ACCELERATED DISTRIBUTION DEMONSTRATION SYSTEM

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:9204140186 DOC.DATE: 92/04/06 NOTARIZED: NO DOCKET #
FACIL:50-269 Oconee Nuclear Station, Unit 1, Duke Power Co. 05000269
50-270 Oconee Nuclear Station, Unit 2, Duke Power Co. 05000270
50-287 Oconee Nuclear Station, Unit 3, Duke Power Co. 05000287
AUTH.NAME AUTHOR AFFILIATION
GROGAN,J.E. Duke Power Co.
RECIP.NAME RECIPIENT AFFILIATION
MOUBERRY,A. North Carolina, State of
KEPLER,R. North Carolina, State of

SUBJECT: Submits amend to 911202 application for amend to NPDES Permit NC0026255,allowing use of copper sulfate & Cutrine Plus algicides & revising two flows.Form 101 & MSDS sheets for listed chemicals encl.

DISTRIBUTION CODE: C001D COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 30
TITLE: Licensing Submittal: Environmental Rept Amdt & Related Correspondence

NOTES:

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	WIENS,L	1	1			
INTERNAL:	ACRS	6	6	NRR/DET/ESGB 8D	1	1
	OC/LEMB	1	0	OGC/HDS2	1	0
	REG FILE 01	1	1	RGN2 DRSS/RPB	1	1
EXTERNAL:	EG&G SIMPSON,F	2	2	NRC PDR	1	1
	NSIC	1	1			

NOTE TO ALL "RIDS" RECIPIENTS:

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RIDS/ADDS

RIDS/ADDS

RIDS/ADDS

Duke Power Company
Wachovia Center
P.O. Box 1007
Charlotte, N.C. 28201-1007

DUKE POWER

April 6, 1992

Mr. Arthur Mouberry
Permits and Engineering Unit
Division of Environmental Management
P. O. Box 29535
Raleigh, NC 27626-0535

Attn: Mr. Randy Kepler
NPDES Permits Group

RE: Training and Technology Center
NPDES Permit NC 0026255
Amendment Request to Permit Application
File: MC 702.13

Dear Mr. Kepler:

With reference to the December 2, 1991, letter to you requesting NPDES permit renewal for the Duke Power Training and Technology Center, we request an amendment to our application. This amendment is needed to allow the use of copper sulfate and Cutrine Plus algicides, and to revise two flows on the December 2, 1991, application. Please find enclosed a Form 101 and an MSDS sheet for each of these chemical products. Calculations are included that are based on the revised flow rates.

Due to recent algal problems at our facility, we have already submitted to the NCDNRCD toxicity data for the use of Cutrine Plus. We have received verbal approval to begin use of this product and anticipate written approval in the near future.

Duke Power Company requests an amendment to certain flow numbers on the "Application for Permit to Discharge - Short Form D" originally submitted to you December 2, 1991. Attachment 8 is the amended form with the following changes: (1) Item 6.C., "Other Discharges," should be amended to 50,000 or more gallons per day; and (2) Item 6.d., "Maximum Per Operating Day," should be amended to 50,000 or more gallons per day.

The original numbers listed in the December 2, 1991, application reflected the reduced flow rates due to a reduction in in-house laboratory testing. The Training and Technology Center laboratory projects that its flow may increase in the future due to increased testing. The system

C001
1/1

was originally designed and permitted for these higher flow rates.

We appreciate your consideration of this request. Should you have any questions or desire additional information, please contact Norma Atherton at (704) 382-2116 or Robert Wylie at (704) 373-2028.

Sincerely,

James E. Grogan

James E. Grogan, Vice President
Generation Services

Attachments

c. Mr. Rex Gleason (w/attachment)
NRC Document Control Desk

Attachment 1 Pool Elevation of 10 Feet

BIOCIDE/CHEMICAL TREATMENT

WORKSHEET-FORM 101

The following calculations are to be performed on any biocidal products ultimately discharged to the surface waters of North Carolina. This worksheet must be completed separately for each biocidal product in use. This worksheet is to be returned with all appropriate data entered into the designated areas with calculations performed as indicated.

I. Facility Name Duke Power Company / Training and Technology Center

NPDES # NC 0026255

County Mecklenburg

Receiving Stream Lake Norman / Catawba River Basin 7Q10 80 (cfs)

(All above information supplied by the Division of Environmental Management)

What is the Average Daily Discharge (A.D.D.) volume of the water handling systems to the receiving water body?

A.D.D. = 0.013 (In M.G.D.)

Please calculate the Instream Waste Concentration (IWC in percent) of this discharge using the data entered above.

$$IWC = \frac{(A.D.D.) \times 100}{(7Q10)(0.646)} = \frac{(0.013) \times 100}{(80)(0.646) + (A.D.D.)} = 0.025\ \%$$

This value (IWC) represents the waste concentration to the receiving stream during low flow conditions.

II. What is the name of the whole product chemical treatment proposed for use in the discharge identified in Part I?

Cutrine Plus

Please list the active ingredients and percent composition:

Copper Alkanolamine Complex	%
	%
	%
	%
	%

What feed or dosage rate (D.R.) is used in this application? The units must be converted to grams of whole product used per day.

D.R.= 2300 grams/day

ATTACHMENT

Estimate total volume of the water handling system between entry of biocidal product and NPDES discharge point. On an attached sheet please provide justification for this estimate (system volume, average cycles per blowdown, holding lagoon size, etc.)

Volume= .552 million gallons See ATTACHMENT 4

What is the pH of the handling system prior to biocide addition? If unknown, enter N/A. 7

What is the decay rate (D.K.) of the product? If unknown, assume no decay (D.K.=0) and proceed to asterisk. The degradation must be stated at pH level within 1/2 pH standard unit within handling system. Enter the half life (Half Life is the time required for the initial product to degrade to half of its original concentration). Please provide copies of the sources of this data.

H.L. = 0 Days

The decay rate is equal to $\frac{1}{H.L.}$ X 0.69 = 0 =Decay Rate (D.K.)

Calculate degradation factor (D.F.). This is the first order loss coefficient.

$$D.F. = \frac{(A.D.D.)}{(Volume)} + (D.K.) \quad \frac{(0.013)}{(0.552)} + (0) = 0.0236$$

Calculate Steady State Discharge Concentration:

$$\text{Dischg Conc.} = \frac{(D.R.)}{(D.F.)(Volume)(3785)} = \frac{(2300)}{(0.0236)(0.552)(3785)} = 46.6 \text{ mg/l}$$

Calculate concentration of biocide instream during low flow conditions.

(Receiving Stream Concentration)

$$\frac{(Dischg.\ Conc.) \times (IWC\%)}{100} = \frac{(46.6) \times (0.025)}{100} = 0.0117 \text{ mg/l}$$

Receiving Stream Concentration

III. Calculate regulated limitation.

List all LC50 data available for the whole product according to the following columns. (Note that units should be in mg/l). Please provide copies of the sources of this data.

Organism	Test Duration	LC50 (mg/l)
See Attachment 3		

ATTACHMENT 1

Choose the lowest LC50 listed above:

Enter the LC50: 1.2 mg/L

If the half life (H.L.) is less than 4 days, perform the following calculation.

Regulated Limitation = 0.05 x LC50 = _____mg/l

If the half life (H.L.) is greater than 4 days or unknown, perform the following calculation.

Regulated Limitation = 0.01 x LC50 = 0.012 mg/l

Choose the appropriate regulated limitation from the calculations immediately above and place in this blank:

0.012 mg/liter

From Part II enter the receiving stream concentration:

0.0117 mg/liter

IV. Analysis.

If the receiving stream concentration is greater than the calculated regulated limitation, then this biocide is unacceptable for use.

J. R. Garrison

Name (Print)

J. R. Garrison / RRM — 3/12/92

Signature — Date

Person in Responsible Charge

ATTACHMENT 2 Pond Elevation of 6 Feet

BIOCIDE/CHEMICAL TREATMENT

WORKSHEET-FORM 101

The following calculations are to be performed on any biocidal products ultimately discharged to the surface waters of North Carolina. This worksheet must be completed separately for each biocidal product in use. This worksheet is to be returned with all appropriate data entered into the designated areas with calculations performed as indicated.

I. Facility Name Duke Power Company / Training and Technology Center

NPDES # NC 0026255

County Mecklenburg

Receiving Stream Lake Norman / Catawba River Basin 7Q10 80 (cfs)

(All above information supplied by the Division of Environmental Management)

What is the Average Daily Discharge (A.D.D.) volume of the water handling systems to the receiving water body?

A.D.D. = 0.013 (In M.G.D.)

Please calculate the Instream Waste Concentration (IWC in percent) of this discharge using the data entered above.

$$IWC = \frac{(A.D.D.) \times 100}{(7Q10)(0.646)} = \frac{(0.013) \times 100}{(80)(0.646) + (A.D.D.)} = 0.025\ \%$$

This value (IWC) represents the waste concentration to the receiving stream during low flow conditions.

II. What is the name of the whole product chemical treatment proposed for use in the discharge identified in Part I?

Cutrine Plus

Please list the active ingredients and percent composition:

Copper Alkanolamine Complex	%
	%
	%
	%
	%

What feed or dosage rate (D.R.) is used in this application? The units must be converted to grams of whole product used per day.

D.R.= 2,288 grams/day

ATTACHMENT 2

Estimate total volume of the water handling system between entry of biocidal product and NPDES discharge point. On an attached sheet please provide justification for this estimate (system volume, average cycles per blowdown, holding lagoon size, etc.)

Volume= .259 million gallons SEE ATTACHMENT 4

What is the pH of the handling system prior to biocide addition? If unknown, enter N/A. 7

What is the decay rate (D.K.) of the product? If unknown, assume no decay (D.K.=0) and proceed to asterisk. The degradation must be stated at pH level within 1/2 pH standard unit within handling system. Enter the half life (Half Life is the time required for the initial product to degrade to half of its original concentration). Please provide copies of the sources of this data.

H.L. = 0 Days

The decay rate is equal to $\frac{1}{H.L.}$ X 0.69 = 0 =Decay Rate (D.K.)

Calculate degradation factor (D.F.). This is the first order loss coefficient.

D.F. = $\frac{(A.D.D.)}{(Volume)}$ + (D.K.) $\frac{(.013)}{(.259)}$ + (0) = .0502

Calculate Steady State Discharge Concentration:

Dischg Conc. = $\frac{(D.R.)}{(D.F.)(Volume)(3785)} = \frac{(2,288)}{(.0502)(.259)(3785)}$ = 46.5 mg/l

Calculate concentration of biocide instream during low flow conditions.

(Receiving Stream Concentration)

$\frac{(Dischg.\ Conc.) \times (IWC\%)}{100} = \frac{(46.5) \times (0.025)}{100}$ = 0.0117 mg/l

Receiving Stream Concentration

III. Calculate regulated limitation.

List all LC50 data available for the whole product according to the following columns. (Note that units should be in mg/l). Please provide copies of the sources of this data.

Organism	Test Duration	LC50 (mg/l)
See Attachment 3		

ATTACHMENT 2

Choose the lowest LC50 listed above:

Enter the LC50: 1.2 mg/L

If the half life (H.L.) is less than 4 days, perform the following calculation.

Regulated Limitation = 0.05 x LC50 = _____ mg/l

If the half life (H.L.) is greater than 4 days or unknown, perform the following calculation.

Regulated Limitation = 0.01 x LC50 = 0.0120 mg/l

Choose the appropriate regulated limitation from the calculations immediately above and place in this blank:

0.0120 mg/liter

From Part II enter the receiving stream concentration:

0.0117 mg/liter

IV. Analysis.

If the receiving stream concentration is greater than the calculated regulated limitation, then this biocide is unacceptable for use.

J. R. Garrison

Name (Print)

J. R. Garrison / RRP

Signature

3/12/92

Date

Person in Responsible Charge

Attachment 3

TOXICOLOGY DATA

ORGANISM	FORMULATED PRODUCT	TOXICITY BIOASSAY	ACTIVE INGREDIENT (copper)
Rat	Between 650 and 2,420 mg/kg[1]	ACUTE ORAL LD_{50}*	Between 58 and 216[1] mg/kg[1]
Leghorn Chicken	Greater than 2,500 ppm[1]	SUBACUTE DIETARY LC_{50}**	Greater than 225 ppm[1]
Ring-necked Pheasant	Greater than 1,000 ppm[2]		Greater than 70 ppm[2]
Mallard Duck	Greater than 1,000 ppm[2]		Greater than 70 ppm[2]
Rainbow Trout (44 ppm Total Hardness)	Less than 3.0 mg/l[2]	96 HOUR LC_{50}*** 96 HOUR LC_{50}***	Less than 0.2 mg/l[2]
Rainbow Trout (290 ppm Total Hardness)	56 mg/l[1]		4.0 mg/l
Bluegill (48 ppm Total Hardness)	13.3 mg/l[1]		1.2 mg/l
Bluegill (200 ppm Total Hardness)	83 mg/l		7.5 mg/l
Channel Catfish	67 mg/l[2]		6.0 mg/l
Blue Shrimp (Juvenile)	211 mg/l[1]		19.0 mg/l
Grass Shrimp	68 mg/l[2]		4.8 mg/l
Fiddler Crab	2,200 mg/l[2]		156 mg/l

1 = Data from 9% copper mixed ethanolamine complex (Cutrine®-Plus).

2 = Data from 7.1% copper-triethanolamine complex (Cutrine®).

* Acute oral LD_{50} is the "lethal dosage determined to kill 50% of a test population of animals under laboratory conditions. Chemical is fed directly to the animal."

** Subacute Dietary LC_{50} is the "lethal concentration of a chemical determined to kill 50% of a test population of animals when introduced in the food rations of the animals. Test is run for 8 days."

*** 96 Hour LC_{50} is the "lethal concentration of a chemical in water determined to kill 50% of a test population of animals exposed for a 96 hour period."

ATTACHMENT 4

VOLUME SIZE OF TREATMENT SYSTEM

1. Pond Elevation = 10 ft

$45' \times 164' \times 10' = 73,800\ ft^3 = .552 * 10^6\ gals.$

2. Pond Elevation = 6 ft

$37' \times 156' \times 6' = 34,632\ ft^3 = .259 * 10^6\ gals.$

HMIS CODE
H= 2
F= 0
R= 1
PP= B

(X)

MATERIAL SAFETY DATA SHEET

Revision: 10/1/91

DE NAME: CUTRINE PLUS

SECTION I

IUFACTURER'S NAME: APPLIED BIOCHEMISTS, INC.
6120 West Douglas Ave.
Milwaukee, WI 53218

ERGENCY PHONE NUMBERS:

(414) 242-5870

R LEAKS OR SPILLS - Contact Chemtrec at 1-(800) 424-9300

EL NAME: Cutrine Plus

CHEMICAL NAME & SYNONYMS: Copper Alkanolamine Complex

EMICAL FAMILY: Copper and Nitrogen Compounds

FORMULA: Formulation

SECTION II - Hazardous Ingredients

Copper Carbonate	CAS# 12069-69-1	
Monoethanolamine	41-43-5	
Triethanolamine	107-71-6	Not a known carcinogen

SECTION III - Physical Data

OILING POINT (Deg. F): 212 °F

SPECIFIC GRAVITY (H_2O = 1): 1.2 @ 27°C

APOR PRESSURE (mm Hg.):

VOLATILE BY VOLUME(%): Nil

APOR DENSITY (AIR=1):

EVAPORATION RATE (_____ =1):

OLUBILITY IN WATER: Complete

REACTIVITY IN WATER: Soluble

PPEARANCE AND ODOR: Blue viscous liquid. Slight odor.

SECTION IV - Fire & Explosion Hazard Data

LASH POINT (Method Used): N/A

AUTO-IGNITION TEMPERATURE: > 205°F

LAMMABLE LIMITS: Not Flammable Lel: Uel:

EXTINGUISHING MEDIA: CO_2, H_2O or dry chemical. Polymer foam for large fires.

SPECIAL FIRE FIGHTING PROCEDURES: None

SECTION V - HEALTH HAZARD DATA

ESHOLD LIMIT VALUE: Copper mists: 1.0 mg/M^3
Ethanolamines: 3 p/m 6 mg/M^3

ECTS OF OVEREXPOSURE: Contact with skin and eyes may be irritating. Vapors or mist may cause irritation with pain, coughing and discomfort to eyes, nose, throat and chest.

RGENCY FIRST AID PROCEDURES:
Inhalation: Remove to fresh air
Eyes: Flush with plenty of water for at least 15 minutes. Get medical attention.
Skin: Flush with plenty of water for at least 15 minutes.
Ingestion: Get immediate medical attention.

SECTION VI - REACTIVITY DATA

BILITY ( ) UNSTABLE (XXX) STABLE

NDITIONS TO AVOID: Thermal decomposition may cause oxides of carbon/nitrogen.

OMPATIBILITY (Materials to Avoid): Strong acids and nitrites

ZARDOUS POLYMERIZATION: ( ) MAY OCCUR (XXX) WILL NOT OCCUR

NDITIONS TO AVOID: Contact with strong acids and nitrites

SECTION VII - SPILL OR LEAK PROCEDURES

EPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Flush heavily with water after picking up all possible spillage.

ASTE DISPOSAL METHOD: Incinerate in a furnace or flush small amount into sewer system.
More than 5 gallons, contact local authorities for directions.

SECTION VIII - SPECIAL PROTECTION INFORMATION

ESPIRATORY PROTECTION (Specify Type):

VENTILATION

OCAL EXHAUST: MECHANICAL (General): Acceptable

PECIAL:

ROTECTIVE GLOVES: Preferable

EYE PROTECTION: Goggles

OTHER PROTECTIVE EQUIPMENT: Safety Shower and eye wash

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING:
May cause skin damage. Do not get on skin, eyes or clothing.
KEEP OUT OF REACH OF CHILDREN

OTHER PRECAUTIONS:

Trade Name Formulation And Active Ingredient	Description (Type, mode of action, target pests, precautions, application rates)	Manufacturer
Aquathol K Liquid Dipotassium Salt of Endothall (40.3%) active	Broad range contact herbicide for controlling underwater weeds. Especially effective against Pondweeds (Potamogeton Spp.) Application rates range from 0.3 to 3.2 gallons per acre foot depending upon species and nature of area to be treated.	Pennwalt Corporation AgChem Division, Fresno, California
Aquathol Granular Dipotassium Salt of Endothall (10.1%) active	Broad range contact herbicide. Soluble active ingredient released from clay granules to give herbicidal effect. Application rates range from 13 to 135 pounds per acre-foot depending upon species andnature of area to be treated.	Pennwalt Corporation AgChem Division, Fresno, California
Cutrine-Plus Liquid Copper from Alkanolamine Complex (9%) active	Chelated copper algaecide effective against most species of planktonic, filamentous, and bottom algae types. Non-corrosive to equipment. Does not precipitate out of solution in hard water. Compatible in tank mixes with Aquathol K and Diquat. Application rates range from 0.6 to 1.2 gallons per acre-foot.	Applied Biochemists ~~5300 W. County Line Rd. Mequon, WI 53092~~ 1-800-558-5106 6120 N. Douglas Ave Milwaukee, WI 532...
Cutrine-Plus Granular Copper Alkanolamine Complex (3.7%)	Soluble active ingredient released from clay granules effective against most bottom growing forms of algae. Especially effective for spot treatments or in moving water. Application rate 60 pounds per surface acre.	Applied Biochemists 5300 W. County Line Rd Mequon, WI 53092 1-800-558-5106
Diquat Diquat cation (19%)	Broad range herbicide rapidly absorbed by plants. Effective against most submerged, floating, and emergent weeds. Do not use in muddy waters. May be corrosive to applicating equipment. Application rates range from 0.5 to 2 gallons per surface acre.	VALENT ~~Ortho Chevron Chemical~~ Company ~~Mendota Heights, Minnesota~~ Walnut Creek, CA
Vegatrol LV 4-D 2,4-D LV Ester (69.9%)	Selective systemic-type herbicide especially effective against water milfoil, coontail, and water lilies. Do not use in ponds used for irrigation purposes. Application rates range from 0.75 to 1.4 gallons per acre-foot.	Velsicol Chemical Corporation Chicago, Illinois
Weedtrine II Granular Iso-Octyl Ester of 2,4-D (30.22%)	Soluble active ingredient released from clay granules. Effective against selected species of submerged and emergent aquatic plants. Application rates range from 100-150 pounds per surface acre.	Applied Biochemists ~~5300 W. County Line Rd Mequon, WI 53092~~ 1-800-558-5106

Attachment 5 Pond Elevation of 10 feet

BIOCIDE/CHEMICAL TREATMENT

WORKSHEET-FORM 101

The following calculations are to be performed on any biocidal products ultimately discharged to the surface waters of North Carolina. This worksheet must be completed separately for each biocidal product in use. This worksheet is to be returned with all appropriate data entered into the designated areas with calculations performed as indicated.

I. Facility Name DUKE POWER COMPANY / TRAINING AND Technology Center

NPDES # NC 0026255

County Mecklenburg

Receiving Stream LAKE NORMAN / CATAWBA RIVER BASIN 7Q10 80 (cfs)

(All above information supplied by the Division of Environmental Management)

What is the Average Daily Discharge (A.D.D.) volume of the water handling systems to the receiving water body?

A.D.D. = 0.013 (in M.G.D.)

Please calculate the Instream Waste Concentration (IWC in percent) of this discharge using the data entered above.

$$IWC = \frac{(A.D.D.) \times 100}{(7Q10)(0.646)} = \frac{(0.013) \times 100}{(80)(0.646) + (A.D.D.)} = 0.025\ \%$$

This value (IWC) represents the waste concentration to the receiving stream during low flow conditions.

II. What is the name of the whole product chemical treatment proposed for use in the discharge identified in Part I?

Copper Sulfate

Please list the active ingredients and percent composition:

Copper (II) Sulfate Pentahydrate	100 %
	%
	%
	%
	%

What feed or dosage rate (D.R.) is used in this application? The units must be converted to grams of whole product used per day.

D.R.= 4536 grams/day

ATTACHMENT 5

Estimate total volume of the water handling system between entry of biocidal product and NPDES discharge point. On an attached sheet please provide justification for this estimate (system volume, average cycles per blowdown, holding lagoon size, etc.)

Volume= 0.552 million gallons See ATTACHMENT 4

What is the pH of the handling system prior to biocide addition? If unknown, enter N/A. 7

What is the decay rate (D.K.) of the product? If unknown, assume no decay (D.K.=0) and proceed to asterisk. The degradation must be stated at pH level within 1/2 pH standard unit within handling system. Enter the half life (Half Life is the time required for the initial product to degrade to half of its original concentration). Please provide copies of the sources of this data.

H.L. = 0 Days

The decay rate is equal to $\frac{1}{\text{H.L.}}$ X 0.69 = 0 =Decay Rate (D.K.)

Calculate degradation factor (D.F.). This is the first order loss coefficient.

D.F. = $\frac{\text{(A.D.D.)}}{\text{(Volume)}}$ + (D.K.) $\frac{(0.013)}{(0.552)} + (0) = 0.0236$

Calculate Steady State Discharge Concentration:

Dischg Conc. = $\frac{\text{(D.R.)}}{\text{(D.F.)(Volume)(3785)}} = \frac{(4536)}{(0.0236)(0.552)(3785)} = 95.882$ mg/l

Calculate concentration of biocide instream during low flow conditions.

(Receiving Stream Concentration)

$\frac{\text{(Dischg. Conc.) x (IWC\%)}}{100} = \frac{(95.882) \times (0.025)}{100} = 0.0240$ mg/l ($CuSO_4$)

$(.0240 \text{ mg/L}) \times \left(\frac{63.54 \text{ M.wt. Cu}}{249.68 \text{ M.wt. } CuSO_4}\right) = 0.0061 \text{ mg/L Cu} = 6.1 \text{ ug/L Cu}$ Receiving Stream Concentration

III. Calculate regulated limitation.

List all LC50 data available for the whole product according to the following columns. (Note that units should be in mg/l). Please provide copies of the sources of this data.

Organism	Test Duration	LC50 (mg/l)
See page 3		

ATTACHMENT S

Choose the lowest LC50 listed above:

Enter the LC50: Action Level = 7ug/L of Copper used for calculation

If the half life (H.L.) is less than 4 days, perform the following calculation.

Regulated Limitation = 0.05 x LC50 = _____ mg/l

If the half life (H.L.) is greater than 4 days or unknown, perform the following calculation.

Regulated Limitation = 0.01 x LC50 = _____ mg/l

Choose the appropriate regulated limitation from the calculations immediately above and place in this blank:

7ug/L Cu. ~~mg/liter~~

From Part II enter the receiving stream concentration:

6.0240 mg/liter of Copper Sulfate

OR 6.1 ug/L of Copper

IV. Analysis.

If the receiving stream concentration is greater than the calculated regulated limitation, then this biocide is unacceptable for use.

J.R. GARRISON

Name (Print)

J.R. Garrison /mga — 4/6/92

Signature — Date

Person in Responsible Charge

ATTACHMENT 6 Pond Elevation of 6 Feet

BIOCIDE/CHEMICAL TREATMENT

WORKSHEET-FORM 101

The following calculations are to be performed on any biocidal products ultimately discharged to the surface waters of North Carolina. This worksheet must be completed separately for each biocical product in use. This worksheet is to be returned with all appropriate data entered into the designated areas with calculations performed as indicated.

I. Facility Name DUKE POWER COMPANY/TRAINING AND Technology Center

NPDES # NC 0026255

County Mecklenburg

Receiving Stream LAKE NORMAN/CATAWBA River BASIN 7Q10 80 (cfs)

(All above information supplied by the Division of Environmental Management)

What is the Average Daily Discharge (A.D.D.) volume of the water handling systems to the receiving water body?

A.D.D. = 0.013 (In M.G.D.)

Please calculate the Instream Waste Concentration (IWC in percent) of this discharge using the data entered above.

$$IWC = \frac{(A.D.D.) \times 100}{(7Q10)(0.646)} = \frac{(0.013) \times 100}{(80)(0.646) + (A.D.D.)} = 0.025\ \%$$

This value (IWC) represents the waste concentration to the receiving stream during low flow conditions.

II. What is the name of the whole product chemical treatment proposed for use in the discharge identified in Part I?

Copper Sulfate

Please list the active ingredients and percent composition:

Copper (II) Sulfate Pentahydrate	100 %
	%
	%
	%
	%

What feed or dosage rate (D.R.) is used in this application? The units must be converted to grams of whole product used per day.

D.R.= 2268 grams/day

ATTACHMENT 6

Estimate total volume of the water handling system between entry of biocidal product and NPDES discharge point. On an attached sheet please provide justification for this estimate (system volume, average cycles per blowdown, holding lagoon size, etc.)

Volume= 0.259 million gallons See ATTACHMENT 4

What is the pH of the handling system prior to biocide addition? If unknown, enter N/A. 7

What is the decay rate (D.K.) of the product? If unknown, assume no decay (D.K.=0) and proceed to asterisk. The degradation must be stated at pH level within 1/2 pH standard unit within handling system. Enter the half life (Half Life is the time required for the initial product to degrade to half of its original concentration). Please provide copies of the sources of this data.

H.L. = 0 Days

The decay rate is equal to $\frac{1}{H.L.}$ X 0.69 = 0 =Decay Rate (D.K.)

Calculate degradation factor (D.F.). This is the first order loss coefficient.

D.F. = $\frac{(A.D.D.)}{(Volume)}$ + (D.K.) $\frac{(0.013)}{(0.259)}$ + (0) = .0502

Calculate Steady State Discharge Concentration:

Dischg Conc. = $\frac{(D.R.)}{(D.F.)(Volume)(3785)}$ = $\frac{(2268)}{(.0502)(.259)(3785)}$ = 46.09 mg/l

Calculate concentration of biocide instream during low flow conditions.

(Receiving Stream Concentration)

$\frac{(Dischg.\ Conc.) \times (IWC\%)}{100}$ = $\frac{(46.09) \times (0.025)}{100}$ = .012 mg/l ($CuSO_4$)

(.012 mg/L) x $\frac{(63.54\ M.wt.\ Cu)}{(249.68\ M.wt.\ CuSO_4)}$ = 0.0030 mg/L Cu Receiving Stream Concentration

OR 3.0 ug/L Cu

III. Calculate regulated limitation.

List all LC50 data available for the whole product according to the following columns. (Note that units should be in mg/l). Please provide copies of the sources of this data.

Organism	Test Duration	LC50 (mg/l)
See page 3		

ATTACHMENT 6

Choose the lowest LC50 listed above:

Enter the LC50: Action Level = 7ug/L of Copper (used for calculation)

If the half life (H.L.) is less than 4 days, perform the following calculation.

Regulated Limitation = 0.05 x LC50 = _____ mg/l

If the half life (H.L.) is greater than 4 days or unknown, perform the following calculation.

Regulated Limitation = 0.01 x LC50 = _____ mg/l

Choose the appropriate regulated limitation from the calculations immediately above and place in this blank:

7 ug/L Cu ~~mg/liter~~

From Part II enter the receiving stream concentration:

0.012 mg/liter (of $CuSO_4$)
= 3.0 ug/L Cu

IV. Analysis.

If the receiving stream concentration is greater than the calculated regulated limitation, then this biocide is unacceptable for use.

J. R. GARRISON
Name (Print)

J. R. Garrison /nga — 4/6/92
Signature — Date

Person in Responsible Charge

Mallinckrodt
Material Safety Data

INV. REV. 221

Emergency Phone Number: 314-539-1600

Performance and Laboratory Chemical Div., P.O. Box 800, Paris, KY 40362.

ATTACHMENT 1

CUPRIC SULFATE

PRODUCT IDENTIFICATION:

Synonyms: Copper (II) Sulfate Pentahydrate (1:1:5); blue vitriol; Sulfuric acid copper (2+) salt (1:1), Pentahydrate

Formula CAS No.: 7758-99-8 (Hydrated)

TSCA CAS No.: 7758-98-7 (Anhydrous)

Molecular Weight: 249.68

Chemical Formula: $CuSO_4$ $5H_{20}$

Hazardous Ingredients: Cupric sulfate

PRECAUTIONARY MEASURES

WARNING! HARMFUL IF SWALLOWED. CAUSES IRRITATION.

Avoid contact with eyes, skin and clothing.
Wash thoroughly after handling.

EMERGENCY/FIRST AID

If swallowed, induce vomiting immediately by giving two glasses of water and sticking finger down throat. Never give anything by mouth to an unconscious person. In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes.
In all cases call a physician.
SEE SECTION 5.

DOT Hazard Class: ORM-E

SECTION 1 Physical Data

Appearance: Transparent blue triclinic crystals or crystalline granules or power.

Odor: Odorless.

Solubility: 24.3g/100g H20 @ 30°C (86°F)

Boiling Point: > 400°C (752°F) decomposes

Melting Point: Loses water @ 110°C (230°F)

Specific Gravity: 2.28

Vapor Density (Air = 1): No information found.

Vapor Pressure (mm Hg): No information found.

Evaporation Rate: (water = 1): slowly efforescent.

SECTION 2 Fire and Explosion Information

Fire:
Not considered to be a fire hazard.

Explosion:
Not considered to be an explosion hazard. Scaled container may rupture during fire conditions from pressure water vapor release.

Fire Extinguishing Media:
Use any means suitable for extinguishing surrounding fire. Water spray may be used to keep fire exposed containers cool.

Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. When heated above 110°C (230°F) material will melt. Avoid using a direct water stream on molten material as it may causes splattering.

SECTION 3 Reactivity Data

Stability:
Stable under ordinary conditions of use and storage.

Hazardous Decomposition Products:
When heated to decomposition cupric oxide and sulfur oxide may form.

Hazardous Polymerization:
Will not occur.

Incompatibilities:
At temperatures greater than 250°C (482°F) the anhydrous salt will ignite hydroxylamine. Solutions are acidic and can react with magnesium to evolve flammable hydrogen gas.

SECTION 4 Leak/Spill Disposal Information

Ventilate area of leak or spill. Clean-up personnel require protective clothing and respiratory protection from dust.

Spills: Pick up and place in a suitable container for reclamation or disposal in a method that does not generate dust.

Disposal: Whatever cannot be saved for reclamation may be disposed in a RCRA approved hazardous waste facility. Reportable Quantity (RQ) (CWA/CERCLA) : 10 lbs. Anhydrous

Ensure compliance with local, state and federal regulations.

Mallinckrodt
Material Safety Data

Emergency Phone Number: 314-539-1600

Performance and Laboratory Chemical Div., P.O. Box 800, Paris, KY 40362.

SECTION 5 Health Hazard Information

A. EXPOSURE / HEALTH EFFECTS

Inhalation:
May cause irritation to the upper respiratory tract; symptoms may include coughing, sore throat, and shortness of breath. May also cause symptoms similar to the common cold; including chills and stuffiness of the head.

Ingestion:
Toxic! May cause burning pain in the mouth, esophagus, and stomach. Hemorrhagic gastritis, nausea, vomiting, abdominal pain, metallic taste, and diarrhea may occur. If vomiting does not occur immediately systemic copper poisoning may occur. Symptoms may include capillary damage, headache, cold sweat, weak pulse, kidney and liver damage, central nervous excitation followed by depression, jaundice, convulsions, paralysis and coma. Death may occur from shock or renal failure.

Skin Contact:
May cause irritation and itching.

Eye Contact:
Dust may cause irritation. Contact may cause conjunctivitis, ulceration, or clouding of the cornea.

Chronic Exposure:
Prolonged or repeated skin exposure may cause dermatitis. Prolonged or repeated exposure to dusts of copper salts may cause discoloration of the skin or hair, ulceration and perforation of the nasal septum, runny nose, metallic taste, and atrophic changes and irritation of the mucous membranes.

Aggrevation of Pre-existing Conditions:
Persons with pre-existing skin disorders or impaired liver, kidney, or pulmonary function or pre-existing Wilson's disease may be more susceptible to the effects of this material.

B. FIRST AID

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

Ingestion:
If swallowed, induce vomiting immediately by giving two glasses of water, or milk if available and sticking finger down throat. Call a physician immediately. Never give anything by mouth to an unconscious person.

Skin Exposure:
Remove any contaminated clothing. Wash skin with plenty of water for at least 15 minutes. If irritation develops, get medical attention.

Eye Exposure:
Wash eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

C. TOXICITY DATA (RTECS, 1986)

Oral rat LD50: 300 mg/kg. Mutation references cited.

SECTION 6 Occupational Control Measures

Airborne Exposure Limits:
-OSHA Permissible Exposure Limit (PEL):
1 mg/m^3 (TWA) for copper dusts & mists as Cu
-ACGIH Threshold Limit Value (TLV):
1 mg/m^3 (TWA) for copper dusts & mists as Cu

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, "Industrial Ventilation, A Manual of Recommended Practices", most recent edition, for details.

Personal Respirators: (NIOSH Approved)
If the TLV is exceeded, a dust/mist respirator with chemical goggles may be worn, in general, up to ten times the TLV. Consult respirator supplier for limitations. Alternatively, a supplied air full facepiece respirator or airlined hood may be worn.

Skin Protection:
Wear protective gloves and clean body-covering clothing.

Eye Protection:
Use chemical safety goggles. Contact lenses should not be worn when working with this material. Maintain eye wash fountain and quick-drench facilities in work area.

SECTION 7 Storage and Special Information

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from incompatible substances. Solutions are corrosive to mild steel.

.....

CUPSU

ATTACHMENT 7

Emergency Phone Number: 314-539-1600

Performance and Laboratory Chemical Div., P.O. Box 800, Paris, KY 40362.

Addendum to Material Safety Data Sheet

REGULATORY STATUS

This Addendum Must Not Be Detached from the MSDS

Identifies SARA 313 substance(s)

Any copying or redistribution of the MSDS must include a copy of this addendum

(Chem.Key: CUPSU)

Hazard Categories for SARA Section 311/312 Reporting

Acute	Chronic	Fire	Pressure	Reactive
X	X			

Product or Components of Product:	SARA EHS Sect. 302 RQ (lbs.)	SARA EHS Sect. 302 TPQ (lbs.)	SARA Section 313 Chemicals Name List	SARA Section 313 Chemicals Chemical Category	CERCLA Sec.103 RQ (lbs.)	RCRA Sec. 261.33
CUPRIC SULFATE (7758-98-7)	No	No	No	Copper compound	10	No

ATTACHMENT 7

SARA Section 302 EHS RQ: Reportable Quantity of Extremely Hazardous Substance, listed at 40 CFR 355.
SARA Section 302 EHS TPQ: Threshold Planning Quantity of Extremely Hazardous Substance. An asterisk (*) following a Threshold Planning Quantity signifies that if the material is a solid and has a particle size equal to or larger than 100 micrometers, the Threshold Planning Quantity = 10,000 LBS.
SARA Section 313 Chemicals: Toxic Substances subject to annual release reporting requirements listed at 40 CFR 372.65.
CERCLA Sec. 103: Comprehensive Enviromental Response, Compensation and Liability Act (Superfund). Releases to air, land or water of these hazardous substances which exceed the Reportable Quantity (RQ) must be reported to the National Response Center, (800-424-8802); Listed at 40 CFR 302.4
RCRA: Resource Conservation and Reclamation Act. Commercial chemical product wastes designated as acute hazards and toxic under 40 CFR 261.33

Attachment 8 Revision 01

NORTH CAROLINA DEPT. OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
ENVIRONMENTAL MANAGEMENT COMMISSION
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
APPLICATION FOR PERMIT TO DISCHARGE - SHORT FORM D

FOR AGENCY USE: APPLICATION NUMBER | DATE RECEIVED (YEAR, MO., DAY)

To be filed only by services, wholesale and retail trade, and other commercial establishments including vessels

Do not attempt to complete this form without reading the accompanying instructions

Please print or type

1. Name, address, and telephone number of facility producing discharge

A. Name Duke Power Training and Technology Center

B. Street address 13339 Hagers Ferry Road

C. City Huntersville D. State NC

E. County Mecklenburg F. ZIP 28078

G. Telephone No. 704 (Area Code) 875-5216 John R. Garrison, Jr. - Operator in Charge

2. SIC ☐☐☐☐ (Leave blank)

3. Number of employees 400-500

4. Nature of business Training Facilities and Environmental Laboratories

5. (a) Check here if discharge occurs all year X, or

(b) Check the month(s) discharge occurs:

1. ☐ January 2. ☐ February 3. ☐ March 4. ☐ April 5. ☐ May
6. ☐ June 7. ☐ July 8. ☐ August 9. ☐ September 10. ☐ October
11. ☐ November 12. ☐ December

(c) How many days per week:

1. ☐ 1 2. ☐ 2-3 3. ☐ 4-5 4. X 6-7

6. Types of waste water discharged to surface waters only (check as applicable)

Discharge per operating day	Flow, gallons per operating day					Volume treated before discharging (percent)				
	0.1-999 (1)	1000-4999 (2)	5000-9999 (3)	10,000-49,999 (4)	50,000 or more (5)	None (6)	0.1-29.9 (7)	30-64.9 (8)	65-94.9 (9)	95-100 (10)
A. Sanitary, daily average				X						X
B. Cooling water, etc., daily average (cooling tower blowdown)		X				X				
C. Other discharge(s), daily average; Specify (aquariums/well water)					X	X				
D. Maximum per operating day for combined discharge (all types)					X					

Attachment 8

Revision 01

7. If any of the types of waste identified in item 6, either treated or untreated, are discharged to places other than surface waters, check below as applicable.

Waste water is discharged to:	0.1-999 (1)	1000-4999 (2)	5000-9999 (3)	10,000-49,999 (4)	50,000 or more (5)
A. Municipal sewer system	NA				
B. Underground well	NA				
C. Septic tank	NA				
D. Evaporation lagoon or pond	NA				
E. Other, specify:	NA				

8. Number of separate discharge points:

A. ☐ 1 B. ☐ 2-3 C. ☐ 4-5 D. ☒ 6 or more

9. Name of receiving water or waters Lake Norman, Catawba River Basin

10. Does your discharge contain or is it possible for your discharge to contain one or more of the following substances added as a result of your operations, activities, or processes: ammonia, cyanide, aluminum, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, zinc, phenols, oil and grease, and chlorine (residual).

A. ☒ yes B. ☐ no

I certify that I am familiar with the information contained in the application and that to the best of my knowledge and belief such information is true, complete, and accurate.

James E. Grogan
Printed Name of Person Signing

Vice President, Generation Services
Title

4/7/92
Date Application Signed

× James E. Grogan
Signature of Applicant

North Carolina General Statute 143-215.6(b)(2) provides that: Any person who knowingly mak any false statement representation, or certification in any application, record, report, pl or other document files or required to be maintained under Article 21 or regulations of the Environmental Management Commission implementing that Article, or who falsifies, tampers wi or knowly renders inaccurate any recording or monitoring device or method required to be operated or maintained under Article 21 or regulations of the Environmental Management Comm implementing that Article, shall be guilty of a misdemeanor punishable by a fine not to exc $10,000, or by imprisonment not to exceed six months, or by both. (18 U.S.C. Section 1001 p a punishment by a fine of not more than $10,000 or imprisonment not more than 5 years, or b for a similar offense.)

Attachment 9

Pond Elevation of 10 Feet (higher flows)

BIOCIDE/CHEMICAL TREATMENT

WORKSHEET-FORM 101

The following calculations are to be performed on any biocidal products ultimately discharged to the surface waters of North Carolina. This worksheet must be completed separately for each biocidal product in use. This worksheet is to be returned with all appropriate data entered into the designated areas with calculations performed as indicated.

I. Facility Name DUKE POWER COMPANY / TRAINING and Technology Center

NPDES # NC 0026255

County Mecklenburg

Receiving Stream LAKE NORMAN / CATAWBA RIVER BASIN 7Q10 80 (cfs)

(All above information supplied by the Division of Environmental Management)

What is the Average Daily Discharge (A.D.D.) volume of the water handling systems to the receiving water body?

A.D.D. = 0.0525 (In M.G.D.)

Please calculate the Instream Waste Concentration (IWC in percent) of this discharge using the data entered above.

$$IWC = \frac{(A.D.D.) \times 100}{(7Q10)(0.646)} = \frac{(.0525) \times 100}{(80)(0.646) + (A.D.D.)(.0525)} = .101\ \%$$

This value (IWC) represents the waste concentration to the receiving stream during low flow conditions.

II. What is the name of the whole product chemical treatment proposed for use in the discharge identified in Part I?

Cutrine Plus

Please list the active ingredients and percent composition:

Cutrine Plus - Copper Alkanolamine Complex	100 %
	%
	%
	%
	%

What feed or dosage rate (D.R.) is used in this application? The units must be converted to grams of whole product used per day.

D.R.= 2300 grams/day

Attachment 9

Estimate total volume of the water handling system between entry of biocidal product and NPDES discharge point. On an attached sheet please provide justification for this estimate (system volume, average cycles per blowdown, holding lagoon size, etc.)

Volume= .552 million gallons see Attachment 4

What is the pH of the handling system prior to biocide addition? If unknown, enter N/A. 7

What is the decay rate (D.K.) of the product? If unknown, assume no decay (D.K.=0) and proceed to asterisk. The degradation must be stated at pH level within 1/2 pH standard unit within handling system. Enter the half life (Half Life is the time required for the initial product to degrade to half of its original concentration). Please provide copies of the sources of this data.

H.L. = 0 Days

The decay rate is equal to $\frac{1}{H.L.}$ X 0.69 = 0 =Decay Rate (D.K.)

Calculate degradation factor (D.F.). This is the first order loss coefficient.

$$D.F. = \frac{(A.D.D.)}{(Volume)} + (D.K.) \quad = \frac{(.0525)}{(.552)} + (0) = 0.0951$$

Calculate Steady State Discharge Concentration:

$$\text{Dischg Conc.} = \frac{(D.R.)}{(D.F.)(Volume)(3785)} = \frac{(2300)}{(0.0951)(0.552)(3785)} = 11.58 \text{ mg/l}$$

Calculate concentration of biocide instream during low flow conditions.

(Receiving Stream Concentration)

$$\frac{(\text{Dischg. Conc.}) \times (\text{IWC\%})}{100} = \frac{(11.58) \times (.101)}{100} = 0.0117 \text{ mg/l}$$

Receiving Stream Concentration

III. Calculate regulated limitation.

List all LC50 data available for the whole product according to the following columns. (Note that units should be in mg/l). Please provide copies of the sources of this data.

Organism	Test Duration	LC50 (mg/l)
See Attachment 3		

Choose the lowest LC50 listed above:

Enter the LC50: 1.2mg/L

If the half life (H.L.) is less than 4 days, perform the following calculation.

Regulated Limitation = 0.05 x LC50 = _____mg/l

If the half life (H.L.) is greater than 4 days or unknown, perform the following calculation.

Regulated Limitation = 0.01 x LC50 = 0.012 mg/l

Choose the appropriate regulated limitation from the calculations immediately above and place in this blank:

0.012 mg/liter

From Part II enter the receiving stream concentration:

0.0117 mg/liter

IV. Analysis.

If the receiving stream concentration is greater than the calculated regulated limitation, then this biocide is unacceptable for use.

J. R. GARRISON

Name (Print)

J. R. Garrison /mga — 4/6/92

Signature — Date

Person in Responsible Charge

Attachment 10

Pond Elevation of 64 (higher Flows

BIOCIDE/CHEMICAL TREATMENT

WORKSHEET-FORM 101

The following calculations are to be performed on any biocidal products ultimately discharged to the surface waters of North Carolina. This worksheet must be completed separately for each biocidal product in use. This worksheet is to be returned with all appropriate data entered into the designated areas with calculations performed as indicated.

I. Facility Name DUKE POWER Company / Training and Technology Center

NPDES # NC 0026255

County Mecklenburg

Receiving Stream LAKE NORMAN / Catawba River 7Q10 80 (cfs)

(All above information supplied by the Division of Environmental Management) BASIN

What is the Average Daily Discharge (A.D.D.) volume of the water handling systems to the receiving water body?

A.D.D. = 0.0525 (In M.G.D.)

Please calculate the Instream Waste Concentration (IWC in percent) of this discharge using the data entered above.

$$IWC = \frac{(A.D.D.) \times 100}{(7Q10)(0.646)} = \frac{(.0525) \times 100}{(80)(0.646) + (A.D.D.)(.0525)} = 0.101\ \%$$

This value (IWC) represents the waste concentration to the receiving stream during low flow conditions.

II. What is the name of the whole product chemical treatment proposed for use in the discharge identified in Part I?

Cutrine Plus

Please list the active ingredients and percent composition:

Copper Alkanolamine Complex	100 %
	%
	%
	%
	%

What feed or dosage rate (D.R.) is used in this application? The units must be converted to grams of whole product used per day.

D.R.= 2288 grams/day

Attachment 10

Estimate total volume of the water handling system between entry of biocidal product and NPDES discharge point. On an attached sheet please provide justification for this estimate (system volume, average cycles per blowdown, holding lagoon size, etc.)

Volume= .259 million gallons See Attachment 4

What is the pH of the handling system prior to biocide addition? If unknown, enter N/A. 7

What is the decay rate (D.K.) of the product? If unknown, assume no decay (D.K.=0) and proceed to asterisk. The degradation must be stated at pH level within 1/2 pH standard unit within handling system. Enter the half life (Half Life is the time required for the initial product to degrade to half of its original concentration). Please provide copies of the sources of this data.

H.L. = 0 Days

The decay rate is equal to $\frac{1}{H.L.}$ X 0.69 = 0 =Decay Rate (D.K.)

Calculate degradation factor (D.F.). This is the first order loss coefficient.

$$D.F. = \frac{(A.D.D.)}{(Volume)} + (D.K.) \quad \frac{(.0525)}{(.259)} + (0) = 0.203$$

Calculate Steady State Discharge Concentration:

$$\text{Dischg Conc.} = \frac{(D.R.)}{(D.F.)(Volume)(3785)} = \frac{(2288)}{(.203)(.259)(3785)} = 11.50 \text{ mg/l}$$

Calculate concentration of biocide instream during low flow conditions.

(Receiving Stream Concentration)

$$\frac{(Dischg.\ Conc.) \times (IWC\%)}{100} = \frac{(11.50) \times (.101)}{100} = 0.0117 \text{ mg/l}$$

Receiving Stream Concentration

III. Calculate regulated limitation.

List all LC50 data available for the whole product according to the following columns. (Note that units should be in mg/l). Please provide copies of the sources of this data.

Organism	Test Duration	LC50 (mg/l)
See Attachment 3		

Attachment 10

Choose the lowest LC50 listed above:

Enter the LC50: 1.2 mg/L

If the half life (H.L.) is less than 4 days, perform the following calculation.

Regulated Limitation = 0.05 x LC50 = _____ mg/l

If the half life (H.L.) is greater than 4 days or unknown, perform the following calculation.

Regulated Limitation = 0.01 x LC50 = 0.0120 mg/l

Choose the appropriate regulated limitation from the calculations immediately above and place in this blank:

0.0120 mg/liter

From Part II enter the receiving stream concentration:

0.0117 mg/liter

IV. Analysis.

If the receiving stream concentration is greater than the calculated regulated limitation, then this biocide is unacceptable for use.

J. R. GARRISON

Name (Print)

J. R. Garrison/mgr — 4/6/92

Signature — Date

Person in Responsible Charge

Attachment 11 Pond Elevation of 10 Feet (higher Flows)

BIOCIDE/CHEMICAL TREATMENT

WORKSHEET-FORM 101

The following calculations are to be performed on any biocidal products ultimately discharged to the surface waters of North Carolina. This worksheet must be completed separately for each biocidal product in use. This worksheet is to be returned with all appropriate data entered into the designated areas with calculations performed as indicated.

I. Facility Name Duke Power Company / Training And Technology Center

NPDES # NC 0026255

County Mecklenburg

Receiving Stream LAKE NORMAN / CATAWBA RIVER BASIN 7Q10 80 (cfs)

(All above information supplied by the Division of Environmental Management)

What is the Average Daily Discharge (A.D.D.) volume of the water handling systems to the receiving water body?

A.D.D. = 0.0525 (In M.G.D.)

Please calculate the Instream Waste Concentration (IWC in percent) of this discharge using the data entered above.

$$IWC = \frac{(A.D.D.) \times 100}{(7Q10)(0.646)} = \frac{(0.0525) \times 100}{(80)(0.646) + (A.D.D.)(.0525)} = .101\ \%$$

This value (IWC) represents the waste concentration to the receiving stream during low flow conditions.

II. What is the name of the whole product chemical treatment proposed for use in the discharge identified in Part I?

Copper Sulfate

Please list the active ingredients and percent composition:

Copper (II) Sulfate Pentahydrate	100 %
	%
	%
	%
	%

What feed or dosage rate (D.R.) is used in this application? The units must be converted to grams of whole product used per day.

D.R.= 4536 grams/day

Attachment 4

Estimate total volume of the water handling system between entry of biocidal product and NPDES discharge point. On an attached sheet please provide justification for this estimate (system volume, average cycles per blowdown, holding lagoon size, etc.)

Volume= 0.552 million gallons see attachment 4

What is the pH of the handling system prior to biocide addition? If unknown, enter N/A. 7

What is the decay rate (D.K.) of the product? If unknown, assume no decay (D.K.=0) and proceed to asterisk. The degradation must be stated at pH level within 1/2 pH standard unit within handling system. Enter the half life (Half Life is the time required for the initial product to degrade to half of its original concentration). Please provide copies of the sources of this data.

H.L. = 0 Days

The decay rate is equal to $\frac{1}{H.L.}$ X 0.69 = 0 =Decay Rate (D.K.)

Calculate degradation factor (D.F.). This is the first order loss coefficient.

D.F. = $\frac{(A.D.D.)}{(Volume)}$ + (D.K.) $= \frac{(.0525)}{(0.552)} + (0) = 0.0951$

Calculate Steady State Discharge Concentration:

Dischg Conc. = $\frac{(D.R.)}{(D.F.)(Volume)(3785)} = \frac{(4536)}{(.0951)(.552)(3785)} = 22.83$ mg/l

Calculate concentration of biocide instream during low flow conditions.

(Receiving Stream Concentration)

$\frac{(Dischg.\ Conc.) \times (IWC\%)}{100} = \frac{(22.83) \times (.101)}{100} = 0.0231$ mg/l

$(.0231 mg/L) \times \frac{(63.54 m.wt.Cu)}{(294.68 m.wt.CuSO_4)} = 0.0059 mg/L\ Cu$ Receiving Stream Concentration

III. Calculate regulated limitation. $= 5.9 ug/L\ Cu$

List all LC50 data available for the whole product according to the following columns. (Note that units should be in mg/l). Please provide copies of the sources of this data.

Organism	Test Duration	LC50 (mg/l)
See Page 3		

Attachment (11)

Choose the lowest LC50 listed above:

Enter the LC50: Action Level = 7ug/L of Copper used for calculation

If the half life (H.L.) is less than 4 days, perform the following calculation.

Regulated Limitation = 0.05 x LC50 = _____ mg/l

If the half life (H.L.) is greater than 4 days or unknown, perform the following calculation.

Regulated Limitation = 0.01 x LC50 = _____ mg/l

Choose the appropriate regulated limitation from the calculations immediately above and place in this blank:

7ug/L Cu mg/liter

From Part II enter the receiving stream concentration:

0.0231 mg/liter of $CuSO_4$

OR 5.9ug/L of Cu

IV. Analysis.

If the receiving stream concentration is greater than the calculated regulated limitation, then this biocide is unacceptable for use.

T. R. GARRISON

Name (Print)

J. R. Garrison /mga 4/6/92

Signature Date

Person in Responsible Charge

Attachment 12

Pond Elevation of 6 feet (Higher Flows)

BIOCIDE/CHEMICAL TREATMENT

WORKSHEET-FORM 101

The following calculations are to be performed on any biocidal products ultimately discharged to the surface waters of North Carolina. This worksheet must be completed separately for each biocical product in use. This worksheet is to be returned with all appropriate data entered into the designated areas with calculations performed as indicated.

I. Facility Name Duke Power Company / Training and Technology Center

NPDES # NC 0026255

County Mecklenburg

Receiving Stream Lake Norman / Catawba River BASIN 7Q10 80 (cfs)

(All above information supplied by the Division of Environmental Management)

What is the Average Daily Discharge (A.D.D.) volume of the water handling systems to the receiving water body?

A.D.D. = .0525 (In M.G.D.)

Please calculate the Instream Waste Concentration (IWC in percent) of this discharge using the data entered above.

$$IWC = \frac{(A.D.D.) \times 100}{(7Q10)(0.646)} = \frac{(.0525) \times 100}{(80)(0.646) + (A.D.D.)} = .101\ \%$$

This value (IWC) represents the waste concentration to the receiving stream during low flow conditions.

II. What is the name of the whole product chemical treatment proposed for use in the discharge identified in Part I?

Copper Sulfate

Please list the active ingredients and percent composition:

Copper (II) Sulfate Pentahydrate	100 %
	%
	%
	%
	%

What feed or dosage rate (D.R.) is used in this application? The units must be converted to grams of whole product used per day.

D.R.= 2268 grams/day

Attachment #2

Estimate total volume of the water handling system between entry of biocidal product and NPDES discharge point. On an attached sheet please provide justification for this estimate (system volume, average cycles per blowdown, holding lagoon size, etc.)

Volume= 0.259 million gallons See Attachment #

What is the pH of the handling system prior to biocide addition? If unknown, enter N/A. 7

What is the decay rate (D.K.) of the product? If unknown, assume no decay (D.K.=0) and proceed to asterisk. The degradation must be stated at pH level within 1/2 pH standard unit within handling system. Enter the half life (Half Life is the time required for the initial product to degrade to half of its original concentration). Please provide copies of the sources of this data.

H.L. = 0 Days

The decay rate is equal to $\frac{1}{H.L.}$ X 0.69 = 0 =Decay Rate (D.K.)

Calculate degradation factor (D.F.). This is the first order loss coefficient.

$$D.F. = \frac{(A.D.D.)}{(Volume)} + (D.K.) \quad \frac{(.0525)}{(0.259)} + (\ 0\ ) = .203$$

Calculate Steady State Discharge Concentration:

$$\text{Dischg Conc.} = \frac{(D.R.)}{(D.F.)(Volume)(3785)} = \frac{(2268)}{(.203)(0.259)(3785)} = 11.39 \text{ mg/l}$$

Calculate concentration of biocide instream during low flow conditions.

(Receiving Stream Concentration)

$$\frac{(\text{Dischg. Conc.}) \times (\text{IWC\%})}{100} = \frac{(11.39) \times (0.101)}{100} = 0.0115 \text{ mg/l}$$

$(.0115 mg/L) \times \frac{(63.54 \text{ M.Wt. Cu})}{(249.68 \text{ M.Wt. } CuSO_4)} = 0.0029 mg/L Cu$ Receiving Stream Concentration

OR 2.9 ug/L Cu

III. Calculate regulated limitation.

List all LC50 data available for the whole product according to the following columns. (Note that units should be in mg/l). Please provide copies of the sources of this data.

Organism	Test Duration	LC50 (mg/l)
See Page 3		

Attachment 12

Choose the lowest LC50 listed above:

Enter the LC50: Action Level = 7ug/L of Cu (used for calculation)

If the half life (H.L.) is less than 4 days, perform the following calculation.

Regulated Limitation = 0.05 x LC50 = _____ mg/l

If the half life (H.L) is greater than 4 days or unknown, perform the following calculation.

Regulated Limitation = 0.01 x LC50 = _____ mg/l

Choose the appropriate regulated limitation from the calculations immediately above and place in this blank:

7ug/L ~~mg/liter~~ Cu

From Part II enter the receiving stream concentration:

.0115 mg/liter $CuSO_4$

OR 2.9 ug/L Cu

IV. Analysis.

If the receiving stream concentration is greater than the calculated regulated limitation, then this biocide is unacceptable for use.

J. R. GARRISON

Name (Print)

J. R. Garrison /mga 4/6/92

Signature Date

Person in Responsible Charge