



Tennessee Valley Authority, Post Office Box 2000, Spring City, Tennessee 37381-2000

April 4, 2001

Mr. Philip Stewart, Manager
Tennessee Department of Environment & Conservation
Division of Water Pollution Control
Environmental Assistance Center
540 McCallie Avenue, Suite 550
Chattanooga, Tennessee 37402-2013

Dear Mr. Stewart:

WATTS BAR NUCLEAR PLANT (WBN) - NATIONAL POLLUTANT DISCHARGE
ELIMINATION SYSTEM (NPDES) PERMIT No. TN0020168 - APPLICATION FOR PERMIT
RENEWAL

Enclosed are one original and one copy of WBN's NPDES permit renewal application. The current WBN NPDES permit expires on September 28, 2001. WBN will continue to operate under the Tennessee Storm Water Multi-Sector Permit (TMSP No. TNR051343) For Industrial Activities. Because plant operations and discharges have not changed significantly, and the last EPA Form 2C submittal was less than three years ago; the same priority pollutant data is being re-submitted. However, the data from January 1998 through December 2000 from the Discharge Monitoring Reports has been updated. In addition, form 2C for outfall 113 data that was previously submitted to you in December of 2000 for discharge characterization, is being re-submitted with this package.

WBN requests changes to the chemical treatment programs for raw river water used in the plant and that thermal compliance monitoring be reduced to an end of pipe value for outfall 113. Changes in the raw water treatment program are necessary in order for WBN to address clam and mussel infestation issues in plant piping systems that are essential for the safe operation of the plant and to address biofouling of the cooling tower. The treatment program changes are detailed under the Raw Water Additives tab in the attached permit application. The requested change in thermal compliance monitoring requirements for outfall 113 is based on the studies conducted by WBN in accordance with the requirements in the current NPDES permit. These studies indicate there has been no impact to aquatic life by the operation of the SCCW system. Similarly, the thermal compliance data collected to date is sufficient to demonstrate by thermal modeling that an impact to aquatic life is not likely in the future. Detailed justification for an end of pipe limit for outfall 113 will be forwarded under a separate cover letter pending analysis of the last thermal survey and final review of all thermal data collected to date on the SCCW system.

C001

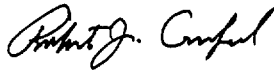
Mr. Philip Stewart, Manager
Page 2
March 30, 2001

The only other significant change to this permit application from previous WBN applications is the flow diagram that accompanies the form 2C. At the request of the Chattanooga Field Office, an attempt was made to make the flow diagram more readable and supportive of the form 2C.

If you need additional copies or have comments or questions, please contact me at (423) 365-8005.

I certify under penalty of law that I have personally examined and am familiar with the information submitted in the attached document; and based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Sincerely,



Robert J. Crawford
Environmental Supervisor

Enclosures

cc (Enclosures):

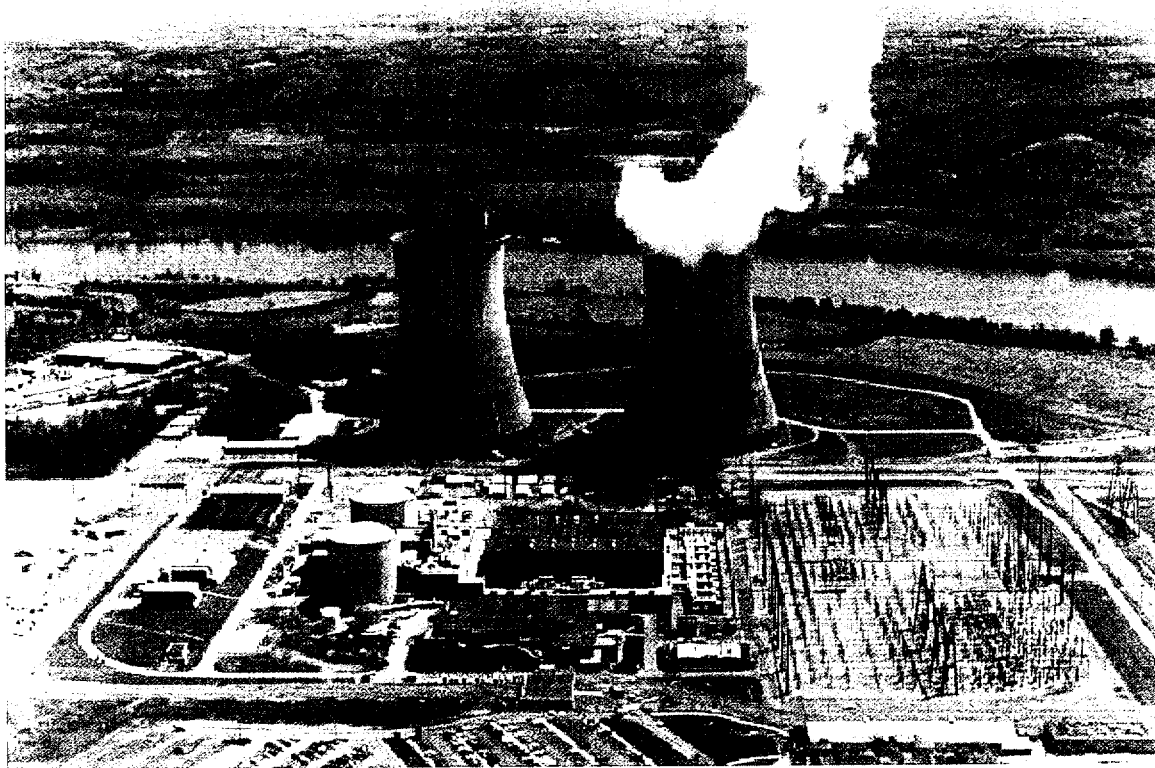
U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555

WBN 2001

NPDES Permit

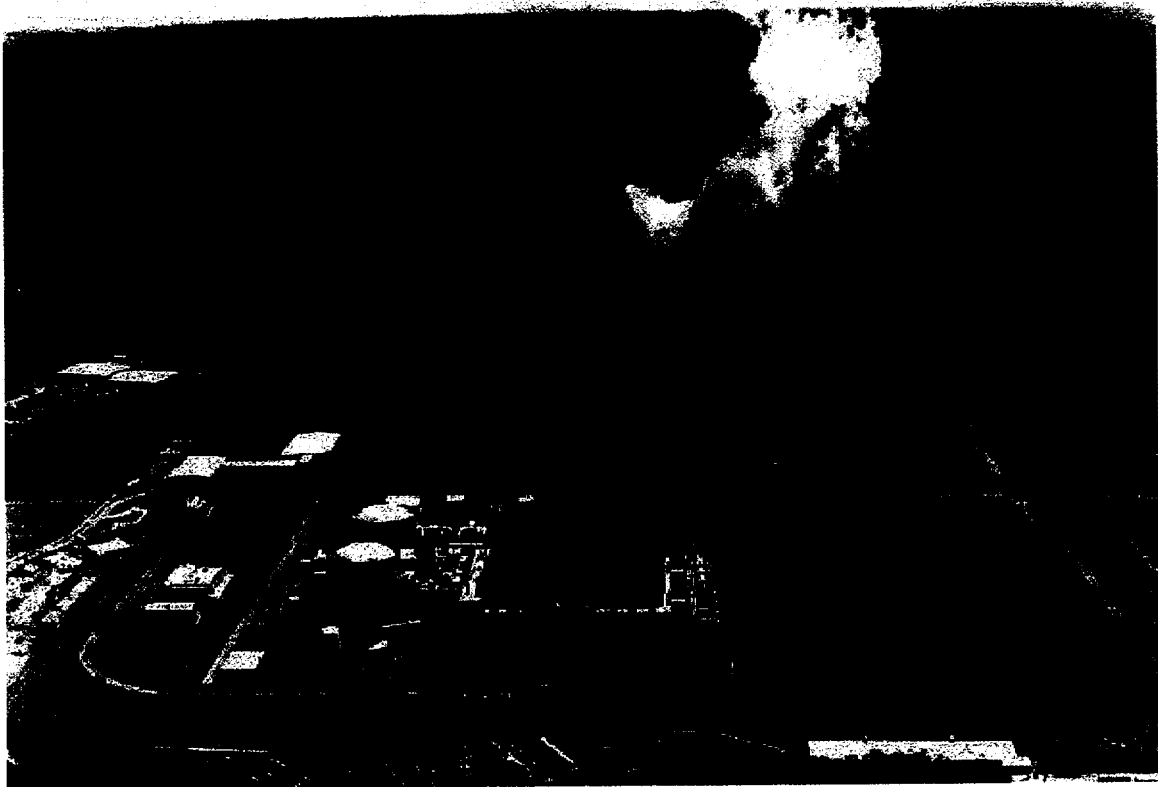
Application

TN0020168



**WBN 2001
NPDES Permit
Application**

TN0020168



Copy

BINDER CONTENTS

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- PERMIT
- DRAFT PERMIT
- CORRESPONDENCE
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- 2C POLLUTANTS
- RAW WATER ADDITIVES
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 - H-130M
 - H-901G
 - MSW-109
 - Nalco 1336
 - PCL-401
 - Towerbrom®960
 - Chlorakill 8816
- DMR HISTORY
- MAPS

ACRONYMS

CCW	Condenser Cooling Water
CFS	Cubic Feet / Second
ConDemin	Condensate Demineralizer
CRHP	Construction Runoff Holding Pond
CT	Cooling Tower
CTBD	Cooling Tower Blow Down
D/G	Diesel Generator
ERCW	Essential Raw Cooling Water
HPFP	High Pressure Fire Protection
HVAC	Heating, Ventilation & Air Conditioning
IPS	Intake Pumping Station
LP	Lined Pond
LVWTP	Low Volume Waste Treatment Pond also referred to as Low Volume Waste Holding Pond
MGD	Million Gallons / Day
NaOCl	Sodium Hypochlorite
NPDES	National Pollutant Discharge Elimination System
OSN	Outfall Serial Number
RCW	Raw Cooling Water
RO	Reverse Osmosis
RSW	Raw Service Water
SCCW	Supplemental Condenser Cooling Water
SGBD	Steam Generator Blow Down
STP	Sewage Treatment Plant
SW	Storm Water
TBSS	Turbine Building Station Sump
TVA	Tennessee Valley Authority
ULP	Unlined Pond
VWPP	Vendor Water Purification Plant
WBNP	Watts Bar Nuclear Plant
WPP	Water Purification Plant
WPP NIS	Water Purification Plant Not In Service
YHP	Yard Holding Pond
YHP OFW	Yard Holding Pond Over Flow Weir



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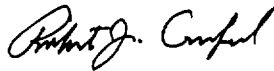
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U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555

**DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF WATER POLLUTION CONTROL**

NPDES PERMIT APPLICATION ADDRESSES

All addresses must be completed even if the same address is used:

NPDES PERMIT NUMBER: TN0020168

CORPORATE HEADQUARTERS (where permit should be sent):

CONTACT PERSON: Robert J. Crawford, Environmental Supv. TELEPHONE: 423-365-8005

COMPANY NAME: TVA - Watts Bar Nuclear Plant

STREET AND/OR P.O. BOX: P.O. Box 2000 MTL-1E

CITY: Spring City STATE: TN ZIP CODE: 37381

PERMIT BILLING ADDRESS (where invoices should be sent):

CONTACT PERSON: Robert J. Crawford, Environmental Supv. TELEPHONE: 423-365-1846

FACILITY NAME: TVA - Watts Bar Nuclear Plant

STREET AND/OR P.O. BOX: P.O. Box 2000 MTL-1E

CITY: Spring City STATE: TN ZIP CODE: 37381

FACILITY LOCATION (actual location of permit site):

CONTACT PERSON: Robert J. Crawford, Environmental Supv. TELEPHONE: 423-365-1846

FACILITY NAME: TVA - Watts Bar Nuclear Plant

STREET AND/OR P.O. BOX: P.O. Box 2000 MTL-1E

CITY: Spring City STATE: TN ZIP CODE: 37381

COUNTY: Rhea Telephone: 423-365-1846

DMR MAILING ADDRESS (where preprinted Discharge Monitoring Reports should be sent):

CONTACT PERSON: Robert J. Crawford, Environmental Supv. TELEPHONE: 423-365-1846

FACILITY NAME: TVA - Watts Bar Nuclear Plant

STREET AND/OR P.O. BOX: P.O. Box 2000 MTL-1E

CITY: Spring City STATE: TN ZIP CODE: 37381

Please print or type in the unshaded areas only
(fill-in areas are spaced for elite type, i.e., 12 characters/inch).

Form Approved. OMB No. 2040-0086. Approval expires 5-31-92.

FORM 1 GENERAL	EPA U.S. ENVIRONMENTAL PROTECTION AGENCY GENERAL INFORMATION <i>Consolidated Permits Program</i> <i>(Read the "General Instructions" before starting.)</i>	I. EPA I.D. NUMBER S T N 002 01 6 8 F 1 2 13 14 15																																																						
LABEL ITEMS I. EPA I.D. NUMBER II. FACILITY NAME V. FACILITY MAILING ADDRESS VI. FACILITY LOCATION PLEASE PLACE LABEL IN THIS SPACE		GENERAL INSTRUCTIONS If a preprinted label has been provided, affix in the designated space. Review the information carefully; if any of it is incorrect, cross through it and enter the correct data in the appropriate fill-in area below. Also, if any of the preprinted data is absent (the area to the left of the label space lists the information that should appear), please provide it in the proper fill-in area(s) below. If the label is complete and correct, you need not complete items 1, III, V, and VI (except VI-B which must be completed regardless). Complete all items if no label has been provided. Refer to the instructions for detailed item descriptions and for the legal authorizations under which this data is collected.																																																						
II. POLLUTANT CHARACTERISTICS INSTRUCTIONS: Complete A through J to determine whether you need to submit any permit application forms to the EPA. If you answer "yes" to any questions, you must submit this form and the supplemental form listed in the parenthesis following the question. Mark "X" in the box in the third column if the supplemental form is attached. If you answer "no" to each question, you need not submit any of these forms. You may answer "no" if your activity is excluded from permit requirements; see Section C of the instructions. See also, Section D of the instructions for definitions of bold-faced terms.																																																								
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">SPECIFIC QUESTIONS</th> <th colspan="3">MARK 'X'</th> <th rowspan="2">SPECIFIC QUESTIONS</th> <th colspan="3">MARK 'X'</th> </tr> <tr> <th>YES</th> <th>NO</th> <th>FORM ATTACHED</th> <th>YES</th> <th>NO</th> <th>FORM ATTACHED</th> </tr> </thead> <tbody> <tr> <td>A. Is this facility a publicly owned treatment works which results in a discharge to waters of the U.S.? (FORM 2A)</td> <td></td> <td style="text-align:center;">X</td> <td></td> <td>B. Does or will this facility (either existing or proposed) include a concentrated animal feeding operation or aquatic animal production facility which results in a discharge to waters of the U.S.? (FORM 2B)</td> <td></td> <td style="text-align:center;">X</td> <td></td> </tr> <tr> <td>C. Is this a facility which currently results in discharges to waters of the U.S. other than those described in A or B above? (FORM 2C)</td> <td style="text-align:center;">X</td> <td></td> <td style="text-align:center;">X</td> <td>D. Is this a proposed facility (other than those described in A or B above) which will result in a discharge to waters of the U.S.? (FORM 2D)</td> <td></td> <td style="text-align:center;">X</td> <td></td> </tr> <tr> <td>E. Does or will this facility treat, store, or dispose of hazardous wastes? (FORM 3)</td> <td></td> <td style="text-align:center;">X</td> <td></td> <td>F. Do you or will you inject at this facility industrial or municipal effluent below the lowermost stratum containing, within one quarter mile of the well bore, underground sources of drinking water? (FORM 4)</td> <td></td> <td style="text-align:center;">X</td> <td></td> </tr> <tr> <td>G. 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III. NAME OF FACILITY 1 SKIP WATTS BAR NUCLEAR PLANT 15 16-29 30 69																																																								
IV. FACILITY CONTACT A. NAME & TITLE (last, first, & title) 2 CRAWFORD, ROBERT ENVIRONMENTAL SUPERVISOR 15 16 45 46 - 48 B. PHONE (area code & no.) 4 2 3 3 6 5 1 8 4 6 45 46 - 48 49 - 51 52 - 55																																																								
V. FACILITY MAILING ADDRESS A. STREET OR P.O. BOX 3 P.O. BOX 2000 15 16 45 B. CITY OR TOWN 4 SPRING CITY 15 16 40 C. STATE T N 41 42 D. ZIP CODE 3 7 3 8 1 47 - 51																																																								
VI. FACILITY LOCATION A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER 5 HWY 68 NUCLEAR PLANT ROAD 15 16 45 B. COUNTY NAME RHEA 46 70 C. CITY OR TOWN 6 SPRING CITY 15 16 40 D. STATE T N 41 42 E. ZIP CODE 3 7 3 8 1 47 - 51 F. COUNTY CODE (if known) 52 - 54																																																								

VII. SIC CODES (4-digit, in order of priority)		B. SECOND	
A. FIRST		(specify)	
9	1	1	1
ELECTRICAL POWER GENERATION			
15	16	15	19
C. THIRD		D. FOURTH	
(specify)		(specify)	
7	7	15	19

VIII. OPERATOR INFORMATION		A. NAME		B. Is the name listed as owner?	
(specify)		(specify)		owner?	
TENNESSEE VALLEY AUTHORITY				<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	
C. STATUS OF OPERATOR (Enter the appropriate letter into the answer box; if "Other", specify.)		D. PHONE (area code & no.)			
F = FEDERAL M = PUBLIC (other than federal or state) S = STATE O = OTHER (specify)		F (specify)		C A 4 2 3 3 6 5 8 7 6 7 15 16 - 18 19 - 21 22 - 25	
E. STREET OR P.O. BOX		F. CITY OR TOWN		G. STATE	
P.O. BOX 2000		BSPRING		TN	
H. ZIP CODE		I. INDIAN LAND		Is the facility located on Indian lands?	
3 7 3 8 1				<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	

X. EXISTING ENVIRONMENTAL PERMITS					
A. NPDES (Discharges to Surface Water)			D. PSD (Air Emissions from Proposed Sources)		
9	N	T	N	0	0
T N 0 0 2 0 1 6 8					
15	16	17	18	15	18
B. UIC (Underground Injection of Fluids)			E. OTHER (specify)		
(specify)			(specify)		
9	R	9	9	15	18
RCRA (Hazardous Wastes)					

XI. MAP
 Attach to this application a topographic map of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Incl X for precise requirements.

XII. NATURE OF BUSINESS (provide a brief description)
 Production of electrical power via thermonuclear fission and associated operations.

XIII. CERTIFICATION (see instructions)		
I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of the persons 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.		
A. NAME & OFFICIAL TITLE (type or print)	B. SIGNATURE	C. DATE SIGNED
W.R. Lagergren Site Vice President Watts Bar Nuclear Plant		4/4/2001

EPA I.D. NUMBER (copy from Item 1 of Form 1)
TN0020168

Form Approved
OMB No. 2040-0086
Approval expires 5/31/92

Please print or type in the unshaded areas only

U. S. ENVIRONMENTAL PROTECTION AGENCY
APPLICATION FOR PERMIT TO DISCHARGE WASTEWATER
EXISTING MANUFACTURING, COMMERCIAL, MINING AND SILVICULTURAL OPERATIONS
Consolidated Permits Program

I. OUTFALL LOCATION
For each outfall, list the latitude and longitude of its location to the nearest 15 seconds and the name of the receiving water.

A. OUTFALL NUMBER <i>(list)</i>	B. LATITUDE			C. LONGITUDE			D. RECEIVING WATER (name)
	1. DEG.	2. MIN	3. SEC.	1. DEG.	2. MIN.	3. SEC.	
101	35	35	36	84	47	9	TENNESSEE RIVER @ 527.9
102	35	35	45	84	47	30	UNNAMED TRIBUTARY OF TENNESSEE RIVER @ 527.2
112	35	36	4	84	48	11	UNNAMED TRIBUTARY OF YELLOW CREEK
113	35	35	36	84	47	9	TENNESSEE RIVER @ TRM 529.2

II. FLOWS, SOURCES, OF POLLUTION, AND TREATMENT TECHNOLOGIES

A. Attach a line drawing showing the water flow through the facility. Indicate sources of intake water, operations contributing wastewater to the effluent, and treatment units labeled to correspond to the more detailed descriptions in Item B. Construct a water balance on the line drawing by showing average flows between intakes, operations, treatment units, and outfalls. If a water balance cannot be determined (e.g., for certain mining activities), provide a pictorial description of the nature and amount of any sources of water and any collection or treatment measures.

B. For each outfall, provide a description of: (1) All operations contributing wastewater to the effluent, including process wastewater, sanitary wastewater, cooling water, and storm water runoff; (2) The average flow contributed by each operation; and (3) The treatment received by the wastewater. Continue on additional sheets if necessary.

1. OUTFALL NO <i>(list)</i>	2. OPERATION(S) CONTRIBUTING FLOW		3. TREATMENT	
	a. OPERATION <i>(list)</i>	b. AVERAGE FLOW <i>(include units)</i>	a. DESCRIPTION	b. LIST CODES FROM TABLE 2C-1
101	Diffuser Discharge	33.670 MGD	Mixing by submerged multiport	1 O
	which receives flow from the following:		diffusers	4 A
	1. Yard Holding Pond	9.6223 MGD		1 U
	a) TBSS "A"	0.0000 MGD	Not used in last 3 years	
	b) CTBD "A"	0.0000 MGD	See Item 2. d) for mass balance	
	c) ERCW Discharge "A"	4.3800 MGD	Biocide	2 F,H
	d) RCW Discharge "A"	4.0500 MGD	Biocide	2 F,H
	e) Low Volume Waste Treatment Pond	0.2190 MGD	Unlined w/ sedimentation, neutralization	2 K
	f) Lined and Unlined Metal Cleaning Waste Ponds	0.0310 MGD	sedimentation neutralization	2 K
	g) Cooling Tower Desilting Basin	0.0020 MGD	Sedimentation	1 U
	h) Potable water line leaks	0.0010 MGD	None	
	i) Service Building Sump	0.0200 MGD	Floor drain with oil skimming	1 U
	j) Diesel Generator Building Sump	0.0001 MGD	Floor drain with oil skimming	1 U
	k) Emergency D/G Building Sump	0.0001 MGD	Floor drain with oil skimming	1 U
	l) ERCW Strainer Backwash	0.0010 MGD	Biocide	2 F
	m) Traveling Screen Backwash (IPS)	0.0020 MGD	None	
	n) CCW Pump Station Sump	0.0001 MGD	Leak collection with oil skimming	1 U
	o) NaOCI Building Sump	0.0010 MGD	None	
	p) Rainwater releases from secondary confinement for bulk chemical storage	0.0010 MGD	None	
	q) Once Through Cooling Water such as used in ice condenser chiller packages and various air coolers	0.2000 MGD	None	
	r) Demin Water discharges to Yard Drains	0.0110 MGD	None	

OFFICIAL USE ONLY (effluent guidelines sub-categories)

EPA I.D. NUMBER (copy from Item 1 of Form 1)
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113	35	35	36	84	47	9	TENNESSEE RIVER @ TRM 529.2

II. FLOWS, SOURCES, OF POLLUTION, AND TREATMENT TECHNOLOGIES

A. Attach a line drawing showing the water flow through the facility. Indicate sources of intake water, operations contributing wastewater to the effluent, and treatment units labeled to correspond to the more detailed descriptions in Item B. Construct a water balance on the line drawing by showing average flows between intakes, operations, treatment units, and outfalls. If a water balance cannot be determined (e.g., for certain mining activities), provide a pictorial description of the nature and amount of any sources of water and any collection or treatment measures.

B. For each outfall, provide a description of: (1) All operations contributing wastewater to the effluent, including process wastewater, sanitary wastewater, cooling water, and storm water runoff; (2) The average flow contributed by each operation; and (3) The treatment received by the wastewater. Continue on additional sheets if necessary.

1. OUTFALL NO <i>(list)</i>	2. OPERATION(S) CONTRIBUTING FLOW		3. TREATMENT	
	a. OPERATION <i>(list)</i>	b. AVERAGE FLOW <i>(include units)</i>	a. DESCRIPTION	b. LIST CODES FROM TABLE 2C-1
101	Diffuser Discharge	33.670 MGD	Mixing by submerged multiport	1 O
	which receives flow from the following:		diffusers	4 A
	1. Yard Holding Pond	9.6223 MGD		
	a) TBSS "A"	0.0000 MGD	Not used in last 3 years	
	b) CTBD "A"	0.0000 MGD	See Item 2. d) for mass balance	
	c) ERCW Discharge "A"	4.3800 MGD	Biocide	2 F,H
	d) RCW Discharge "A"	4.0500 MGD	Biocide	2 F,H
	e) Low Volume Waste Treatment Pond	0.2190 MGD	Unlined w/ sedimentation, neutralization	2 K
	f) Lined and Unlined Metal Cleaning Waste Ponds	0.0310 MGD	sedimentation neutralization	2 K
	g) Cooling Tower Desilting Basin	0.0020 MGD	Sedimentation	1 U
	h) Potable water line leaks	0.0010 MGD	None	
	i) Service Building Sump	0.0200 MGD	Floor drain with oil skimming	1 U
	j) Diesel Generator Building Sump	0.0001 MGD	Floor drain with oil skimming	1 U
	k) Emergency D/G Building Sump	0.0001 MGD	Floor drain with oil skimming	1 U
	l) ERCW Strainer Backwash	0.0010 MGD	Biocide	2 F
	m) Traveling Screen Backwash (IPS)	0.0020 MGD	None	
	n) CCW Pump Station Sump	0.0001 MGD	Leak collection with oil skimming	
	o) NaOCl Building Sump	0.0010 MGD	None	1 U
	p) Rainwater releases from secondary confinement for bulk chemical storage	0.0010 MGD	None	
	q) Once Through Cooling Water such as used in ice condenser chiller packages and various air coolers	0.2000 MGD	None	
	r) Demin Water discharges to Yard Drains	0.0110 MGD	None	

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FORM 2C NPDES		U. S. ENVIRONMENTAL PROTECTION AGENCY APPLICATION FOR PERMIT TO DISCHARGE WASTEWATER EXISTING MANUFACTURING, COMMERCIAL, MINING AND SILVICULTURAL OPERATIONS <i>Consolidated Permits Program</i>					
I. OUTFALL LOCATION							
For each outfall, list the latitude and longitude of its location to the nearest 15 seconds and the name of the receiving water.							
A. OUTFALL NUMBER (list)	B. LATITUDE			C. LONGITUDE			D. RECEIVING WATER (name)
	1. DEG.	2. MIN.	3. SEC.	1. DEG.	2. MIN.	3. SEC.	
II. FLOWS, SOURCES, OF POLLUTION, AND TREATMENT TECHNOLOGIES							
A. Attach a line drawing showing the water flow through the facility. Indicate sources of intake water, operations contributing wastewater to the effluent, and treatment units labeled to correspond to the more detailed descriptions in Item B. Construct a water balance on the line drawing by showing average flows between intakes, operations, treatment units, and outfalls. If a water balance cannot be determined (e.g., for certain mining activities), provide a pictorial description of the nature and amount of any sources of water and any collection or treatment measures.							
B. For each outfall, provide a description of: (1) All operations contributing wastewater to the effluent, including process wastewater, sanitary wastewater, cooling water, and storm water runoff; (2) The average flow contributed by each operation; and (3) The treatment received by the wastewater. Continue on additional sheets if necessary.							
1. OUTFALL NO (list)	2. OPERATION(S) CONTRIBUTING FLOW			3. TREATMENT			
	a. OPERATION (list)	b. AVERAGE FLOW (include units)		a. DESCRIPTION	b. LIST CODES FROM TABLE 2C-1		
101 (cont.)	s) High Pressure Fire Protection (HPFP) Flushes	0.0030 MGD		Biocide			
	t) Storm Water Runoff	0.7000 MGD		None			
	Sum of YHP	9.6223 MGD					
	2. CTBD Line	24.048 MGD					
	a) Liquid Radwaste System	0.0043 MGD		Ion Exchange and Filtration System	2	J	
	which receives flow from the following				1	N	
	A) Radioactive Floor and Equipment Drains, Tanks, and Sumps	0.0039 MGD		Floor drain with oil skimming	1	U	
	B) Laboratory Wastes	0.0001 MGD		None			
	C) Metal cleaning waste	0.0003 MGD		None			
	Sum of Radwaste	0.0043 MGD					
	b. Steam Generator Blowdown	0.1440 MGD		None			
	c. Con Demin Cleanup	0.0010 MGD		Neutralization	2	K	
					1	N	
	d. Cooling Tower Blowdown Weir	23.8990 MGD		Biocide	2	F,H	
102	Yard Holding Pond Overflow Weir	0.000 MGD		See Outfall 101	1	U	
	Not used in over 3 years						
	Provides an alternate discharge path for the						
	diffuser discharge point (OSN 101)						
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FORM 2C NPDES	U. S. ENVIRONMENTAL PROTECTION AGENCY APPLICATION FOR PERMIT TO DISCHARGE WASTEWATER EXISTING MANUFACTURING, COMMERCIAL, MINING AND SILVICULTURAL OPERATIONS <i>Consolidated Permits Program</i>						
I. OUTFALL LOCATION							
For each outfall, list the latitude and longitude of its location to the nearest 15 seconds and the name of the receiving water.							
A. OUTFALL NUMBER (list)	B. LATITUDE			C. LONGITUDE			D. RECEIVING WATER (name)
	1. DEG.	2. MIN	3. SEC.	1. DEG.	2. MIN.	3. SEC.	
II. FLOWS, SOURCES, OF POLLUTION, AND TREATMENT TECHNOLOGIES							
A. Attach a line drawing showing the water flow through the facility. Indicate sources of intake water, operations contributing wastewater to the effluent, and treatment units labeled to correspond to the more detailed descriptions in Item B. Construct a water balance on the line drawing by showing average flows between intakes, operations, treatment units, and outfalls. If a water balance cannot be determined (e.g., for certain mining activities), provide a pictorial description of the nature and amount of any sources of water and any collection or treatment measures.							
B. For each outfall, provide a description of: (1) All operations contributing wastewater to the effluent, including process wastewater, sanitary wastewater, cooling water, and storm water runoff; (2) The average flow contributed by each operation; and (3) The treatment received by the wastewater. Continue on additional sheets if necessary.							
1. OUT-FALL NO (list)	2. OPERATION(S) CONTRIBUTING FLOW			3. TREATMENT			
	a. OPERATION (list)	b. AVERAGE FLOW (include units)		a. DESCRIPTION	b. LIST CODES FROM TABLE 2C-1		
103	Low Volume Waste Treatment Pond	0.219 MGD		Unlined pond with neutralization	1	O,U	
	which receives flow from:				2	K	
	1. Turbine Building Station Sump (TBSS)	0.1342 MGD		Floor drain collection with oil skimming	1	U	
	a) System Leakage and Maintenance	0.1330 MGD		None			
	b) Con Demin Cleanup "A"	0.0000 MGD		See 101 2. c)			
	c) Laboratory Wastes	0.0001 MGD		None			
	d) HPPF flushes	0.0010 MGD		None			
	e) Potable Water Line Leaks	0.0001 MGD		None			
	2. Alum Sludge Supernate	0.0250 MGD		Two ponds providing sludge thickening	1,5	L,Q,U	
	3. Vendor Water Purification (RO reject water)	0.0500 MGD		None			
4. Storm Water Runoff	0.0100 MGD		None				
5. Drum dewatering	0.0001 MGD		None				
6. Water Purification Plant (In Plant)	0.0000 MGD		Neutralization...Currently Not in Use.	2	K		
	Sum of OSN 103	0.2193 MGD					
107	Metal Cleaning Waste Ponds (LP and ULP)	0.031 MGD		1 MG Lined Pond	1	O,U	
	which receive flow from:			5 MG Unlined Pond	2	C,K	
	1. TBSS (when metal cleaning processes have contributed to this collection point)	0.0310 MGD		See OSN 103 for details on the TBSS Floor drain collection with oil skimming	1	U	
	2. Drum rinsing	0.0001 MGD		None			
	3. Diesel Generator Coolant	0.0001 MGD		None			
	4. Storm Water Runoff	0.0001 MGD		None			
		Sum of OSN 107	0.0313 MGD				
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FORM 2C NPDES	U. S. ENVIRONMENTAL PROTECTION AGENCY						
	APPLICATION FOR PERMIT TO DISCHARGE WASTEWATER EXISTING MANUFACTURING, COMMERCIAL, MINING AND SILVICULTURAL OPERATIONS <i>Consolidated Permits Program</i>						
I. OUTFALL LOCATION							
For each outfall, list the latitude and longitude of its location to the nearest 15 seconds and the name of the receiving water.							
A. OUTFALL NUMBER (list)	B. LATITUDE			C. LONGITUDE			D. RECEIVING WATER (name)
	1. DEG.	2. MIN	3. SEC.	1. DEG.	2. MIN	3. SEC.	
II. FLOWS, SOURCES, OF POLLUTION, AND TREATMENT TECHNOLOGIES							
A. Attach a line drawing showing the water flow through the facility. Indicate sources of intake water, operations contributing wastewater to the effluent, and treatment units labeled to correspond to the more detailed descriptions in Item B. Construct a water balance on the line drawing by showing average flows between intakes, operations, treatment units, and outfalls. If a water balance cannot be determined (e.g., for certain mining activities), provide a pictorial description of the nature and amount of any sources of water and any collection or treatment measures.							
B. For each outfall, provide a description of: (1) All operations contributing wastewater to the effluent, including process wastewater, sanitary wastewater, cooling water, and storm water runoff; (2) The average flow contributed by each operation; and (3) The treatment received by the wastewater. Continue on additional sheets if necessary.							
1. OUTFALL NO (list)	2. OPERATION(S) CONTRIBUTING FLOW				3. TREATMENT		
	a. OPERATION (list)			b. AVERAGE FLOW (include units)	a. DESCRIPTION	b. LIST CODES FROM TABLE 2C-1	
111	Sewage Treatment Plant			0.017 MGD	Secondary Treatment - Extended	1 T,U	
					aeration modification of activated	2 F	
					sludge	3 A,C	
						5 A,B	
112	Construction Run Off Holding Pond which receives flow from the following:			0.247 MGD	Sedimentation and oil skimming	1 O,U	
	1) Sewage Treatment Plant			0.0170 MGD	(See OSN-111)		
	2) Training Center HVAC cooling water			0.0010 MGD	None		
	3) HPFP System flushing			0.0100 MGD	None		
	4) Potable Water leaks			0.0010 MGD	None		
	5) Storm Water runoff			0.2180 MGD	None		
	Sum of OSN 112			0.2470 MGD			
113	Supplemental Condenser Cooling Water System (Noncontact Cooling Water)			129.0 MGD	Thermal mixing	1 O	
						4 A	
	"A" denotes an alternate flow path						
	MGD = million gallons per day						
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C. Except for storm runoff, leaks, or spills, are any of the discharges described in Items II-A or B intermittent or seasonal?
 YES (complete the following table) NO (go to Section III)

1. OUTFALL NUMBER (list)	2. OPERATION(S) CONTRIBUTING FLOW (list)	3. FREQUENCY		4. FLOW				c. DURATION (in days)
		a. DAYS PER WEEK (specify average)	b. MONTHS PER YEAR (specify average)	a. FLOW RATE (in mgd)		b. TOTAL VOLUME (specify with units)		
				1. LONG TERM AVERAGE	2. MAXIMUM DAILY	1. LONG TERM AVERAGE	2. MAXIMUM DAILY	

III. PRODUCTION

A. Does an effluent guideline limitation promulgated by EPA under Section 304 of the Clean Water Act apply to your facility?
 YES (complete Item III-B) NO (go to Section IV)

B. Are the limitations in the applicable effluent guideline expressed in terms of production (or other measure of operation)?
 YES (complete Item III-C) NO (go to Section IV)

C. If you answered "yes" to Item III-B, list the quantity which represents an actual measurement of your level of production, expressed in the terms and units used in the applicable effluent guideline, and indicate the affected outfalls.

1. AVERAGE DAILY PRODUCTION			2. AFFECTED OUTFALLS (list outfall numbers)
a. QUANTITY PER DAY	b. UNITS OF MEASURE	c. OPERATION, PRODUCT, MATERIAL, ETC. (specify)	

IV. IMPROVEMENTS

A. Are you now required by any Federal, State or local authority to meet any implementation schedule for the construction, upgrading or operation of wastewater treatment equipment or practices or any other environmental programs which may affect the discharges described in this application? This includes, but is not limited to, permit conditions, administrative or enforcement orders, enforcement compliance schedule letters, stipulations, court orders, and grant or loan conditions.
 YES (complete the following table) NO (go to Item IV-B)

1. IDENTIFICATION OF CONDITION, AGREEMENT, ETC.	2. AFFECTED OUTFALLS		3. BRIEF DESCRIPTION OF PROJECT	4. FINAL COMPLIANCE DATE	
	a. NO.	b. SOURCE OF DISCHARGE		a. RE-REQUIRED	b. PROJECTED

B. OPTIONAL: You may attach additional sheets describing any additional water pollution control programs (or other environmental projects which may affect your discharges) you now have underway or which you plan. Indicate whether each program is now underway or planned, and indicate your actual or planned schedules for construction.

MARK "X" IF DESCRIPTION OF ADDITIONAL CONTROL PROGRAMS IS ATTACHED

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V. INTAKE AND EFFLUENT CHARACTERISTICS

A, B, & C: See instructions before proceeding - Complete one set of tables for each outfall - Annotate the outfall number in the space provided.
 NOTE: Tables V-A, V-B, and V-C are included on separate sheets numbered V-1 through V-9.

D. Use the space below to list any of the pollutants listed in Table 2C-3 of the instructions, which you know or have reason to believe is discharged or may be discharged from any outfall. For every pollutant you list, briefly describe the reasons you believe it to be present and report any analytical data in your possession.

1. POLLUTANT	2. SOURCE	1. POLLUTANT	2. SOURCE
Toxic Pollutant Asbestos (Table 2C-3)	Asbestos Cement Board (ACB) Cooling Tower Basins Units 1 & 2		

VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS

Is any pollutant listed in Item V-C a substance or a component of a substance which you currently use or manufacture as an intermediate or final product or byproduct?

YES (list all such pollutants below)

NO (go to Item VI-B)

Empty space for listing pollutants.

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VII. BIOLOGICAL TOXICITY TESTING DATA

Do you have any knowledge or reason to believe that any biological test for acute or chronic toxicity has been made on any of your discharges or on a receiving water in relation to your discharge within the last 3 years?

YES (identify the test(s) and describe their purposes below)

NO (go to Section VIII)

Semi-annual Biotoxicity tests: 3-Brood *Ceriodaphnia dubia* Survival and Reproduction Tests and 7-Day Fathead Minnow (*Pimephales promelas*) Larval Survival and Growth Tests were conducted on samples of final effluent from Outfalls 101, 112, and 113 each year of operation per the current NPDES permit requirements.

VIII. CONTRACT ANALYSIS INFORMATION

Were any of the analyses reported in Item V performed by a contract laboratory or consulting firm?

YES (list the name, address, and telephone number of, and pollutants analyzed by, each such laboratory or firm below)

NO (go to Section IX)

A. NAME	B. ADDRESS	C. TELEPHONE (area code & no.)	D. POLLUTANTS ANALYZED (list)
EMSL Analytical Inc.	107 Haddon Avenue Westmont, NJ 08108	(609) 858-4800	Asbestos in Water
Enviro Data Group (formerly Commonwealth Technology)	2520 Regency Road Lexington, Kentucky 40503-2961	1-800-489-3506	Whole Effluent Testing

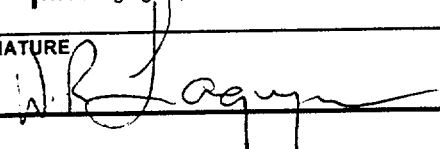
IX. CERTIFICATION

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 gather and evaluate 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.

A. NAME & OFFICIAL TITLE (type or print)
W. R. Lagergren, Site Vice President

B. PHONE NO. (area code & no.)
(423) 365-8767

C. SIGNATURE



D. DATE SIGNED

4/4/2001

Chemicals Used in Plant Processes

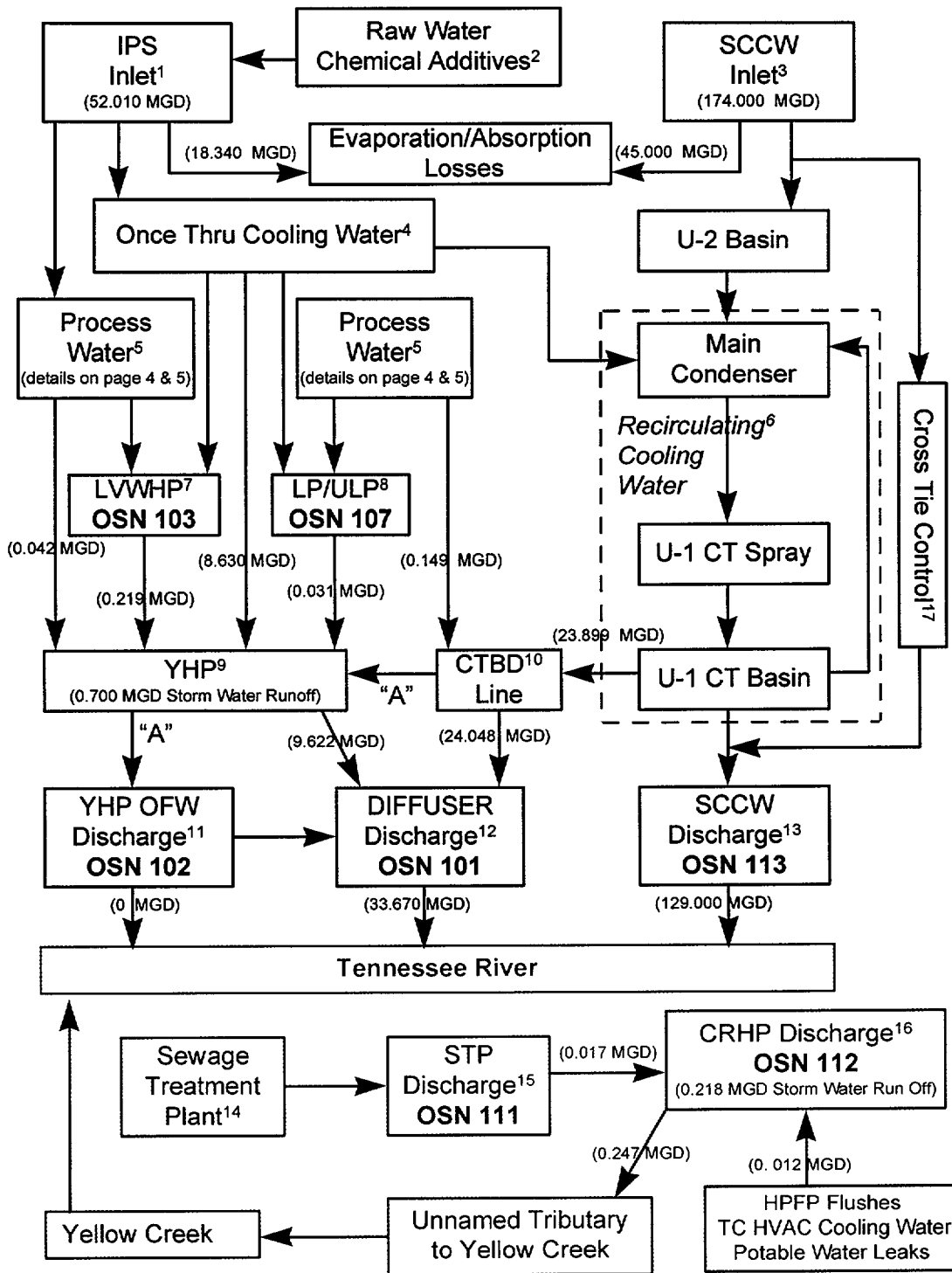
Chemical additives are used in plant processes and may be found in trace quantities in the various NPDES discharge points due to blowdown, leakage, and system maintenance activities. The following paragraph describes the most commonly used system additives. A table on the next page summarizes all chemical additives including the raw water additives that may be found in each outfall as well. The raw water additives are biocides and corrosion treatment chemicals and are discussed in more detail under the Raw Water Additives tab in this binder.

Hydrazine, ammonia, boric acid, sodium tetraborate, monoethanolamine, sodium molybdate, sodium tolyltriazole, potassium hydroxide, and lithium hydroxide are routinely added to the Primary and Secondary Systems to control pH and corrosion. Up to 300 pounds of modified alpha cellulose could be added to the condenser intake channel to temporarily plug pinhole tube leaks in the condenser. Hydrogen peroxide may be added during refueling for Primary System cleanup to reduce radiation exposure to maintenance personnel. Similarly, small quantities of ethylene glycol, a heat transfer medium used in building chiller packages, the ice condenser chiller packages, and diesel generators, could end up via leakage or maintenance activities in OSNs 101, 102, 103, and 107.

SUMMARY OF CHEMICALS ADDED BY DISCHARGE

DISCHARGE	DESCRIPTION	CHEMICALS ADDED
OSN 101	Diffuser Discharge	Ammonium Hydroxide, Ammonium Chloride, Alpha Cellulose, Boric Acid, Sodium Tetraborate, Bromine, Chlorine, Copolymer Dispersant, Ethylene Glycol, Hydrazine, Laboratory Chemical Wastes, Lithium, Molybdate, Monoethanolamine, Molluscicide - Didecyldimethyl Ammonium Chloride, Oil and Grease, Phosphates, Phosphate Cleaning Agents, Paint Compounds, Sodium Hydroxide, Surfactant -Dimethylamide and Alcohol, Tolyltriazole, Zinc Sulfate
OSN 102	Yard Holding Pond Overflow Weir (See OSN 101)	Alternate discharge path for OSN 101
OSN 103	Low Volume Waste Treatment Pond	Ammonium Hydroxide, Ammonium Chloride, Boric Acid, Sodium Tetraborate, Bromine, Chlorine, Copolymer Dispersant, Ethylene Glycol, Hydrazine, Laboratory Chemical Wastes, Lithium, Molybdate, Monoethanolamine, Molluscicide -Didecyldimethyl Ammonium Chloride, Oil and Grease, Phosphates, Phosphate Cleaning Agents, Paint Compounds, Sodium Hydroxide, Surfactant -Dimethylamide and Alcohol, Tolyltriazole, Zinc Sulfate
OSN 107	Lined Pond and Unlined Pond	Metals - mainly Iron and Copper, Acids and Caustics, Ammonium Hydroxide, Ammonium Chloride, Boric Acid, Sodium Tetraborate, Bromine, Chlorine, Copolymer Dispersant, Hydrazine, Laboratory Chemical Wastes, Lithium, Monoethanolamine, Molybdate, Molluscicide -Didecyldimethyl Ammonium Chloride, Nalco, Oil and Grease, Phosphates, Phosphate Cleaning Agents, Sodium, Sodium Hydroxide, Surfactant -Dimethylamide and Alcohol, Tolyltriazole, Zinc Sulfate
OSN 111	Sewage Treatment Plant	Chlorine, Organic Matter, Laboratory Chemical Wastes, Paint Compounds, Asbestos from insulators taking showers, X-ray Film Processing Rinse Water
OSN 112	Runoff Holding Pond	Chlorine, Organic Matter, Paint Compounds, Asbestos from insulators taking showers, X-ray Film Processing Rinse Water, Potable Water (Cooling Tower at Training Center) and High Pressure Fire Protection flushes.

NPDES PROCESSES AT WATTS BAR NUCLEAR PLANT

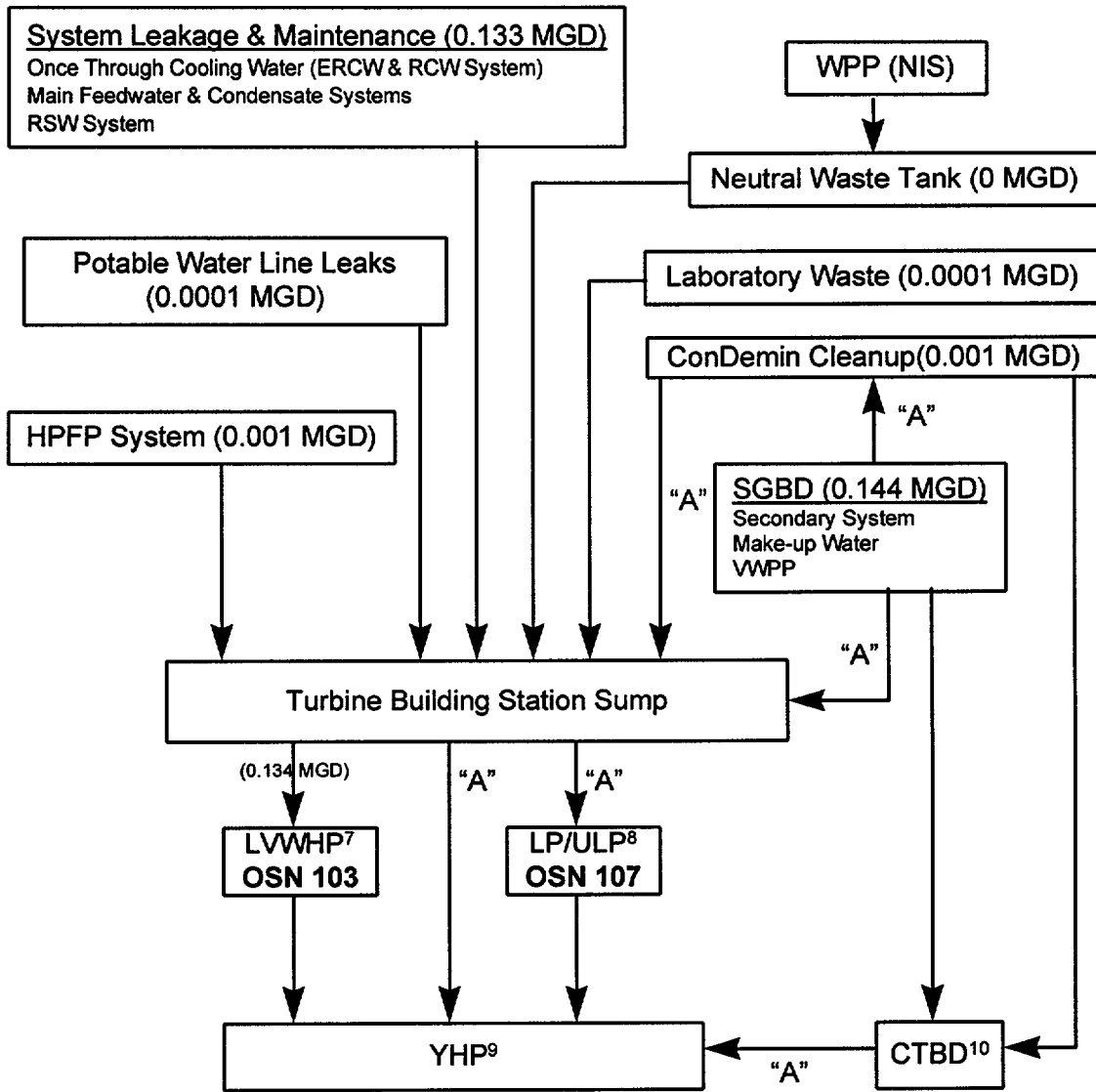


"A" denotes an alternate flow path to be used by authority of the plant manager.

Process Water

WBN Processes discharged to the TBSS

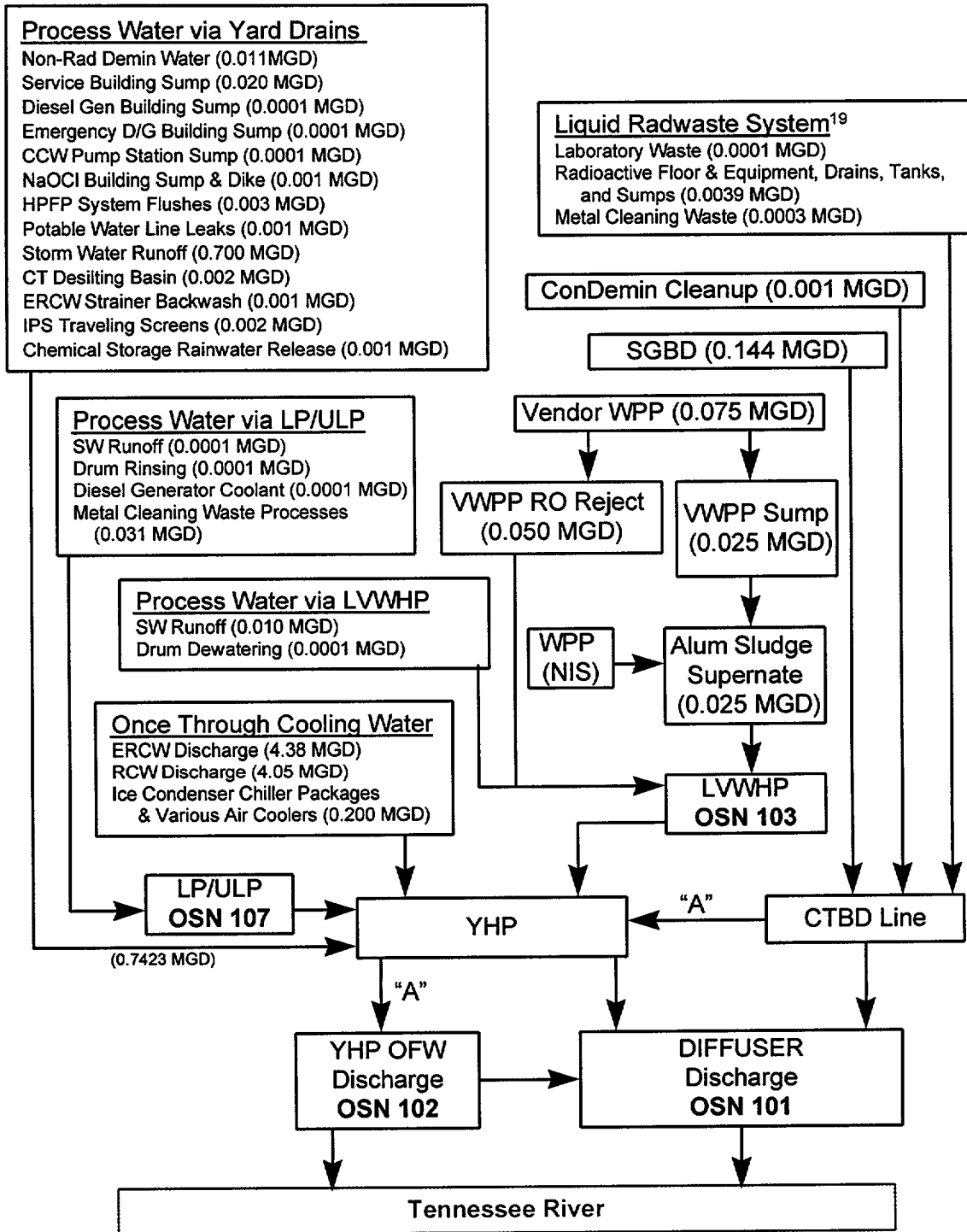
The majority of the Low Volume Waste Water generated at WBN comes from processes that discharge to the TBSS. Leaks and maintenance on non radioactive systems account for the majority of the waste water.



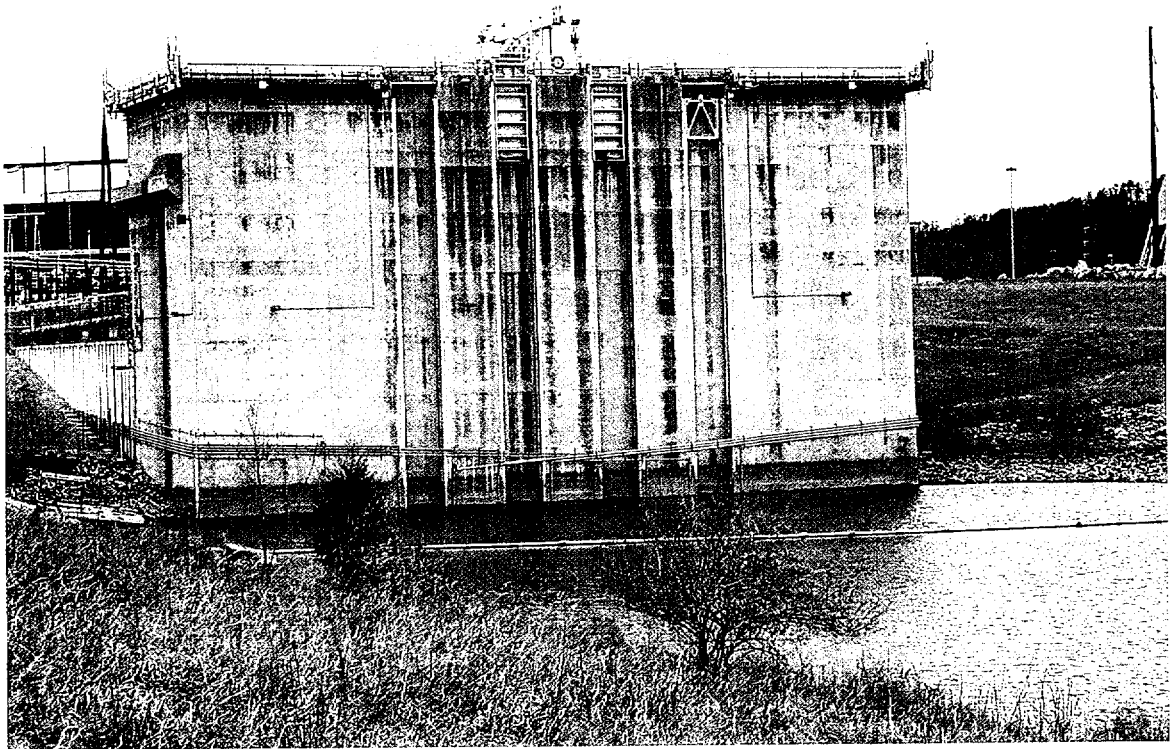
"A" denotes an alternate flow path to be used by authority of the plant manager.

Process Water

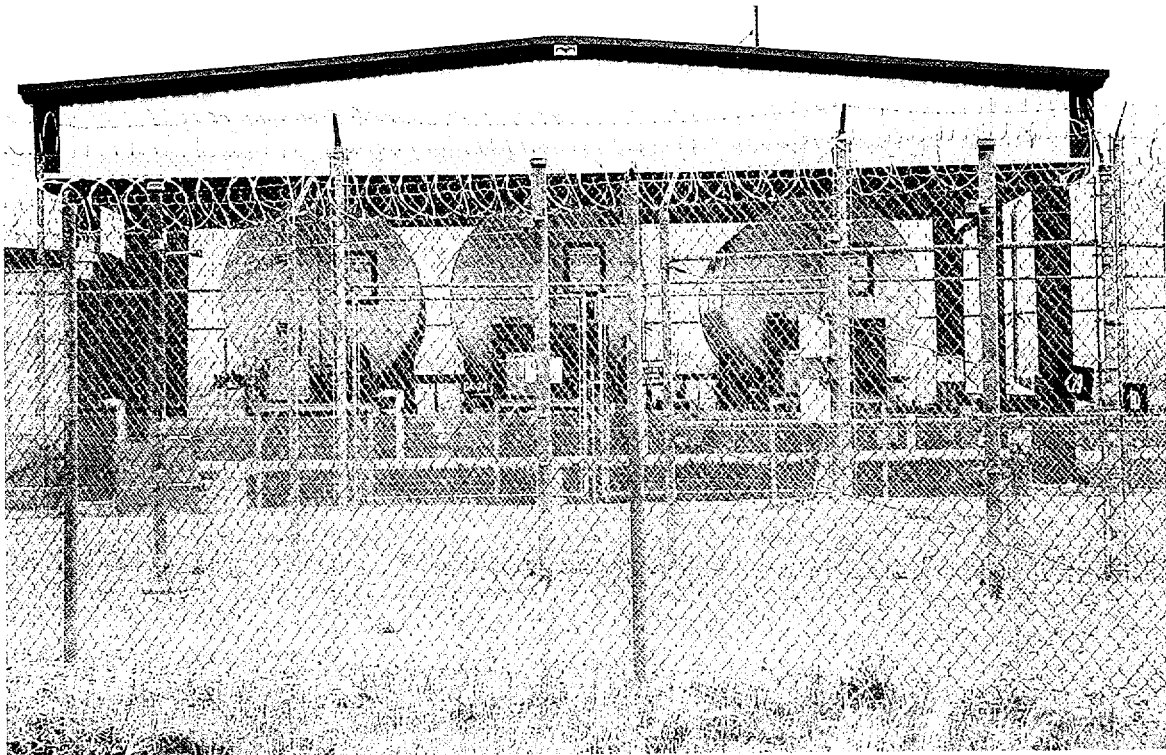
WBN Processes not discharged through the TBSS



1. The **Intake Pumping Station** provides once through cooling water for the Raw Cooling Water and Essential Raw Cooling Water systems as well as water for most of the industrial processes at WBN. The IPS also is the primary source of water for the High Pressure Fire Protection System. The IPS is where most of the biocide and corrosion protection chemicals are added.



2. **Raw Water Chemical Additives** are intended to prevent corrosion and protect plant systems from biological fouling and clam infestations. The additives and treatment programs are discussed in more detail under a separate tab. While there are some additions to discrete components in the plant, the majority of these products and treatments take place at the IPS. Bulk supplies are maintained near the IPS for controlled injection into either of the two IPS pits.



- Supplemental Condenser Cooling Water** is an additional supply of once through cooling water that gravity drains from above the Watts Bar Dam to help cool the main condensers. No chemicals are added to this water. However, upon return to the Unit One Cooling Tower Basin from the main condensers, SCCW water comes into contact with other once through cooling water from the IPS before returning to the river. The SCCW flows through the Unit Two Cooling Tower Basin, shown below, before entering the flume to the Main Condenser.



- 4. Once Through Cooling Water** from the IPS supplies the many heat exchangers throughout the plant. Some of this water is discharged directly to the Turbine Building Station Sump. Some is discharged directly to the Yard Pond by storm drains. Leakage and maintenance activities could also see some of this water collected and processed through the Radwaste System as well. The majority of the water used in plant heat exchangers is then sent via a discharge header to the flume entering the main condensers from the Unit One Cooling Tower Basin to provide additional cooling for the main condensers and a source for the Recirculating Cooling Water System shown on page one of the Flow Diagram.

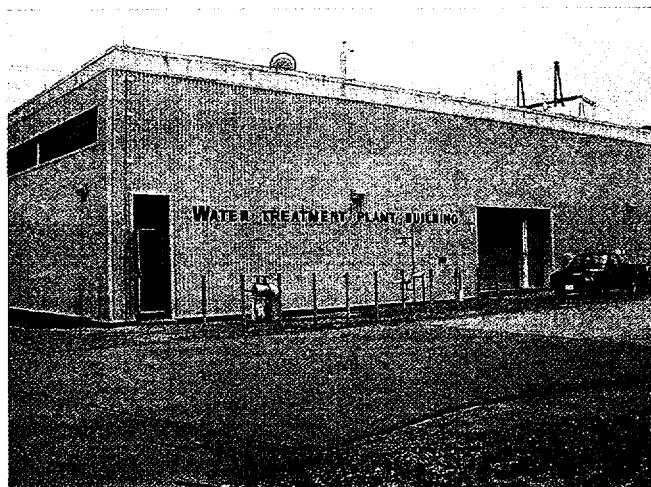


5. **Process Water** refers to all the uses WBN makes of the river water collected at the IPS in order to generate power. Most of the processes require WBN to start by purifying the water to extremely pure levels then adding chemicals to meet the various system needs. As indicated in the form 2C application, most of these processes send wastewater to the TBSS or directly to the Low Volume Waste Treatment Pond. However, a small percentage do send wastewater directly to Cooling Tower Blow Down Line and the Yard Holding Pond.

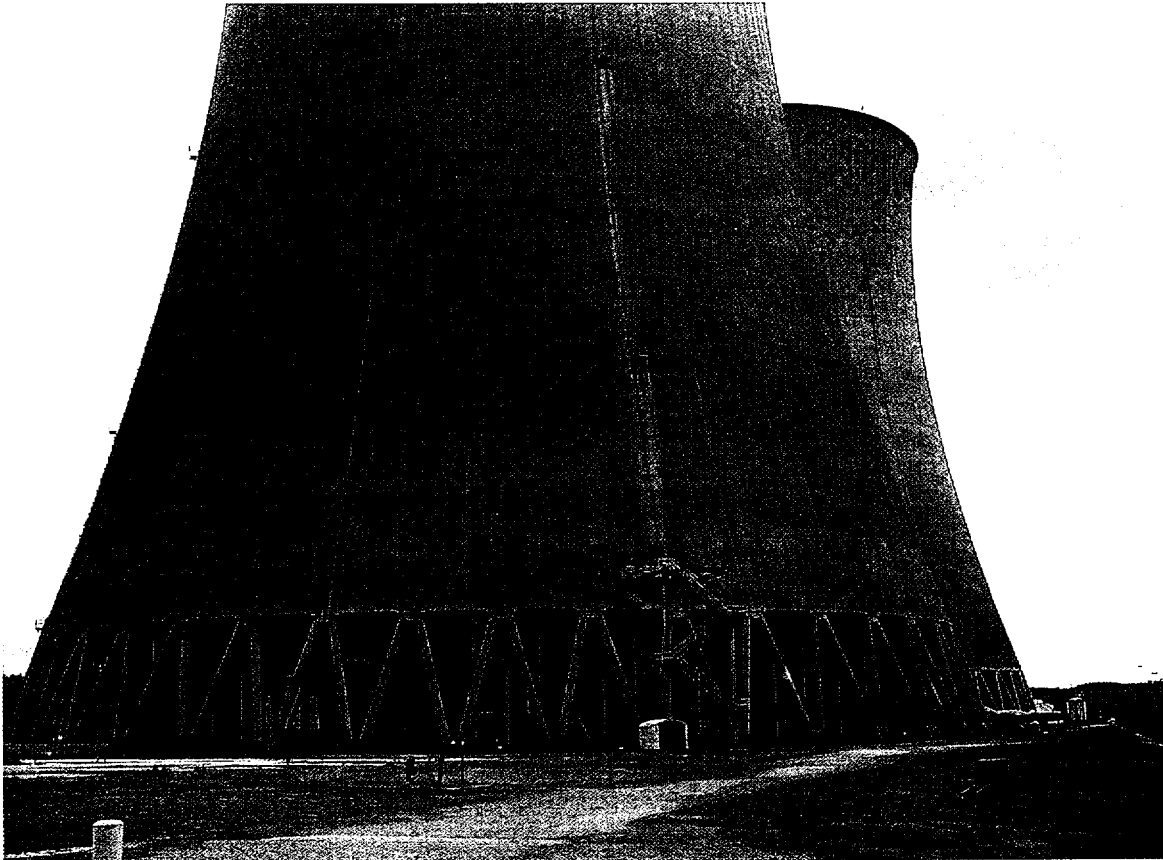
Alum Ponds



Vendor Water Purification Plant



6. **Recirculating Cooling Water** is ERCW and RCW water that is continuously cycled from the main condensers through the cooling towers to provide thermal transfer for the MAIN STEAM to CONDENSATE to FEEDWATER systems used to generate power.



7. The **Low Volume Waste Treatment Pond** is also referred to as the Low Volume Waste Holdup Pond in some correspondence. The majority of all NPDES Low Volume Waste is collected and treated here by sedimentation, oil skimming, and neutralization prior to discharge as an internal NPDES outfall to the Yard Holding Pond. This is OSN 103.



8. The **Lined Pond** and the **Unlined Pond** are metal cleaning waste ponds. These ponds are OSN 107. Physical or chemical cleaning processes potentially generating high levels of copper, iron or phosphorous are treated by sedimentation and neutralization prior to discharge.

Lined Pond



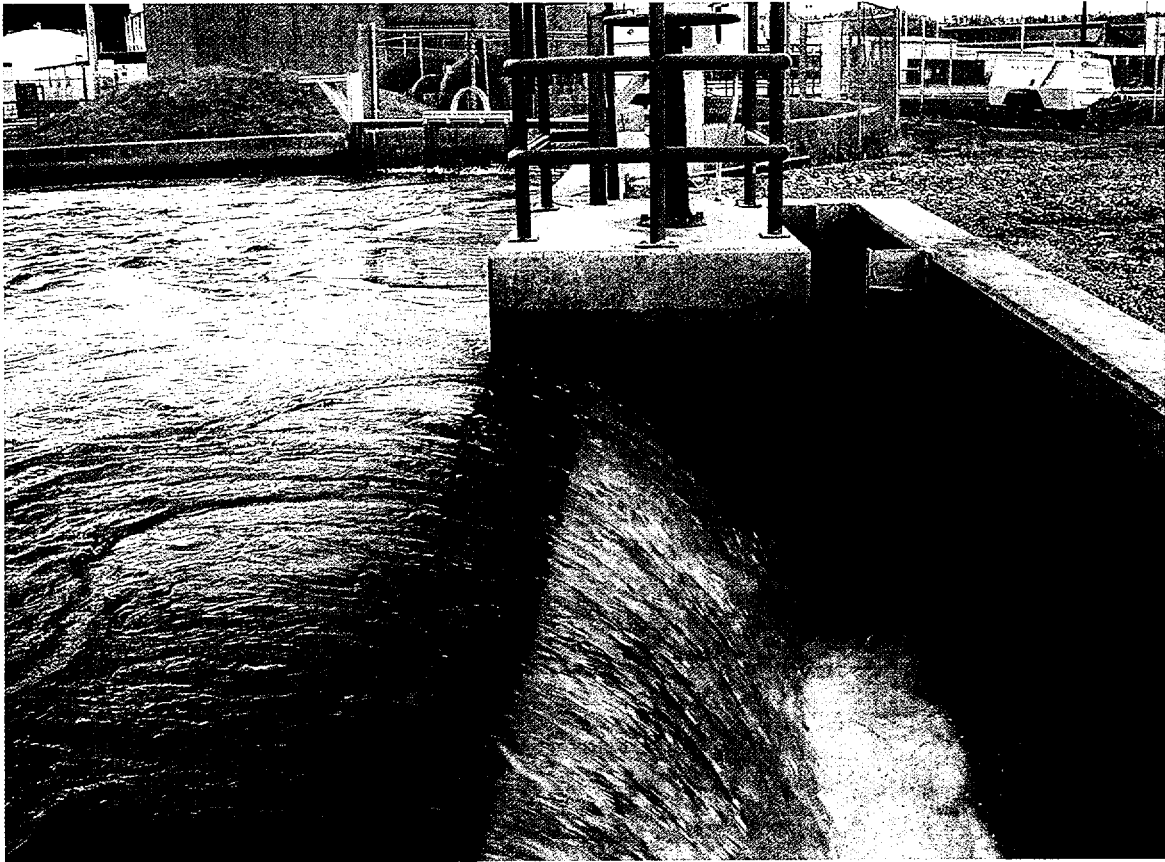
Unlined Pond



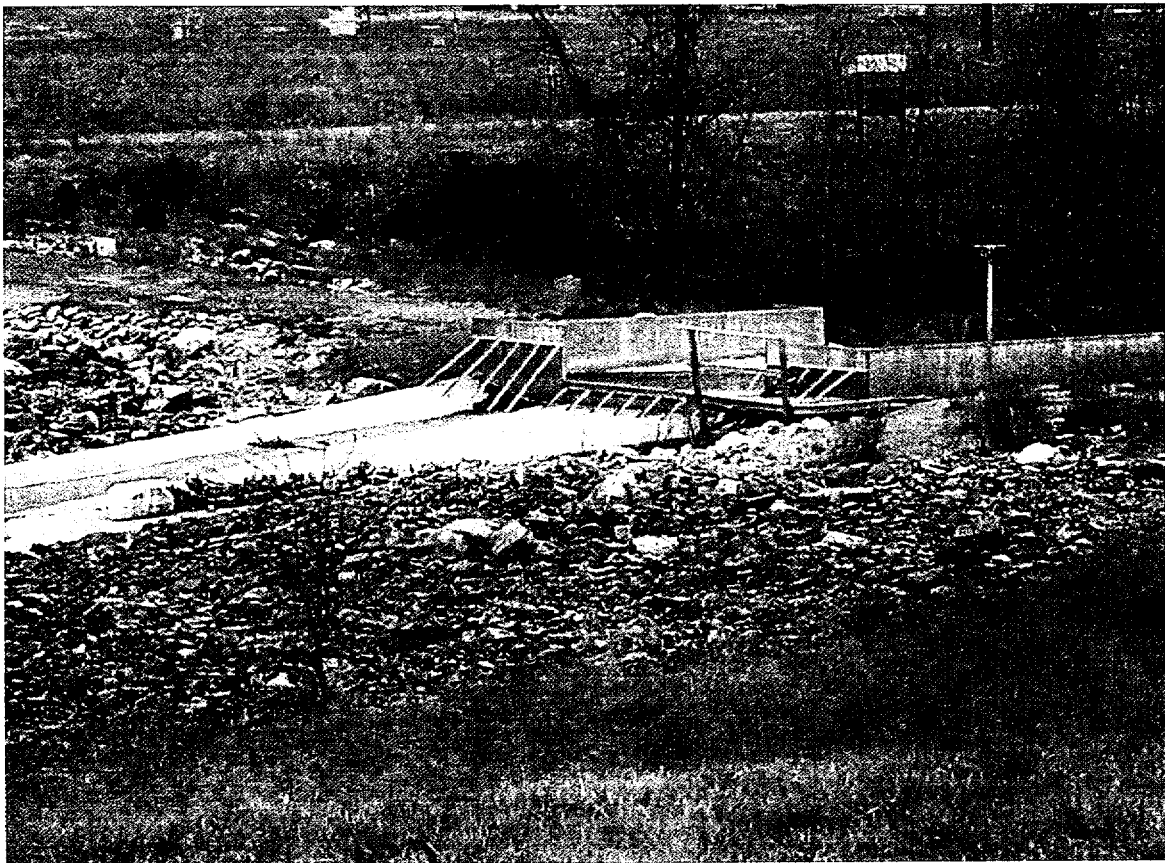
9. The **Yard Holding Pond** receives once through cooling water as well as a small amount of low volume waste from system leakage and maintenance activities. The Yard Holding Pond is designed to provide oil skimming and sedimentation just like the Low Volume Waste Treatment Pond to ensure potential problems from plant processes are addressed prior to discharge. If required, neutralization could also be performed here.



10. The **Cooling Tower Blowdown Line** is that portion of piping between the CTBD Weirs and the “Y” where the Yard Holding Pond discharge joins to create the Diffuser Discharge Line. There are four sources of wastewater to the CTBD Line: the CTBD Weirs at the cooling tower basins; SGBD; the Condensate Demineralizer System; and the Radwaste System. Electronic interlocks prohibit discharges from the Radwaste System when there is less than 3500 cfs flow in the river. The Unit One Cooling Tower Blowdown Weir is shown below and is the major contributor to the CTBD line.



11. The **Yard Holding Pond Overflow Weir Discharge** point is rarely used. It is OSN 102 in the current NPDES permit and is considered an alternate discharge point for the Diffuser Discharge. When the diffusers are isolated, water routed via the CTBD Line backs up into the YHP. When the level of the YHP reaches approximately 706.8 ft. above sea level, the pond begins to overflow across this weir. The effluent of the weir eventually enters the Tennessee River approximately 2500 feet downstream of the normal diffuser discharge point.



12. The **Diffuser Discharge** is OSN 101. The effluent from the YHP and CTBD Line merge into a single pipeline that later splits into two multiport diffuser legs that efficiently disperses the effluent in the Tennessee River.



13. The **Supplemental Condenser Cooling Water Discharge** point is OSN 113. The energy dissipation structure and the 7 to 15 foot drop at the Glory Hole provide excellent aeration prior to discharging to the river. A concrete ramp in the river diverts flow towards the surface to minimize thermal impact to any bottom dwelling aquatic life.



14. The **Sewage Treatment Plant** is a 4 unit extended aeration facility. WBN recently added UV disinfection capacity to improve reliability and minimize impact to the environment.



15. The **Sewage Treatment Plant Discharge** is OSN 111. This discharge point travels several hundred feet before emptying into the Construction Runoff Holding Pond.



16. The **Construction Runoff Holding Pond** is OSN 112. Storm water runoff is the major contributor by volume to this outfall. The CRHP discharges into an unnamed tributary which eventually empties into Yellow Creek.

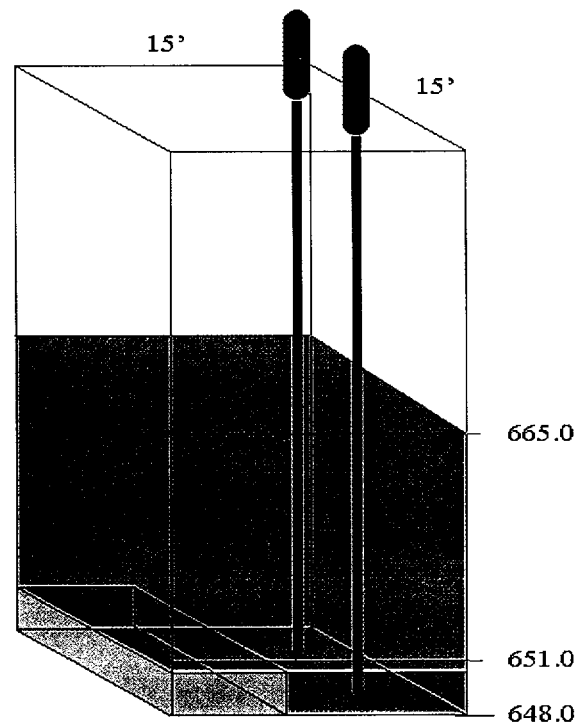


17. **Cross Tie Control** for OSN 113 is a valve that is used to ensure compliance with thermal limits. It allows WBN to control the amount of SCCW water introduced into the main condensers. A valve connecting the inlet and discharge lines is used to divert a portion of SCCW inlet flow directly to the discharge line.

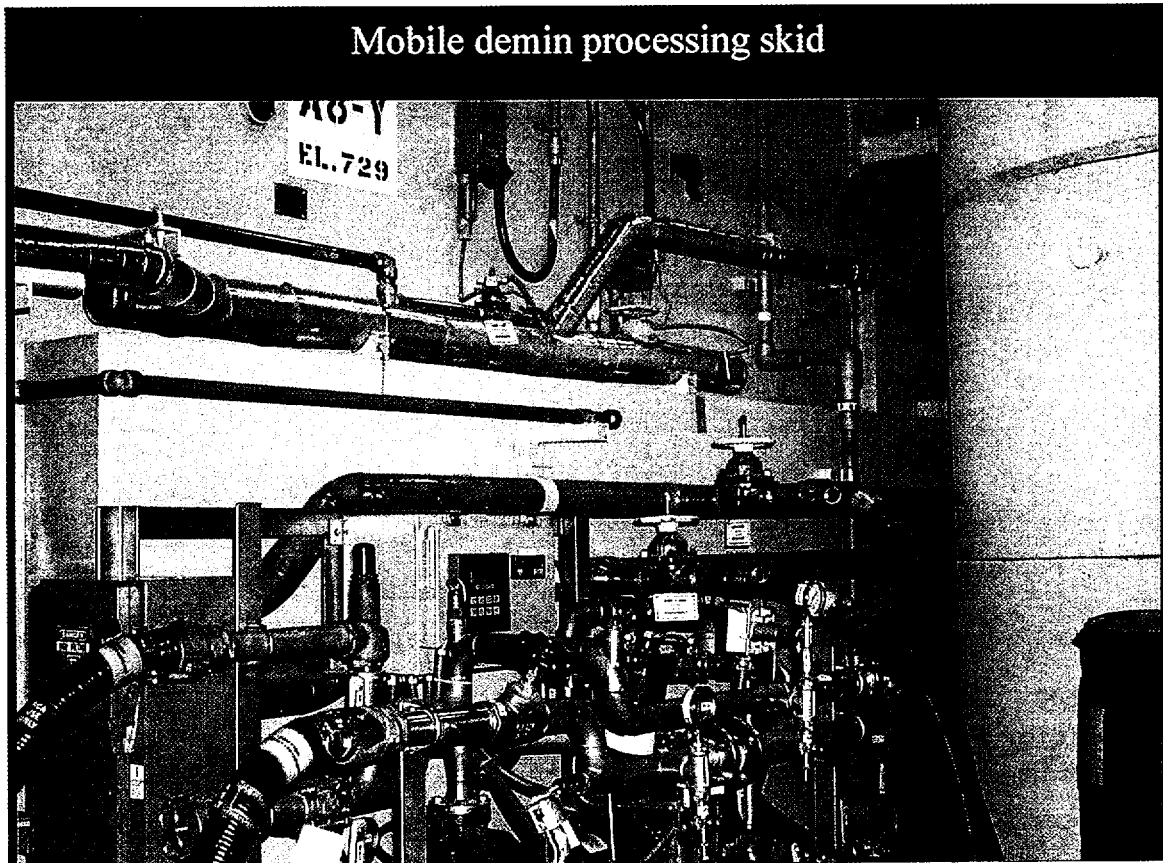


18. The **Turbine Building Station Sump** is the primary collection point for system leaks, and low volume waste water at WBN. The TBSS provides oil skimming and some sedimentation treatment for the effluent. The TBSS effluent may be aligned to several discharge points to accommodate different plant conditions and needs. The normal alignment is to the Low Volume Waste Treatment Pond.

Turbine Building Station Sump



19. The **Liquid Radwaste System** is very sensitive to oil, grease, and suspended matter in the wastewater. A small amount will clog filters and render charcoal and demineralizer beds ineffective. The system will not remove radioactive contaminants if it becomes clogged with oil, grease or suspended matter. When radioactive contaminants are not removed, the system isolates automatically based on signals from the radiation monitor.



RAW WATER CHEMICAL ADDITIVES

Inspection and chemical treatment programs have been implemented at Watts Bar Nuclear Plant to control fouling, plugging, and pipe wall thinning of the raw water systems. Most of these chemicals are added at the IPS to ensure all raw water systems are protected. Several of these systems, the High Pressure Fire Protection and the Essential Raw Cooling Water systems in particular, are essential for the safe operation of the plant. These programs provide for detection of microbiologically induced corrosion and clam or mussel infestations in the piping utilizing nondestructive examinations, leak detection, repairs, raw water sampling, and the addition of biocides and corrosion inhibitors.

This document is intended to be a comprehensive statement of the chemical treatments WBN proposes to use upon approval from the state to control corrosion and biological infestations. WBN proposes to show compliance with the methods below using mass balance calculations where possible. Detailed product information is included under the tab for that product at the end of this description of chemical treatments. A summary of the products to be used and their environmental impact is provided at the end of this document.

CARBON STEEL CORROSION INHIBITION

WBN currently uses a combination of three chemicals to provide corrosion protection for plant piping. These chemicals are zinc sulfate (PCL-10Z), sodium pyrophosphate (PCL-60K) and a copolymer (PCL-401). WBN proposes changing from a zinc/pyrophosphate-based program (PCL-10Z & PCL-60K) to a zinc/orthophosphate-based program (MSW-109). MSW-109 contains 12.6% zinc chloride and 36 % orthophosphate. However, the concentration of zinc and phosphorous in the plant effluents will remain the same as our current program. The zinc and the phosphorous levels will not exceed 0.2 ppm in plant effluents. It will still be necessary to maintain PCL-401 (copolymer) feed year round. Table 1 below details the proposed revisions to chemical feed.

TABLE 1
RAW WATER CORROSION TREATMENTS
(Based on 40,375 gpm average flow rate, 365 day continuous feed)

CURRENT PROGRAM -PCL-60K, PCL-10Z AND PCL-401

PRODUCT	ACTIVE INGREDIENT	DISCHARGE PPM
PCL-60K	60% Pyrophosphate	0.2 as P
PCL-10Z	25% Zinc Sulfate	0.2 as Zn
PCL-401	28.5% copolymer	0.2

PROPOSED PROGRAM MSW-109 AND PCL-401

PRODUCT	ACTIVE INGREDIENT	DISCHARGE PPM
MSW-109	36% Orthophos 12.6% Zinc	0.2 as P 0.2 as Zn
PCL-401	28.5% copolymer	0.2

COPPER CORROSION INHIBITOR FEED

WBN proposes to feed tolytriazole (Nalco 1336) on a continuous basis to small portions of the ERCW and RCW systems. This will result in a discharge concentration of less than 0.25 ppm as tolytriazole in plant effluents.

RAW COOLING WATER BIOCIDES TREATMENTS

Watts bar plans to continue the use, at our discretion, of the biopenetrant CL-363 and an oxidizing biocide in the raw cooling water. WBN is requesting with this permit application an increase in the CL-363 concentrations allowed and proposes to use an alternate oxidizing biocide.

CONVERSION FROM BCDMH TO TOWERBROM 960

Due to safety concerns about the loading of BCDMH (H-901G), WBN proposes to use Towerbrom 960 as a direct replacement for the BCDMH. Towerbrom is safer to use because it is packaged to be replaced as a bin rather than as a bag of powder. Towerbrom 960 contains 89% Sodium Dichloro-S-Triazinetrione and 7% Sodium Bromide. Towerbrom 960 dissolves to release bromine and chlorine much the same as BCDMH. It will be fed at the same frequency as the current BCDMH (approximately 4 to 6 hours per day) with the same resulting TRO concentrations. If this change is acceptable, WBN will continue using BCDMH until design changes are implemented in the plant for a new feed system. The schedule of implementation is dependent upon state approval and the installation of the feed system.

To ensure complete halogenation of High Pressure Fire Protection systems necessary for plant safety, it will still be necessary to periodically perform periods of continuous bromination up to three times per year. These periods of continuous bromination will be a minimum of 21 day duration.

MOLLUSK CONTROL TREATMENT

Due to an increase in the clam infestation seen in the plant piping necessary for safe shutdown of the plant, WBN proposes using the non-oxidizing biocide H-130M a minimum of 4 times per train per year. By treating train specific WBN will minimize the discharge level of H-130M to <0.10 ppm as active ingredient in plant effluents.

COOLING TOWER TREATMENTS

WBN currently adds Towerbrom 960 to the cooling tower basin on a periodic basis for biological control. To enhance the effectiveness of this program, WBN proposes to use biopenetrant, CL-363, prior to halogenation. WBN proposes to begin feeding the CL-363 to enhance the oxidizing biocide effectiveness approximately 15 minutes prior to the Towerbrom addition. CL-363 is a 10% solution of dimethylamide (DMAD). WBN will then add Towerbrom 960 directly to the basin. These chemicals will be added until a residual of 0.5 ppm TRO is achieved for 4 hours in the cooling tower basin. This treatment will be performed with the diffusers and SCCW isolated or, at WBN's discretion, WBN will de-chlorinate as needed using sodium bisulfite solutions to ensure the current discharge limit of 0.1-ppm TRO is not exceeded at either OSN 101 (the Diffuser discharge) or OSN 113 (the SCCW discharge). Sodium bisulfite (Chlorakill 8816) will be ratio fed at a rate of 5 ppm product for every 1.0 ppm of TRO. The process will be controlled to ensure that the discharge concentration of TRO to the Tennessee River will never exceed 0.1 ppm and the discharge concentration of DMAD will never exceed 0.8 ppm as shown by calculation.

CALGON CORPORATION PRODUCT AND ENVIRONMENTAL INFORMATION SUMMARY

PRODUCT	PURPOSE	ACTIVES	AQUATIC TOXICITY	MAX DISCHARGE CONCENTRATION
			(ppm)	(ppm)
MSW-109	Continuous Feed Metal Passivator & Corrosion Inhibitor	Zinc Chloride 12.6% Solution; Orthophosphate 36% Solution		<0.2 Total Zinc <0.2 Total P
PCL-401	Continuous Feed Dispersant	Anionic Copolymer 28.5% Solution	48-h LC50 = 2,800 (<i>D. magna</i>) 96-h LC50 = > 10,000 (<i>bluegill sunfish</i>) 96-h LC50 = 4,900 (<i>rainbow trout</i>)	<0.2 as active ingredient
Chlorakill 8816	Periodic Feed as Needed to Dechlorinate	Sodium Bisulfite 38 %Solution	48-h LC50 = 116 (<i>D. magna</i>) 96-h LC50 = 240 (<i>mosquito fish</i>)	< 10.0 ppm as sodium bisulfite
Nalco 1336	Continuous Feed Copper Corrosion Inhibitor	Tolyltriazole 50% Solution	48-h LC50 = 420 (<i>D. magna</i>) 96-h LC50 = 191.2 (<i>bluegill sunfish</i>)	<0.25 as active ingredient
H-901G	Periodic 4 Hours Per Day Biocide	Bromo-chloro, Dimethyl Hydantoin (BCDH) 96% Solid	48-h EC50 = 0.75 (<i>D. magna</i>) 96-h LC50 = 0.4 (<i>rainbow trout</i>) 96-h LC50 = 0.46 (<i>bluegill sunfish</i>)	0.10 Chlorine (Total Res.)
Towerbrom®960	Periodic 4 Hours Per Day and Periodic Dosing Of Cooling Towers	Sodium Bromide & Sodium Dichloro-s-triazinetrione 96% Solid	48-h LC50 = 2.5 (<i>D. magna</i>) 48-h LC50 = 0.7 (<i>P. promelas</i>)	0.10 Chlorine (Total Res.)
CL-363	Periodic Surfactant Feed 30 Minute Weekly	Dimethylamide 10% & Isopropanol 40% Solution	48-h LC50 = 1.2 (<i>D. magna</i>) 96-h LC50 = 8,300 (<i>P. promelas</i>) 96-h LC50 = 0.43 (<i>rainbow trout</i>)	<0.8 as active ingredient
H-130M	Periodic Selected System Piping Molluscicide	Didecyldimethyl Ammonium Chloride 50% & Ethanol 10% Solution	7-d NOEC = 0.075 (<i>C. dubia</i>) 7-d NOEC = 0.38 (<i>P. promelas</i>)	<0.10 as active ingredient

PRODUCT BULLETIN

CL-363

Deposit Penetrant

PRODUCT BENEFITS

- **Prevents Organic Deposit** — Oil, whether from a process leak or scrubbed from the atmosphere, can build up on system surfaces causing restricted water flow and loss of heat transfer, and it provides an ideal source of nutrient for biological growth. **CL-363** effectively penetrates and disperses these deposits.
- **Improves Corrosion Inhibitor Performance** — Corrosion control of cooling water systems is based on forming a passivating film on the metal surfaces. When these surfaces are fouled, treatment is often incomplete. **CL-363** keeps metal surfaces clean, thus allowing a more uniform film formation and improved corrosion control.

GENERAL DESCRIPTION

CL-363 deposit penetrant is a specially formulated liquid organic dispersant used to prevent and disperse biological and other organic deposits in cooling water and air washer systems. When added to the system, **CL-363** increases the effectiveness of microbicides, enabling them to better penetrate and disperse the attached biomass. **CL-363** is also effective in penetrating and dispersing oil and other non-biological, organic deposits. For a general description of the typical chemical and physical properties, refer to the **CL-363** Material Safety Data Sheet.

MATERIALS COMPATIBILITY

Compatible materials of construction for bulk storage tanks include high density or cross-linked polyethylene, 316 stainless steel, and epoxy phenolic lined steel.

Compatible materials for pump "liquid ends" and piping include polyethylene, polypropylene, PVC, Kynar, 316 stainless steel, Hypalon, Teflon.

CONTROL TESTING

Product performance is ultimately confirmed by periodic equipment inspections, as well as heat transfer and corrosion monitoring.

FEEDING AND DOSAGE

CL-363 should be fed directly from the shipping container as received, minimizing operator involvement. **CL-363** should not be mixed with other water treatment chemicals prior to feeding. Feed rates for **CL-363** will vary depending upon system operating parameters and the type of deposition. Your Nalco representative will assist you in determining optimum dosage, feed point, and duration of feed.

(Continued on Reverse Side)

C-CL-363

NALCO CHEMICAL COMPANY One Nalco Center • Naperville, Illinois 60563-1198



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NALCO



STORAGE AND HANDLING

The recommended minimum storage temperature for CL-363 is within the range of 0-5°F. Best if used within six (6) months from the time of receipt.

SHIPPING

CL-363 is shipped in pails, drums or delivered to on-site storage facilities via bulk.

DOT Hazardous Class	Flammable Liquid
DOT Proper Shipping Name	Flammable Liquid
UN Number	1219

REMARKS

If you need assistance or information, please call your nearest Nalco representative, or our Naperville office at 630-305-1000. For more news about Nalco, visit our website at www.nalco.com.

For Medical and Transportation Emergencies involving Nalco products, call (24 hour response):
(800) I-M- ALERT (800-462-5378).



MATERIAL SAFETY DATA SHEET

PRODUCT

CL-363

EMERGENCY TELEPHONE NUMBER

(800)462-5378 (24 Hours) (800) I-M-ALERT

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : CL-363
APPLICATION : DEPOSIT PENETRANT
CHEMICAL DESCRIPTION : Water, Alcohol
COMPANY IDENTIFICATION : Nalco Chemical Company
One Nalco Center
Naperville, Illinois
60563-1198
EMERGENCY TELEPHONE NUMBER : (800)462-5378 (24 Hours) (800) I-M-ALERT

NFPA 704M/HMIS RATING

HEALTH: 2/2 FLAMMABILITY: 3/3 REACTIVITY: 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)
Isopropanol	67-63-0	30.0 - 60.0

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

WARNING

Flammable. Irritating to eyes and skin. Harmful by inhalation and if swallowed. Keep away from heat. Keep away from sources of ignition - No smoking. Keep container tightly closed. Do not get in eyes, on skin, on clothing. Avoid breathing vapor. Use with adequate ventilation. Do not take internally. 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.

Wear suitable protective clothing, gloves and eye/face protection.

Flammable Liquid; may release vapors that form flammable mixtures at or above the flash point. Vapors can travel to a source of ignition and flash back. 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.

PRIMARY ROUTES OF EXPOSURE :

Eye, Skin, Inhalation



MATERIAL SAFETY DATA SHEET

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HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :

Can cause moderate irritation.

SKIN CONTACT :

May cause irritation with prolonged contact.

INGESTION :

Not a likely route of exposure. May cause nausea and vomiting. Can cause chemical pneumonia if aspirated into lungs following ingestion. Can cause central nervous system depression.

INHALATION :

Repeated or prolonged exposure may irritate the respiratory tract.

SYMPTOMS OF EXPOSURE :

Acute :

Inhalation of high concentrations of organic solvents can cause nausea, dizziness, vomiting, stupor or unconsciousness.

Chronic :

Frequent or prolonged contact with product may defat and dry the skin, leading to discomfort and dermatitis.

AGGRAVATION OF EXISTING CONDITIONS :

Skin contact may aggravate an existing dermatitis condition.

4. FIRST AID MEASURES

EYE CONTACT :

Immediately flush eye with water for at least 15 minutes while holding eyelids open. Get immediate medical attention.

SKIN CONTACT :

Immediately wash with plenty of soap and water. Get medical attention.

INGESTION :

Do not induce vomiting: contains petroleum distillates and/or aromatic solvents. If conscious, washout mouth and give water to drink. Get medical attention.

INHALATION :

Remove to fresh air, treat symptomatically. 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.



MATERIAL SAFETY DATA SHEET

PRODUCT

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5. FIRE FIGHTING MEASURES

FLASH POINT : 70 °F / 21 °C (TCC)

EXTINGUISHING MEDIA :

Carbon dioxide, Foam, 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.

UNSUITABLE EXTINGUISHING MEDIA :

Do not use water unless flooding amounts are available.

FIRE AND EXPLOSION HAZARD :

Flammable Liquid; may release vapors that form flammable mixtures at or above the flash point. Vapors can travel to a source of ignition and flash back. 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.

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. Remove sources of ignition. Stop or reduce any leaks if it is safe to do so. Have emergency equipment (for fires, spills, leaks, etc.) readily available. 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 dyking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Clean contaminated surfaces with water or aqueous cleaning agents. 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 :

Prevent material from entering sewers or waterways.

7. HANDLING AND STORAGE

HANDLING :

Use with adequate ventilation. 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. Do not take internally. Do not breathe vapors/gases/dust. Do not get in eyes, on skin, on clothing. Have emergency equipment (for fires, spills, leaks, etc.) readily available.

MATERIAL SAFETY DATA SHEET**PRODUCT****CL-363****EMERGENCY TELEPHONE NUMBER****(800)462-5378 (24 Hours) (800) I-M-ALERT****STORAGE CONDITIONS :**

Store away from heat and sources of ignition. Store separately from oxidizers. Store the containers tightly closed. Connections must be grounded to avoid electrical charges. Have appropriate fire extinguishers available in and near the storage area.

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)

Isopropanol

TWA: 400 ppm , 983 mg/m³STEL: 500 ppm , 1,230 mg/m³**OSHA/PEL :**

Substance(s)

Isopropanol

TWA: 400 ppm , 980 mg/m³STEL: 500 ppm , 1,225 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 or supplied air 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 :

Nitrile gloves, Viton™ gloves, Polyvinyl alcohol gloves

SKIN PROTECTION :

Wear impervious apron and boots.

EYE PROTECTION :

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



MATERIAL SAFETY DATA SHEET

PRODUCT

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APPEARANCE Clear Yellow

ODOR Alcoholic

SPECIFIC GRAVITY 0.91 - 0.92 @ 77 °F / 25 °C

SOLUBILITY IN WATER Miscible

pH (100 %) 5.7 - 6.5

VAPOR PRESSURE 33 mm Hg @ 68 °F / 20 °C

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.

HAZARDOUS DECOMPOSITION PRODUCTS :

Under fire conditions: Oxides of carbon

11. TOXICOLOGICAL INFORMATION

The following results are for the active substances.

ACUTE ORAL TOXICITY :

Species	LD50	Tested Substance
Rat	5,045 mg/kg	Isopropanol
Rating : Non-Hazardous		

ACUTE DERMAL TOXICITY :

Species	LD50	Tested Substance
Rabbit	12,800 mg/kg	Isopropanol
Rating : Non-Hazardous		

ACUTE INHALATION TOXICITY :

Species	LC50	Tested Substance
Rat	12,000 mg/l (8 hrs)	Isopropanol



MATERIAL SAFETY DATA SHEET

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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	Tested Substance
Fathead Minnow	96 hrs	> 1,000 mg/l	

Rating : Essentially non-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

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

Proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are:

LAND TRANSPORT :

Proper Shipping Name :	ISOPROPANOL MIXTURE
Technical Name(s) :	
UN/ID No :	1219
Hazard Class - Primary :	3
Packing Group :	II
Flash Point :	21 °C / 70 °F



MATERIAL SAFETY DATA SHEET

PRODUCT

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EMERGENCY TELEPHONE NUMBER

(800)462-5378 (24 Hours) (800) I-M-ALERT

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name :	ISOPROPANOL MIXTURE
Technical Name(s) :	
UN/ID No :	1219
Hazard Class - Primary :	3
Packing Group :	II
IATA Cargo Packing Instructions :	307
IATA Cargo Aircraft Limit :	60 L (Max net quantity per package)

MARINE TRANSPORT (IMDG/IMO) :

IMDG Page :	3244
Proper Shipping Name :	ISOPROPANOL MIXTURE
Technical Name(s) :	
UN/ID No :	1219
Hazard Class - Primary :	3.2
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.

Isopropanol : Flammable, 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 EPA hazard categories:

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



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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 chemical substances in this product are on 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 / 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

Isopropanol :

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 :

The following substances are disclosed for compliance with State Right to Know Laws:

Isopropanol

67-63-0

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 :

B2 - Flammable Liquids, D2B - Materials Causing Other Toxic Effects - Toxic Material

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.



MATERIAL SAFETY DATA SHEET

PRODUCT

CL-363

EMERGENCY TELEPHONE NUMBER

(800)462-5378 (24 Hours) (800) I-M-ALERT

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 : 04/10/2000
Replaces : 05/12/1992

PRODUCT BULLETIN

H-130M[®]

Molluscicide

C-H-130M

PRODUCT BENEFITS

- Achieves a 100% kill rate of adult, juvenile, and veliger forms of zebra mussels and Asiatic clams usually within 24 hours of the start of a treatment program.
- One to three 24-hour treatments per year are usually sufficient to avoid the problems associated with an uncontrolled mollusk infestation.
- Treatment of a plant's discharge with CA-35, a bentonite clay, effectively complexes with H-130M to eliminate toxicity to non-target organisms. The combined complex is not harmful to aquatic species or benthic organisms.
- Biodegradable at use concentrations, providing an environmentally acceptable treatment.
- Treatment dosages as low as 0.5-2.0 ppm of H-130M are sufficient for an effective treatment.
- H-130M is a non-oxidizing molluscicide meaning that H-130M is available for mollusk control rather than being consumed by organic or inorganic reducing substances in the cooling water.
- Addition to the cooling water does not depress the pH of the bulk water and does not form corrosive by-products as found with chlorination or bromination.
- Corrosion of metal surfaces is not accelerated by biocide treatment.

DIRECTIONS FOR USE

H-130M molluscicide is only sold as part of a complete Nalco mollusk treatment application service. This product is safe to the aquatic environment only if the treated water is properly deactivated prior to discharge. The method for using this product is restricted by environmental regulations. This product is not to be used without supervision from a Nalco representative.

MATERIALS COMPATIBILITY

Compatible materials of construction for pump and piping include polypropylene, polyethylene, Hypalon, stainless steel, epoxy phenolic-lined steel, or isophthalic polyester resins.

CONTROL TESTING AND EFFLUENT TOXICITY TESTING

H-130M residual is monitored throughout a plant system and prior to discharge using a test procedure sensitive down to 20 ppb. The biological toxicity of the effluent water generated during the treatment is verified to be safe through a composite water sample sent to an outside laboratory. Results of this testing are provided to the customer.

(Continued on Reverse Side)

EPA REGISTRATION

Molluscicide H-130M is registered by the Environmental Protection Agency (EPA Registration No. 6836-203-1706) as a slug feed molluscicide for industrial cooling water systems.

NALCO CHEMICAL COMPANY One Nalco Center • Naperville, Illinois 60563-1198



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All Rights Reserved H-130M is a Registered Trademark of Calgon Corporation Printed in U.S.A. 1-01





FEEDING AND DOSAGE

H-130M is fed as close to the raw water inlet as possible without risking the release of the chemical into the environment. Treatment of a system with H-130M molluscicide typically includes a 24-hour feed period at 1.5 ppm to the inlet of the plant, maintaining a residual at the discharge of 0.5 ppm. The rate of adsorption of the biocide on the target mollusks and thus, the kill rate, is temperature-dependent. Actual treatment durations may vary from site to site dependent on water temperature and other site specific conditions.

DEACTIVATION REQUIREMENTS

CA-35 is used to deactivate H-130M molluscicide in the plant water prior to discharge to the environment. The feed rate of the CA-35 is typically 5 ppm of CA-35 for every 1 ppm of H-130M molluscicide fed to the inlet water. CA-35 feed continues for at least 2 hours past the time when the H-130M molluscicide feed is discontinued to assure complete deactivation of biocide remaining in the system.

HANDLING AND STORAGE

Do not use or store near heat sources or open flame. H-130M is stable at room temperature. A slight haziness occurs as the product approaches its freezing point. Warming will return it to original condition with molluscicidal properties unimpaired.

Best if used within six months from the time of receipt.

SHIPPING

H-130M molluscicide is shipped in 5 gal pails and 55 gal drums.

DOT Hazard Class	Combustible liquid
DOT Proper Shipping Name	Combustible liquid, N.O.S. (isopropanol)
UN#	1993

DISPOSAL

Prohibitions — Do not contaminate water, food or feed by storage or disposal.

Pesticide Control — 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.

Metal Containers — Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, by incineration or as allowed by state and local procedures.

Plastic Containers — Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, by incineration or, if allowed by state and local authorities, by other means. If burned, stay out of smoke.

Tank Cleaning — Transport tanks and equipment should be thoroughly drained and flushed with water to properly remove all traces of product. Dispose of washings as indicated above. Liquid and solid residues are hazardous.

REMARKS

If you need assistance or information, please call your nearest Nalco representative, or our Naperville office at 630-305-1000. For more news about Nalco, visit our website at www.nalco.com.

For Medical and Transportation Emergencies involving Nalco products, call (24 hour response): (800) I-M- ALERT or (800) 462-5378.



MATERIAL SAFETY DATA SHEET

PRODUCT

H-130M

EMERGENCY TELEPHONE NUMBER

(800)462-5378 (24 Hours) (800) I-M-ALERT

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : H-130M
APPLICATION : BIOCIDE
CHEMICAL DESCRIPTION : Quaternary ammonium compound(s), Alcohol, Water
COMPANY IDENTIFICATION : Nalco Chemical Company
One Nalco Center
Naperville, Illinois
60563-1198
EMERGENCY TELEPHONE NUMBER : (800)462-5378 (24 Hours) (800) I-M-ALERT

NFPA 704M/HMIS RATING

HEALTH: 3 / 3 FLAMMABILITY: 2 / 2 REACTIVITY: 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	50.0
Ethanol	64-17-5	10.0

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

DANGER

Combustible. May cause tissue damage. Toxic to aquatic organisms.
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.
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

MATERIAL SAFETY DATA SHEET

PRODUCT

H-130M

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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

For eye contact, flush eyes with large amounts of running water for at least 15 minutes. Hold eyelids apart to ensure rinsing of the entire surface of the eye and lids with water. If physician is not available, flush for additional 15 minutes. Obtain immediate medical attention.

IF ON SKIN: Immediately flush contact areas with copious quantities of water for at least 15 minutes. Remove and wash contaminated clothing before reuse.

IF SWALLOWED: Promptly drink a large quantity of milk, beaten egg white or gelatin solution. If these are not available, drink large quantities of water. Avoid alcohol. Call a physician immediately. NEVER give an unconscious person anything by mouth.

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

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)



MATERIAL SAFETY DATA SHEET

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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.



MATERIAL SAFETY DATA SHEET

PRODUCT

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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



MATERIAL SAFETY DATA SHEET

PRODUCT

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(800)462-5378 (24 Hours) (800) I-M-ALERT

DENSITY 7.7 lb/gal
SOLUBILITY IN WATER Complete
pH (1 %) 7.0 - 8.0
VISCOSITY < 100 cps @ 77 °F / 25 °C

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 DERMAL TOXICITY :

Species	LD50	Tested Substance
Rabbit	> 4 g/kg	

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.



MATERIAL SAFETY DATA SHEET

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ACUTE FISH RESULTS :

Species	Exposure	LC50	Tested Substance
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	Tested Substance
Daphnia magna	48 hrs	0.19 mg/l		
Mysid Shrimp (A. 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

Proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are:

LAND TRANSPORT :

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

Nalco Chemical Company One Nalco Center • Naperville, Illinois 60563-1198

(630)305-1000

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**MATERIAL SAFETY DATA SHEET****PRODUCT****H-130M****EMERGENCY TELEPHONE NUMBER****(800)462-5378 (24 Hours) (800) I-M-ALERT**

Technical Name(s) : DIDECYLDIMETHYLAMMONIUM CHLORIDE, ETHANOL
UN/ID No : 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 : 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
Ethanol

RQ
1,000 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 EPA hazard categories:

X Immediate (Acute) Health Hazard
- Delayed (Chronic) Health Hazard



MATERIAL SAFETY DATA SHEET

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- 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 chemical substances in this product are on 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 / 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:

<u>Substance(s)</u>	<u>Citations</u>
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) :

All substances in this product are listed on the Domestic Substances List (DSL), are exempt, or have been reported in accordance with the New Substances Notification Regulations.



MATERIAL SAFETY DATA SHEET

PRODUCT

H-130M

EMERGENCY TELEPHONE NUMBER

(800)462-5378 (24 Hours) (800) I-M-ALERT

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 : 07/10/2000

Replaces : 07/08/1999



CALGON

C O R P O R A T I O N

PRODUCT BULLETIN

Rev. 8/98

Bulletin No. 00-67H3

H-901G **Microbiocide**

DESCRIPTION

Calgon **H-901G** Microbiocide is a chlorine/bromine donating organic compound in granular form, facilitating rapid delivery into the cooling system. **H-901G** is registered for use in once-through cooling water systems and air washers. **H-901G**, when dissolved in water, releases powerful oxidizing hypohalous acids which are highly effective in preventing biomass fouling in once-through cooling water systems. **H-901G** also controls the growth of microorganisms in the bulk air-washer water and removes existing biofouling from system surfaces.

ADVANTAGES

- **H-901G's** granular form provides for rapid application to fouled systems, resulting in a "shock" treatment, quickly arresting biological activity.
- **H-901G** effectively controls microorganisms in cooling water systems operating over a pH range of 6.0 to 9.0. The hypobromous acid formed when **H-901G** is dissolved in water is about four times more active in maintaining microbiological control at lower treatment levels than chlorine fed intermittently alone.
- **H-901G** provides broad spectrum control of slime-producing microorganisms such as bacteria, fungi, and algae in air washers systems. Often, reliable microbiological control can be achieved with **H-901G** as a single microbiocide treatment program.
- **H-901G** remains active in the presence of ammonia. When ammonia is present in cooling waters, both chlorine and bromine will react with it to form haloamines. The chloramines formed are less effective biocides. However, bromines have relatively the same biological effectiveness as hypobromous acid.
- **H-901G** releases balanced amounts of residual hypobromous and hypochlorous acid. Lower total free halogens are required to maintain microbiological control than when chlorine alone is used. Less free halogen is available to cause wood delignification or contribute to corrosion of system metallurgy.
- **H-901G** is supplied as a granular solid. It eliminates the need for gas chlorination equipment, handling gas cylinders, or feeding liquid hypochlorite. Since there is no gaseous chlorine to escape to the atmosphere, and no liquid that could be spilled accidentally, the product is safer to store and feed than gaseous chlorine or liquid hypochlorite products.

EPA REGISTRATION/USDA APPROVAL

H-901G is registered by the United States Environmental Protection Agency as a biocide for use in industrial, once-through cooling water systems (both fresh and seawater); cooling ponds and lagoons; influent water systems (e.g., flow-through filters, lagoons, etc.); heat exchange water systems; industrial, water-scrubbing systems; brewery and canning pasteurizers; and industrial air washing systems equipped with a mist eliminator. EPA Registration No. 8622-29-10445.

DIRECTIONS FOR USE

Badly fouled systems must be cleaned before treatment is begun.

METHOD OF FEEDING

H-901G is dissolved and slug fed to the system using a brominator, a corrosion resistant polyester feed system, specially designed for the use of granular hydantoin-based microbiocides. Your Calgon representative will determine the proper size feed system to meet your specific needs.

FEED RATES

Initial Dose: When the system is noticeably fouled, add 0.2-0.6 pounds per 1000 gallons of water contained in the system.

The information and recommendations contained in this document are presented in good faith and believed to be reliable, but shall not be part of the terms and conditions of sale of any Calgon product. Because many factors affect product application and performance, each Calgon customer must determine for itself, by conducting appropriate tests or other methods, whether a Calgon product is suitable for that customer's needs. **CALGON MAKES NO WRITTEN, ORAL, EXPRESS OR IMPLIED WARRANTY REGARDING THE CALGON PRODUCTS DESCRIBED HEREIN, THE RESULTS TO BE OBTAINED FROM THEIR USE, OR THE ACCURACY OR USE OF THE INFORMATION AND RECOMMENDATIONS CONTAINED HEREIN. CALGON SPECIFICALLY DISCLAIMS THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.**

Information concerning human and environmental exposure may be reviewed on the Material Safety Data Sheet for the product. For additional information regarding incidents involving human and environmental exposure call 1-800-955-0090 and ask for the Health and Environmental Affairs Department.

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For more information, contact your local Calgon representative, call 1-800-955-0090, or write: Calgon Corporation, P.O. Box 1346, Pittsburgh, PA 15230.

Internet address: <http://www.calgon.com>



INNOVATIVE TECHNOLOGIES, CREATIVE SOLUTIONS ... SINCE 1918

H-901G



P.O. Box 1346
Pittsburgh, PA 15230-1346
Phone--(412)494-8000
CHEMTREC® 1-800-424-9300

MATERIAL SAFETY DATA SHEET

Section 1. PRODUCT IDENTIFICATION

PRODUCT NAME: H-901G

CHEMICAL DESCRIPTION: Halogenated hydantoin granules
PRODUCT CLASS: Biocide
MSDS CODE: 0E08-10-19-93

Section 2. INFORMATION ON INGREDIENTS

<u>Chemical Name</u>	<u>CAS Number</u>	<u>% by Weight</u>	<u>OSHA PEL</u>	<u>ACGIH TLV</u>
Bromochloro-5,5-dimethylhydantoin (BCDMH)	32718-18-6	96	None established	None established

Alternate Chemical Name: 1-Bromo-3-chloro-5,5-dimethylhydantoin (BCDMH), CAS #16079-88-2, is the specific isomer usually referenced for this product. When dissolved in water, BCDMH hydrolyzes immediately to hypobromous acid, hypochlorous acid (the active biocides) and 5,5-dimethylhydantoin (DMH).

Section 3. HAZARDS IDENTIFICATION

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

White to off-white granules with faint halogen odor.

DANGER!

Strong oxidizer. Contact with other material may cause fire.

Contamination with moisture, organic matter or other chemicals may start a chemical reaction with generation of heat, hazardous gases and possible fire and explosion.

May cause severe eye and skin damage.

May be harmful if swallowed or if inhaled.

Contact with this product may induce delayed hypersensitivity.

PRIMARY ROUTES OF ENTRY: Eye and skin contact, inhalation, ingestion

TARGET ORGANS: Eye, skin, mucous membranes

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: None reported. Existing dermatitis may be aggravated by exposure.

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POTENTIAL HEALTH EFFECTS:

EYE CONTACT: This product may cause severe irritation and damage upon contact with the eye.

SKIN CONTACT: Contact with moist skin will cause severe skin burns. Product may cause an allergic skin reaction in susceptible individuals.

INGESTION: Ingestion of this product may cause severe irritation or burns of the mucous membranes of the mouth, throat, esophagus and stomach.

INHALATION: Inhalation of product dust may be severely irritating to the nose, throat, and lungs causing shortness of breath, headache, and nausea.

SUBCHRONIC, CHRONIC:
Ames mutagenicity: Negative.

CARCINOGENICITY:

NTP:

No ingredients listed in this section

IARC:

No ingredients listed in this section

OSHA:

No ingredients listed in this section

Section 4. FIRST AID MEASURES

EYE CONTACT: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Seek medical aid immediately.

SKIN CONTACT: Remove contaminated clothing immediately. Brush off excess chemical and wash skin with large volumes of soap and water, flushing the skin with water for at least 15 minutes. Seek medical aid immediately. Wash clothing before reuse. Do not take clothing home to be laundered.

INGESTION: If swallowed, do NOT induce vomiting. Give large quantities of water. Seek medical aid immediately. Never give anything by mouth to an unconscious person.

NOTE TO PHYSICIAN: Probable mucosal damage may contraindicate the use of gastric lavage.

INHALATION: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Seek medical aid.

Section 5. FIRE-FIGHTING MEASURES

FLASH POINT: Not applicable
This product is a strong oxidizer. Contact with other material may cause fire.

LOWER FLAMMABLE LIMIT: Not applicable **UPPER FLAMMABLE LIMIT:** Not applicable

AUTO-IGNITION TEMPERATURE: Not available

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EXTINGUISHING MEDIA: Use water. Do not use ammonium phosphate fire extinguishers. (The presence of ammonium ion accelerates the decomposition of BCDMH.)

FIRE-FIGHTING INSTRUCTIONS: Exercise caution when fighting any chemical fire. A self-contained breathing apparatus and protective clothing are essential. Use water spray to cool containers exposed to fire. Minimize exposure. DO NOT breathe fumes. Contain run-off.

FIRE & EXPLOSION HAZARDS: Product emits toxic gases under fire conditions. Runoff to sewer may create fire or explosion hazard. Runoff from fire control or dilution water may cause pollution.

DECOMPOSITION PRODUCTS: Combustion may generate hydrogen chloride, hydrogen bromide, nitrogen oxides, bromine, and chlorine.

NFPA RATINGS: Health = 3 Flammability = 1 Reactivity = 1 Special Hazard = OX

Hazard rating scale: 0=Minimal 1=Slight 2=Moderate 3=Serious 4=Severe

Section 6. ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Do not touch or walk through spilled material. Keep combustibles (wood, paper, oil, etc.) away from spilled material. Wear personal protective equipment recommended in Section 8. Avoid inhalation of dust. With clean shovel, place material into a clean, dry container and cover loosely; move containers from spill area. Remove and isolate contaminated clothing and shoes at the site. Wash area of spill with large amounts of water. Keep spills and cleaning runoff out of municipal sewers and open bodies of water.

Section 7. HANDLING AND STORAGE

HANDLING: It is a violation of Federal law to use this product in a manner inconsistent with its labeling. Do not get in eyes, on skin or clothing. Avoid breathing dust. Use with adequate ventilation. Avoid contact with organic materials, oils, greases, and any oxidizable materials. Use clean, dry utensils and equipment. Do not add this product to any dispensing device containing remnants of any other product. Such use may cause a violent reaction leading to fire and explosion. In case of contamination or decomposition, do not reseal container. If possible, isolate container in open air or well ventilated area. Wash thoroughly after handling. Remove and wash contaminated clothing promptly. Store in tightly closed container.

STORAGE: Recommended storage temperature range is 68-86°F (20-30°C). Keep product dry in tightly closed container when not in use. Store in a cool, dry, well-ventilated area away from heat, open flames, organic chemicals, combustible materials, and sunlight.

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Section 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

PERSONAL PROTECTIVE EQUIPMENT:

EYE/FACE PROTECTION: Chemical splash goggles and face shield
SKIN PROTECTION: Chemical resistant gloves and protective clothing
RESPIRATORY PROTECTION: A NIOSH approved dust mask must be used when handling this product.

ENGINEERING CONTROLS: Use local exhaust ventilation with a minimum capture velocity of 150 ft/min at the point of dust or mist evolution.

WORK PRACTICES: Eye wash station and safety shower should be accessible in the immediate area of use. Remove and wash contaminated clothing promptly.

SATISFACTORY MATERIALS OF CONSTRUCTION: PVC, CPVC, polyethylene, Teflon, Viton, fiberglass with isophthalic polyester resin.

Section 9. PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT: Not applicable	SOLUBILITY IN WATER: 0.2% (as BCDMH) @ 25°C
VAPOR PRESSURE: Negligible	SPECIFIC GRAVITY: 1.8 - 2.0
VAPOR DENSITY (air=1): Not applicable	pH: 3.5 (0.1% soln in DI water)
%VOLATILE BY WEIGHT: Not available	FREEZING POINT: Decomposes ~ 130°C
APPEARANCE AND ODOR: White to off-white granules with faint halogen odor.	
VISCOSITY: Not applicable	

Section 10. STABILITY AND REACTIVITY

CHEMICAL STABILITY: Stable	HAZARDOUS POLYMERIZATION: Will not occur
CONDITIONS TO AVOID: Keep from contact with clothing and other combustible materials. Avoid high storage temperatures and moisture.	
INCOMPATIBILITY: Strong reducing agents, organics, acids, bases	
DECOMPOSITION PRODUCTS: Combustion may generate hydrogen chloride, hydrogen bromide, nitrogen oxides, bromine, and chlorine.	

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Section 11. TOXICOLOGICAL INFORMATION

ON PRODUCT:

Product Oral LD₅₀ (rat): 929 mg/kg
Product Inhalation LC₅₀ (rat): 1.11 mg/L for 4 hr

Section 12. ECOLOGICAL INFORMATION

ON PRODUCT:

Aquatic toxicity data:

(for 5,5-dimethylhydantoin, the dehalogenated by-product of 1-bromo-3-chloro-5,5-dimethylhydantoin)
48 hr LC₅₀ (Daphnia magna): 1300 ppm
96 hr LC₅₀ (rainbow trout): 6100 ppm
96 hr LC₅₀ (fathead minnow): 8100 ppm

Environmental data:

The COD for 5,5-dimethylhydantoin (DMH) was determined to be 1005 mg O₂ per gram of DMH.

Environmental toxicity:

Dietary LC₅₀ (bobwhite quail): > 5620 ppm
Oral LD₅₀ (bobwhite quail): 1839 mg/kg
Dietary LC₅₀ (mallard duck): > 5620 ppm

This product 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.

ON INGREDIENTS:

Chemical Name
BCDMH (96%)

Aquatic Toxicity Data
96 hr LC₅₀ (rainbow trout): 0.4 ppm
96 hr LC₅₀ (bluegill sunfish): 0.46 ppm
48 hr LC₅₀ (Daphnia magna): 0.75 ppm

Section 13. DISPOSAL CONSIDERATIONS

RCRA STATUS: Discarded product, as sold, would be considered a RCRA Hazardous Waste based on the characteristic of ignitability. The EPA Hazardous Waste Number is D001.

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 label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance. Do not reuse empty container.

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Section 14. TRANSPORT INFORMATION

DOT CLASSIFICATION:

Class/Division: 5.1

Proper Shipping Name: Oxidizing solid, n.o.s. (1-Bromo-3-chloro-5,5-dimethylhydantoin)

Label: Oxidizer

Packing Group: II

ID Number: UN 1479

Section 15. REGULATORY INFORMATION

OSHA Hazard Communication Status: Hazardous

TSCA: Pesticides are exempted by TSCA (the Toxic Substances Control Act), under Section 3(2)(a)ii, from the provisions of the Act.

CERCLA reportable quantity of EPA hazardous substances in product:

Chemical NameRQ

No ingredients of this product have CERCLA reportable quantities.

Product RQ: Not applicable

(Notify EPA of product spills exceeding this amount.)

SARA TITLE III:**Section 302 Extremely Hazardous Substances:**Chemical NameCAS #RQTPQ

There are no SARA 302 Extremely Hazardous Substances in this product.

Section 311 and 312 Health and Physical Hazards:

Immediate

Delayed

Fire

Pressure

Reactivity

[yes]

[yes]

[yes]

[no]

[yes]

Section 313 Toxic Chemicals:Chemical NameCAS #% by WeightThere are no reportable SARA 313 Toxic Chemicals in this product.

Section 16. OTHER INFORMATION

HMSD RATINGS:

Health = 3*

Flammability = 1

Reactivity = 1

Personal Protective Equipment = X (to be specified by user depending on use conditions)

*There are potential chronic health effects to consider.

Hazard rating scale: 0=Minimal 1=Slight 2=Moderate 3=Serious 4=Severe

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MSDS REVISION SUMMARY: Supersedes MSDS issued on 12/20/93. The MSDS has been changed in Section 14.

While this information and recommendations set forth herein are believed to be accurate as of the date hereof, CALGON CORPORATION MAKES NO WARRANTY WITH RESPECT HERETO AND DISCLAIMS ALL LIABILITY FROM RELIANCE THEREON.

PREPARED BY: P.J. Maloney

PRODUCT BULLETIN

MSW-109*Corrosion Inhibitor***PRODUCT BENEFITS**

- Rapidly forms protective film with excellent film stability
- Enhanced protection from pitting and general corrosion
- Chlorine and bromine resistant with no halogen demand
- Stabilizes dissolved manganese which enhances finished paper mill products brightness
- Elimination of corrosion products prevents brightness reversion/staining in finished paper mill products
- Prevents the decomposition of bleaching solutions in paper mills due to excessive iron
- Easy-to-feed liquid

GENERAL DESCRIPTION

MSW-109 is a liquid formulation of an orthophosphate zinc corrosion inhibitor. The product is designed to provide superior corrosion protection of ferrous and copper-based alloys in very corrosive, once-through cooling water systems. For a general description of the typical chemical and physical properties, see the MSW-109 Material Safety Data Sheet.

MATERIALS COMPATIBILITY

Compatible materials of construction for bulk storage tanks include high density (HDPE) or cross linked (XLPE) polyethylene, fiberglass (FRP) with polyester or vinyl ester resins. Compatible materials for pump liquid ends and piping include polyethylene, polypropylene, PVC or Teflon.

CONTROL TESTING

Product performance is ultimately confirmed by periodic equipment inspection, as well as by heat transfer and corrosion monitoring. MSW-109 concentrations should be monitored by performing undigested total phosphate tests. Your Nalco representative will assist you in selecting the proper test procedure.

FEEDING AND DOSAGE

MSW-109 should be fed continuously at a point in the system where turbulent flow will assure good mixing. Product should be fed neat and must not be mixed with other water treatment chemicals prior to feeding. Dosage rates will vary depending upon system parameters, water quality, and desired performance results. Your Nalco representative will assist you in establishing a treatment program to meet your specific cost performance criteria.

FDA APPROVAL

The components of MSW-109 are compliant with 21 CFR Sections 176.170 and 176.180 for use in the manufacturing of paper and paper board products destined for food contact use.

POTABLE WATER APPROVAL

MSW-109 is certified to ANSI/NSF Standard 60™: drinking water treatment chemicals - health effects, by NSF *International* up to a maximum product dosage of 15.6mg/L.

(Continued on Reverse Side)

C-MSW-109

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STORAGE

MSW-109 should not be allowed to freeze. Although this product is freeze-thaw stable, stratification may occur upon freezing.

SHIPPING

MSW-109 is shipped in drums or delivered to on-site storage facilities via bulk.

REMARKS

If you need assistance or information, please call your nearest Nalco representative, or our Naperville office at 630-305-1000. For more news about Nalco, visit our website at www.nalco.com.

For Medical and Transportation Emergencies involving Nalco products, call (24 hour response): (800) I-M- ALERT (800-462-5378).

MATERIAL SAFETY DATA SHEET**PRODUCT****MSW-109****EMERGENCY TELEPHONE NUMBER****(800)462-5378 (24 Hours) (800) I-M-ALERT****1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION**

PRODUCT NAME : MSW-109

CHEMICAL DESCRIPTION : Inorganic salt(s), Inorganic acid(s), Water

COMPANY IDENTIFICATION : Nalco Chemical Company
One Nalco Center
Naperville, Illinois
60563-1198

EMERGENCY TELEPHONE NUMBER : (800)462-5378 (24 Hours) (800) I-M-ALERT

NFPA 704M/HMIS RATING

HEALTH : 3 / 3 **FLAMMABILITY :** 0 / 0 **REACTIVITY :** 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)
Phosphoric Acid	7664-38-2	30.0 - 60.0
Zinc Chloride	7648-85-7	30.0 - 60.0

3. HAZARDS IDENTIFICATION****EMERGENCY OVERVIEW******DANGER**

Corrosive. May cause tissue damage. Toxic to aquatic organisms.
Do not get in eyes, on skin, on clothing. Do not take internally. 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.
Wear a face shield. Wear chemical resistant apron, chemical splash goggles, impervious gloves and boots.
Not flammable or combustible. May evolve oxides of carbon (CO_x) under fire conditions. May evolve oxides of phosphorus (PO_x) under fire conditions. May evolve HCl under fire conditions. May evolve zinc fumes under fire conditions.

PRIMARY ROUTES OF EXPOSURE :

Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :**EYE CONTACT :**

Corrosive. Will cause eye burns and permanent tissue damage.

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MATERIAL SAFETY DATA SHEET

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MSW-109

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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 :

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 :

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 ()

EXTINGUISHING MEDIA :

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



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FIRE AND EXPLOSION HAZARD :

Not flammable or combustible. May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of phosphorus (POx) under fire conditions. May evolve HCl under fire conditions. May evolve zinc fumes 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 dyking. 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 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.

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)

Phosphoric Acid

TWA: 1 mg/m³

STEL: 3 mg/m³



MATERIAL SAFETY DATA SHEET

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Zinc Chloride TWA: 1 mg/m³
STEL: 2 mg/m³

OSHA/PEL :
Substance(s)

Phosphoric Acid TWA: 1 mg/m³
STEL: 3 mg/m³

Zinc Chloride TWA: 1 mg/m³
STEL: 2 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 :

NEOPRENE, NITRILE, OR NATURAL RUBBER 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 Colorless

ODOR

SPECIFIC GRAVITY 1.56 - 1.6 @ 77 °F / 25 °C
DENSITY 13.3 lb/gal
SOLUBILITY IN WATER Complete
pH (100 %) < 1.0

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**MATERIAL SAFETY DATA SHEET****PRODUCT****MSW-109****EMERGENCY TELEPHONE NUMBER****(800)462-5378 (24 Hours) (800) I-M-ALERT**

FREEZING POINT -4 °F / -20 °C
BOILING POINT > 212 °F / > 100 °C

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 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. Metals

HAZARDOUS DECOMPOSITION PRODUCTS :

Under fire conditions: Oxides of carbon, Oxides of phosphorus, HCl

11. TOXICOLOGICAL INFORMATION

The following results are for the hazardous substances.

ACUTE ORAL TOXICITY :

Species	LD50	Tested Substance
Rat	1,530 mg/kg	Phosphoric Acid
Rat	350 mg/kg	Zinc Chloride

Rating : Non-Hazardous

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 :**

No toxicity studies have been conducted on this product.

ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION



MATERIAL SAFETY DATA SHEET

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Based on our hazard characterization, the potential environmental hazard is: High

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

Proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are:

LAND TRANSPORT :

Proper Shipping Name :	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.
Technical Name(s) :	ZINC CHLORIDE, PHOSPHORIC ACID
UN/ID No :	3264
Hazard Class - Primary :	8
Packing Group :	III
Flash Point :	> 93 °C / > 200 °F

DOT Reportable Quantity (per package) :	3,800 lbs
DOT RQ Component :	ZINC CHLORIDE

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name :	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.
Technical Name(s) :	ZINC CHLORIDE, PHOSPHORIC ACID
UN/ID No :	3264
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) :

IMDG Page :	8147-1
Proper Shipping Name :	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.
Technical Name(s) :	ZINC CHLORIDE, PHOSPHORIC ACID



MATERIAL SAFETY DATA SHEET

PRODUCT

MSW-109

EMERGENCY TELEPHONE NUMBER

(800)462-5378 (24 Hours) (800) I-M-ALERT

UN/ID No : 3264
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.

Phosphoric Acid : Corrosive
Zinc Chloride : Corrosive

CERCLA/SUPERFUND, 40 CFR 117, 302 :

This product contains the following Reportable Quantity (RQ) Substance. Also listed is the RQ for the product.

<u>RQ Substance</u>	<u>RQ</u>
Zinc Chloride	3,800 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 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 contains the following substance(s), (with CAS # and % range) which appear(s) on the List of Toxic Chemicals

<u>Hazardous Substance(s)</u>	<u>CAS NO</u>	<u>% (w/w)</u>
Phosphoric Acid	7664-38-2	30.0 - 60.0
Zinc Chloride	7846-85-7	30.0 - 60.0

MATERIAL SAFETY DATA SHEET**PRODUCT****MSW-109****EMERGENCY TELEPHONE NUMBER****(800)462-5378 (24 Hours) (800) 1-M-ALERT****TOXIC SUBSTANCES CONTROL ACT (TSCA) :**

The chemical substances in this product are on the TSCA 8(b) Inventory (40 CFR 710).

NATIONAL SANITATION FOUNDATION (ANSI/NSF STANDARD 60) :

This product has received NSF/International certification under ANSI/NSF Standard 60 in the corrosion and scale control and sequestering categories. The official name is "Zinc Orthophosphate." Maximum product application dosage is : 15.6 mg/l.

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR / formerly Sec. 311 :

This product contains the following substances listed in the regulation:

<u>Substance(s)</u>	<u>Citations</u>
Phosphoric Acid :	Sec. 311
Zinc Chloride :	Sec. 307, 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 :

This product contains the following substances listed in the regulation:

Zinc Chloride

STATE RIGHT TO KNOW LAWS :

The following substances are disclosed for compliance with State Right to Know Laws:

Zinc Chloride	7646-85-7
Phosphoric Acid	7664-38-2

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) :

All substances in this product are listed on the Domestic Substances List (DSL), are exempt, or have been reported in accordance with the New Substances Notification Regulations.

MATERIAL SAFETY DATA SHEET

PRODUCT

MSW-109

EMERGENCY TELEPHONE NUMBER

(800)462-5378 (24 Hours) (800) I-M-ALERT



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 : 01/24/2000

Replaces : 06/10/1999



MATERIAL SAFETY DATA SHEET

PRODUCT

NALCO 1336

EMERGENCY TELEPHONE NUMBER

(800)462-5378 (24 Hours) (800) I-M-ALERT

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : NALCO 1336
APPLICATION : CORROSION INHIBITOR
CHEMICAL DESCRIPTION : Substituted triazole, in aqueous solution
COMPANY IDENTIFICATION : Nalco Chemical Company
One Nalco Center
Naperville, Illinois
60563-1198
EMERGENCY TELEPHONE NUMBER : (800)462-5378 (24 Hours) (800) I-M-ALERT

NFPA 704M/HMIS RATING
HEALTH: 2/3 FLAMMABILITY: 1/1 REACTIVITY: 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 Tolyltriazole	64665-57-2	40.0 - 70.0

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. 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.
Wear chemical resistant apron, chemical splash goggles, impervious gloves and boots.
May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) under fire conditions.

PRIMARY ROUTES OF EXPOSURE :
Eye, Skin



MATERIAL SAFETY DATA SHEET

PRODUCT

NALCO 1336

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(800)462-5378 (24 Hours) (800) I-M-ALERT

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 :

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 :

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 :

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.



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NALCO 1336

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(800)462-5378 (24 Hours) (800) I-M-ALERT

5. FIRE FIGHTING MEASURES

FLASH POINT : None

EXTINGUISHING MEDIA :

Not expected to burn. Use extinguishing media appropriate for surrounding fire. Water mist may be used to cool closed containers.

FIRE AND EXPLOSION HAZARD :

May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) 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. Do not mix with acids. 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 acids. Store in suitable labelled containers.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :

At present, no exposure limit applies to this product. However, good manufacturing practices should emphasize exposure avoidance.

**MATERIAL SAFETY DATA SHEET****PRODUCT****NALCO 1336****EMERGENCY TELEPHONE NUMBER****(800)462-5378 (24 Hours) (800) I-M-ALERT****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 :

Neoprene gloves, Nitrile gloves, PVC gloves, Butyl gloves, Rubber 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.

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	Liquid
APPEARANCE	Clear Amber Brown
ODOR	Characteristic
SPECIFIC GRAVITY	1.19 @ 77 °F / 25 °C
SOLUBILITY IN WATER	Complete
pH (100 %)	13.5
(10 %)	11.2 - 12.4
VISCOSITY	55 cps
FREEZING POINT	18 °F / -8 °C
VAPOR PRESSURE	< 0.1 mm Hg @ 68 °F / 20 °C



MATERIAL SAFETY DATA SHEET

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NALCO 1336

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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 acids (e.g. sulfuric, phosphoric, nitric, hydrochloric, chromic, sulfonic) may generate heat, splattering or boiling and 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	Tested Substance
Rat	640 mg/kg	Product
Rating : Non-Hazardous		

ACUTE DERMAL TOXICITY :

Species	LD50	Tested Substance
Rabbit	> 2,000 mg/kg	Product
Rating : Non-Hazardous		

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.



MATERIAL SAFETY DATA SHEET

PRODUCT

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(800)462-5378 (24 Hours) (800) I-M-ALERT

ACUTE FISH RESULTS :

Species	Exposure	LC50	Tested Substance
Bluegill Sunfish	96 hrs	191.2 mg/l	Product
Rainbow Trout	96 hrs	23.7 mg/l	

Rating : Slightly toxic

ACUTE INVERTEBRATE RESULTS :

Species	Exposure	LC50	EC50	Tested Substance
Daphnia magna	48 hrs	420 mg/l		Product

Rating : Slightly toxic

PERSISTENCY AND DEGRADATION :

Total Organic Carbon (TOC) : 270,000 mg/l

Chemical Oxygen Demand (COD) : 750,000 mg/l

ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION

Based on our hazard characterization, the potential environmental hazard is: Moderate

Based on our recommended product application and the product's characteristics, the potential environmental exposure is: High

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:

LAND TRANSPORT :

Proper Shipping Name :	CAUSTIC ALKALI LIQUID, N.O.S.
Technical Name(s) :	SODIUM HYDROXIDE
UN/ID No :	1719
Hazard Class - Primary :	8



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(800)462-5378 (24 Hours) (800) I-M-ALERT

Packing Group : II
Flash Point : None

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name : CAUSTIC ALKALI LIQUID, N.O.S.
Technical Name(s) : SODIUM HYDROXIDE
UN/ID No : 1719
Hazard Class - Primary : 8
Packing Group : II
IATA Cargo Packing Instructions : 813
IATA Cargo Aircraft Limit : 30 L (Max net quantity per package)

MARINE TRANSPORT (IMDG/IMO) :

IMDG Page : 8136
Proper Shipping Name : CAUSTIC ALKALI LIQUID, N.O.S.
Technical Name(s) : SODIUM HYDROXIDE
UN/ID No : 1719
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.

Sodium Tolyltriazole : 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) :

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 EPA hazard categories:

X Immediate (Acute) Health Hazard
- Delayed (Chronic) Health Hazard
- Fire Hazard



MATERIAL SAFETY DATA SHEET

PRODUCT

NALCO 1336

EMERGENCY TELEPHONE NUMBER

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- 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 chemical substances in this product are on 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 / formerly Sec. 311 :
This product contains the following substances listed in the regulation:

<u>Substance(s)</u>	<u>Citations</u>
Sodium Hydroxide :	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:

Water	7732-18-5
Sodium Tolytriazole	64665-57-2
Sodium Hydroxide	1310-73-2

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) :
All substances in this product are listed on the Domestic Substances List (DSL), are exempt, or have been reported in accordance with the New Substances Notification Regulations.



MATERIAL SAFETY DATA SHEET

PRODUCT

NALCO 1336

EMERGENCY TELEPHONE NUMBER

(800)462-5378 (24 Hours) (800) I-M-ALERT

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: Moderate

* The environmental risk is: Moderate

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.



MATERIAL SAFETY DATA SHEET

PRODUCT

NALCO 1336

EMERGENCY TELEPHONE NUMBER

(800)462-5378 (24 Hours) (800) I-M-ALERT

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 : 08/25/2000
Replaces : 10/15/1997

PRODUCT BULLETIN

PCL-401

Scale Inhibitor

PRODUCT BENEFITS

- Prevents the Formation of Calcium Phosphate** — Scale inhibition under severe conditions of calcium phosphate supersaturation is cost-effectively attainable with TRC-233[®]. The deposition of calcium phosphate scale from orthophosphate present in the cooling water system, either as the result of the inorganic phosphate corrosion control practice or from orthophosphate in the make-up, is effectively controlled by a threshold mechanism. Control of calcium phosphate is achieved without the need for costly pretreatment, undesirable pH depression and excessive blowdown.
- Inhibits Scale Formation in High pH/Alkalinity Water** — Formulated to control potential scaling problems with calcium phosphate and low to moderate degrees of calcium carbonate supersaturation scaling. Typical acid feed rates are greatly reduced, and in many systems, acid feed may be eliminated entirely.
- Complements Good Corrosion and Biological Control** — For systems in which zinc is still permissible for use as a corrosion inhibitor, PCL-401 can be used to complement heavy metal corrosion control programs without pH control.

Deposits provide media for the propagation of biological growth and cause localized corrosion of metal surfaces. PCL-401 prevents the formation of deposits and disperses suspended solids. Cleaner surfaces deter further biological growth and assure better performance of corrosion inhibitors.

- Iron Oxide Deposit Control** — Functions as a dispersant keeping metal oxides and silts fluidized, minimizing deposition in equipment and on heat exchanger surfaces.

- Stable In Chlorinated Water** — There is no need to increase dosage during periods of chlorination.
- Contains No Heavy Metals** — Contains no zinc or chromate. It can be used in systems where current discharge regulations prohibit the use of heavy metals.
- Convenient to Use** — Supplied as a liquid and can be fed directly from the shipping container or bulk storage tank. The need and associated costs for premixing chemicals is eliminated.

C-PCL-401

GENERAL DESCRIPTION

PCL-401, based on pHreeGUARD[®] technology, is a liquid product formulated to control the deposition of calcium scales in once-through and recirculating cooling water systems. The product contains the copolymer TRC-233. It is particularly effective for controlling the precipitation of calcium phosphate. PCL-401 is a dispersant for suspended material such as silt and metal oxides. This dispersant action maintains the insoluble material in suspension, facilitating its removal from the system. For a general description of the typical chemical and physical properties, see the PCL-401 Material Safety Data Sheet.

PATENTS

These products are covered under U.S. Patents 4,552,665 and 3,709,816.

(Continued on Reverse Side)

NALCO CHEMICAL COMPANY One Nalco Center • Naperville, Illinois 60563-1198



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pHreeGUARD and TRC-233 are Registered Trademarks of Calgon Corporation Printed in U.S.A. 11-00



MATERIALS COMPATIBILITY

Compatible materials of construction for bulk storage tanks include high density, low density, or cross-linked polyethylene, fiberglass with isophthalic or bisphenol resins, epoxy phenolic or vinylester lined steel, 304 or 316 stainless steel. Compatible materials for pump "liquid ends" and piping include polyethylene, polypropylene, PVC, 304 or 316 SS, Viton, Buna-N, Teflon, neoprene, Hypalon, Kynar.

CONTROL TESTING

In recirculating waters, product performance is ultimately confirmed by equipment inspection and/or by monitoring heat transfer. In once-through waters, product dosages are generally below detectable limits. Product feed rates are adjusted based on water quality and system flow.

FEEDING AND DOSAGE

PCL-401 should be fed at a point in the system where turbulent flow will assure good mixing. The product may be fed either neat or diluted and must not be mixed with other water treatment chemicals prior to feeding. Dosage rates will vary depending upon system parameters and water quality. Your Nalco representative will assist you in establishing a treatment program to fit your specific cost performance criteria.

STORAGE AND HANDLING

The recommended minimum storage temperature for PCL-401 is within the range of 15-20°F. Best if used within 12 months from the time of receipt. If product freezes, it does not lose its integrity. Restore for use by warming slowly until product thaws; agitate.

SHIPPING

PCL-401 is shipped to on-site storage facilities via bulk.

DOT Hazardous Class	Not Restricted
DOT Proper Shipping Name	Not Restricted
UN Number	Not Applicable

REMARKS

If you need assistance or information, please call your nearest Nalco representative, or our Naperville office at 630-305-1000. For more news about Nalco, visit our website at www.nalco.com.

For Medical and Transportation Emergencies involving Nalco products, call (24 hour response): (800) I-M- ALERT (800-462-5378).

MATERIAL SAFETY DATA SHEET



PRODUCT

PCL-401

EMERGENCY TELEPHONE NUMBER

(800)462-5378 (24 Hours) (800) I-M-ALERT

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : PCL-401

APPLICATION : WATER TREATMENT

CHEMICAL DESCRIPTION : Water, Polymer

COMPANY IDENTIFICATION : Nalco Chemical Company
One Nalco Center
Naperville, Illinois
60563-1198

EMERGENCY TELEPHONE NUMBER : (800)462-5378 (24 Hours) (800) I-M-ALERT

NFPA 704M/HMIS RATING
HEALTH : 0/0 **FLAMMABILITY :** 1/1 **REACTIVITY :** 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. Wear suitable protective clothing. Keep container tightly closed. Flush affected area with water.
 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 :

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.



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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 : > 200 °F / > 93 °C ()

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.



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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 dyking. 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.

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.

MATERIAL SAFETY DATA SHEET**PRODUCT****PCL-401****EMERGENCY TELEPHONE NUMBER****(800)462-5378 (24 Hours) (800) I-M-ALERT****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

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**ACUTE ORAL TOXICITY :**

Species	LD50	Tested Substance
Rat	5 g/kg	Product

ACUTE DERMAL TOXICITY :

Species	LD50	Tested Substance
Rabbit	2 G/KG	Product

MATERIAL SAFETY DATA SHEET**PRODUCT****PCL-401****EMERGENCY TELEPHONE NUMBER****(800)462-5378 (24 Hours) (800) I-M-ALERT****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 :**

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

Proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are:

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 :**



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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 chemical substances in this product are on 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 / 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 :

MICHIGAN CRITICAL MATERIALS :

STATE RIGHT TO KNOW LAWS :

None of the substances are specifically listed in the regulation.

NATIONAL REGULATIONS, CANADA :

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :



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WHMIS CLASSIFICATION :

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 : 02/10/2000
Replaces : 06/18/1999

Nalco Chemical Company One Nalco Center • Naperville, Illinois 60563-1198

(630)305-1000

7 / 7

PRODUCT BULLETIN**Towerbrom® 960***Microbicide***EPA Registration No: 935-71-1706**

C-960

PRODUCT BENEFITS

- Supplied as a granular solid, Towerbrom 960 eliminates the need for gas chlorination equipment, handling gas cylinders, or feeding liquid hypochlorite. There is no gaseous chlorine to escape to the atmosphere and no liquid which could leak.
- Provides broad spectrum control of slime-producing microorganisms such as bacteria, fungi, and algae in industrial cooling water systems. Often, reliable microbiological control can be achieved in a single microbicide treatment program.
- Easily fed over a broad range of dosages
- Effective in the presence of ammonia. Both chlorine and bromine will react with ammonia to form haloamines. However, chloramines are ineffective biocides while bromamines have relatively the same biocidal effectiveness as hypobromous acid. Towerbrom 960 systems are kept clean with minimum chemical usage and operator supervision.
- Effectively controls microorganisms in cooling water systems operating over a pH range of 6.0-9.5.

GENERAL DESCRIPTION

Towerbrom 960 Microbicide is a high performance, sodium dichloro-s-triazinetrione/sodium bromide composition, in granular form, for use in industrial cooling water systems. When dissolved in water, Towerbrom 960 forms oxidizing hypochlorous and hypobromous acids which are highly effective in controlling organic slimes of algae, bacteria and fungi. For a general description of the chemical and physical properties, refer to the Towerbrom 960 Material Safety Data Sheet.

CONTROL TESTING

The best indication of the successful application of Towerbrom 960 is visual inspection of system surfaces, or monitoring changes in heat transfer on metal surfaces or process equipment. Usually a free oxidant residual is required to achieve biological control. Use of on-site bacterial count or microscopic examinations provide relative indicators of system cleanliness and biological control. If bacteria counts are used, note that counts may be high immediately after biocide addition. Counts will decrease as control is achieved.

MATERIALS COMPATIBILITY

Towerbrom 960 or a solution of Towerbrom 960 is a strong oxidizer. Do not mix directly with reducing agents, other oxidants or organic materials.

Compatible materials of construction for piping include C PVC, CPVC, Kynar, Viton A and acrylic.

(Continued on Reverse Side)

Towerbrom is a Registered Trademark of, and is used under license from, Occidental Chemical Corporation

NALCO CHEMICAL COMPANY One Nalco Center • Naperville, Illinois 60563-1198



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NALCO



FEEDING AND DOSAGE

Due to its high solubility, Towerbrom 960 is easily fed over a broad range of dosages, either directly from the pails or from returnable, dry-bin feed systems. Towerbrom 960 is well-suited for slug applications. It should be added to the water at a point where the dissolved material will be uniformly mixed. Your Nalco representative will assist you with determining dosage rates best suited to your water quality and system operating criteria.

STORAGE

Store pails in a cool, dry, well-ventilated area away from heat and open flames. Keep container off wet floors. While it is not required that bins be stored indoors, it is recommended that they be sheltered from rain or other water by a shed, lean-to, or tarpaulin. Do not contaminate water, food, or feed by storage.

REGISTRATIONS

Towerbrom 960 is registered by the United States Environmental Protection Agency (EPA Registration No. 935-71-1706) as a biocide for use in air washers; commercial/industrial water cooling systems; evaporative condensers; ornamental ponds and aquaria; heat exchange water systems; lakes, ponds, reservoirs (without human or wildlife use); industrial scrubbing systems; industrial auxiliary water systems; industrial process water; industrial disposal systems; pasteurizer, warmer, cannery cooling water systems; primary, secondary, and tertiary wastewater systems; fresh or salt-water, once-through cooling systems; and in pulp and paper mill water systems.

SHIPPING

Towerbrom 960 is shipped in 50 lb net plastic pails or returnable bins.

DOT Hazardous Class	Oxidizer
DOT Proper Shipping Name	Dichloroisocyanuric Acid Salts, Mixture
UN Number	2465

REMARKS

If you need assistance or information, please call your nearest Nalco representative, or our Naperville office at 630-305-1000. For more news about Nalco, visit our website at www.nalco.com.

For Medical and Transportation Emergencies involving Nalco products, call (24 hour response):
(800) I-M- ALERT (800-462-5378).

Towerbrom 960



P.O. Box 1346
Pittsburgh, PA 15230-1346
Phone--(412)494-8000

MATERIAL SAFETY DATA SHEET

Section 1. PRODUCT IDENTIFICATION

PRODUCT NAME: Towerbrom 960

CHEMICAL DESCRIPTION: This product is a mixture of Sodium dichloro-s-triazinetriene and Sodium bromide. When dissolved in water, the mixture produces the disinfectant hypobromous acid.

PRODUCT CLASS: Microbiocide

MSDS CODE: 0B79-10-04-93

Section 2. INFORMATION ON INGREDIENTS

<u>Chemical Name</u>	<u>CAS Number</u>	<u>% by Weight</u>	<u>OSHA PEL</u>	<u>ACGIH TLV</u>
Sodium dichloro-s-triazinetriene	2893-78-9	89	None established	TWA 0.5 mg/m ³ , STEL 1.5 mg/m ³ (supplier recommendation)
Sodium bromide	7647-15-6	7	None established	None established

Product ingredient, Sodium dichloro-s-triazinetriene, is also referred to as Sodium dichloroisocyanurate. Product contains 57% available chlorine. Product provides 128% available bromine with continued use in accordance with the directions for use.

Section 3. HAZARDS IDENTIFICATION

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

DANGER!

May cause severe eye and skin damage.

May be harmful if swallowed.

May cause respiratory tract irritation.

STRONG OXIDIZING AGENT. WILL BURN WITH THE EVOLUTION OF CHLORINE AND EQUALLY TOXIC GASES.

Contact with water slowly liberates irritating and hazardous chlorine containing gases.

Decomposes at 460-480°F with release of harmful gases.

PRIMARY ROUTES OF ENTRY: Eye and skin contact, inhalation, ingestion

Towerbrom 960

TARGET ORGANS: Eye, skin, respiratory tract, gastrointestinal tract

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: No data available.

POTENTIAL HEALTH EFFECTS:

EYE CONTACT: This product may cause severe irritation and damage upon contact with the eye.

SKIN CONTACT: This product may be irritating and damaging to the skin upon contact. In dry form, the product is not appreciably irritating to dry skin. However, on contact with moisture, sodium dichloro-s-triazinetrione readily hydrolyzes to form hypochlorous acid which may cause tissue damage. This product is not expected to be absorbed through the skin in harmful amounts or to cause an allergic skin reaction.

INGESTION: Ingestion of this product may result in burning of mouth, throat and esophagus, abdominal distress and severe irritation, possible corrosion of the digestive tract. Prolonged ingestion of large amounts may cause adverse central nervous system effects including: headache, irritability, muscle incoordination and dizziness.

INHALATION: Inhalation of sodium dichloro-s-triazinetrione dust has been reported to produce nose, throat, and respiratory tract irritation and in some individuals bronchospasm may result. Chlorine gas from decomposition of the product has been reported to cause burning of the nose and mouth and irritation of the lining of the respiratory tract with coughing, a choking sensation, chest pain, vomiting, nausea, headache, dizziness and fainting. The onset of severe respiratory symptoms following exposure to chlorine, including pulmonary edema and pneumonitis, may be delayed.

SUBCHRONIC, CHRONIC:

Exposure to large amounts may cause damage to the liver and kidney. Due to sodium bromide content, prolonged ingestion of large amounts may cause adverse central nervous system effects.

CARCINOGENICITY:

NTP:

No ingredients listed in this section

IARC:

No ingredients listed in this section

OSHA:

No ingredients listed in this section

Section 4. FIRST AID MEASURES

EYE CONTACT: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Seek medical aid immediately.

SKIN CONTACT: In case of contact, immediately brush off excess product and flush with plenty of soap and water. Remove contaminated clothing. Seek medical aid immediately. Wash clothing before reuse.

INGESTION: If swallowed, do NOT induce vomiting. Give large quantities of water. Seek medical aid immediately. Never give anything by mouth to an unconscious person.

NOTE TO PHYSICIAN: Probable mucosal damage may contraindicate the use of gastric lavage.

Towerbrom 960

INHALATION: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Seek medical aid.

Section 5. FIRE-FIGHTING MEASURES

FLASH POINT: Not applicable

This product is not, by definition, flammable or combustible, however, it is an oxidizing and chlorinating agent. If heated by an outside source to temperatures above 240°C (464°F), it will undergo vigorous self-sustaining decomposition with the evolution of heat and dense noxious gases. In addition, when in contact with another combustible material, this product will increase the burning rate of the combustible material. When ignited, it will burn with the evolution of noxious chlorine containing gases.

LOWER FLAMMABLE LIMIT: Not applicable

UPPER FLAMMABLE LIMIT: Not applicable

AUTO-IGNITION TEMPERATURE: Not available

EXTINGUISHING MEDIA: Use water spray to cool containers exposed to fire and massive quantities of water to dilute material involved in a fire or spilled from containers. Do not use ABC or other dry chemical fire extinguishers since there is the potential for a violent reaction.

FIRE-FIGHTING INSTRUCTIONS: Exercise caution when fighting any chemical fire. A self-contained breathing apparatus and protective clothing are essential. Chlorine containing gases with traces of phosgene can be liberated at temperatures in excess of 400°F. Using a 10% solution of sodium carbonate, thoroughly decontaminate fire fighting equipment including all fire fighting wearing apparel after the incident.

FIRE & EXPLOSION HAZARDS: Nitrogen trichloride can be generated slowly by the reaction of small quantities of water with a high concentration of this product. Nitrogen trichloride can present an explosion hazard.

Immediately after a fire has been extinguished, check for wet or damp material. Any spilled material from burned or broken containers should be assumed to be contaminated. Neutralize to a non-oxidizing material for safe disposal. Do not attempt to re-close broken containers, even for movement to the disposal area. They should be left open to disperse any nitrogen trichloride that may form.

Bulging containers require extreme care. Contact the fire department.

DECOMPOSITION PRODUCTS: Chlorine (released in presence of moisture) and other chlorine containing compounds. Hypobromous acid, hypochlorous acid, and cyanuric acid (released when dissolved in water). Thermal decomposition or combustion may produce oxides of nitrogen, disodium oxide, bromine, and traces of phosgene.

NFPA RATINGS: Health = 3 Flammability = 1 Reactivity = 2 Special Hazard = Oxidizer

Hazard rating scale: 0=Minimal 1=Slight 2=Moderate 3=Serious 4=Severe

Towerbrom 960

Section 6. ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Contain spilled material. Any spillage should be cleaned up as soon as possible. DO NOT add water to spilled material. Using clean, dedicated equipment, sweep and scoop all spilled material, contaminated soil, and other contaminated material and place into clean, dry containers for disposal. DO NOT use floor sweeping compounds to clean up spills. DO NOT close drums containing wet or damp material. They should be left open to disperse any nitrogen trichloride that may form. DO NOT transport wet or damp material. Keep product out of sewers, water sheds and water systems. DO NOT contaminate water, food, or feed by storage or disposal. Report any release of this product if it could cause harm to people or the environment, or if the State requires a more stringent reporting threshold. If this product spill gets into the ground or surface water or is involved in a fire, toxic gases are released; therefore, the spill should be reported.

Section 7. HANDLING AND STORAGE

HANDLING: It is a violation of Federal law to use this product in a manner inconsistent with its labeling. Do not get in eyes, on skin or clothing. Avoid breathing dust or fume. Use with adequate ventilation. Wash thoroughly after handling. Keep container closed when not in use. Keep from contact with clothing and other combustible materials. Remove and wash contaminated clothing promptly. Never add water to product. Always add product to large quantities of water. Use clean, dry utensils. DO NOT add this product to any dispensing device containing remnants of any other product. Such use may cause a violent reaction leading to fire or explosion. Contamination with moisture, organic matter, or other chemicals may start a chemical reaction with generation of heat, liberation of hazardous gases, and possible fire and explosion.

STORAGE: Store in a cool, dry, well-ventilated place away from flammable liquids, combustible materials, and oxidizable materials. Store in original container and in a dry area where temperatures do not exceed 125°F (52°C) for 24 hours. Keep container tightly closed. DO NOT allow water to get into container and keep off wet floors. Do not contaminate water, food or feed by storage or disposal.

Section 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

PERSONAL PROTECTIVE EQUIPMENT:

EYE/FACE PROTECTION: Chemical splash goggles and face shield

SKIN PROTECTION: Chemical resistant gloves and protective clothing

RESPIRATORY PROTECTION: If airborne concentrations exceed published exposure limits, use a NIOSH approved respirator in accordance with OSHA respiratory protection requirements (29 CFR 1910.134).

ENGINEERING CONTROLS: Use local and/or general exhaust ventilation to maintain airborne concentrations below exposure limits.

WORK PRACTICES: Eye wash station and safety shower should be accessible in the immediate area of use.

Towerbrom 960

Section 9. PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT: Not applicable

SOLUBILITY IN WATER: 10 g/100 g @ 25°C

VAPOR PRESSURE: Not available

SPECIFIC GRAVITY: Not applicable

VAPOR DENSITY (air=1): Not available

pH: 6.0 - 7.0 (1% solution @ 25°C)

%VOLATILE BY WEIGHT: Nil

FREEZING POINT: 240 - 250°C

APPEARANCE AND ODOR: White crystalline granules with a slight bromine odor.

Section 10. STABILITY AND REACTIVITY

CHEMICAL STABILITY: Stable

HAZARDOUS POLYMERIZATION: Will not occur

CONDITIONS TO AVOID: Overheating.

INCOMPATIBILITY: Avoid contact with water on concentrated material in the container. Also avoid contact with easily oxidizable organic material; ammonia, urea, or similar nitrogen containing compounds; inorganic reducing compounds; floor sweeping compounds; calcium hypochlorite; alkalis.

DECOMPOSITION PRODUCTS: Chlorine (released in presence of moisture) and other chlorine containing compounds. Hypobromous acid, hypochlorous acid, and cyanuric acid (released when dissolved in water). Thermal decomposition or combustion may produce oxides of nitrogen, disodium oxide, bromine, and traces of phosgene.

Towerbrom 960

Section 11. TOXICOLOGICAL INFORMATION

ON PRODUCT:

Product Oral LD₅₀ (rat): 1350 mg/kg (similar formulation)

Product Dermal LD₅₀ (rabbit): > 5000 mg/kg (similar formulation)

Toxicological data on oral effects: Following repeated exposure (8-weeks) to sodium dichloro-s-triazinetrione in their drinking water, rats demonstrated decreases in body weight gain, and drinking water consumption and changes in urine composition at dose levels of 4000 and 8000 ppm which produced some deaths. In a 90-day feeding study with rats, the two highest dose levels of 6000 and 12,000 ppm caused increases of the relative kidney and liver weights.

No birth defects were noted in rats given sodium dichloro-s-triazinetrione orally during the pregnancy, even at amounts which produced adverse effects on the mothers.

Toxic effects reported following ingestion of large single doses of bromide include stomach irritation, nausea, vomiting, and lethargy. Repeated ingestion of sodium bromide produces sedation and central nervous system (CNS) depression with possible effects such as headache, irritability, vertigo, memory loss, muscular incoordination, increased action of the reflexes, decreased appetite, hallucinations, acne-like rash, stupor and coma.

Following repeated exposures (4-12 weeks) to sodium bromide in their feed, signs of muscular incoordination and depressed grooming, changes in body weight and behavior, and endocrine (hormone) system effects were reported in laboratory animals. Reduced fertility and viability of offspring were noted in rats fed sodium bromide for three successive generations. These effects on the ability of rats to reproduce were reported to be reversible upon withdrawal of the bromide. Results of another study suggest that learning ability was reduced in offspring of rats given sodium bromide during pregnancy.

Toxicological data on inhalation effects: Signs of eye and nose irritation and changes in body weight, liver weight and blood cell composition were noted following repeated inhalation (4-weeks) of sodium dichloro-s-triazinetrione dust by rats.

Section 12. ECOLOGICAL INFORMATION

ON PRODUCT:

Aquatic toxicity data:

48 hr LC₅₀ (mysid shrimp): 3.54 ppm

96 hr LC₅₀ (sheepshead minnow): 3.42 ppm

48 hr LC₅₀ (Daphnia magna): 2.5 ppm

48 hr LC₅₀ (fathead minnow): 0.7 ppm

Environmental hazards:

This product 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.

Towerbrom 960

ON INGREDIENTS:

Chemical Name
Sodium dichloroisocyanurate

Aquatic Toxicity Data
96 hr LC₅₀ (rainbow trout): 0.37 ppm
96 hr LC₅₀ (bluegill sunfish): 0.43 ppm

Section 13. DISPOSAL CONSIDERATIONS

RCRA STATUS: Discarded product, as sold, would be considered a RCRA Hazardous Waste based on the characteristics of ignitability and reactivity. The EPA Hazardous Waste Numbers are D001 and D003.

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 label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

Section 14. TRANSPORT INFORMATION

DOT CLASSIFICATION:

Class/Division: 5.1
Proper Shipping Name: Dichloroisocyanuric acid salts, mixture
Label: Oxidizer
Packing Group: II
ID Number: UN 2465

Section 15. REGULATORY INFORMATION

OSHA Hazard Communication Status: Hazardous

TSCA: Pesticides are exempted by TSCA (the Toxic Substances Control Act), under Section 3(2)(a)ii, from the provisions of the Act.

CERCLA reportable quantity of EPA hazardous substances in product:

Chemical Name RQ
No ingredients of this product have CERCLA reportable quantities.

Product RQ: This product has not been assigned an RQ; however, releases may be reportable. (Notify EPA of product spills exceeding this amount.)

SARA TITLE III:

Section 302 Extremely Hazardous Substances:

Chemical Name CAS # RQ TPQ
There are no SARA 302 Extremely Hazardous Substances in this product.

Section 311 and 312 Health and Physical Hazards:

Immediate [yes]	Delayed [yes]	Fire [yes]	Pressure [no]	Reactivity [yes]
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Towerbrom 960

Section 313 Toxic Chemicals:

Chemical Name

CAS #

% by Weight

There are no reportable SARA 313 Toxic Chemicals in this product.

Section 16. OTHER INFORMATION

HMIS RATINGS: Health = 3* Flammability = 1 Reactivity = 2
 Personal Protective Equipment = X (to be specified by user depending on use conditions)

*There are potential chronic health effects to consider.

Hazard rating scale: 0=Minimal 1=Slight 2=Moderate 3=Serious 4=Severe

MSDS REVISION SUMMARY: Supersedes MSDS issued on 10/26/95. The MSDS has been changed in Section 5.

While this information and recommendations set forth herein are believed to be accurate as of the date hereof, CALGON CORPORATION MAKES NO WARRANTY WITH RESPECT HERETO AND DISCLAIMS ALL LIABILITY FROM RELIANCE THEREON.

PREPARED BY: P.J. Maloney

ChlorKill 8816



P.O. Box 1346
Pittsburgh, PA 15230-1346
24-Hour Emergency Telephone
Phone--(412)494-8000
CHEMTREC® 1-800-424-9300

MATERIAL SAFETY DATA SHEET

Section 1. PRODUCT IDENTIFICATION

PRODUCT NAME: **ChlorKill 8816**

CHEMICAL DESCRIPTION: Sodium bisulfite solution

PRODUCT CLASS: Water treatment

MSDS CODE: 0638-07-22-97

Section 2. INFORMATION ON INGREDIENTS

Chemical Name	CAS Number	% by Weight	OSHA PEL	ACGIH TLV
Sodium bisulfite (or Sodium hydrogen sulfite)	7631-90-5	> 38	None established	TWA 5 mg/m ³ , A4

Section 3. HAZARDS IDENTIFICATION

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

Clear, light yellow liquid with pungent sulfur dioxide odor.

WARNING!

Causes eye, skin, and respiratory tract irritation.

PRIMARY ROUTES OF ENTRY: Eye and skin contact, inhalation

TARGET ORGANS: Eye, skin, respiratory tract

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Sulfite-sensitive individuals who inhale or ingest this product may experience severe allergic reaction.

POTENTIAL HEALTH EFFECTS:

EYE CONTACT: This product produces irritation upon contact with the eye.

SKIN CONTACT: This product causes irritation upon contact with the skin. No data is available to suggest that this product may produce an allergic skin reaction or be absorbed through the skin in harmful amounts.

INGESTION: Swallowing this product may irritate the gastrointestinal tract and cause nausea and vomiting. Sulfite-sensitive individuals, upon ingestion of this product, may experience an allergic reaction characterized by nausea, diarrhea, itching, swelling, hives, acute asthma attack (possibly life-threatening), loss of consciousness or anaphylactic shock. Large doses may produce violent gastrointestinal colic and depression of the central nervous system.

ChlorKill 8816

INHALATION: Inhalation of product mist or vapors is irritating to the respiratory tract. Sulfite-sensitive individuals, upon inhalation of this product, may experience an allergic reaction similar to that described under **INGESTION**.

SUBCHRONIC, CHRONIC: No applicable information was found concerning any potential health effects resulting from subchronic or chronic exposure to the product.

CARCINOGENICITY:

NTP: No ingredients listed in this section.

IARC: No ingredients listed in this section.

OSHA: No ingredients listed in this section.

Section 4. FIRST AID MEASURES

EYE CONTACT: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Seek medical aid.

SKIN CONTACT: In case of contact, flush skin with plenty of water. Remove contaminated clothing. Seek medical aid if irritation persists. Wash clothing before reuse.

INGESTION: Not an expected route of overexposure. If swallowed, do not induce vomiting. Call a physician. This product would be expected to be practically non-toxic by ingestion.

INHALATION: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Seek medical aid.

Section 5. FIRE-FIGHTING MEASURES

FLASH POINT: Not applicable
Sodium bisulfite is non-flammable and non-explosive under normal conditions of use.

LOWER FLAMMABLE LIMIT: Not applicable

UPPER FLAMMABLE LIMIT: Not applicable

AUTO-IGNITION TEMPERATURE: Not applicable

EXTINGUISHING MEDIA: Use extinguishing media appropriate for the surrounding fire.

FIRE-FIGHTING INSTRUCTIONS:

Exercise caution when fighting any chemical fire. A self-contained breathing apparatus and protective clothing are essential. Use water to keep fire-exposed containers cool.

FIRE & EXPLOSION HAZARDS: Sulfur dioxide may be generated in a fire.

DECOMPOSITION PRODUCTS: Disodium oxide, sulfur dioxide, and sodium sulfide

NFPA RATINGS: Health = 2 Flammability = 0 Reactivity = 0 Special Hazard = None

Hazard rating scale: 0=Minimal; 1=Slight; 2=Moderate; 3=Serious; 4=Severe

ChlorKill 8816

Section 6. ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:

Wearing appropriate personal protective equipment, contain spill, collect onto inert absorbent and place into suitable container. Do not allow to contaminate sewers and waterways.

Section 7. HANDLING AND STORAGE

HANDLING: Avoid contact with eyes, skin and clothing.
Avoid breathing mist or sulfur dioxide vapors.
Use with adequate ventilation.
Wash thoroughly after handling.
Keep container closed when not in use.
Drums should be opened in well-ventilated areas.

STORAGE: Prolonged storage of drums containing bisulfites may result in the evolution of sulfur dioxide. The PEL for sulfur dioxide is 2 ppm (TWA), 5 ppm (STEL).
Store in a cool, well-ventilated area away from acids and oxidizing agents.

Section 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

PERSONAL PROTECTIVE EQUIPMENT:

EYE/FACE PROTECTION: Chemical splash goggles

SKIN PROTECTION: Chemical resistant gloves

RESPIRATORY PROTECTION: If airborne concentrations exceed published exposure limits, use a NIOSH approved respirator in accordance with OSHA respiratory protection requirements (29 CFR 1910.134).

ENGINEERING CONTROLS: Local exhaust ventilation may be required in addition to general room ventilation to maintain airborne concentrations below exposure limits.

WORK PRACTICES: An eye wash station should be accessible in the immediate area of use.

UNSATISFACTORY MATERIALS OF CONSTRUCTION: Aluminum and carbon steel.

Section 9. PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT: 219°F (104°C)

SOLUBILITY IN WATER: Complete

VAPOR PRESSURE: 76 mmHg @ 37.7°C

SPECIFIC GRAVITY: 1.35 - 1.37 @ 25°C

VAPOR DENSITY (air = 1): 2.2

pH: 3.8 - 4.4

%VOLATILE BY WEIGHT: < 62% as water

FREEZING POINT: Begins at ~ 34 °F (~ 1.1 °C)

APPEARANCE AND ODOR: Clear, light yellow liquid with pungent sulfur dioxide odor.

VISCOSITY: ~ 2.8 cps @ 25°C

ChlorKill 8816

Section 10. STABILITY AND REACTIVITY

CHEMICAL STABILITY: Stable

HAZARDOUS POLYMERIZATION: Will not occur

CONDITIONS TO AVOID: Avoid acidification or heating since either condition accelerates the release of sulfur dioxide gas.

INCOMPATIBILITY: Strong oxidizers

DECOMPOSITION PRODUCTS: Disodium oxide, sulfur dioxide, and sodium sulfide

Section 11. TOXICOLOGICAL INFORMATION

Toxicological data on chronic effects:

Little information is available about the health significance of low-level chronic sulfite exposure (including production within the body), but sulfite and bisulfite react irreversibly through free radical formation and otherwise with various substances in the body including DNA. Sodium sulfite has been demonstrated to be mutagenic in microbial systems; however, it is not mutagenic in studies involving insects and is not considered to present a mutagenic threat to humans.

Test material	Oral LD50(rat)	Dermal LD50(rabbit)	Inhalation LC50(rat)
Sodium bisulfite (or Sodium hydrogen sulfite)	2000 mg/kg	Not available	Not available

Section 12. ECOLOGICAL INFORMATION

Test Material	Aquatic Toxicity Data
Sodium bisulfite	96 hr LC50 (mosquito fish): 240 ppm 48 hr LC50 (Daphnia magna): 116 ppm

Section 13. DISPOSAL CONSIDERATIONS

RCRA STATUS: Discarded product, as sold, would be considered a RCRA Hazardous Waste based on the characteristic of corrosivity. The EPA Hazardous Waste Number is D002.

DISPOSAL: Dispose of in accordance with local, state and federal regulations. Prevent entry into sewers or waterways.

Section 14. TRANSPORT INFORMATION

DOT CLASSIFICATION:

Proper Shipping Name: Bisulfites, aqueous solution, n.o.s. (contains Sodium bisulfite)

Class/Division: 8

ID Number: UN 2693

Packing Group: III

Label: Corrosive

ChlorKill 8816

Section 15. REGULATORY INFORMATION

OSHA Hazard Communication Status: Hazardous

TSCA: The ingredients of this product are listed on the Toxic Substances Control Act (TSCA) Chemical Substances Inventory.

CERCLA reportable quantity of EPA hazardous substances in product:

Chemical Name	RQ
Sodium bisulfite (or Sodium hydrogen sulfite)	5000 lb

Product RQ: 13,158 lb (Notify EPA of product spills exceeding this amount.)

SARA TITLE III:

Section 302 Extremely Hazardous Substances:

Chemical Name	CAS #	RQ	TPQ
None			

Section 311 and 312 Health and Physical Hazards:

Immediate [yes]	Delayed [no]	Fire [no]	Pressure [no]	Reactivity [no]
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Section 313 Toxic Chemicals:

Chemical Name	CAS #	% by Weight
None		

Section 16. OTHER INFORMATION

HMIS RATINGS: Health = 2 Flammability = 0 Reactivity = 0

Personal Protective Equipment = B

Hazard rating scale: 0=Minimal; 1=Slight; 2=Moderate; 3=Serious; 4=Severe

MSDS REVISION SUMMARY: Supersedes MSDS issued on 06/04/96. The MSDS has been changed in section 3.

While this information and recommendations set forth herein are believed to be accurate as of the date hereof, THE MANUFACTURER MAKES NO WARRANTY WITH RESPECT HERETO AND DISCLAIMS ALL LIABILITY FROM RELIANCE THEREON.

PREPARED BY: Megan G. Marks

NPDES Effluent History for TN0020168

(from January, 1998 thru December, 2000)

DSN: 101 Diffuser Discharge

CHLORINE, TOTAL RESIDUAL

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
1980	0.080 mg/L	13.739 lbs/day	36	0.043 mg/L	425.897 lbs/mo	1980	0.026 mg/L	7.373 lbs/day

DISCHARGE EVENT OBSERVATION

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
17	-1.000 Y/N	Not Applicable	17	-1.000 Y/N	Not Applicable	17	-1.000 Y/N	Not Applicable

FLOW, IN CONDUIT OR THRU TREATMENT PLANT

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
1094	73.152 MGD	Not Applicable	36	48.795 MGD	Not Applicable	1094	33.670 MGD	Not Applicable

IC25 STATRE 7DAY CHR CERIODAPHNIA

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
3	13.200 PERCENT	Not Applicable	3	13.200 PERCENT	Not Applicable	3	13.200 PERCENT	Not Applicable

IC25 STATRE 7DAY CHR PIMEPHALES

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
3	13.200 PERCENT	Not Applicable	3	13.200 PERCENT	Not Applicable	3	13.200 PERCENT	Not Applicable

LC50 STATRE 96HR ACU CERIODAPHNIA

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
3	100.000 PERCENT	Not Applicable	3	100.000 PERCENT	Not Applicable	3	77.067 PERCENT	Not Applicable

LC50 STATRE 96HR ACU PIMEPHALES

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
3	100.000 PERCENT	Not Applicable	3	100.000 PERCENT	Not Applicable	3	100.000 PERCENT	Not Applicable

NOEL STATRE 7DAY CHR CERIODAPHNIA

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
3	100.000 PERCENT	Not Applicable	3	100.000 PERCENT	Not Applicable	3	77.467 PERCENT	Not Applicable

NOEL STATRE 7DAY CHR PIMEPHALES

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
3	100.000 PERCENT	Not Applicable	3	100.000 PERCENT	Not Applicable	3	80.000 PERCENT	Not Applicable

NPDES Effluent History for TN0020168

(from January, 1998 thru December, 2000)

OIL & GREASE

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
178	7.000 mg/L	2035.508 lbs/day	36	5.500 mg/L	63100.734 lbs/mo	178	5.014 mg/L	1409.605 lbs/day

PCB, TOTAL, SCAN EFFLUENT

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
2	0.050 YES=1;NO=0	Not Applicable	2	0.050 YES=1;NO=0	Not Applicable	2	0.050 YES=1;NO=0	Not Applicable

PH

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
179	8.890 pH units	Not Applicable	36	8.726 pH units	Not Applicable	179	8.187 pH units	Not Applicable

SOLIDS, TOTAL SUSPENDED

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
181	32.000 mg/L	4435.969 lbs/day	36	15.286 mg/L	137515.032 lbs/mo	181	8.142 mg/L	2153.249 lbs/day

TEMPERATURE, WATER DEG. CENTIGRADE

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
3285	31.200 C(deg)	Not Applicable	36	29.094 C(deg)	Not Applicable	3285	21.816 C(deg)	Not Applicable

NPDES Effluent History for TN0020168

(from January, 1998 thru December, 2000)

DSN: 103 Low Vol. Waste Treatment Pond

COPPER, TOTAL (AS CU)

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
1	0.004 ug/L	0.025 lbs/day	1	0.004 ug/L	0.149 lbs/mo	1	0.004 ug/L	0.025 lbs/day

FLOW, IN CONDUIT OR THRU TREATMENT PLANT

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
376	2.426 MGD	Not Applicable	36	1.524 MGD	Not Applicable	376	0.636 MGD	Not Applicable

IRON, TOTAL (AS FE)

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
39	0.970 ug/L	2.289 lbs/day	5	0.368 ug/L	23.617 lbs/mo	39	0.288 ug/L	1.531 lbs/day

OIL & GREASE

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
116	6.000 mg/L	63.555 lbs/day	36	5.333 mg/L	500.170 lbs/mo	116	5.009 mg/L	26.556 lbs/day

PCB, TOTAL, SCAN EFFLUENT

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
2	0.050 YES=1;NO=0	Not Applicable	2	0.050 YES=1;NO=0	Not Applicable	2	0.050 YES=1;NO=0	Not Applicable

PH

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
208	8.960 pH units	Not Applicable	36	8.540 pH units	Not Applicable	208	7.771 pH units	Not Applicable

PHOSPHORUS, TOTAL (AS P)

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
39	0.390 mg/L	0.635 lbs/day	5	0.121 mg/L	4.491 lbs/mo	39	0.096 mg/L	0.496 lbs/day

SOLIDS, TOTAL SUSPENDED

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
122	65.000 mg/L	101.689 lbs/day	36	22.889 mg/L	1134.752 lbs/mo	122	11.460 mg/L	58.762 lbs/day

NPDES Effluent History for TN0020168

(from January, 1998 thru December, 2000)

DSN: 107 Metal Cleaning Waste Pond

COPPER, TOTAL (AS CU)

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
19	0.070 ug/L	0.838 lbs/day	8	0.040 ug/L	1.871 lbs/mo	19	0.017 ug/L	0.353 lbs/day

FLOW, IN CONDUIT OR THRU TREATMENT PLANT

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
15	3.550 MGD	Not Applicable	8	3.200 MGD	Not Applicable	15	2.293 MGD	Not Applicable

IRON, TOTAL (AS FE)

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
19	1.000 ug/L	13.883 lbs/day	8	0.650 ug/L	41.096 lbs/mo	19	0.381 ug/L	7.983 lbs/day

NITROGEN, AMMONIA TOTAL (AS N)

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
1	2.200 mg/L	Not Applicable	1	2.200 mg/L	Not Applicable	1	2.200 mg/L	Not Applicable

OIL & GREASE

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
19	5.000 mg/L	133.488 lbs/day	8	5.000 mg/L	340.095 lbs/mo	19	5.000 mg/L	95.644 lbs/day

PH

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
18	8.760 pH units	Not Applicable	8	8.575 pH units	Not Applicable	18	7.947 pH units	Not Applicable

SOLIDS, TOTAL SUSPENDED

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
19	8.000 mg/L	135.157 lbs/day	8	6.000 mg/L	291.936 lbs/mo	19	4.167 mg/L	87.495 lbs/day

NPDES Effluent History for TN0020168

(from January, 1998 thru December, 2000)

DSN: 111 Combined Sewage Treatment Plants

BOD, 5-DAY (20 DEG. C)

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
159	29.000 mg/L	Not Applicable	36	17.600 mg/L	Not Applicable	159	3.057 mg/L	Not Applicable

CHLORINE, TOTAL RESIDUAL

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
800	1.800 mg/L	0.073 lbs/day	36	0.368 mg/L	2.272 lbs/mo	800	0.227 mg/L	0.032 lbs/day

COLIFORM, FECAL MF, M-FC BROTH, 44.5C

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
162	1066.600 N/100 ml	Not Applicable	36	342.000 N/100 ml	Not Applicable	162	57.010 N/100 ml	Not Applicable

FLOW, IN CONDUIT OR THRU TREATMENT PLANT

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
1094	0.141 MGD	Not Applicable	36	0.036 MGD	Not Applicable	1094	0.017 MGD	Not Applicable

SOLIDS, SETTLEABLE

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
794	0.100 ml/L	Not Applicable	36	0.100 ml/L	Not Applicable	794	0.100 ml/L	Not Applicable

SOLIDS, TOTAL SUSPENDED

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
159	23.000 mg/L	1.865 lbs/day	36	7.250 mg/L	57.822 lbs/mo	159	1.975 mg/L	0.317 lbs/day

NPDES Effluent History for TN0020168

(from January, 1998 thru December, 2000)

DSN: 112 Runoff Holding Pond

CHLORINE, TOTAL RESIDUAL

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
138	0.100 mg/L	0.617 lbs/day	34	0.100 mg/L	6.789 lbs/mo	138	0.074 mg/L	0.165 lbs/day

FLOW, IN CONDUIT OR THRU TREATMENT PLANT

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
172	1.802 MGD	Not Applicable	34	0.740 MGD	Not Applicable	172	0.247 MGD	Not Applicable

IC25 STATRE 7DAY CHR CERIODAPHNIA

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
4	100.000 PERCENT	Not Applicable	4	100.000 PERCENT	Not Applicable	4	99.850 PERCENT	Not Applicable

IC25 STATRE 7DAY CHR PIMEPHALES

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
3	100.000 PERCENT	Not Applicable	3	100.000 PERCENT	Not Applicable	3	100.000 PERCENT	Not Applicable

LC50 STATRE 96HR ACU CERIODAPHNIA

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
3	100.000 PERCENT	Not Applicable	3	100.000 PERCENT	Not Applicable	3	100.000 PERCENT	Not Applicable

LC50 STATRE 96HR ACU PIMEPHALES

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
6	100.000 PERCENT	Not Applicable	5	100.000 PERCENT	Not Applicable	6	100.000 PERCENT	Not Applicable

NITROGEN, AMMONIA TOTAL (AS N)

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
152	0.780 mg/L	Not Applicable	34	0.588 mg/L	Not Applicable	152	0.176 mg/L	Not Applicable

NOEL STATRE 7DAY CHR CERIODAPHNIA

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
3	100.000 PERCENT	Not Applicable	3	100.000 PERCENT	Not Applicable	3	100.000 PERCENT	Not Applicable

NOEL STATRE 7DAY CHR PIMEPHALES

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
6	100.000 PERCENT	Not Applicable	5	100.000 PERCENT	Not Applicable	6	83.520 PERCENT	Not Applicable

NPDES Effluent History for TN0020168

(from January, 1998 thru December, 2000)

OXYGEN, DISSOLVED (DO)

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
138	14.500 mg/L	Not Applicable	34	12.775 mg/L	Not Applicable	138	9.373 mg/L	Not Applicable

PH

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
169	9.490 pH units	Not Applicable	34	9.200 pH units	Not Applicable	169	8.326 pH units	Not Applicable

SOLIDS, TOTAL SUSPENDED

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
140	71.000 mg/L	134.571 lbs/day	34	45.500 mg/L	651.717 lbs/mo	140	12.916 mg/L	24.666 lbs/day

NPDES Effluent History for TN0020168

(from January, 1998 thru December, 2000)

DSN: 113 SCCW Discharge

CHLORINE, TOTAL RESIDUAL

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
76	0.080 mg/L	78.789 lbs/day	18	0.056 mg/L	2363.658 lbs/mo	76	0.032 mg/L	34.006 lbs/day

DISCHARGE EVENT OBSERVATION

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
17	-1.000 Y/N	Not Applicable	17	-1.000 Y/N	Not Applicable	17	-1.000 Y/N	Not Applicable

FLOW, IN CONDUIT OR THRU TREATMENT PLANT

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
497	222.440 MGD	Not Applicable	18	198.710 MGD	Not Applicable	497	127.464 MGD	Not Applicable

IC25 STATRE 7DAY CHR CERIODAPHNIA

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
3	41.200 PERCENT	Not Applicable	3	41.200 PERCENT	Not Applicable	3	33.967 PERCENT	Not Applicable

IC25 STATRE 7DAY CHR PIMEPHALES

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
3	41.200 PERCENT	Not Applicable	3	41.200 PERCENT	Not Applicable	3	41.200 PERCENT	Not Applicable

OXYGEN, DISSOLVED (DO)

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
75	11.000 mg/L	Not Applicable	18	10.450 mg/L	Not Applicable	75	8.458 mg/L	Not Applicable

PH

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
75	8.570 pH units	Not Applicable	18	8.268 pH units	Not Applicable	75	7.928 pH units	Not Applicable

SOLIDS, TOTAL SUSPENDED

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
76	24.000 mg/L	9010.019 lbs/day	18	7.500 mg/L	279310.597 lbs/mo	76	3.380 mg/L	3716.788 lbs/day

STREAM FLOW DIRECTION RECORDING

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
439	0.658	Not Applicable	15	0.309	Not Applicable	439	0.186	Not Applicable

NPDES Effluent History for TN0020168

(from January, 1998 thru December, 2000)

TEMP. DIFF. BETWEEN SAMP. & UPSTRM DEG. C

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
445	2.800 C(deg)	Not Applicable	15	1.858 C(deg)	Not Applicable	445	0.804 C(deg)	Not Applicable

TEMPERATURE, RATE OF CHANGE, DEG. C/HR

Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
443	1.600 C(deg)	Not Applicable	15	0.694 C(deg)	Not Applicable	443	0.456 C(deg)	Not Applicable

TEMPERATURE, WATER DEG. CENTIGRADE

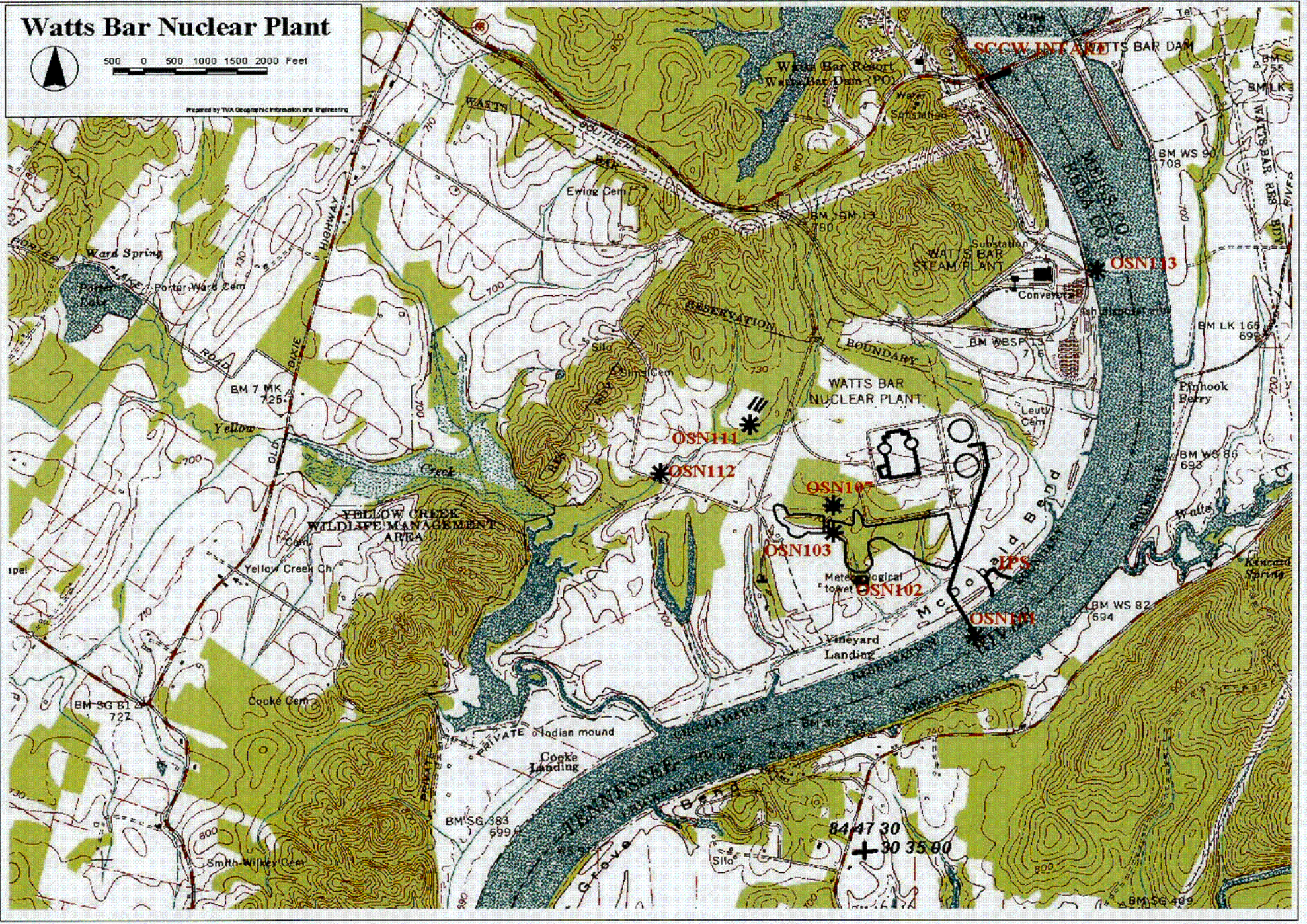
Maximum Daily Values			Max 30-day Values			Average Daily Values Over Report Period		
Count	Max Conc./Rate	Max Mass	Count	Max Conc./Rate	Max Mass	Count	Avg Conc./Rate	Avg Mass
4449	34.740 C(deg)	Not Applicable	18	32.075 C(deg)	Not Applicable	4449	21.577 C(deg)	Not Applicable

Watts Bar Nuclear Plant



500 0 500 1000 1500 2000 Feet

Prepared by TVA Geographic Information and Engineering



CO1

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