2. Outfall	3. Amount Per Outfall			4. Origin and Source	5. Treatment Provided		
		Quantity lb/24 hrs	Frequency	Duration		a	b	c
Sodium Hypochlorite	071	5000	2x/day	2 hrs/Unit	Cooling Tower Chlorination	☐	☒	☐
						☐	☐	☐
						☐	☐	☐
						☐	☐	☐
						☐	☐	☐
						☐	☐	☐
						☐	☐	☐
						☐	☐	☐
						☐	☐	☐
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						☐	☐	☐
						☐	☐	☐
						☐	☐	☐
						☐	☐	☐
						☐	☐	☐
						☐	☐	☐
						☐	☐	☐
						☐	☐	☐
						☐	☐	☐
						☐	☐	☐

Applicant Name: PPL Susquehanna, LLC
Outfall: All

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OTHER TOXIC CHEMICALS
MODULE 11

Before completing this form, read the step-by-step instructions provided in Appendix 1.

Applicant Name	PPL Susquehanna, LLC
Outfall Number	All (N/A)

1. GC/MS "Five Peaks" pollutants (see Appendix 1)

Group Number (3 - 6)	Chemical Substance or Compound Name	MDL (µg/L)	Average Effluent Concentration (µg/L)	Maximum Effluent Concentration (µg/L)	No. Samples Positive / No. analyzed
					/
					/
					/
					/
					/

2. Other Chemicals

Substance	Reason for Presence in Discharge	Average Concentration (µg/L)	Indicate if Presence is Known (K) or Suspected (S)

☐ If additional peaks were not available for one or more groups with the method used check here and attach an explanation of why the method was selected.

Provide additional sheets as necessary.

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Applicant Name: PPL Susquehanna, LLC

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BUREAU OF WATER SUPPLY AND WASTEWATER MANAGEMENT

STORMWATER
MODULE 12

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME: PPL Susquehanna, LLC

1. Site Plan and Stormwater Runoff. Attach a copy of your facility's site plan. (See instructions)

   DEP strongly recommends the separation of stormwater and other wastewaters.

2. Description of Potential Pollutant Sources and Controls

   a. For each stormwater outfall, provide an estimate of the area (include units) drained to the outfall, and a list of potential pollutant(s) and sources for the outfall.

Outfall Number	Total Area Drained (provide units)	Potential Pollutant(s) and Sources
070	133 Acres	Oil Storage in south drainage, water storage tanks, water treatment bldgs.
075	167 Acres	Oil Storage in north drainage, firing range, site runoff
080	51 Acres	Oil and waste storage in central drainage, water storage tanks, well treatment bldg.

   b. Describe Best Management Practices and nonstructural controls used to prevent potential pollutants in stormwater.

   Inspections, container condition maintained, PPC Plan Implemented, training provided, assessments, audits, walkdowns, limit storage volume(s), utilize less hazardous approved materials whenever possible.

   c. For each stormwater outfall, provide the location and description of existing structural control measures to reduce pollutants in stormwater runoff; and a description of the treatment the stormwater receives, including the schedule and type of maintenance for control and treatment measures and the ultimate disposal of any solid or fluid wastes other than by discharge.

Outfall Number	Control Measures
070	Rention pond, spill containment / berms, level alarms
075	Spill berms, Oil spill collar on rentention pond standpipe, leak detection alarms
080	Rentention pond, spill containments, level controls/alarms

3. Non-stormwater Discharges

   a. All non-stormwater discharges from these outfall(s) are identified in the Industrial Wastewater section of this application for the outfall.

   ☒ YES ☐ NO

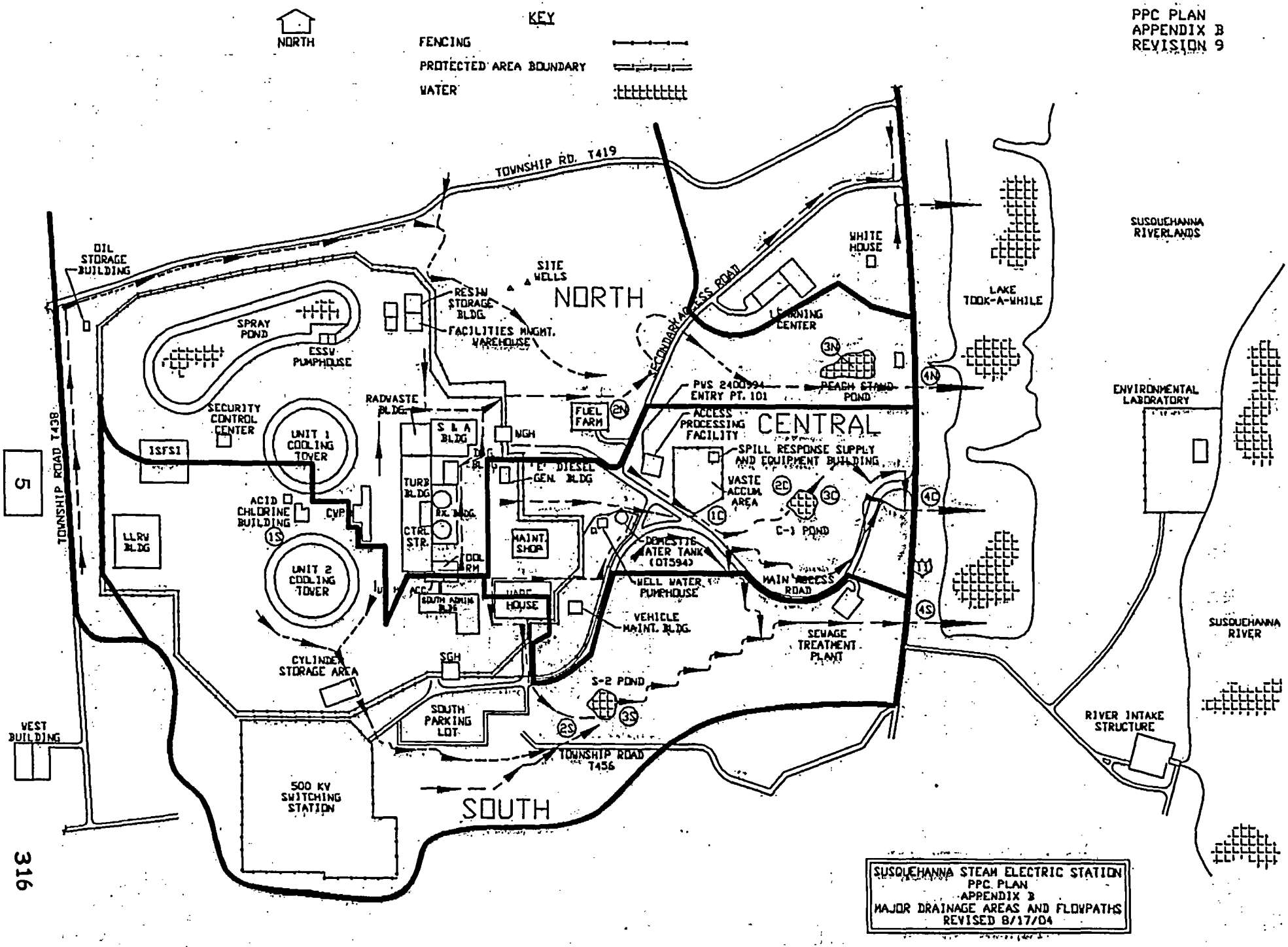
   b. Provide a description of the method used, the date of any testing, and the on-site drainage points that were directly observed during a test.

   N/A

4. Significant Leaks or Spills

   Provide existing information regarding the history of significant leaks or spills of toxic or hazardous pollutants at the facility in the last 3 years, including the approximate date and location of the spill or leak, and the type and amount of material released.

   Lube Oil Cleanup in North Storm Drainage from Main Turbine Lube Oil Mist Elim Roof Vent Discharge Completed 09/23/04.


PPC PLAN
APPENDIX B
REVISION 9
NORTH
KEY
FENCING
PROTECTED AREA BOUNDARY
WATER
TOWNSHIP RD. T419
TOWNSHIP ROAD T438
OIL STORAGE BUILDING
SPRAY POND
ESSV PUMPHOUSE
SECURITY CONTROL CENTER
UNIT 1 COOLING TOWER
UNIT 2 COOLING TOWER
ISFSI
LLRV BLDG
ACID CHLORINE BUILDING
CYP
CYLINDER STORAGE AREA
VEST BUILDING
500 KV SWITCHING STATION
SOUTH PARKING LOT
SOUTH
TOWNSHIP ROAD T456
SGH
RESIN STORAGE BLDG.
FACILITIES MNGMT. WAREHOUSE
SITE WELLS
NORTH
RADWASTE BLDG.
S & A BLDG
TURB BLDG
CTRL STR.
RX BLDG
TOOL RM
SOUTH ADMIN BLDG
WARE HOUSE
MAINT. SHOP
NGH
"E" DIESEL GEN. BLDG
FUEL FARM
SECONDARY ACCESS ROAD
PVS 2400994 ENTRY PT. 101
ACCESS PROCESSING FACILITY
CENTRAL
SPILL RESPONSE SUPPLY AND EQUIPMENT BUILDING
WASTE ACCUM. AREA
C-1 POND
DOMESTIC WATER TANK (OT594)
WELL WATER PUMPHOUSE
VEHICLE MAINT. BLDG.
MAIN ACCESS ROAD
SEWAGE TREATMENT PLANT
S-2 POND
WHITE HOUSE
LEARNING CENTER
PEACH STAND POND
LAKE TOOK-A-WHILE
SUSQUEHANNA RIVERLANDS
ENVIRONMENTAL LABORATORY
SUSQUEHANNA RIVER
RIVER INTAKE STRUCTURE
1S
2S
3S
4S
1C
2C
3C
4C
1N
2N
3N
4N
SUSQUEHANNA STEAM ELECTRIC STATION
PPC PLAN
APPENDIX B
MAJOR DRAINAGE AREAS AND FLOWPATHS
REVISED 8/17/04

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Applicant Name: PPL Susquehanna, LLC

5. PREPAREDNESS, PREVENTION, AND CONTINGENCY (PPC) PLANNING.

Does the facility have a PPC plan? ☒ YES ☐ NO

Does the facility have any other related plans, such as a Pollution Incident Prevention (PIP) Plan, Spill Prevention Control and Counter Measure (SPCC) Plan or Stormwater BMP Plan? ☒ YES ☐ NO

If "YES," identify and indicate date(s) implemented.

Type of Plan		Date Implemented
PPC Plan	Note: Two (2) Copies provided w/Application	Updated 11/19/04
SPPC Plan	Note: Two (2) Copies provided w/Application	Updated 11/19/04

DEP may require the plan(s) be submitted with this application.

6. Additional Stormwater Information Submission

a. Could all sampling be performed as required? ☒ YES ☐ NO (Explain below)

b. Complete a Stormwater Sampling Data Table (Module 13) for each outfall containing stormwater. Indicate the total number of tables submitted. Outfall 075 was sampled representative of 070 & 080 — 1

Applicant Name: PPL Susquehanna, LLC
Outfall: 075

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STORMWATER SAMPLING DATA TABLE
MODULE 13

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME	PPL Susquehanna, LLC		
OUTFALL NUMBER	075	REPRESENTATIVE OUTFALL NUMBER(S)	

1. Provide the results of at least one analysis for every pollutant in this table. See Appendix 1.

Pollutant	CAS Number (if available)	Maximum Values (include units) Grab Sample Taken During First 30 Minutes	Average Values (include units) Grab Sample Taken During First 30 Minutes	Number of Storm Events Sampled	Sources of Pollutants
Oil and Grease		ND	ND	1	
Biological Oxygen Demand (BODS)		ND	ND	1	
Chemical Oxygen Demand (COD)		ND	ND	1	
Total Suspended Solids (TSS)		9 mg/L	9 mg/L	1	
Total Kjeldahl Nitrogen		ND	ND	1	
Nitrate plus Nitrite Nitrogen		1.78 mg/L	1.78 mg/L	1	
Total Phosphorus		ND	ND	1	
pH (min./Max.)		7.55 SU	7.55 SU	1	

2. List each pollutant that is limited by an ELG which the facility is subject to or any pollutant listed in the facility's NPDES permit for its process wastewater (if the facility is operating under an existing NPDES permit). See the instructions for additional details and requirements.

Pollutant	CAS Number (if available)	Maximum Values (include units) Grab Sample Taken During First 30 Minutes	Average Values (include units) Grab Sample Taken During First 30 Minutes	Number of Storm Events Sampled	Sources of Pollutants
Chlorine total Residual		<0.05 mg/L	<0.05 mg/L	1	Infrequent, Incidental Tank Drainage

Applicant Name: PPL Susquehanna, LLC
Outfall: 075

3. List each pollutant shown in Table 3 and Pollutant Groups 1-6 that is known or believed to be present. (See Appendix 1.)

Pollutant	CAS Number (if available)	Maximum Values (include units) Grab Sample Taken During First 30 Minutes	Average Values (include units) Grab Sample Taken During First 30 Minutes	Number of Storm Events Sampled	Sources of Pollutants
Lead		ND	ND	1	Firing Range – bullet backstop material previously screened to remove fragments

4. Provide data for the storm event(s) which resulted in the maximum values for the flow weighted composite sample.

1. Date of Storm Event	2. Duration of Storm (in minutes)	3. Total rainfall during storm event (in inches)	4. Number of hours between beginning of storm measured and end of previous measurable event	5. Maximum flow rate during rain event (gallons per minute or specify units)	6. Total flow from rain event (gallons or specify units	7. Season Sample Was taken	8. Form of Precipitation (rainfall, snowmelt)
07/07/04	8 min	0.1	72 Hours	166.35 gpm	28,435 gal	Summer	Rainfall

5. Provide a description of the method of flow measurement or estimate.

Volumetric measurement at discharge pipe into container of known quantity.

Appendix A

EPA 316(b) Phase II Documentation

PPL Susquehanna, LLC Operation is in compliance with Phase II per Compliance Alternative (1)(i)

NPDES
RENEWAL APPLICATION
PERMIT NO. PA 0047325

January 6, 2005

EPA 316(b) Rule (Phase II)
Cooling Water Intake Structure

PPL Susquehanna, LLC is choosing to comply with the requirements of the Phase II 316(b) Rule by selecting Compliance Alternative (1)(i). The following data shows that this facility is equipped with a closed-cycle recirculating system. According to the rule, having made this demonstration, this facility will be deemed to have met the applicable performance standards and will not be required to demonstrate further that this facility meets the impingement mortality and entrainment performance standards in 40 CFR 125.94(b) of the rule. We are submitting the following data as required by 40 CFR 122.2(r)(2),(3) and (5).

1. Source water physical data

1.1 The Susquehanna River is the principal water source for the Susquehanna SES (SSES). The Susquehanna River Drainage Basin, shown on Figure 1, lies in the northeastern portion of the United States generally between latitudes N 39° 30' to N 43° 00' and longitudes W 74° 30' to W 79° 00'. The basin is the largest on the Atlantic seaboard of the United States. The length of the Susquehanna Basin is about 250 miles. The total drainage area is 27,510 square miles of which 6,270 are in south central New York, 20,950 in central Pennsylvania, and 290 in northeastern Maryland. The total drainage area upstream of the site is about 10,240 square miles.

Figure 2, Susquehanna River Profile, shows the stream profile of the Upper Susquehanna River within a 50-mile radius of the SSES. Between its confluence with the Lackawanna River, about 31 miles upstream of the SSES to its confluence with the West Branch of the Susquehanna, about 41 miles downstream, the river undergoes a drop of about 115 feet for an average drop of 1.6 feet per mile. Within this reach there is only a small change is streambed gradient. Upstream of the station the average gradient is 1.8 feet per mile. Downstream of SSES, the average gradient is 1.5 feet per mile.

The river channel is about 800 feet wide in the vicinity of the SSES. Bathymetric features of the river in the vicinity of the make up water intake and blowdown discharge structures are provided on Figure 3, Susquehanna River Bathymetry.

Moderate to steep slopes directed toward the river along both its banks characterize the topography in the general area of the site. The station is located approximately 4,000 feet west of the intake structure at an elevation of about 670 feet above mean sea level (msl) or about 190 feet above the river bed. The average slope toward the river is about 8%.

The elevation of the Susquehanna River at the SSES site ranges from 485.9 ft to 518.2 ft above msl. Flow range is from about 800 to 345,000 cfs. The maximum elevation and flow were from Tropical Storm Agnes in June 1972.

A policy decision of the Susquehanna River Basin Commission regarding consumptive withdrawals during low flow periods provides that future water users will not diminish natural flow during droughts. The source of low flow augmentation for SSES is the Cowanesque Reservoir. Cowanesque is a storage release reservoir that was completed in 1990 and is owned and operated by the U. S. Army Corps of Engineers. Cowanesque is located in Pennsylvania along the New York border about 170 miles upstream from the Susquehanna SES. A water release from Cowanesque is triggered by a river flow at the USGS Wilkes-Barre, Pennsylvania gaging station equal to the 7-day, 10-year, low flow plus the consumptive use of the Susquehanna SES. The 1-day and 5-day rates of river flow decline and the 5-day travel time to Wilkes-Barre are other factors considered to make a water release. The normal trigger value is 868 cfs.

The Susquehanna River at SSES shows a predictable annual pattern of temperatures, with lowest temperatures in winter and highest temperatures in late summer. High water temperatures in August and September are moderated by lower air temperatures and higher river flows in October. In 2002, daily mean water temperatures ranged from 0° C (January 1 through January 9) to 28.9° C (August 4), while average monthly daily mean temperatures ranged from 0.8° C in January to 26.0° C in August.

2. Cooling Water Intake Structure Data

2.1 The Phase I 316(b) report for the SSES intake structure was filed with the PA DER on 11 August 1982 and approved on 6 October 1982 after review by the United States Environmental Protection Agency, United States Department of Interior Fish and Wildlife Service, Pennsylvania DER Wilkes-Barre Office, and the Pennsylvania Fish Commission. The SSES intake structure was constructed to outperform acceptable intake flow design parameters listed in "Development Document for Best Technology Available for Location, Construction and Capacity of Cooling Water Intake Structures for Minimizing Adverse Environmental Impact", USEPA, April 1976.

2.2 Susquehanna SES is a base-loaded plant and is in operation 24/7/365 unless offline for an outage. The river intake structure consists of an embayment and pumphouse. It is located on the west bank of the Susquehanna River at a latitude of N 41° 05.300' and longitude of W 76° 07.910' (Figure 4). An earth embankment extends 20 ft above the floodplain to elevation 526.0 ft above msl, which is 1.0 ft above the maximum water elevation for the postulated Standard Project Flood. The floor level of the intake superstructure is located at the top of the graded embankment. The elevated embankment and the riverbank at the intake entrance are covered with a blanket of heavy riprap for erosion protection during high riverflow conditions.

The intake structure consists of a steel superstructure above the operating floor and a reinforced concrete substructure extending into the rock below the level of the river bottom. The superstructure houses the makeup water pumps and associated equipment, including switchgear, automatic operating equipment for trash-handling screens, motor control centers, screen wash strainers, and a debris-handling facility.

The substructure contains two water entrance chambers that house the traveling screens and two pump chambers. The floor and sides of the entrance chambers (Figure 5) form the intake openings. The top of the intake openings is formed by an inverted weir extending 1.0 ft below the minimum river water level (elevation 484.0 ft) to intercept floating oil and debris. The front of the intake is at the riverbank with flared wing walls extending down the natural slope of the bank to provide for an even and gradual water-approach velocity.

The dimensions of the wing walls are shown in Figure 6. The applicant has computed the area of the embayment created by the wing walls as approximately 5,400 sq ft (horizontal projection). During periods of low flow, the embayment will contain approximately 37,800 cu ft of water (based on an elevation of 482 ft above msl). At normal flow (based on mean flow derived from June 1973 to May 1978) the calculated volume of the embayment will be 59,400 cu ft; at high flow (top of wing walls at an elevation of 505 ft above msl) or maximum volume of the embayment, the volume will be 86,500 cu ft.

Riprap protecting the east slope of the intake structure facing the river extends approximately 161 ft south and 89 ft north from the respective edges of the structure. The riprap was placed by "end dumping" on a two-horizontal-to-one-vertical slope to an approximate elevation of 482 ft above msl. The riprap on the north and south side of the embankment covers approximately 2,500 sq ft and 6,200 sq ft, respectively. The total surface area of riprap behind the wing walls from elevation 505 ft (top of wing walls) to elevation 482 ft above msl is about 8,700 sq ft.

The intake-flow velocity is perpendicular to and less than the river velocity. Figure 5 shows the average horizontal velocity of the water flowing from the river to the intake pumps.

Four nominal one-third capacity intake pumps with a capacity of 30 cfs each are installed in the intake structure. Three pumps can support station load operation (100%) of both units with an 87 cfs intake flow under the least favorable (1%) meteorological conditions. Four-pump operation is utilized from time to time to support certain operating conditions (i.e. to maintain makeup water system pressure) and may see increased use in the future as power uprates at the station are implemented. Makeup flows can increase up to 20% under these conditions but are acceptable within design criteria of the makeup system.

Each of the two water entrance chambers is equipped with two automatically operated trash removal screens in series. A bar screen behind each of the inverted weir intake openings prevents large debris from impeding operation of the automatic traveling screen. The bar screen, trash racks, and traveling screens are operated automatically either by differential pressure sensors or by a timer for periodic cleaning. Water-spray systems wash debris from the screens into a pit for disposal whenever the trash rack or traveling screens operate. The bar screens consist of vertical 1.25-in bars with a 1.0-in opening between bars. The traveling screens have 0.37-in mesh wire openings.

Stop-log slots are provided in front of and behind the screens so that the provided stop-logs may be lowered and the chamber dewatered for repair of the screens. Another set of stop-logs may be used to close the slot in the center wall for the purpose of dewatering one of the pump chambers. The insertion of these barriers requires the effort of heavy portable equipment and a maintenance crew. Such an effort will normally be scheduled during a period of reduced station load when less water is required and design-intake velocities are not being exceeded.

With three pumps in operation (the flow being 87 cfs), the velocity of water through both intake-structure passages is:

a. 0.37 ft/s through the entrance openings (i.e., under inverted weir); this value is independent of river level.

b. 0.58 ft/s through the clean bar screen openings at the minimum river level of 484 ft above msl.

c. 0.64 ft/s through the clean traveling screen openings at the minimum river level of 484 ft above msl.

Since there is the capability to block off one or more of the passages, there is a potential for increased velocities. During four-pump operation, these flow velocities may increase by up to 20%.

Under the worst case anticipated, with three pumps operating at a flow of 87 cfs and with only one passage open, the inlet velocity would be 0.75 ft/s. Four-pump operation under these conditions could increase this velocity up to 20%. The insertion of stop-logs is regulated by strict administrative procedures.

3. Cooling Water System Data

Each circulating water system consists of a main condenser, circulating water pumps, piping and valves, a natural draft cooling tower and a basin below the tower that acts as a reservoir for the cooled circulating water.

3.1 Main Condensers

Each condenser is single pass, triple shell, triple pressure and is designed to remove 8.07 billion Btu/hr. At design conditions the circulating water flow through each condenser is 484,000 gpm, and at design meteorological conditions (73° F wet bulb and 65% relative humidity) the inlet temperature is 87° F and the outlet temperature is 121.8° F. The parts of the condenser that contact the circulating water are tubes made of stainless steel and tube sheets and water boxes made of carbon steel. The travel time of the circulating water through the condenser is about 15 seconds.

3.2 Circulating Water Pumps and Piping

The circulating water system for each unit has four-25% capacity circulating water pumps, which are of the horizontal split case centrifugal type. Each pump is designed to deliver 121,000 gpm at 103.5-ft total differential head.

The circulating water piping is lined with coal tar epoxy to minimize corrosion.

3.3 Cooling Towers

The towers are of the hyperbolic natural draft counter flow type, 540 ft high by 420 ft base diameter and are located approximately 750 ft apart (center-to-center). Cold air enters the bottom of the tower, mixes with the circulating water in the tower fill (water dispersal material), and removes heat from the water and the warm air-water vapor mixture rises to leave the tower at the top. The towers are suitable for year-round operation. Circulating water outlets from the tower basins are protected from ingress of debris by screens that are cleaned manually. Duplicate screens are provided to permit removal of either one for cleaning.

The cooling tower blowdown is discharged through a diffuser directly into the river. Monitoring instrumentation in the circulating water circuit and the blowdown lines warns if blowdown criteria are being approached.

The tower blowdown rate is set from the central control room to control the concentration of chemical and dissolved solids in the circulating water. Water lost from the circulating system by tower evaporation, drift and blowdown is made up by river water supplied from the intake structure.

Circulating water carrying the heat rejected from the station is brought into direct contact with atmospheric air drawn into the tower by the difference in air densities inside and outside the tower. As the heated water falls through the tower, the incoming air-cools it. The cooler air passing over the warmer water vaporizes a small percentage of the water, thereby cooling the remaining water. The air is heated as it flows through the tower. The heat exchange between the air and water through direct contact is derived from two types of heat transfer: a) the evaporative cooling of the water and b) the sensible heating of the air due to the difference in temperature of water and air.

Table 1, Cooling Tower Performance, shows the maximum and minimum water evaporation rates required for the 8 billion Btu/hr waste heat rejection for one unit at full power. This data is based upon the range of meteorology recorded at Avoca, Pennsylvania.

Drift

Drift is the water that is entrained in the air discharging from the cooling tower. For the Susquehanna SES towers the manufacturer's guaranteed drift loss is 0.02% of the design circulating water flow. The drift is expected to be approximately 0.002% of the design circulating water flow.

Drift is minimized by the installation in the tower of "Drift Eliminators." These function by forcing the discharge air carrying the entrained water to make sudden changes in direction; the resulting centrifugal force effectively separates the drops of water from the air, depositing them on the surface of the eliminator. The accumulated water droplets coalesce and then flow down to the tower basin.

Fog

A visible plume results when the warm moist air discharging from the tower mixes with cooler ambient air that lacks the capacity to absorb all of the moisture. The excess moisture condenses as fog. There is no practical means of preventing the formation of a visible plume in this type-cooling tower.

Tower Performance

The towers are designed to cool 478,000 gpm of circulating water to a temperature of 87° F at an ambient wet bulb temperature of 73° F and a relative humidity of 65%.

The average monthly tower performance for a flow of 478,000 gpm at the average monthly temperatures and humidities is presented in Table 1, Cooling Tower Performance. Also shown for comparison is the cooling tower performance design condition (Case 1) and the maximum (Case 2) and minimum (Case 3) evaporation in Figure 7, Cooling Tower Performance.

In general the flow of the circulating water remains constant through the cooling towers under normal variations in heat rejection loads. During periods of extended reduced heat rejection loads, it may be desirable to reduce the circulating water flow by shutting off one (or two in extreme cases) of the circulating water pumps. In all such cases the evaporation and drift losses are less than the normal operating conditions.

For reasons of power generation efficiency, pumps would not be stopped unless circulating water temperatures could be kept below normal with the reduced flow. The temperature of the blowdown would be affected by a negligible amount with a reduced number of pumps in operation.

The cooling tower has provisions that are used to isolate the center section of the tower during extremely cold weather operation. This is done to direct more warm water toward the periphery of the cooling tower to prevent freezing in the outside fill sheets.

3.4 Cooling Tower Basin

Each tower is located over a circulating water basin-reservoir. The basin inside diameter is 410.5 ft and at normal water level of seven feet contains about seven million gallons. The cooled water from the tower fill rains down uniformly upon the basin surface. The mean time for the 508,000-gpm design rate of cooled water to travel through the seven million-gallon basin is about 15 minutes.

The actual travel time of an increment of water flowing horizontally across the basin varies from a few seconds to over five hours, depending upon the distance from the point where the water falls to the basin surface to the circulating water outlet. The increment of circulating water, which is ultimately blown down makes approximately 100 passes across the basin before it is discharged. The longest of the paths taken by the blowdown water, by which suspended solids are ultimately discharged, determines the suspended solids concentration of the entire circulating water flow.

The settling opportunity provided by the longest flow paths ensures that much of the suspended solids entering with the makeup water will settle in the basin and not appear in the blowdown.

The cooling tower basin has high and low level switches that are tied into a flow-modulating valve in the makeup piping. The valve is opened or closed automatically to provide makeup water as necessary for the circulating water system during all meteorological and station operating conditions.

The basin is equipped with ramps to permit earth-moving equipment to enter the tower basin and remove the accumulation of deposited silt during scheduled shutdowns.

Table 1

COOLING TOWER PERFORMANCE
(Based on One Unit at Full Load)

Month(1)	Wet Bulb °F	% Rel. Hum.	Evaporation gpm	Evaporation acre Ft Per Mo.	Cold Water °F	Exit Air °F	Exit Air Million cfm	Exit Air Velocity fpm	Sp. Vol Ft^3/lb Dry Air	Density lb/Ft^3 Mixture
Jan	22.3	24	9,560	1,307	59.2	77.6	58.7	825	13.99	.0729
Feb	18.5	0	9,480	1,170	57.9	75.2	60.2	846	13.89	.0733
Mar	27.1	15	10,490	1,434	62.0	80.7	56.9	799	14.12	.0724
Apr	35.4	28	11,020	1,458	66.7	86.0	53.5	752	14.35	.0715
May	48.4	53	11,730	1,603	73.1	92.1	51.7	727	14.65	.0705
June	58.6	67	12,170	1,600	78.4	97.8	49.31	693	14.96	.0695
July	62.4	69	12,340	1,687	80.3	98.7	50.71	713	15.01	.0694
Aug	63.3	76	12,250	1,674	80.7	99.3	50.4	708	15.04	.0693
Sept	53.8	72	11,640	1,540	75.3	94.2	52.1	732	14.76	.0701
Oct	45.5	63	11,180	1,528	71.1	89.6	54.1	761	14.53	.0709
Nov	35.4	45	10,700	1,415	66.2	85.4	54.4	765	14.33	.0716
Dec	25.5	33	9,870	1,349	61.0	79.8	57.3	805	14.08	.0724
Design (2)	73	65	13,170		87	104.8	46.4	653	15.37	.0683
Maximum(3)	75	37	14,210		90	108.4	41.5	583	15.61	.0676
Minimum(3)	0	100	6,550		46	41.1	70.2	987	13.73	.0740

(1) Monthly Performance based upon on site Meteorological Observations during 1973 to 1975
(2) Selection of design condition based upon on site meteorological observations during 1973-1975
(3) Maximum summer evaporation (not the highest wet bulb) and minimum evaporation condition based upon on site meteorology observations during 1973 to 1975.

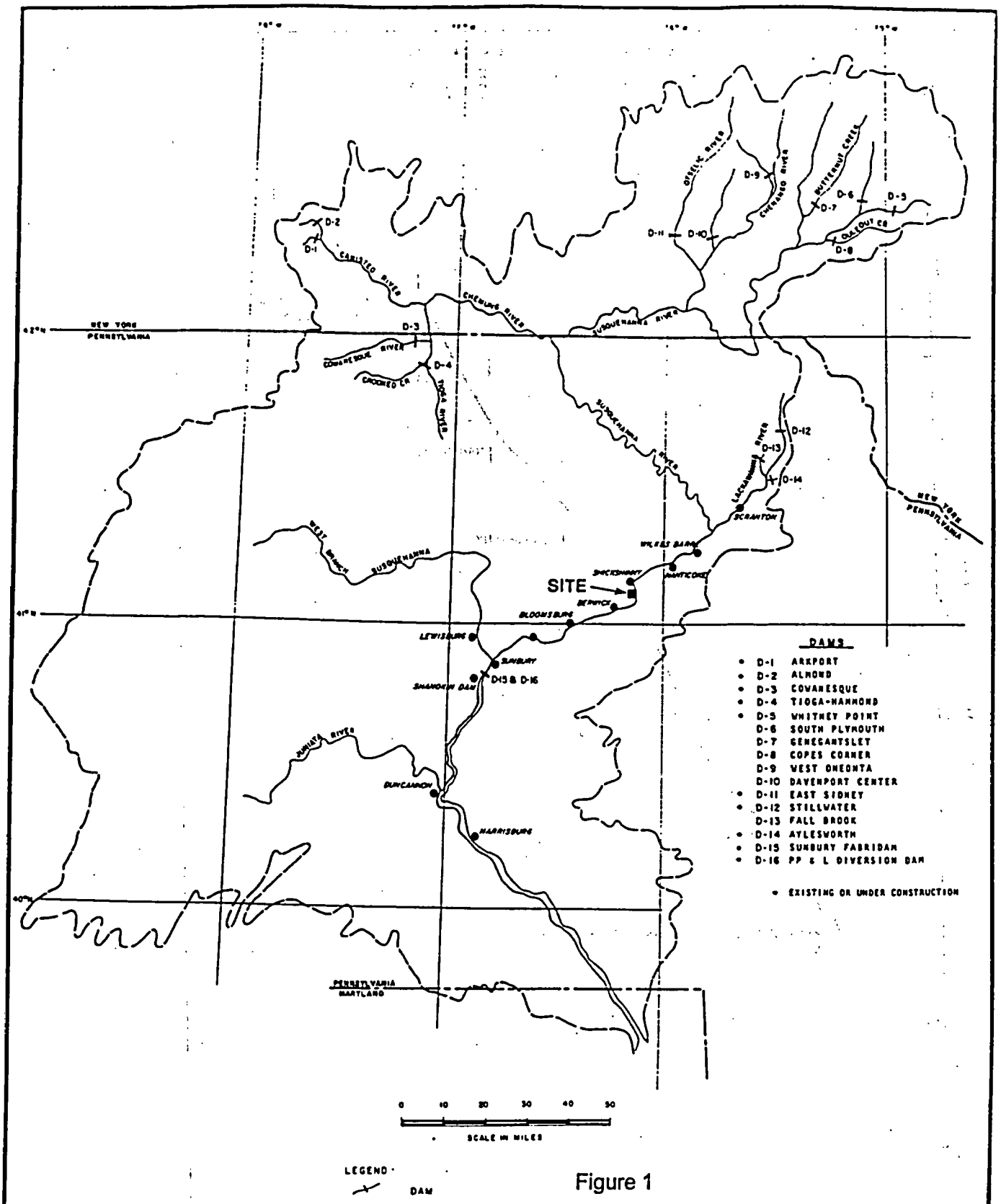

Figure 1

Susquehanna River Drainage Basin

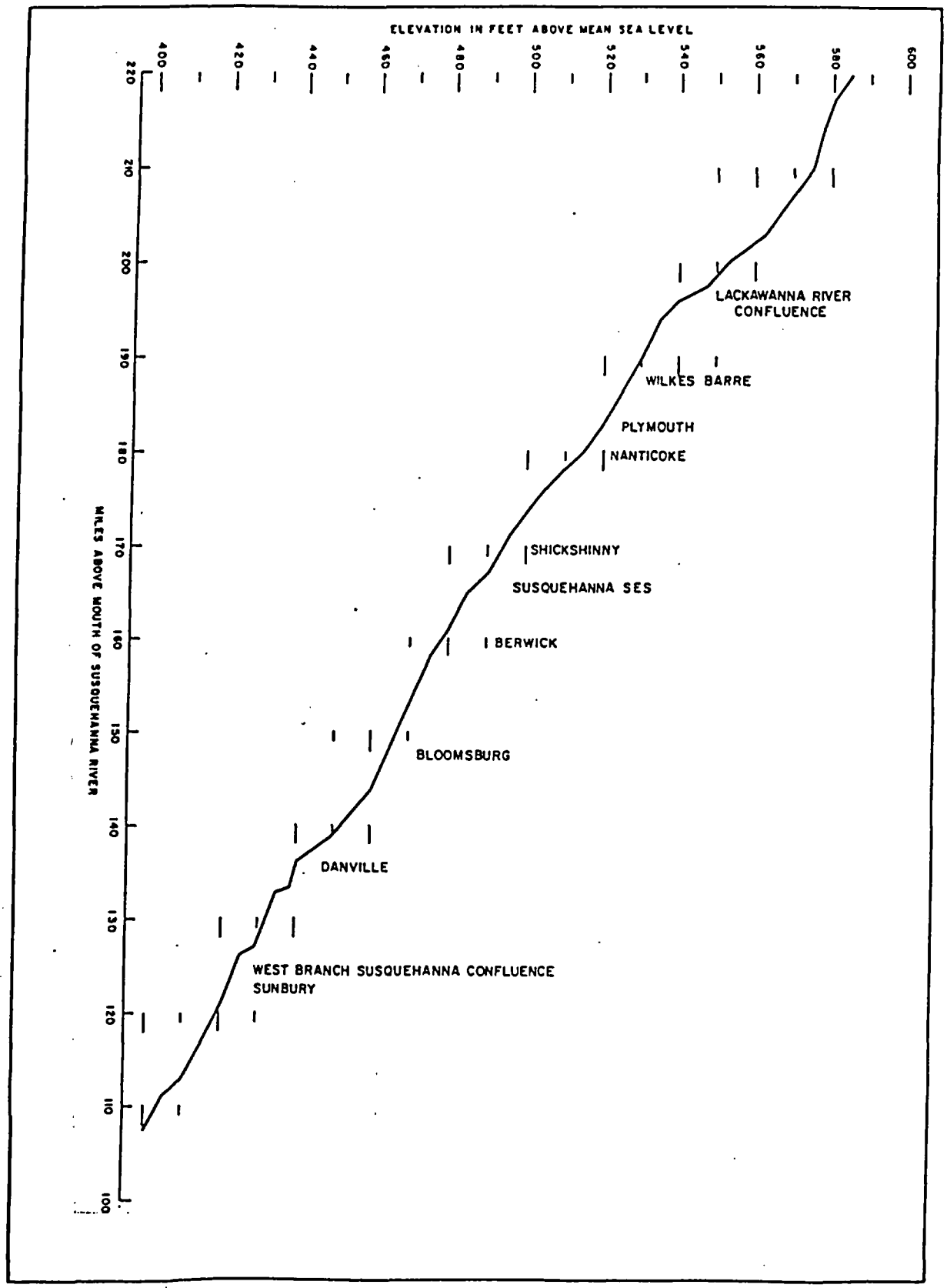

Figure 2

Susquehanna River Profile

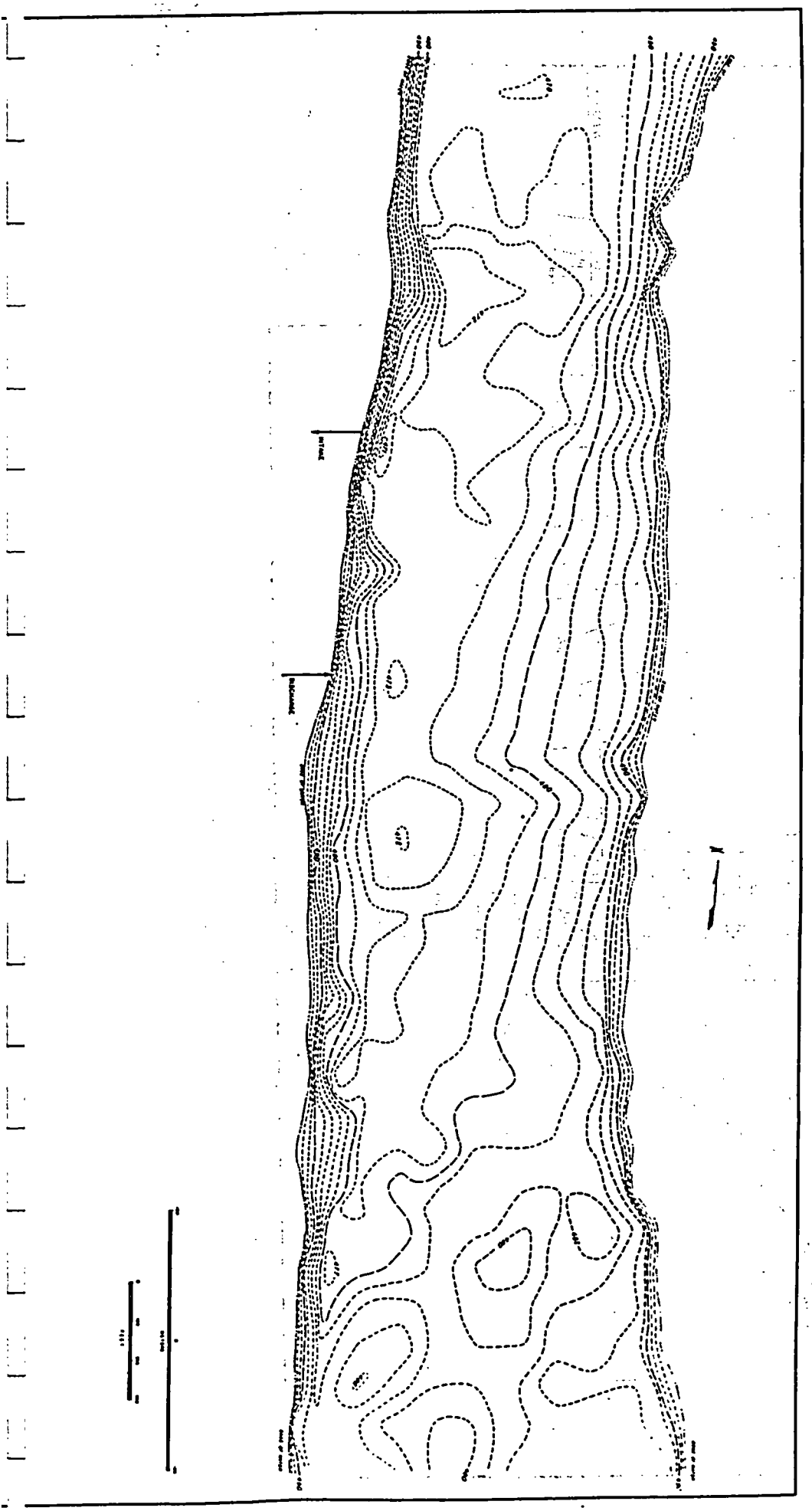

Figure 3

Susquehanna River
Bathymetry

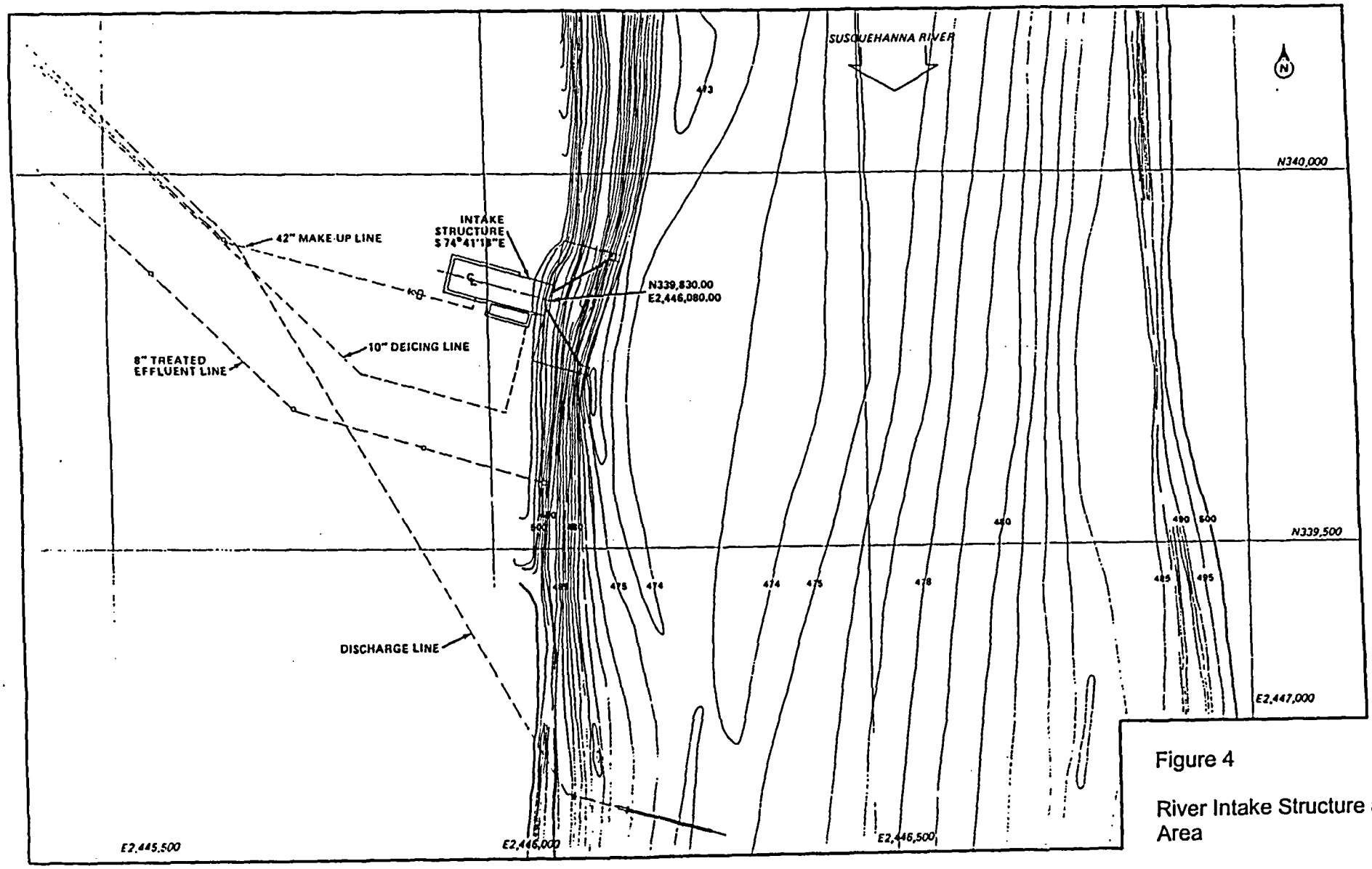

Figure 4

River Intake Structure and Area

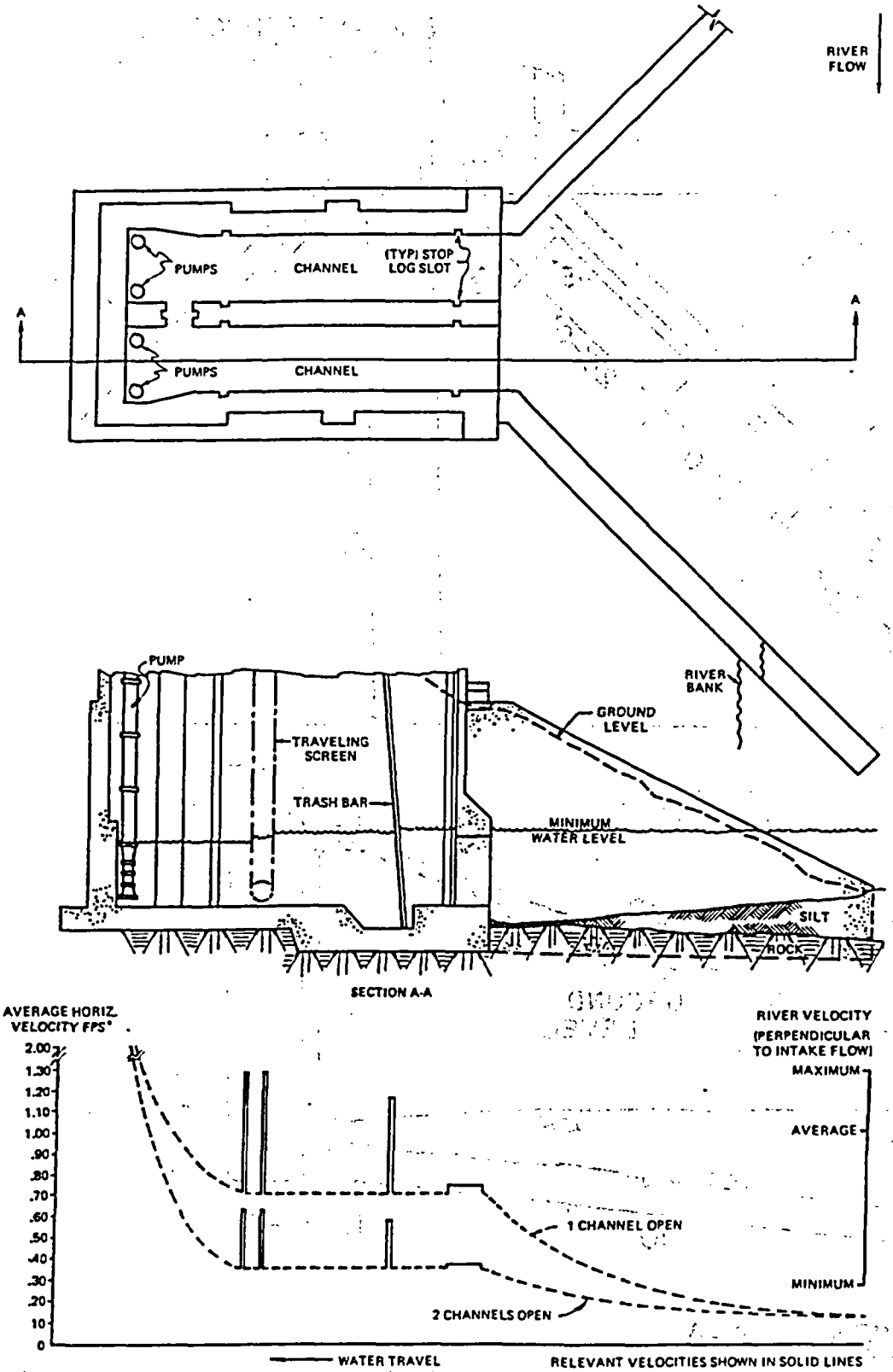

Figure 5

River Intake Structure and Velocity Profile

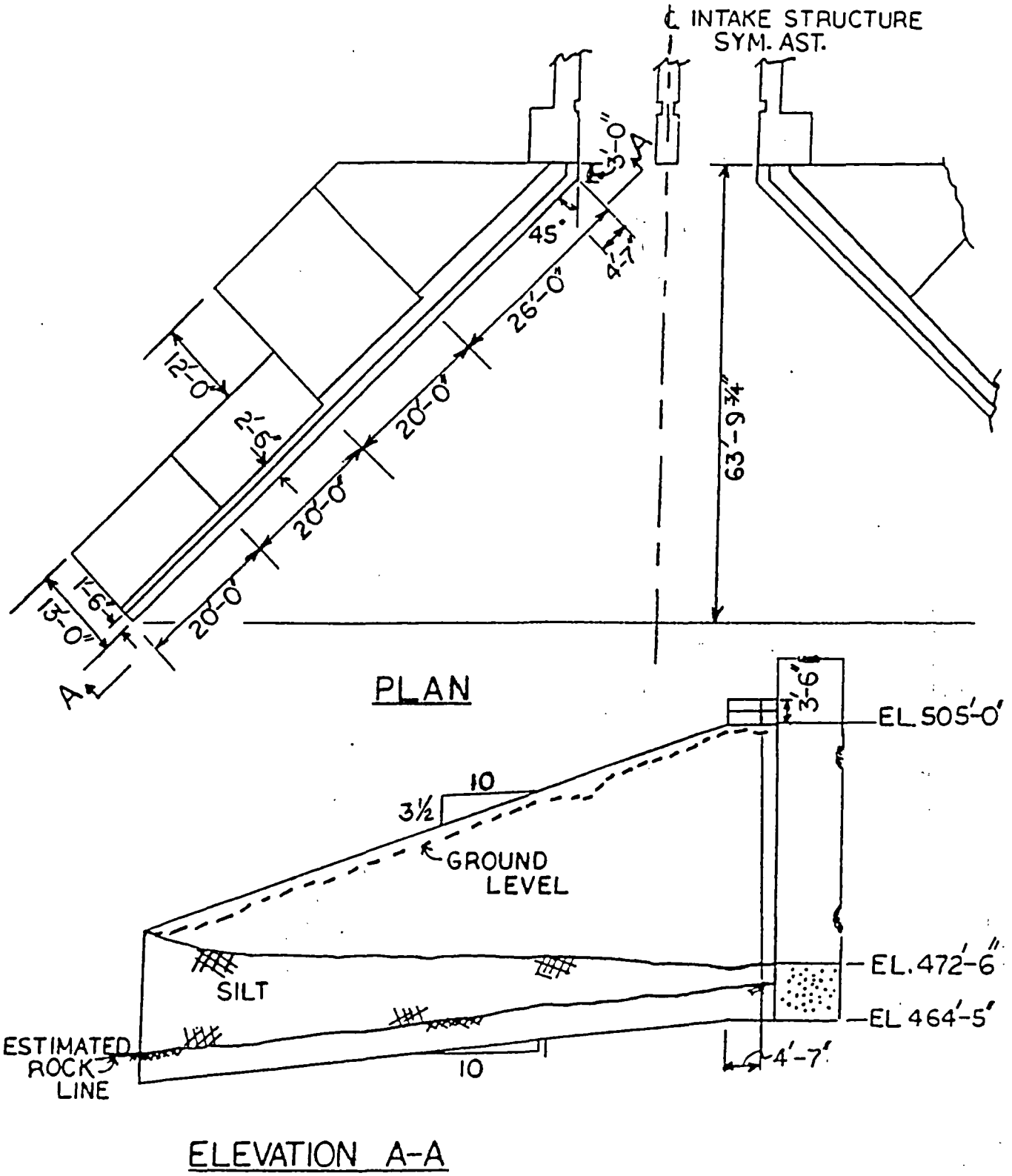

Figure 6

River Intake Structure Wing Walls

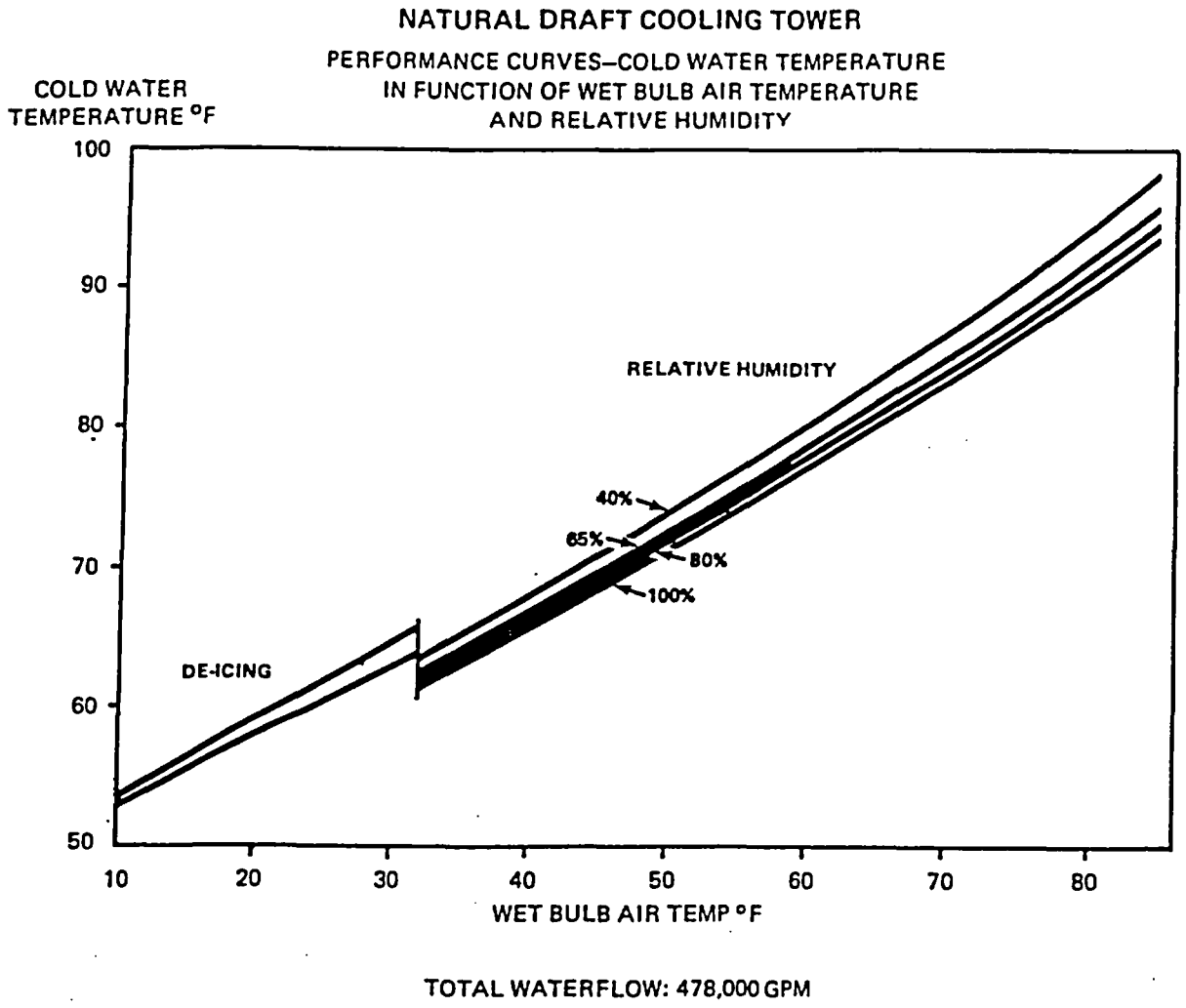

Figure 7

Cooling Tower Performance

Appendix B

Preparedness Prevention and Contingency (PPC) Plan (Includes SPCC Plan)

NPDES
RENEWAL APPLICATION
PERMIT NO. PA 0047325

January 6, 2005

PPL Susquehanna, LLC

(2 Copies provided to PaDEP with Original Application)

(PPL distribution, see Nuclear Department Waste and Chemical web site for copy of PPC Plan)