VPDES PERMIT PROGRAM FACT SHEET

This document gives pertinent information concerning the reissuance of the VPDES permit listed below. This permit is being processed as a major industrial permit. Omega Protein, formerly Zapata Protein, Inc., processes menhaden by cooking the fish, pressing and separating the oil and solids, and evaporating the water to leave fish meal and oil. The 001 discharge to Cockrell's Creek results from the operation of scrubber water (contact cooling water) for the air pollution scrubbers. The 002 discharge to Cockrell's Creek results from the operation of the aerated lagoons for treating the fish condensate. The 003 discharge results from the barge disposal of fish condensate in a designated area of the Chesapeake Bay. This method of disposal has not been used in over 15 years, but it is retained in case of emergency. The 004 discharge is non-contact cooling water for the evaporators used in the processing of the fish condensate 005 is a new non-contact cooling water discharge from the new evaporator, placed online September, 1998. In the previous permit, 006 was a combined contact cooling water and non-contact cooling water outfall that was created in the winter of 2000; it combined 001+004+005 and provide aeration to decrease ammonia. However, it has been modified again during the winter of 2002 to separate the contact from the non-contact cooling waters. Now the outfall configuration is 001 again and 995, the combination of 004+005 (the non-contact cooling waters) only. This permit action also allows the location of the shipyard activity at both the Reedville side of the creek and the Fairport side, the commencement of a barge loading operation and the replacement of the fish oil distillers with an updated unit. The refrigeration water is the chilled water from the hold of the ships which cools the fish until they are unloaded at the dock. The ships then dispose of the water east of a line between Fleeton Point Light and Black Can Buoy No. 3. In 1997, Zapata Protein bought Ampro Fisheries, another menhaden fishing operation, located across the Creek in Fairport. Ampro Fisheries was shut down. A permit modification after the purchase incorporated Ampro's wasteload allocation in Cockrell's Creek with Omega's permit limitations.

1. Facility Name and Address: SIC Code: 2077

   Omega Protein
   P.O. Box 175
   Reedville, VA. 22539

   Location: VSH 659, Reedville, VA. 22539

2. Permit No. VA0003867 Expiration Date: December 17, 2002

3. Owner Contact: Name: Lyell Jett
   Title: General Manager
   Telephone #: 804-453-4211

4. Application Complete Date: February 14, 2003
   Permit Drafted By: D. M. Mosca Date: February 21, 2003, May 4, 2004, August 3, 2004 , March 29, 2005

   DEQ Regional Office: Piedmont Regional Office
   Reviewed by: Debra J. Barnes, KSO Date: 3-18-03
   Curt Linderman, PRO Date: 3-20-03
   Ray Jenkins, PRO Date: 8-18-04

5. Receiving Waters Classification: (refer to topo map Attachment 1)

   Receiving Stream: Cockrell's Creek River Mile: 1.00 Outfalls 001, 002, 995
   Basin: Chesapeake Bay/Atlantic/Small Coastal
   Subbasin: N/A
   Section: 2 Class: II
   Special Standards: a

   Receiving Stream: Chesapeake Bay Outfall 003
   Basin: Chesapeake Bay/Atlantic/Small Coastal
   Subbasin: N/A
   Section: 2 Class: II
   Special Standards: a

   7-Day, 10-Year Low Flow: (N/A: Saltwater)
   Tidal? YES On 303D list? YES

Revised 2/2003

State "Transmittal Checklist" to Assist in Targeting Municipal and Industrial Individual NPDES Draft Permits for Review

Part I. State Draft Permit Submission Checklist

In accordance with the MOA established between the Commonwealth of Virginia and the United States Environmental Protection Agency, Region III, the Commonwealth submits the following draft National Pollutant Discharge Elimination System (NPDES) permit for Agency review and concurrence.

Facility Name: Omega Protein

NPDES Permit Number: VA0003867

Permit Writer Name: Denise Mosca

Date: 12-4-03 Rev. 9-30-04 DMM

Major [x] **Minor** [ ] **Industrial** [ ] **Municipal** [ ]

I.A. Draft Permit Package Submittal Includes:	**Yes**	**No**	**N/A**
1. Permit Application?	x		
2. Complete Draft Permit (for renewal or first time permit – entire permit, including boilerplate information)?	x		
3. Copy of Public Notice?		**X**	
4. Complete Fact Sheet?	x		
5. A Priority Pollutant Screening to determine parameters of concern?	x		
6. A Reasonable Potential analysis showing calculated WQBELs?	x		
7. Dissolved Oxygen calculations?		x	
8. Whole Effluent Toxicity Test summary and analysis?	x		
9. Permit Rating Sheet for new or modified industrial facilities?	x		

I.B. Permit/Facility Characteristics	**Yes**	**No**	**N/A**
1. Is this a new, or currently unpermitted facility?		x	
2. Are all permissible outfalls (including combined sewer overflow points, non-process water and storm water) from the facility properly identified and authorized in the permit?	x		
3. Does the fact sheet **or** permit contain a description of the wastewater treatment process?	x		

I.B. Permit/Facility Characteristics – cont.	Yes	No	N/A
4. Does the review of PCS/DMR data for at least the last 3 years indicate significant non-compliance with the existing permit?	x		
5. Has there been any change in streamflow characteristics since the last permit was developed?		x	
6. Does the permit allow the discharge of new or increased loadings of any pollutants?	x		
7. Does the fact sheet **or** permit provide a description of the receiving water body(s) to which the facility discharges, including information on low/critical flow conditions and designated/existing uses?	x		
8. Does the facility discharge to a 303(d) listed water?	x		
a. Has a TMDL been developed and approved by EPA for the impaired water?		x	
b. Does the record indicate that the TMDL development is on the State priority list and will most likely be developed within the life of the permit?		x	
c. Does the facility discharge a pollutant of concern identified in the TMDL or 303(d) listed water?	x		
9. Have any limits been removed, or are any limits less stringent, than those in the current permit?	x		
10. Does the permit authorize discharges of storm water?		x	
11. Has the facility substantially enlarged or altered its operation or substantially increased its flow or production?		x	
12. Are there any production-based, technology-based effluent limits in the permit?		x	
13. Do any water quality-based effluent limit calculations differ from the State's standard policies or procedures?		x	
14. Are any WQBELs based on an interpretation of narrative criteria?		x	
15. Does the permit incorporate any variances or other exceptions to the State's standards or regulations?	x		
16. Does the permit contain a compliance schedule for any limit or condition?	x		
17. Is there a potential impact to endangered/threatened species or their habitat by the facility's discharge(s)?		x	
18. Have impacts from the discharge(s) at downstream potable water supplies been evaluated?			x
19. Is there any indication that there is significant public interest in the permit action proposed for this facility?	x		
20. Have previous permit, application, and fact sheet been examined?	x		

Part II. NPDES Draft Permit Checklist

Region III NPDES Permit Quality Checklist – for POTWs

(To be completed and included in the record only for POTWs)

II.A. Permit Cover Page/Administration	Yes	No	N/A
1. Does the fact sheet or permit describe the physical location of the facility, including latitude and longitude (not necessarily on permit cover page)?			
2. Does the permit contain specific authorization-to-discharge information (from where to where, by whom)?			

II.B. Effluent Limits – General Elements	Yes	No	N/A
1. Does the fact sheet describe the basis of final limits in the permit (e.g., that a comparison of technology and water quality-based limits was performed, and the most stringent limit selected)?			
2. Does the fact sheet discuss whether "antibacksliding" provisions were met for any limits that are less stringent than those in the previous NPDES permit?			

II.C. Technology-Based Effluent Limits (POTWs)	Yes	No	N/A
1. Does the permit contain numeric limits for ALL of the following: BOD (or alternative, e.g., CBOD, COD, TOC), TSS, and pH?			
2. Does the permit require at least 85% removal for BOD (or BOD alternative) and TSS (or 65% for equivalent to secondary) consistent with 40 CFR Part 133?			
a. If no, does the record indicate that application of WQBELs, or some other means, results in more stringent requirements than 85% removal or that an exception consistent with 40 CFR 133.103 has been approved?			
3. Are technology-based permit limits expressed in the appropriate units of measure (e.g., concentration, mass, SU)?			
4. Are permit limits for BOD and TSS expressed in terms of both long term (e.g., average monthly) and short term (e.g., average weekly) limits?			
5. Are any concentration limitations in the permit less stringent than the secondary treatment requirements (30 mg/l BOD5 and TSS for a 30-day average and 45 mg/l BOD5 and TSS for a 7-day average)?			
a. If yes, does the record provide a justification (e.g., waste stabilization pond, trickling filter, etc.) for the alternate limitations?			

II.D. Water Quality-Based Effluent Limits	Yes	No	N/A
1. Does the permit include appropriate limitations consistent with 40 CFR 122.44(d) covering State narrative and numeric criteria for water quality?			
2. Does the fact sheet indicate that any WQBELs were derived from a completed and EPA approved TMDL?			

II.D. Water Quality-Based Effluent Limits – cont.	Yes	No	N/A
3. Does the fact sheet provide effluent characteristics for each outfall?			
4. Does the fact sheet document that a "reasonable potential" evaluation was performed?			
a. If yes, does the fact sheet indicate that the "reasonable potential" evaluation was performed in accordance with the State's approved procedures?			
b. Does the fact sheet describe the basis for allowing or disallowing in-stream dilution or a mixing zone?			
c. Does the fact sheet present WLA calculation procedures for all pollutants that were found to have "reasonable potential"?			
d. Does the fact sheet indicate that the "reasonable potential" and WLA calculations accounted for contributions from upstream sources (i.e., do calculations include ambient/background concentrations)?			
e. Does the permit contain numeric effluent limits for all pollutants for which "reasonable potential" was determined?			
5. Are all final WQBELs in the permit consistent with the justification and/or documentation provided in the fact sheet?			
6. For all final WQBELs, are BOTH long-term AND short-term effluent limits established?			
7. Are WQBELs expressed in the permit using appropriate units of measure (e.g., mass, concentration)?			
8. Does the record indicate that an "antidegradation" review was performed in accordance with the State's approved antidegradation policy?			

II.E. Monitoring and Reporting Requirements	Yes	No	N/A
1. Does the permit require at least annual monitoring for all limited parameters and other monitoring as required by State and Federal regulations?			
a. If no, does the fact sheet indicate that the facility applied for and was granted a monitoring waiver, AND, does the permit specifically incorporate this waiver?			
2. Does the permit identify the physical location where monitoring is to be performed for each outfall?			
3. Does the permit require at least annual influent monitoring for BOD (or BOD alternative) and TSS to assess compliance with applicable percent removal requirements?			
4. Does the permit require testing for Whole Effluent Toxicity?			

II.F. Special Conditions	Yes	No	N/A
1. Does the permit include appropriate biosolids use/disposal requirements?			
2. Does the permit include appropriate storm water program requirements?			

II.F. Special Conditions – cont.	Yes	No	N/A
3. If the permit contains compliance schedule(s), are they consistent with statutory and regulatory deadlines and requirements?			
4. Are other special conditions (e.g., ambient sampling, mixing studies, TIE/TRE, BMPs, special studies) consistent with CWA and NPDES regulations?			
5. Does the permit allow/authorize discharge of sanitary sewage from points other than the POTW outfall(s) or CSO outfalls [i.e., Sanitary Sewer Overflows (SSOs) or treatment plant bypasses]?			
6. Does the permit authorize discharges from Combined Sewer Overflows (CSOs)?			
a. Does the permit require implementation of the "Nine Minimum Controls"?			
b. Does the permit require development and implementation of a "Long Term Control Plan"?			
c. Does the permit require monitoring and reporting for CSO events?			
7. Does the permit include appropriate Pretreatment Program requirements?			

II.G. Standard Conditions	Yes	No	N/A
1. Does the **permit** contain all 40 CFR 122.41 standard conditions or the State equivalent (or more stringent) conditions?			

List of Standard Conditions – 40 CFR 122.41

Duty to comply
Duty to reapply
Need to halt or reduce activity not a defense
Duty to mitigate
Proper O & M
Permit actions

Property rights
Duty to provide information
Inspections and entry
Monitoring and records
Signatory requirement
Bypass
Upset

Reporting Requirements
- Planned change
- Anticipated noncompliance
- Transfers
- Monitoring reports
- Compliance schedules
- 24-Hour reporting
- Other non-compliance

2. Does the permit contain the additional standard condition (or the State equivalent or more stringent conditions) for POTWs regarding notification of new introduction of pollutants and new industrial users [40 CFR 122.42(b)]?			

Part II. NPDES Draft Permit Checklist

Region III NPDES Permit Quality Review Checklist – For Non-Municipals

(To be completed and included in the record for all non-POTWs)

II.A. Permit Cover Page/Administration	Yes	No	N/A
1. Does the fact sheet **or** permit describe the physical location of the facility, including latitude and longitude (not necessarily on permit cover page)?	x		
2. Does the permit contain specific authorization-to-discharge information (from where to where, by whom)?	x		

II.B. Effluent Limits – General Elements	Yes	No	N/A
1. Does the fact sheet describe the basis of final limits in the permit (e.g., that a comparison of technology and water quality-based limits was performed, and the most stringent limit selected)?	x		
2. Does the fact sheet discuss whether "antibacksliding" provisions were met for any limits that are less stringent than those in the previous NPDES permit?	x		

II.C. Technology-Based Effluent Limits (Effluent Guidelines & BPJ)	Yes	No	N/A
1. Is the facility subject to a national effluent limitations guideline (ELG)?		x	
a. If yes, does the record adequately document the categorization process, including an evaluation of whether the facility is a new source or an existing source?			x
b. If no, does the record indicate that a technology-based analysis based on Best Professional Judgement (BPJ) was used for all pollutants of concern discharged at treatable concentrations?	x		
2. For all limits developed based on BPJ, does the record indicate that the limits are consistent with the criteria established at 40 CFR 125.3(d)?	x		
3. Does the fact sheet adequately document the calculations used to develop both ELG and /or BPJ technology-based effluent limits?	x		
4. For all limits that are based on production or flow, does the record indicate that the calculations are based on a "reasonable measure of ACTUAL production" for the facility (not design)?	x		
5. Does the permit contain "tiered" limits that reflect projected increases in production or flow?		x	
a. If yes, does the permit require the facility to notify the permitting authority when alternate levels of production or flow are attained?			x
6. Are technology-based permit limits expressed in appropriate units of measure (e.g., concentration, mass, SU)?	x		

II.C. Technology-Based Effluent Limits (Effluent Guidelines & BPJ) – cont.	Yes	No	N/A
7. Are all technology-based limits expressed in terms of both maximum daily, weekly average, and/or monthly average limits?	x		
8. Are any final limits less stringent than required by applicable effluent limitations guidelines or BPJ?		x	

II.D. Water Quality-Based Effluent Limits	Yes	No	N/A
1. Does the permit include appropriate limitations consistent with 40 CFR 122.44(d) covering State narrative and numeric criteria for water quality?	x		
2. Does the record indicate that any WQBELs were derived from a completed and EPA approved TMDL?		x	
3. Does the fact sheet provide effluent characteristics for each outfall?	x		
4. Does the fact sheet document that a "reasonable potential" evaluation was performed?	x		
a. If yes, does the fact sheet indicate that the "reasonable potential" evaluation was performed in accordance with the State's approved procedures?	x		
b. Does the fact sheet describe the basis for allowing or disallowing in-stream dilution or a mixing zone?	x		
c. Does the fact sheet present WLA calculation procedures for all pollutants that were found to have "reasonable potential"?	x		
d. Does the fact sheet indicate that the "reasonable potential" and WLA calculations accounted for contributions from upstream sources (i.e., do calculations include ambient/background concentrations where data are available)?		x	
e. Does the permit contain numeric effluent limits for all pollutants for which "reasonable potential" was determined?	x		
5. Are all final WQBELs in the permit consistent with the justification and/or documentation provided in the fact sheet?	x		
6. For all final WQBELs, are BOTH long-term (e.g., average monthly) AND short-term (e.g., maximum daily, weekly average, instantaneous) effluent limits established?	x		
7. Are WQBELs expressed in the permit using appropriate units of measure (e.g., mass, concentration)?	x		
8. Does the fact sheet indicate that an "antidegradation" review was performed in accordance with the State's approved antidegradation policy?	x		

II.E. Monitoring and Reporting Requirements	Yes	No	N/A
1. Does the permit require at least annual monitoring for all limited parameters?	x		
a. If no, does the fact sheet indicate that the facility applied for and was granted a monitoring waiver, AND, does the permit specifically incorporate this waiver?			
2. Does the permit identify the physical location where monitoring is to be performed for each outfall?	x		
3. Does the permit require testing for Whole Effluent Toxicity in accordance with the State's standard practices?	x		

II.F. Special Conditions	Yes	No	N/A
1. Does the permit require development and implementation of a Best Management Practices (BMP) plan or site-specific BMPs?	x		
a. If yes, does the permit adequately incorporate and require compliance with the BMPs?	x		
2. If the permit contains compliance schedule(s), are they consistent with statutory and regulatory deadlines and requirements?	x		
3. Are other special conditions (e.g., ambient sampling, mixing studies, TIE/TRE, BMPs, special studies) consistent with CWA and NPDES regulations?	x		

II.G. Standard Conditions	Yes	No	N/A
1. Does the **permit** contain all 40 CFR 122.41 standard conditions or the State equivalent (or more stringent) conditions?	x		

List of Standard Conditions – 40 CFR 122.41

Duty to comply
Duty to reapply
Need to halt or reduce activity not a defense
Duty to mitigate
Proper O & M
Permit actions

Property rights
Duty to provide information
Inspections and entry
Monitoring and records
Signatory requirement
Bypass
Upset

Reporting Requirements
- Planned change
- Anticipated noncompliance
- Transfers
- Monitoring reports
- Compliance schedules
- 24-Hour reporting
- Other non-compliance

2. Does the permit contain the additional standard condition (or the State equivalent or more stringent conditions) for existing non-municipal dischargers regarding pollutant notification levels [40 CFR 122.42(a)]?	x		

Part III. Signature Page

Based on a review of the data and other information submitted by the permit applicant, and the draft permit and other administrative records generated by the Department/Division and/or made available to the Department/Division, the information provided on this checklist is accurate and complete, to the best of my knowledge.

Name	Denise Mosca
Title	Environmental Specialist II
Signature	Denise Mosca
Date	12/4/03

6. Operator Requirements: Class III
7. Reliability Class Designation: None (not a sewage discharge)
8. Permit Characterization: (Check as many as necessary)

(x) Private
( ) Federal
( ) State
( ) POTW

( ) Effluent Limited
(x) Water Quality Limited
(x) Toxics Monitoring Program Required
( ) Pretreatment Program Required
( ) Possible Interstate Effect
(x) Compliance Schedule Required
( ) Interim Limits in Permit
( ) Interim Limits in Other Document

9. **Attachment 2** is a schematic of Wastewater Treatment System.

Table I
NUMBER AND DESCRIPTION OF DISCHARGES

OUTFALL NUMBER AND LOCATION	SOURCE OF DISCHARGE (LIST OPERATION CONTRIBUTING FLOW)	TREATMENT (BRIEF DESCRIPTION UNIT BY UNIT)	FLOW AVERAGE/MAXIMUM (GIVE AVG & MAX FOR INDUSTRY & DESIGN FOR MUNICIPAL)
001 Cockrell's Creek (Attachment 2d) 37 49 48 76 16 42	Processing Menhaden: Contact Cooling water from Dryer Scrubbers; Emergency Discharge of Evaporation Condensate	Evaporation	3.037 MGD long term average, 3.821 max 30 day value MGD; 4.14 MGD maximum daily flow
002 Cockrell's Creek 37 49 30 76 16 32	Processing Menhaden: the aerated lagoon treatment of the evaporation condensate. Includes 1-4 gpm water from fish oil processing facility and 14.5 gpm boiler blowdown from 2 boilers used to produce steam for cookers and steam dryers	Aeration, detention	0.249 MGD max 30 day flow, 0.210 MGD long term avg flow; 0.481 MGD maximum daily flow
003 Chesapeake Bay 37 30 01 76 12 40	Processing Menhaden: Evaporation Condensate.	Evaporation	0.3 MGD long term avg. flow, 0.4 MGD max (measured in barge fulls of condensate, at 0.2 MG per barge)
995 (Combines 004+005) Cockrell's Creek (Attachment 2c) 37 49 48 76 16 40	Processing Menhaden: Non-contact Cooling water from Evaporation Units	Evaporation	7.1 MGD max 30 day average flow; long term average flow 5.64 MGD, 14.2 MGD maximum daily flow

OUTFALL NUMBER AND LOCATION	SOURCE OF DISCHARGE (LIST OPERATION CONTRIBUTING FLOW)	TREATMENT (BRIEF DESCRIPTION UNIT BY UNIT)	FLOW AVERAGE/MAXIMUM (GIVE AVG & MAX FOR INDUSTRY & DESIGN FOR MUNICIPAL)
996 (Combines 001+002+003 for nutrient loading)	Process wastewater outfalls	Evaporation, aeration, detention	Long term average flow 3.547 MGD
East of Fleeton Point Light and Black Can Buoy #3 (Attachment 2e)	refrigeration water (from ships)	None	Unknown: subject to criteria that the discharge be made while the ship is underway and at a rate such that the discharge is not visible.
Stormwater handled by General Permit	Stormwater Monitoring at Outfall 001	None	Monitored under general permit VAR540298 for Reedville side; VAR540312 for Fairport side

Bailwater is creekwater used to transfer the fish off the boat hydraulically to shore at the dock. The bailwater goes through the process so what water is not evaporated is discharged through outfall 001.

The boat engines require cooling water and a discharge of the engine cooling water may be seen at the dock if the engines are running waiting to unload the fish catch.

Stickwater is wastewater from the fish cooker that has been pressed and centrifuged. It consists of 10 percent solids. It is further evaporated to condensate, which are 50 percent solids. The condensate is treated in the aerated lagoon and discharged to Cockrell's Creek at outfall 002.

The 003 wastewater is barged out to a designated quadrant in the Bay, diluted with seawater, and discharged below the barge. This method of disposal has not been used in over 15 years, but it is retained in case of emergency. Sufficient dilution is possible provided the barge discharge pumps dilute the wastewater with seawater such that no water quality violations are expected. This information must be documented and submitted to DEQ with the monthly reports.

Refrigeration water is used to cool the fish as they are brought to the plant for processing. After the ships drop off their menhaden catch, they head back out to fish. Once they reach a point east of a line between Fleeton Point Light and Black Can Buoy No. 3, they discharge the refrigeration water in compliance with water quality standards while the vessel is underway and at such a rate that the discharge is minimized.

10. Sewage Sludge Use or Disposal: NA

11. Discharge Location Description: See **Attachment 1**.

12. Material Storage: List the type and quantity of wastes, fluids, or pollutants being stored at this facility. Briefly describe the storage facilities and list any measures taken to prevent the stored material from reaching state waters.

    A. Marine Paints for touchup work on the menhaden boats. Brushwork only, instead of spraying, is done at this facility.

    B. Sulfuric Acid for the scrubbers. The acid is stored so that it does not come in contact with stormwater or wastewater.

    C. Oils in ASTs. These are stored inside bermed areas in case of leakage of one of the tanks.

13. <u>Receiving Waters Information</u>:

    The Cockrell's Creek water body encompasses the area southeast and east of Lilian on Rte. 360 to the

confluence with Ingram Bay and Chesapeake Bay, including Cockrell Creek's and numerous unnamed coves. This water body is classified as water quality limited. The DEQ maintains a water quality monitoring station near Reedville (COC001.61). Sampling data for this station may be seen in **Attachment 3**. Cockrell's Creek is restricted for shellfish by the VDH. It is considered fully supporting with observed effects for aquatic life based on chlorophyll a exceedance.

Shellfish condemnations in Cockrell's Creek are associated with the buffer zone surrounding the discharge from the Town of Reedville WWTP and non-point source pollutants. Two seafood fish-packing facilities, Pride of Virginia and Reedville Menhaden presently discharge to Cockrell's Creek, in addition to the menhaden plant.

In addition to the information about Cockrell's Creek, the Chesapeake Bay is the discharge location for outfall 003 and refrigeration water. The northwest Chesapeake Bay, HUC 02080101, is non-supporting for aquatic life due to impaired benthic communities and dissolved oxygen criteria violations in deep water and deep channel areas. This segment is also considered nutrient enriched. See **Attachment 4** for 303(d) list fact sheets.

14. Antidegradation Review and Comments.

The State Water Control Board's Water Quality Standards includes an antidegradation policy (9 VAC 25-260-30). All state waters are provided one of three levels of antidegradation protection. For Tier 1 or existing use protection, existing uses of the water body and the water quality to protect these uses must be maintained. Tier 2 water bodies have water quality that is better than the water quality standards. Significant lowering of the water quality of Tier 2 waters is not allowed without an evaluation of the economic and social impacts. Tier 3 water bodies are exceptional waters and are so designated by regulatory amendment. The antidegradation policy prohibits new or expanded discharges into exceptional waters. The limitations in this permit were developed in accordance with Section 303(d)(4) of the Clean Water Act. Therefore, antidegradation restrictions do not apply.

Cockrell Creek is a tier 1 stream, considered fully allocated, based on the VIMS model and supporting documentation. The model was performed to model the creek for the menhaden plant limitations and showed a wasteload allocation of 5000 lb/day BOD_5. This wasteload allocation was split between the two menhaden plants on the creek at the time, and an amount (100 lb/day) was delegated to the Reedville WWTP. See **Attachment 5** for information on the VIMS model.

The Chesapeake Bay is considered tier 1 because it is on the 2004 section 303(d) list of impaired waters for nutrients and low D.O (**Attachment 4**).

15. Site Inspection: The site inspection was performed on October 9, 2002 by Steven Stell. (**Attachment 6**).

16. Effluent Screening and Limitation Development:

- Technology Based Limits: 40 CFR Part 408.150 (Subpart O Fish Meal Processing Subcategory), BPJ,BEJ See **Attachment 7** (Table IV) These guidelines were never adopted but were used to calculate technology limits for BOD_5, TSS and Oil and Grease, which are considered appropriate limits for these discharges. Relative flows were used to proportion BOD_5 and the other constituents between the outfalls. However, water quality limits calculated for these outfalls were more stringent.
- Water Quality Based Limits: The EPA guidelines cited above were used to calculate water quality limits for BOD_5, and suggest limits for TSS and Oil and Grease based on the relative proportions of the multipliers to the BOD_5 wasteload allocation. Relative flows were used to proportion BOD_5 and the other constituents between the outfalls. Note that in Table IV that the water quality standards dictate more stringent limits for BOD_5. than the technology limits. Permittee has met required quantification limits for toxics scan submittals.
- EPA requirements require metals limits to be in the form of total recoverable metals, whereas the standards are shown as the dissolved form. For this reason, when our objective is to get more data to evaluate, when monitoring is placed in the permit, metals must be in the dissolved form. We can use total recoverable data to rule out the need for a limit, but we cannot impose one based upon that type of data. We assume a 1:1 ratio between total recoverable and dissolved metals. This is the reason why the metals are in the form of dissolved at 001 and 003 and total recoverable at 995(004/005).
- Limitations and monitoring for stormwater are required under the VPDES permit regulation, 9 VAC 25-31-220A, and EPA's storm water effluent limitation guidelines in the Code of Federal Regulations at 40 CFR Part 429, Part 418, Part 443, Part 411, and Part 423. **Omega Protein has two stormwater general permits, for the Fairport side of**

Cockrell's Creek (formerly the Ampro plant) and the Reedville location (formerly Zapata Haynie). A new barge operation to ship fishmeal by water is being permitted. No discharge to state waters is being allowed. BMPs to achieve this goal will be included in the updated Operations and Maintenance Manual.

- Evaluation of existing effluent data to determine the need for water quality based limits or toxics monitoring. **See Attachment 8 (Outfall 001), Attachment 9 (Outfall 002), Attachment 10 (Outfall 003), Attachment 11 (Outfall 995—004+005), (See also Tables V-VIII).** Fecal coliform has shown up in high values in the permit application at the Cockrell's Creek outfalls (001: 1600 max daily value, 1250 long term avg and max. 30 day value; 002: 500 max daily value, 335 long term avg, 004/005 240 max daily value, 145 max 30 day avg.; all units N/100 ml). Because 001 and 004/005, the cooling water outfalls, consist of Cockrell Creek water and these bacteria are not characteristic of these wastestreams, no limits were applied at this time. Limits for fecal and enterococci were imposed at 002, the lagoon outfall, in accordance with a schedule of compliance. The assumption was made that enterococci were present due to high fecal bacterial levels. Fecal coliform is an indicator organism of bacteria from the intestinal tract of humans and animals. New agency guidance to test for enterococci has been applied in accordance with the schedule of compliance. Annual nutrient loads were determined in accordance with 05-2009
- Stream Flow Basis for wasteload allocations. **In the absence of other data, agency defaults have been used.**
- Calculations of wasteload allocations **See Attachment 8-11**.
- Computer printout of the WLA.exe and MIX.exe computer programs. **See Attachment 8-11.**
- Provide a rationale for limiting internal waste streams, indicator pollutants and sewage sludge use and disposal requirements. **NA**
- Explanation if pollutants reported on Form 2C in quantifiable amounts are not limited in the permit. **NA**
- Attach a copy of the DMR to the Fact Sheet. **See Attachment 12.**

Basis for Effluent Limitations – Table II

001 (Contact cooling water)

Parameter	**Basis**
Flow	7
pH	7
BOD	5
Total Suspended Solids	7
Oil and Grease	7
Total Phosphorus	6
Orthophosphate	6 monitoring only
Total Nitrogen	6 monitoring only
Total Kjeldahl Nitrogen	6 monitoring only
Nitrate plus Nitrite	6 monitoring only
Ammonia-Nitrogen	4 monitoring only
Cyanide	5
Temperature	4
Total Residual Chlorine	5

Basis for Effluent Limitations

002 Process Wastewater (Lagoon Effluent)

Parameter	**Basis**
Flow	7
pH	4
Total Suspended Solids	7
Temperature	7
Oil and Grease	7
Ammonia	4
WET Limit	DEQ Toxic Management Guidance
enterococci	4
Fecal Coliform	4
Total Phosphorus	6
Orthophosphate	6 monitoring only
Total Nitrogen	6 monitoring only
Total Kjeldahl Nitrogen	6 monitoring only

Nitrate plus Nitrite	6 monitoring only
BOD	5

Basis for Effluent Limitations

003 Process Wastewater (Chesapeake Bay Discharge)

Parameter	Basis
Flow	7
pH	4
Total Suspended Solids	7
Temperature	7
Oil and Grease	7
Ammonia	5
Total Nitrogen	6 monitoring only
Total Kjeldahl Nitrogen	6 monitoring only
Nitrate plus Nitrite	6 monitoring only
Total Phosphorus	6
Orthophosphate	6 monitoring only
Dissolved Oxygen	7
Dissolved Copper	7 monitoring only
BOD	5

Basis for Effluent Limitations

995 (004/005) Non-Process Wastewater (non-contact cooling water)

Parameter	Basis
Flow	7
pH	4
Dissolved Zinc	7
Total Recoverable Copper	5
Temperature	7

Basis for Effluent Limitations

996 (001+002+003) Nutrient Loading for Process Wastewater

Parameter	Basis
Total Nitrogen kg/mo	6
Total Nitrogen kg/yr	6
Total Phosphorus kg/mo	6
Total Phosphorus kgyr	6

Basis Key:
1 Per 208 Plan and Date
2 Per 303(e) Plan and Date
3 Per 401 Certification and Date
4 SWCB Water Quality Standards
5 Model
6 SWCB Nutrient Policy for Nutrient Enriched Waters, 9 VAC 25-40-10 et seq as revised to reflect public comments 6/27/05 and revised in accordance with draft water quality management plan allocations approved by the SWCB on 9/26/05; Guidance Memo 05-2009
7 Best Engineering Judgement

17. Antibacksliding Statement: Rationale for relaxed limits: In accordance with Section 303(d)(4)(b) of the Clean Water Act, the water quality standards are being maintained in the receiving stream, and any revisions of water quality limitations are permissible if they are consistent with antidegradation policies under Section 302 (d) (4) (B). See **Attachment 13**. **Ammonia and cyanide limitations were adjusted at 001 because an effluent diffuser was installed. New evaluation criteria (LC50, NOEC) were determined for the Biological Monitoring at 001 as well for the same reason and at 003 to account for available mixing. The WET limit at outfall 002 is being revised to account for the diffuser in place there since June, 2000. The phosphorus limit was removed at 995(004/005) because phosphorus is not an expected pollutant of non-contact cooling water if no additives are used.**

18. Compliance Schedules: The permittee shall achieve compliance with the final limits and monitoring requirements for Total Phosphorus at 002 and 003, as specified in this permit in accordance with the following schedule:

SCHEDULE OF COMPLIANCE FOR
Total Phosphorus at 002 and 003

1. Initiate design of facilities	Within **90** days after permit reissuance..
2. Report of progress to DEQ	Quarterly.
3. Achieve Compliance with Effluent Limitations.	Within **3** years of permit reissuance.

The permittee shall achieve compliance with the final limits and monitoring requirements for total nitrogen and total phosphorus at 996, total recoverable copper and total recoverable silver at 004/005, and Fecal Colform and enterococci at 002, as specified in this permit in accordance with the following schedule:

SCHEDULE OF COMPLIANCE FOR ANNUAL NUTRIENT LOADINGS
996 (001+002+003) and enterococci, Fecal Coliform at 002, Total Recoverable Copper and Total Recoverable Silver at 995 (004/005)

1. Select a design engineer	Within **10 months** after the effective date of **permit reissuance.**
2. Submit final, approvable plans and specifications to DEQ.	**Once a year from the effective date of permit reissuance**
3. Submit progress reports	**By January 1st of each year**
4. Achieve Compliance with Effluent Limitations.	**Within 4 years of the effective date of permit reissuance**.

No later than 14 calendar days following a date identified in the above schedules of compliance, the permittee shall submit to the Department's staff, either a report of progress, or, in the case of specific actions being required by identified dates, a written notice of compliance or noncompliance. In the latter case, the notice shall include the cause of noncompliance, any remedial actions taken, and the probability of meeting the next scheduled requirement.

19. Special Conditions:

B.1. Compliance Reporting--Authorized by VPDES Permit Regulation, 9 VAC 25-31-190 J 4 and 220 I. This condition is necessary when toxic pollutants are monitored by the permittee and a maximum level of quantification and/or a specific analytical method is required in order to assess compliance with a permit limit or to compare effluent quality with a numeric criterion. The condition also establishes protocols for calculation of reported values.

B.2. Bay Discharge (003) Requirements - based on the previous permit. Monitoring required to ensure discharges meet water quality standards.

B.3. Refrigeration Water Discharge Requirements - based on the previous permit. Monitoring required to ensure discharges meet water quality standards.

B.4. Instream Monitoring – Because the ammonia standards for 001, 002 and 995 (004/005) have been calculated with 10 years of environmental data instead of the period of record (which includes data that are not representative of current conditions), the permittee has agreed to instream monitoring for ammonia, temperature, pH and salinity to provide a complete and current record with which to determine compliance with the water quality standards. Includes a permit reopener for addressing any water quality violations.

B.5. Bacterial Effluent Limitations and Monitoring Requirements – Additional Instructions --Added per Guidance memo 03-2007, to apply to 002. On January 14, 2003, new bacterial standards in 9 VAC 25-260-170.A became effective, as did the revised disinfection policy of 9 VAC 25-260-170B. These standards replaced the existing fecal coliform standard and disinfection policy of 9 VAC 25-160-170. The condition is customized because of the direct implementation of the enterococci limit for an

industrial permit in accordance with the schedule of compliance, only the sampling protocols apply. The addition of chlorine at 001 is considered to be addressing the cyanide at that outfall only and not for bacterial removal.

B.6. Notification levels of Toxics - Required by VPDES Permit Regulation, 9 VAC 25-31-200A for all manufacturing, commercial, mining, and silvicultural dischargers.

B.7. Materials Handling/Storage. 9 VAC 25-31-50, Section A. prohibits the discharge of any wastes into State waters unless authorized by permit. Code of Virginia Section 62.1-44.16 and 62.1-44.17 authorizes the Board to regulate the discharge of industrial waste or other waste.

B.8. Water Quality Criteria Reopener. VPDES Permit Regulation 9 VAC 25-31-220D requires effluent limitations to be established which will contribute to the attainment or maintenance of the water quality standards.

B.9. Operations and Maintenance Manual. Required by Code of Virginia Section 62.1-44.16; VPDES Permit Regulation, 9 VAC 25-31-190, Section E. and 40 CFR 122.41(e). These require proper operation and maintenance of the permitted facility. Compliance with an approved O&M manual ensures this.

B.10. Licensed Operator Requirement. Required by VPDES Permit Regulation 9 VAC-25-31-200D and The Code of Virginia 54.1-2300 et seq, Rules and Regulations for Waterworks and Wastewater Works Operators (18 VAC 160-20-10 et seq.) requires licensure of operators.

B.11. 2C Application form for 003 discharge. The permittee must complete and submit to DEQ Item V and VI of Form 2C for outfall 003 within 30 days of the effective date of the permit, or within 30 days of the first discharge of the season of evaporation condensate to the lagoon if the timeframe within 30 days of the effective date of the permit falls in a period when Omega is not operating. Outfall 003 (Barge to Chesapeake Bay) has not been used in over 15 years. Therefore, effluent data were not provided in the permit renewal application. The permit limitations are based upon assumed water quality effluent characteristics that can only be validated with actual effluent data. The submission of actual data is required in the application form instructions. This condition is an adaptation of a condition from the permit manual used for a facility that has not been constructed and therefore cannot submit sampling data; it was modified because of the similar situation with the 003 outfall that has not been used. A 30-day completion of the application was selected instead of the 2 years allowed in the permit manual because of the need for a tighter feedback mechanism to evaluate the effectiveness of the controls.

B.12. Lagoon Salinity Profile. Salinity checks from the laboratory upon receipt of TMP samples from 002 showed salinities that varied from 0 ppt-20 ppt, whereas the fish condensate that is sent to the lagoon is not expected to have any appreciable salinity. Our inspector took a sample of the lagoon effluent on October 10, 2002 and measured a salinity of 0.56 ppt. The company responded that a gasket had failed on the condensate plate heat exchangers, dumping salt water into the lagoon regularly, and that it should now be fixed. A salinity profile of the lagoon will be helpful to assess if the lagoon still contains salty water and where the location of it is. The profile will allow us to evaluate the appropriateness of Omega Protein's sampling.

B.13. Chlorine in cyanide removal process. Omega will be installing facilities to remove cyanide, using chlorine in accordance with the 2003 consent order. This condition establishes a chlorine limit that will become effective upon approval of a plan and schedule by DEQ.

B.14. Best Management Practices: Fairport and Reedville Locations Off Season Maintenance Areas. Because this facility performs touch-up scraping and painting of boats over water at the locations shown in Permit Attachment B (see fact sheet **Attachment 14**), the shipyard BMPs have been maintained in this permit, along with a reporting form (Permit Attachment C). The previous permit had the BMPs applicable to the Reedville side of Cockrell's Creek, and this permit application now proposes to expand the location to the other side as well. This facility does not use TBT so no limits have been assigned. However, a one-time sampling of the soil, sediment and water column at the boat maintenance areas has been instituted to show that water quality standards will be maintained due to past practices at the facility. (I.B.15, below) No COD sampling has been included due to the chloride interference with this test expected with salt water. VPDES Permit Regulation, 9 VAC25-31-220K, requires the use of best management practices where applicable to control or abate the discharge of pollutants when numeric effluent limits are infeasible or the practices are necessary to achieve effluent limit or to carry out the purpose and intent of the Clean Water Act and State Water Control Law.

B.15. Soil/Sediment and Water Column Testing of Boat Maintenance Areas. This is for the permittee to perform a one time sampling of the water column at the Boat Maintenance Areas. The sampling will demonstrate if past practices are causing current water quality problems that may need to be addressed by a limit. A permit reopener clause is also included.

B.16. Compliance Schedule for Total Phosphorus at 002; Compliance Schedule for Annual Nutrient Loadings

at 996 and Total Recoverable Copper/Total Recoverable Silver at Outfall 995 (004+005) and enterococci and fecal coliform at 002. Per 00-2011, if the permit action is a reissuance or a modification, and a water quality based limit is incorporated into the permit for the first time, then a schedule of compliance for meeting the new limit may be incorporated into the permit.

B.17. Oil Storage Ground water Monitoring Reopener. Most facilities with large oil storage tanks, above or below ground, are required to monitor ground water under the Facility and Aboveground Storage Tank (AST) Regulation, 9 VAC-25-91-10 et seq. Where potential exists for ground water pollution and that regulation does not require monitoring, the VPDES permit may under Code of Virginia section 62.1-44.21.

B.18. Section 303(d) of the Clean Water Act requires that Total Maximum Daily Loads (TMDLs) be developed for streams listed as impaired. This special condition is to allow the permit to be reopened as necessary to bring it into compliance with any applicable TMDL approved for the receiving stream. The re-opener recognizes that, according to Section 402(o)(1) of the Clean Water Act, limits and/or conditions may be either more or less stringent than those contained in this permit. Specifically, they can be relaxed if they are the result of a TMDL, basin plan, or other wasteload allocation prepared under Section 303 of the Act.

B.19. Nutrient Enriched Waters/Chesapeake Bay reopener. The Regulation for Nutrient Enriched Waters and Dischargers within the Chesapeake Bay Watershed, 9 VAC 25-40-10 et seq. allows reopening of permits for discharges into waters designated as nutrient enriched if total phosphorus and total nitrogen in a discharge potentially exceed specified concentrations. The policy also anticipates that future nutrient limits may be needed to control aquatic plants.

B.20 General Permit Clause

The Virginia General Assembly, in their 2005 session, enacted a new Article 4.02 (Chesapeake Bay Watershed Nutrient Credit Exchange Program) to the Code of Virginia to address nutrient loads to the Bay. Section 62.1-44.19.4 of the law requires the development of a watershed general permit that authorizes point source discharges of total nitrogen and total phosphorus and provides for the control of those nutrients in lieu of the individual VPDES permits, unless the individual permits contain more restrictive limits that are necessary to protect local water quality. That section of the law also sets forth various items to be contained within the general permit. Section 62.1-44.19:15 sets forth the requirements for new and expanded discharges which are captured by the requirements of law.

B.21-23 Nutrient Reporting, Basis of Design Report and Interim Optimization Plan

Significant portions of the Chesapeake Bay and its tributaries are listed as impaired on Virginia's 303(d) list of impaired waters for not meeting the aquatic life use support goal, and the 2004 Virginia Water Quality Assessment 305(b)/303(d) Integrated Report indicates that 83% of the mainstream Bay does not fully support this use support goal under Virginia's water quality assessment guidelines. Nutrient enrichment is cited as one of the primary causes for impairment.

The "Nutrient Monitoring and Maximum Annual Loads for VPDES Permitted Facilities on the DEQ Chesapeake Bay Program's List of Significant Discharges" Guidance Memorandum 05-2009 implements DEQ's best professional judgment decision to limit increases in nutrient loading from facilities listed on the Chesapeake Bay Program Significant Discharger List. Guidance Memorandum 05-2009 provides the basis for this decision and specifies the procedure for determining annual effluent limitations for these parameters for each affected facility, as well as monitoring requirements, a schedule of compliance and special conditions to be included in each affected permit.

B.24 Water Quality Criteria Monitoring and Reopener. State Water Control Law §62.1-44.21 authorizes the Board to request information needed to determine the discharge's impact on State waters. States are required to review data on discharges to identify actual or potential toxicity problems, or the attainment of water quality goals, according to 40 CFR Part 131, Water Quality Standards, subpart 131.11. To ensure that water quality criteria are maintained, the permittee is required to analyze the facility's effluent for the substances noted in Attachment D of this VPDES permit which contains new pollutants included in the February 2004 Water Quality Standards.

B.25. State Water Control Law Section 62.1-44.21 authorizes the Board to request information needed to determine the discharge's impact on State waters. Ground water monitoring for parameters of concern or other means of checking the lagoon liner permeability will indicate whether possible lagoon seepage is resulting in violations to the State Water Control Board's Ground Water standards. The intent is for this requirement to be imposed every 5 years—i.e., at permit reissuance, Omega must demonstrate the integrity of the lagoon liner by an approved method.

C.1. Toxics Management Program (**Attachment 15**). VPDES Permit Regulation, 9 VAC 25-31-210 and 220 I, requires monitoring in the permit to provide for and assure compliance with all applicable requirements of the State Water Control Law and the Clean Water Act. Outfall 001: This condition is required based on the Applicability Criteria of the Toxics Management Regulation. The daily maximum wastewater flow from these outfalls is greater than 50,000 gallons per day and a reasonable potential for toxicity exists in the wastewater as this outfall contains contact cooling water, which comes in contact with the dryer scrubbers. A diffuser was installed in the summer of 2002 (**Attachment 8**), and the NOEC has been adjusted in accordance with the increased mixing characteristics provided. Outfall 002 (treated wastewater from lagoon) has completed a Toxicity Reduction Evaluation (TRE) in a previous permit cycle, and a Whole Effluent Toxicity (WET) limit has been applied in accordance with the recommendation made September 10, 1997 by Mason Harper. A diffuser was installed in June 2000 (**Attachment 9**), and the NOEC has been adjusted in accordance with the increased mixing characteristics provided. Outfall 003, the barge discharge, has not been used since prior to 1989; however, because the treated wastewater has been shown to be potentially toxic, the untreated wastewater barged out to the Bay may also be potentially toxic, a requirement for TMP testing to begin has been included should this outfall be used. The NOEC for 003 has been adjusted in accordance with the mixing characteristics calculated by OWPS. It has been demonstrated through quarterly testing over the 1992-1997 permit term that Outfall 004 (Non-contact cooling water) is not acutely or chronically toxic, so TMP requirements were dropped for this outfall in the permit reissued December 17, 1997.

Part II Conditions Applicable to all Permits. VPDES Permit Regulation, 9VAC 25-31-190 requires all VPDES permits to contain or specifically cite the conditions listed.

20. NPDES Permit Rating Work Sheet: Total Score: 160 (Major) See **Attachment 16**.

21. Table II is to be used to record changes in the permit (1) from the previously issued permit and/or (2) during the permit processing period.

006 is now separated into 001 and 995(004/005) outfalls.

*Schedule of Compliance Applies

Table III Permit Processing Change Sheet – Limitation and Monitoring Requirements

Limit/Monitoring	Parameter Changed	Requirement Changed From	Requirement Changed To	Rationale	Initials and Date
001	BOD	1755 kg/d mo avg 3142 kg/d max	1700 kg/d mo avg 3100 kg/d max	guidance 04-2020 for two sig. figs-rounding down to remain under WLA	4/03 DMM
	TSS	655 kg/d mo avg 1609 kg/d max	650 kg/d mo avg. 1600 kg/d max	guidance 04-2020 for two sig. figs-rounding down to remain under WLA	4/03 DMM
	Oil and Grease	372 mo avg 685 kg/d max	370 mo avg 680 kg/d max	guidance 04-2020 for two sig. figs-rounding down to remain under WLA	4/03 DMM
	Total Phosphorus loading	37.85 kg/d	22.99 kg/d, rounded to 23	Flow decrease at the outfall	2/03 DMM
	Ammonia-Nitrogen	1.68 mg/l avg/2.1 mg/l max	NL for both	Omega installed diffuser, calculations show no limit necessary	2/03 DMM

Table III Permit Processing Change Sheet – Limitation and Monitoring Requirements					
Limit/Monitoring	Parameter Changed	Requirement Changed From	Requirement Changed To	Rationale	Initials and Date
001	Cyanide	1.54 ug/l avg/2.00 ug/l max	96 ug/l avg/110 max	Omega installed diffuser, calculations indicate higher limit appropriate.	2/03 DMM
	Dissolved Silver	No monitoring	NL	Although calculations (STATS) indicate no limit is appropriate, variability in the database indicates a need to supplement the database.	2/03 DMM
	Dissolved Silver	NL	No monitoring	Though the data showed variability, all the datapoints were below a level of concern	6/05 DMM
	enterococci*	No monitoring	35/100 ml freq. rev. 6/03 from 1/day from permit manual (municipal section) for bacteria to 3/wk. in 03-2007	appl. data show elevated levels of fecal coliform, discharge to shellfish waters. enterococci presumed present with fecal bacteria.	4/03 DMM
	enterococci	35/100 ml	limit removed	enterococci source is Cockrell Creek intake water, rather than process water. Bacteria are not characteristic of contact cooling water effluent.	11/03 DMM
	Fecal Coliform*	No monitoring	200/100 ml frequency given as 3/wk. for comparability with entero.	appl. data show elevated levels of fecal coliform, discharge to shellfish waters	6/03 DMM
	Fecal Coliform	200/100 ml	limit removed	Fecal coliform source is Cockrell Creek, rather than process water. Bacteria are not characteristic of contact cooling water effluent.	11/03 DMM

Table III Permit Processing Change Sheet – Limitation and Monitoring Requirements					
Limit/Monitoring	Parameter Changed	Requirement Changed From	Requirement Changed To	Rationale	Initials and Date
	Chlorine produced oxidant	No monitoring	580 ug/l avg/1200 ug/l max	Use of chlorine to react with cyanide-subject to plan and schedule	2/03 DMM
001	Total Nitrogen	mo. avg and max monitoring	Also tracking total kg/month and kg/yr	DEQ nutrient guidance 05-2009	7/04 DMM
	TKN, Nitrate+Nitrite, Orthophosphate	no monitoring	NL	DEQ nutrient guidance 05-2009	7/04 DMM
	Total Phosphorus	23 kg/d and 2.0 mg/l	Also tracking total kg/mo. and kg/yr	DEQ nutrient guidance 05-2009	7/04 DMM
002	BOD	468 kg/d avg/837 kg/d max	270 kg/d avg/480 kg/d max 6/03 and back to original limits—(470 kg/d avg/840 kg/d max rounded to 2 sig.fig.) to use previous limit at 001 and new limit at 002 did not add up to whole WLA	4/03 Reapportion-ment of wasteload allocation in accordance with application data, rounded to 2 sig. figs. See Table IV	2/03 DMM/rev. 4/03, 6/03
	TSS	171 kg/d avg/422 kg/d max	160 kg/d avg/410 kg/d max	Reapportion-ment of wasteload allocation in accordance with application data, rounded down to 2 sig figs. 04-2020	2/03 DMM
	Oil and Grease	27.6 kg/d avg/50.9 kg/d max	25 kg/d avg/46 kg/d max	Reapportion-ment of wasteload allocation in accordance with application data, rounded down to 2 sig figs 04-2020	2/03 DMM
	enterococci*	No monitoring	35/100 ml freq. rev. 6/03 from 3days/wk from permit manual (municipal section) for bacteria to 1/wk. in 03-2007	appl. data show elevated levels of fecal coliform, discharge to shellfish waters. enterococci presumed present with fecal bacteria.	4/03, rev. 6/03 DMM

Table III Permit Processing Change Sheet – Limitation and Monitoring Requirements					
Limit/Monitoring	Parameter Changed	Requirement Changed From	Requirement Changed To	Rationale	Initials and Date
	Fecal Colform*	No monitoring	200/100 ml frequency given as 1/wk. for comparability with entero.	appl. data show elevated levels of fecal coliform, discharge to shellfish waters	6/03 DMM
	Total Kjeldahl Nitrogen	no monitoring	NL	OWPS guidance 05-2009 for significant dischargers to the Chesapeake Bay calls for nutrient monitoring. Monitoring is being instituted in order to determine if a limit is necessary.	8/04 DMM
	Nitrate plus Nitrite	no monitoring	NL	OWPS guidance 05-2009 for significant dischargers to the Chesapeake Bay calls for nutrient monitoring. Monitoring is being instituted in order to determine if a limit is necessary	8/04 DMM
	Total Nitrogen	No monitoring	NL	OWPS guidance 05-2009 for significant dischargers to the Chesapeake Bay calls for nutrient monitoring. Monitoring (including tracking total kg/mo. and kg/yr) is being instituted.	11/03 (updated 8/04) DMM
	Total Phosphorus	No monitoring	2.0 mg/l, 1.9 kg/d	current DEQ nutrient guidance, applied to facility as a whole, not individual outfalls OWPS guidance	5/04 (updated 8/04) DMM

Table III Permit Processing Change Sheet – Limitation and Monitoring Requirements					
Limit/Monitoring	Parameter Changed	Requirement Changed From	Requirement Changed To	Rationale	Initials and Date
				05-2009 for significant dischargers to the Chesapeake Bay calls for nutrient monitoring. Monitoring (including tracking total kg/mo. and kg/yr) is being instituted.	
	Orthophosphate	no monitoring	NL	OWPS guidance 05-2009 for significant dischargers to the Chesapeake Bay calls for nutrient monitoring. Monitoring is being instituted in accordance with 05-2009.	8/04 DMM
	Temperature	1/day freq.	2/week	greater than 14 day residence time in pond; consistency with pH	6/03 DMM
	WET limit	LC50 greater or equal to 100%	LC 50 greater or equal to 7%, TUa of 14 max. rev. as TUa of 14 max only after further discussion with CO	WET limit had not been adjusted for diffuser in last permit mod.	2/03 DMM, rev. 6/03
003	BOD	4296 kg/d mo avg 7710 kg/d max	4300 kg/d mo avg 7700 kg/d max	Guidance 04-2020 for two sig. figs	4/03 DMM
	TSS	114 kg/d mo avg 282 kg/d max	110 kg/d mo avg 280 kg/d max	guidance for two sig. figs 04-2020	4/03 DMM
	Oil and Grease	426 kg/d mo avg 784 kg/d max	430 kg/d mo avg 780 kg/d max	guidance 04-2020 for 2 sig. figs	4/03 DMM
	Ammonia-Nitrogen	39.6 mg/l avg/49.0 max	36 mg/l avg/44 max	Ammonia criteria calculation justified decreasing limit slightly, rounded to 2 sig. fig. 04-2020	2/03 DMM
003	Ammonia-Nitrogen	36 mg/l avg/44 max	37mg/l avg/45max	New ammonia standard	5/04 DMM

Table III Permit Processing Change Sheet – Limitation and Monitoring Requirements					
Limit/Monitoring	Parameter Changed	Requirement Changed From	Requirement Changed To	Rationale	Initials and Date
				calculation justifies increase, antidegradation does not apply: co. has not met these and they are still a decrease over previous permit	
	Dissolved Copper	No monitoring	NL	Total recoverable data presented indicated this parameter may be a concern, need dissolved data for eval. If there's a discharge	2/03 DMM
	Acceptable TMP criteria	LC50 > or equal to 100%	LC50> or equal to 25%	Criteria had not been adjusted for diffusion of 003 barge movement in last permit mod	2/03 DMM
	Total Nitrogen	no monitoring	monitoring for mo. avg/max, kg/mo., kg/yr	DEQ guidance 05-2009	8/04 DMM
	TKN	no monitoring	monitoring mo. avg/max	DEQ guidance 05-2009	8/04 DMM
	Nitrate-Nitrite	no monitoring	monitoring mo. avg/max	DEQ guidance 05-2009	8/04 DMM
	Total Phosphorus	no monitoring	monitoring for mo. avg/max, kg/mo., kg/yr	DEQ guidance 05-2009	8/04 DMM
	Orthophosphate	no monitoring	monitoring mo. avg/max	DEQ guidance 05-2009	8/04 DMM
995 (004/005)	Total Phosphorus loading	93.9 kg/d	53.7, rounded to 54 kg/d	Flow decrease at the outfall, 2 sig.fig 04-2020	2/03 DMM
	Total Phosphorus	2.0 mg/l, 54 kg/d	no monitoring or limit	Most recent nutrient guidance excludes non-process wastewater; non-contact cooling water GP specifies TP only if additives used.	6/04 DMM
	enterococci	No monitoring	35/100 ml rev. 6/03 from 1/day from permit manual (municipal section) for	appl. data show elevated levels of fecal coliform, discharge to shellfish waters enterococci	4/03 DMM rev.6/03

Table III Permit Processing Change Sheet – Limitation and Monitoring Requirements					
Limit/Monitoring	Parameter Changed	Requirement Changed From	Requirement Changed To	Rationale	Initials and Date
			bacteria to 3/wk. in 03-2007	presumed present with fecal bacteria.	
995 (004/005)	enterococci	35/100 ml	Limit removed	Fecal coliform source is Cockrell Creek intake water. Bacteria are not characteristic of non-contact cooling water effluent.	11/03 DMM
	Fecal Coliform	No monitoring	200/100 ml frequency given as 3/wk. for comparability with entero.	appl. data show elevated levels of fecal coliform, discharge to shellfish waters	6/03 DMM
	Fecal Coliform	200/100 ml	limit removed	Fecal coliform source is Cockrell Creek intake water. Bacteria are not characteristic of non-contact cooling water effluent.	11/03 DMM
	Total Nitrogen	NL	monitoring removed	Total nitrogen source is Cockrell Creek intake water. Nitrogen is not characteristic of non-contact cooling water effluent.	
	Ammonia-Nitrogen	NL	No monitoring	Ammonia source is Cockrell Creek intake water. Nitrogen is not characteristic of non-contact cooling water effluent.	
	Toxics Monitoring	quarterly acute and chronic tests	no monitoring	Omega satisfied non-toxicity of effluent in previous cycle. In lieu of Toxics Monitoring on the new 004/005 outfall arrangement, an in-depth study of Ni, Zn, Cu is being required	

Table III Permit Processing Change Sheet – Limitation and Monitoring Requirements					
Limit/Monitoring	Parameter Changed	Requirement Changed From	Requirement Changed To	Rationale	Initials and Date
				being required instead.	
	Dissolved Zinc	no monitoring	NL	Decision was made to model limitations after cooling water general permit. Zinc monitoring is required by the general permit.	11/03 DMM
	Total Recoverable Silver	no limit or monitoring	4.0 ug/l monthly average, 4.0 mg/l max daily	dissolved silver data indicated water quality limit	9/04 DMM
995	Total Recoverable Copper*	No limit or monitoring	19 ug/l avg/19 ug/l max	Dissolved copper data presented indicated a limit is appropriate	2/03 DMM
996	Total Nitrogen* kg/mo	No monitoring—new summary sheet	NL	05-2009: annual load lim. converted from the allocations incl. in Tributary strategy input deck for Rapp.R. listed to the kilogram	3/05 DMM
	Total Nitrogen* kg/yr	No monitoring—new summary sheet	7076 kg/yr max	05-2009: annual load lim. converted from the allocations incl. in Tributary strategy input deck for Rapp.R. listed to the kilogram	3/05 DMM
	Total Nitrogen* kg/yr	7076 kg/yr max	9620 kg/yr max	Per E. Gilinsky email of 10/31/05, replace allocations with those from Board approved draft reg. which become effective Nov. 16, 2005 listed to the kilogram	11/05 DMM
	Total Phosphorus* kg/mo	No monitoring—new summary sheet	NL	05-2009: annual load lim. converted from the allocations incl. in Tributary strategy input deck for Rapp.R. listed to the	3/05 DMM

Table III Permit Processing Change Sheet – Limitation and Monitoring Requirements					
Limit/Monitoring	Parameter Changed	Requirement Changed From	Requirement Changed To	Rationale	Initials and Date
				kilogram	
	Total Phosphorus* kg/yr	No monitoring—new summary sheet	530 kg/yr max	05-2009: annual load lim. converted from the allocations incl. in Tributary strategy input deck for Rapp.R. listed to the kilogram	3/05 DMM
	Total Phosphorus* kg/yr	530 kg/yr max	721 kg/yr max	Per E. Gilinsky email of 10/31/05, replace allocations with those from Board approved draft reg. which become effective Nov. 16, 2005 listed to the kilogram	11/05 DMM

* Schedule of Compliance applies

Special Conditions: (List any changes associated with the special conditions and the reasons for the changes).
Former Condition 4. Industrial Reopener. Deleted per VPDES permit manual, iss. 4/01.
Condition 1 Compliance reporting and Quantification Levels. Required by updated Quantification Level guidance (00-2011 amendment #3) dated October 29, 2001.
Condition 4 Receiving Stream Monitoring and reopener. Due to ammonia criteria for Cockrell's Creek being calculated with less than the entire period of record of data (last 10 years), the monitoring ensures that DEQ can monitor the data for water quality standards violations.
Condition 5 Additional Guidance for Alternate Bacterial Disinfection. Added per Guidance memo 03-2007 and adapted for this industrial facility.
Condition 8 Water Quality Criteria Reopener. Added so permit may be reopened if necessary to address any parameter, which is monitored on the Part 1.A. pages.
Condition 9 O&M manual. Updated per VPDES permit manual, iss. 4/01. Customized for addition of barge BMPs.
Condition 10 Licensed Wastewater operator. Updated per VPDES permit manual, iss. 4/01.
Condition 11 Submittal of Form 2C Section V and VI for Outfall 003 to complete the application. Outfall 003 has not been used in 15 years, and data provided on the application were estimates. Should the outfall is used, application sampling must take place with the data submitted to DEQ.
Condition 12 Lagoon Salinity Profile. A salinity profile of the lagoon will be used to assess if the lagoon still contains salty water from the gasket failure on the condensate plate heat exchangers.
Condition 13 Chlorine Limit at 001. Omega will be installing facilities to remove cyanide, using chlorine in accordance with the 2003 consent order being negotiated now. This condition establishes a chlorine limit that will become effective in accordance with an approved plan and schedule.
Condition 14 Best Management Practices. Updated per VPDES permit manual, iss. 4/01.
Condition 15 Soil, Sediment and Water Column Sampling of Boat Maintenance Areas. To demonstrate if past practices are having any effects on present water quality.
Water Quality Standards Monitoring. Formerly Condition 16 (subsequent conditions renumbered). This condition was dropped per instructions at PRO VPDES staff meeting 6/24/03. Future requirements for testing the main body of parameters for which we have standards will be given at the next permit reissuance. See Condition 23, below. Condition 23 requires the submittal of the 35 water quality standards that were new in February 2004 that were not submitted along with the current permit application.
Condition 16 Compliance Schedule for Total Phosphorus at 002 and 003; Schedule of Compliance for Annual Nutrient Loading at 996 and Total Recoverable Copper at outfall 995 (004/005) and fecal coliform,

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Condition 16 Compliance Schedule for Total Phosphorus at 002 and 003; Schedule of Compliance for Annual Nutrient Loading at 996 and Total Recoverable Copper at outfall 995 (004/005) and fecal coliform, enterococci at 002. These are new to address need for water quality limits at these outfalls.

Condition 17 Oil Storage Groundwater Monitoring Reopener. New per VPDES permit manual, iss. 4/01.

Condition 18 303(d)/Total Maximum Daily Load (TMDL) Reopener. Required by 6/04 VPDES permit manual.

Condition 19 Nutrients Reopener, Nutrient Limitations and Reporting, General Permit Control, Basis of Design -23 and Interim Optimization Reports. Required per Nutrient Guidance 05-2009. The reopener is a revision of Special Condition No. 7 in the current permit.

Condition 24. Water Quality Criteria Monitoring and Reopener. State Water Control Law §62.1-44.21 authorizes the Board to request information needed to determine the discharge's impact on State waters. States are required to review data on discharges to identify actual or potential toxicity problems, or the attainment of water quality goals, according to 40 CFR Part 131, Water Quality Standards, subpart 131.11. To ensure that water quality criteria are maintained, the permittee is required to analyze the facility's effluent for the substances noted in Attachment D of this VPDES permit which contains new pollutants included in the February 2004 Water Quality Standards.

Condition 25 Treatment Lagoon Liner Permeability Demonstration. This is a new condition inserted to demonstrate the lagoon liner integrity due to the addition of the sludge storage lagoon in 2005 and the sludge removal operation at the treatment lagoon.

Section C1. Toxics Management Program. Sections C.1.b. and C.1.c. (and I.A.7) have been updated in accordance with the tests run by the company since the previous permit reissuance, new outfall diffuser coefficients for 001, 002 and 003, and the current toxics management guidance (1993 manual, with revisions 2002). Sampling frequencies have been revised upward for 001 (from annual to quarterly) due to the number of invalid tests presented for review during the past permit cycle, and because 001 is now separate from the non-contact cooling water (995 or 004/005).

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22. Variances/ Alternate Limits or Conditions: none.

23. Public Notice: The draft permit was public noticed in the Northumberland Echo. One comment from Cary Jones, a Reedville resident, was received. He was mainly concerned that the cooling water discharges for 001 and 995 consisted of groundwater and the effect of withdrawing large amounts of groundwater on the water table. He was informed that these discharges consisted of water from Cockrell's Creek.
Public Notice Information required by 9 VAC 25-31-280 B:
Comment period Start date August 31, 2005 End date 5PM on October 3, 2005

All pertinent information is on file and may be inspected and copied by contacting Denise M. Mosca at Virginia DEQ Piedmont Regional Office, 4949-A Cox Road, Glen Allen, Va. 23060. (804) 527-5027 e-mail address: dmmosca@deq.virginia.gov.

Persons may comment in writing or by e-mail to the DEQ on the proposed reissuance of the permit and may request a public hearing during the comment period. Written or email comments shall include the name, address and telephone number of the writer, and shall contain a complete, concise statement of the factual basis for comments. Only those comments received within this period will be considered. The DEQ may decide to hold a public hearing if public response is significant. Requests for public hearings shall state the reason why a hearing is requested, the nature of the issues proposed to be raised in the public hearing and a brief explanation of how the requester's interests would be directly and adversely affected by the proposed permit action.

Following the comment period, the Board will make a determination regarding the proposed reissuance. This determination will be come effective, unless the DEQ grants a public hearing. Due notice of any public hearing will be given.

24. Additional Comments:

PREVIOUS PUBLIC COMMENT

This draft permit is revised from a version that received public notice in February, 2004. A public hearing was requested by several commenters on the basis that nutrient monitoring was not provided in the draft. The public hearing was denied on the basis that nutrient guidance was being developed by the agency and that the draft would be revised in accordance with that guidance when it was released and the draft would be re-advertised for comment.

The public notice was published in the Northumberland Echo and the comment period for this facility ran from February 4, 2004 to March 5, 2004. Seven responses were received, all concerned with nutrient limitations for Omega Protein. One response was received after the close of comments at 5PM on March 5 by Ken Hinman, president of the National Coalition for Marine Conservation, and requested a public hearing. Two responses were received from Maryland: one from the Chesapeake Bay Ecological Foundation, Inc., and another from Charles Hutchinson, who says he belongs to several recreational fishing groups concerned with the Bay. These commenters don't specify how the Omega discharge affects Virginia interests other than their interests in the Chesapeake Bay; their comments echoed those below and both requested a public hearing. One of the remaining 4 valid commenters requested a public hearing. That commenter is the Director of Environmental Defense, who represented himself as a Virginia resident and director of the agency. The Chesapeake Bay Foundation wrote extensive comments and urged DEQ to grant the public hearing requested by Environmental Defense under the DEQ policy of increased public participation. The other two commenters were: John Bello, Chairman of Coastal Conservation Association, and Elizabeth Andrews. The following issues were raised:

1. A concentration limit at 002 for ammonia without loading could allow significant nutrient loading to Cockrell's Creek. Oxygen demand from increased ammonia, coupled with CBOD and indirect effects from nutrient and solids loading may threaten dissolved oxygen concentrations.
   Staff response: Applying limits as concentrations for toxic parameters such as ammonia is in accordance with agency guidance. BOD_5 limitations, which are expressed as concentrations and loadings, were derived from a wasteload allocation for Cockrell's Creek determined by the Virginia Institute of Marine Science. These limitations include nitrogenous demand and will keep a lid on excess nitrogen discharged. In addition, in place at 002 is a quarterly requirement for a bioassay to measure toxicity. In accordance with 05-2009, annual nutrient loading limits have been imposed with a schedule of compliance at outfall 996, which is an aggregate of 001+002+003.

2. The failure of the draft permit to impose limits of 3 mg/l Total Nitrogen and 0.1 mg/l Total Phosphorus is inconsistent with Virginia's commitment under the Chesapeake 2000 agreement to reduce nutrient loadings to Chesapeake Bay and its tributaries. DEQ should enter into a consent order with the facility to require interim limits of a 50% reduction in Total Nitrogen and an 80% reduction in Total Phosphorus (under DEQ tributary strategies' recommendations) to the year 2010. Final limits,

for the year 2010 and beyond, should be a maximum of 3 mg/l Total Nitrogen and 0.1 mg/l Total Phosphorus. The draft permit not only fails to reduce excessive nutrient loadings from the facility, but would allow for significant expansion of Total Nitrogen and Total Phosphorus into already nutrient enriched waters with Omega's expansion. The proposed draft does not have Total Phosphorus limits at all the outfalls. Issuing permits without Total Nitrogen or Total Phosphorus limits clearly violates the Clean Water Act, the State Water Control Law, the state narrative water quality criteria, the VPDES permit regulation and the DEQ anti-degradation policy. The proposed discharge from 002 is inconsistent with anti-degradation; it is not consistent with DEQ's nutrient policy to hold the line on discharges to nutrient enriched waters.
Staff response: The proposed permit will be revised in accordance with the latest agency nutrient guidance which is being developed and sent back out to public notice for comments. In addition, the general permit for nutrients being developed will supersede this permit.

3. Despite the SWCB nutrient policy's being applied at each outfall in accordance with the permit manual (and 002 not qualifying for a Total Phosphorus limit), it is in direct violation of the language of that policy, which applies to the permittee or discharger, not discharges.
   Staff response: We agree with your comment. The revised draft permit contains a limit at 002 for Total Phosphorus.

4. The nutrient policy states that when the permittee has the potential for discharging Total Phosphorus greater than 2 mg/l or Total Nitrogen greater than 10 mg/l, the Board may reopen the permit to impose monitoring requirements. Omega is currently discharging greater than 2 mg/l Total Phosphorus and 10 mg/l Total Nitrogen.
   Staff response: Limits of 2.0 mg/l for Total Phosphorus will be in the revised draft permit at 001 and 002. Annual load limitations for Total Nitrogen and Total Phosphorus have been imposed at the aggregate outfall 996, comprised of outfalls 001, 002 and 003. Additional nitrogen over that present in the intake is not expected to be characteristic of non-contact cooling water (outfall 995).

5. Omega's discharges cause water quality excursions for nutrients and failure to attain designated uses. Limitations for Total Nitrogen and Total Phosphorus must be incorporated into the draft permit.
   Staff response: Cockrell's Creek is considered fully supporting for nutrients under the current 2004 305 (b) report.

6. The permit should require sufficient nutrient removal technology that would lower Total Nitrogen and Total Phosphorus. Costs for maximum levels of nutrient removal are less than what Omega is spending for improvements to the fish oil refinery and less than the profit announced for the last two years. When amortized over twenty years, the cost of nutrient removal is affordable for the company.
   Staff response: DEQ does not require specific technologies nor impose limitations on a facility based on their ability to pay. Under GM 05-2009, the owner will prepare a basis of design report to look at nutrient removal and an interim optimization report.

7. The water quality reopener was missing from the draft permit. The draft permit must include a mandatory reopener to address the adoption of limits for dissolved oxygen, water clarity and chlorophyll a when these criteria are available.
   Staff response: The new nutrient guidance will contain a special reopener that will be used in the revised draft permit to be sure nutrient and related criteria are addressed.

8. The proposed draft must include requirements for the submittal of plans for review and approval by DEQ that address technology to attain compliance with nutrient limitations and guidelines.
   Staff response: When the staff impose a new water quality limitation, a schedule of compliance is indicated. The schedule of compliance will require the submittal of a concept engineering report for DEQ review and approval to address technology to attain compliance.

9. The Chesapeake Bay Foundation incorporated by reference any and all comments filed with the DEQ regarding the Philip Morris and Town of Onancock permit reissuance applications.
   Staff response: Public hearings have already been held for those two permit actions; those issues have already been discussed.

PREVIOUS BOARD ACTION

Omega Protein is under consent order for addressing ammonia and cyanide concentrations at 001, and ammonia concentrations at 002.

REDUCED MONITORING

Reduced monitoring frequencies are not applicable to this facility because this program is not applicable to discharges that are intermittent and addressing water quality violations.

BARGE OPERATION FOR FISHMEAL LOADING (**Attachment 17**)

In October 2003, Omega notified DEQ of their intent to begin loading barges with fish meal. BMPs for this operation have been requested in the Operations and Maintenance manual, which is subject to review by DEQ staff. Omega is reminded that Part II.F. of this permit prohibits unlawful discharges to State waters, and that a report must be made if

such a discharge is discovered.

NUTRIENT MONITORING

The nutrient monitoring instituted in the Part I. pages is due to this facility being considered a significant discharger to the Chesapeake Bay and thus subject to recent guidance 04-2017 as updated in 05-2009. The DEQ Chesapeake Bay Program (CBP) maintains a list of significant dischargers to the Chesapeake Bay and its tributaries. Significant portions of the Chesapeake Bay and its tributaries are listed as impaired on Virginia's 303(d) list of impaired waters for not meeting the aquatic life use support goal, and the 2004 Virginia Water Quality Assessment 305(b)/303(d) Integrated Report indicates that 83% of the mainstem Bay does not fully support this use support goal under Virginia's water quality assessment guidelines. Nutrient enrichment is cited as one of the primary causes for impairment.

Guidance Memorandum 05-2009 implements DEQ's best professional judgement decision to limit increases in nutrient loading from facilities listed on the Chesapeake Bay Program Significant Discharger List. Guidance Memorandum 05-2009 provides the basis for this decision and specifies the procedure for determining annual effluent limitations for these parameters for each affected facility, as well as monitoring requirements, a schedule of compliance and a special condition to be included in each affected permit.

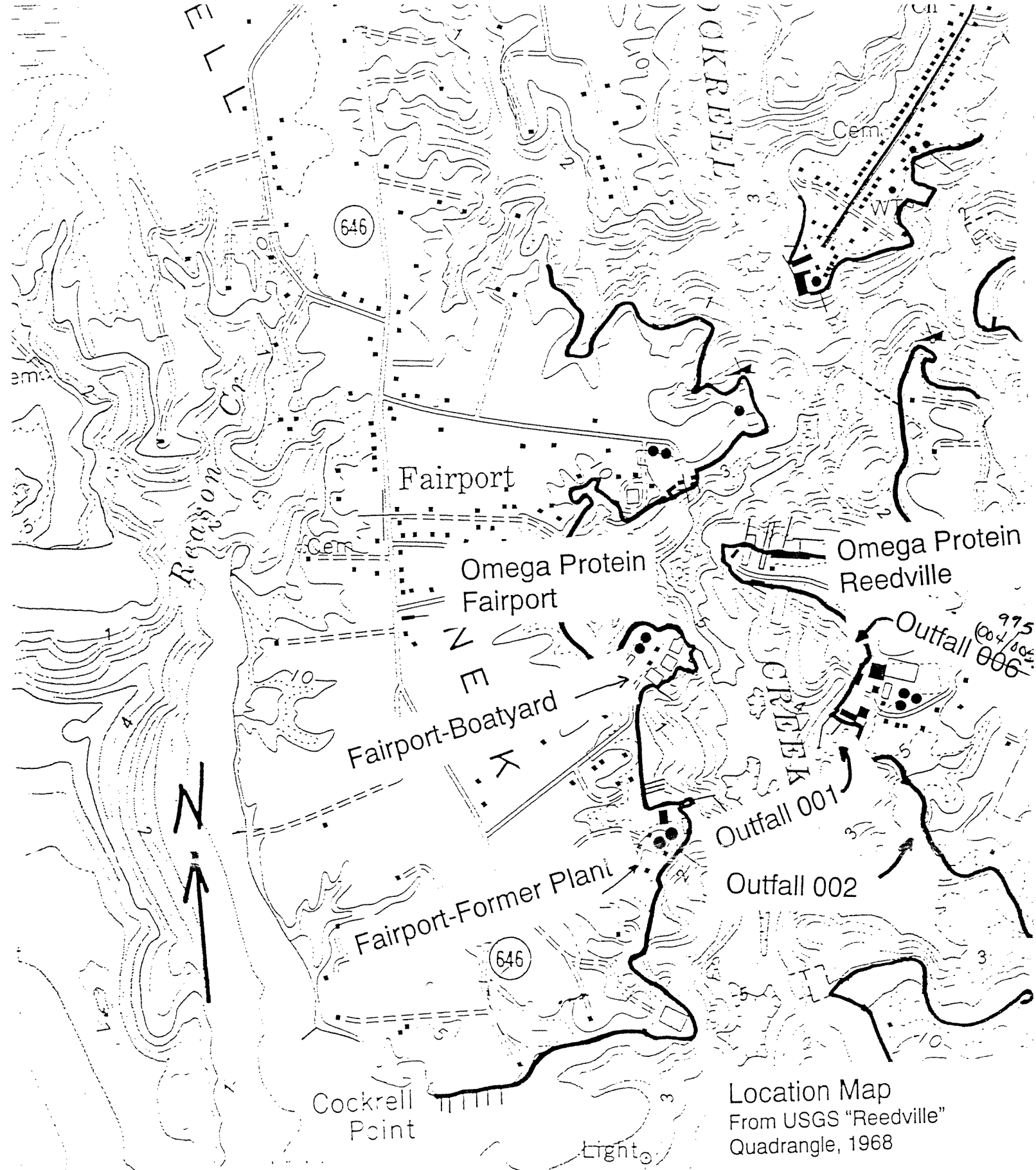
On September 26, 2005, the State Water Control Board approved the draft water quality management plan regulation 9 VAC 25-40 to become effective on November 16, 2005. This regulation included revised nutrient wasteload allocations for Omega Protein. However, at that time, the draft permit was at public notice reflecting the wasteload allocations that had been previously concurred with by the State Water Control Board on June 28, 2005. On October 31, 2005 Regional and Executive DEQ management decided to issue the permit with the Board approved draft allocations that will become finalized on November 16, 2005. Because these allocations have already received public notice and comment, it is not considered that any further notice on the proposed draft permit for Omega is necessary.

25. 303(d) Listed Segments (TMDL): This facility discharges directly to Cockrell's Creek. The segment is: 1.0-MZ of Cockrell's Creek in the WQMA III Watershed (Potomac, Rappahannock, York and Bay Tributaries Area). Because this facility has not been able to comply with limits for cyanide at 001 addressed in a previous Compliance Schedule this facility's receiving stream is listed in Section 5e of the current 303(d) list. The limits for cyanide in this permit will result in attainment of the standards once compliance is achieved. This permit has limits of 96 ug/l monthly average and 110 ug/l maximum for cyanide at 001. The facility is currently in non-compliance with the requirements of the permit. No additional permit limits are necessary and a consent order with the company addresses the cyanide issue. No TMDL will be prepared for this segment since it is not a water quality issue but rather an enforcement issue. The segment will be removed from the 303(d) list when compliance with permit limits is obtained. In addition, Cockrell's Creek is impaired for shellfish consumption. The permit contains a reopener condition that may allow these limits to be modified, in compliance with section 303(d)(4) of the Act once a TMDL is approved. Also, the whole creek is considered fully supporting with observed effects to Aquatic Life use because of exceedance of chlorophyll a at 7-COC001.61. These effects are noted here in the fact sheet because the area is nutrient enriched water.

List of Attachments—
1-Location Maps – Cockrell Creek and Chesapeake Bay
2--Process Diagrams and Site Map, Venturi Fume Scrubber diagram
3—Stream data for Cockrell's Creek and Chesapeake Bay
4--2004 303(d) Fact Sheets
5—VIMS model information
6--Inspection Report
7--Menhaden EPA guidelines/Table IV, Calculation of Conventional Limits/First Fact Sheet to show limit derivation
8--Toxics Calculations for 001 – Outfall information, Table V (data and WLAs), Stats printouts
9--Toxics Calculations for 002 – Outfall information, Table VI (data and WLAs), Stats printouts
10--Toxics Calculations for 003 – Outfall information, Table VII (data and WLAs), Stats printouts
11--Toxics Calculations for 995 (004+005) – Outfall information, Table VIII (data and WLAs), Stats printouts
12--Discharge Monitoring Reports (DMR)
13—Anti-backsliding information
14—Ship Repair location maps
15--TMP review
16—NPDES Permit Rating Worksheet
17—Fish Meal Barge Operation

ATTACHMENT 1

ATTACHMENT 2



Location Map
From USGS "Reedville"
Quadrangle, 1968

NOTE:
There are no hazardous waste treatment, storage or disposal facilities. There are no underground injection wells nor springs.

Omega Protein, Inc.
Reedville, VA VA0003867 February 20

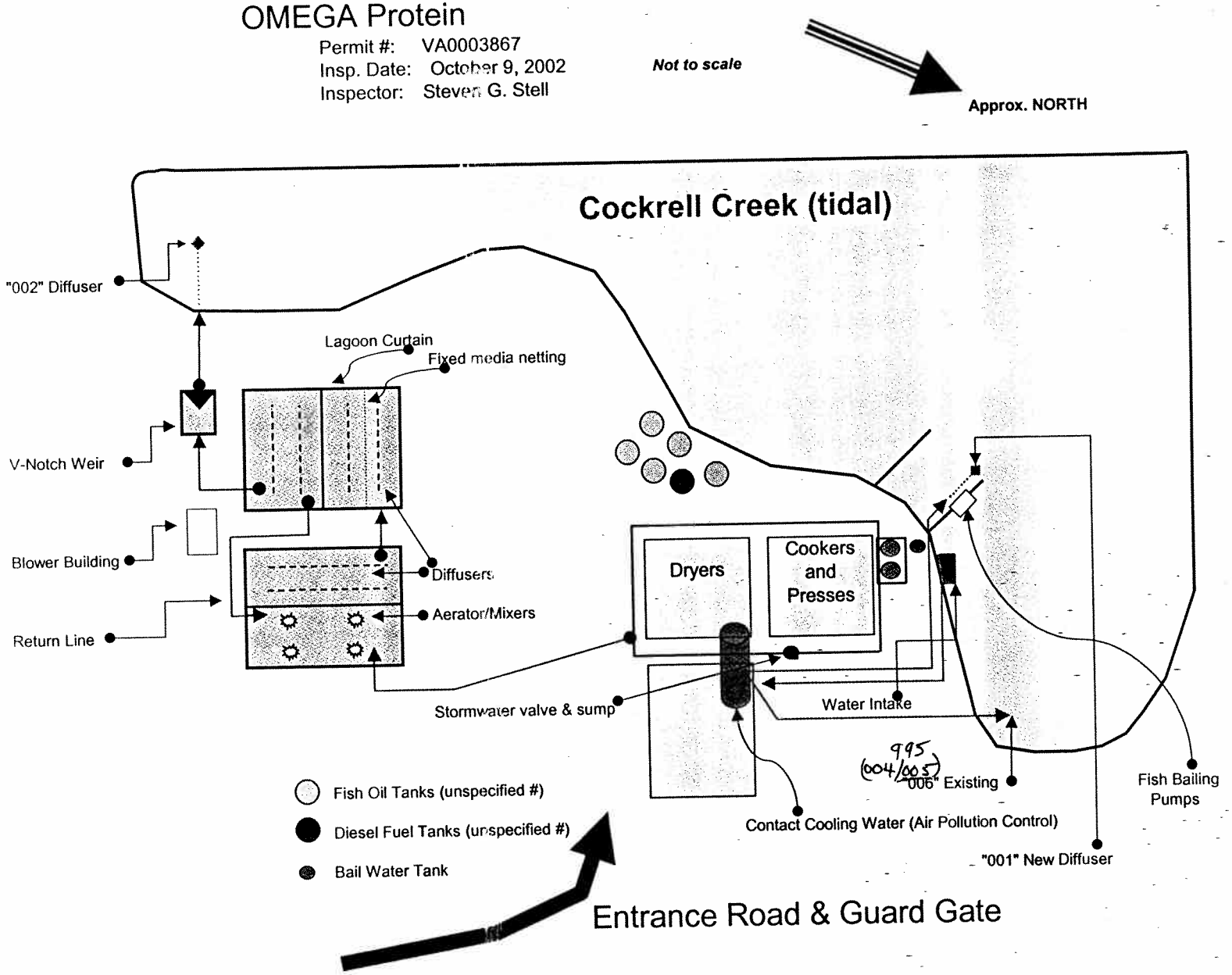
Scale Approx. 1" = 1000'

Attachment 1

OMEGA Protein

Permit #: VA0003867
Insp. Date: October 9, 2002
Inspector: Steven G. Stell

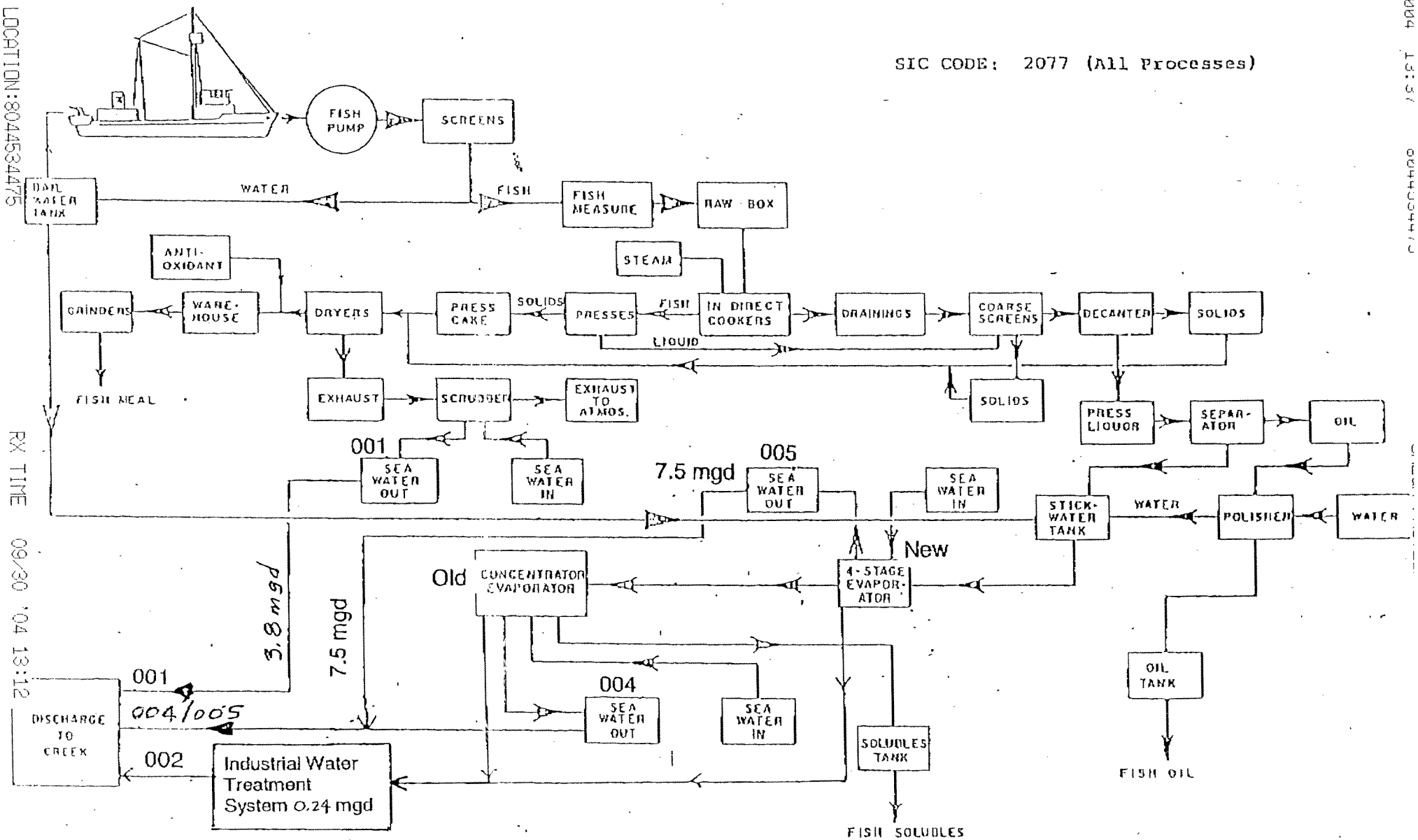
Not to scale



Omega Protein
Attachment 2b

VA 0003867

SIC CODE: 2077 (All Processes)



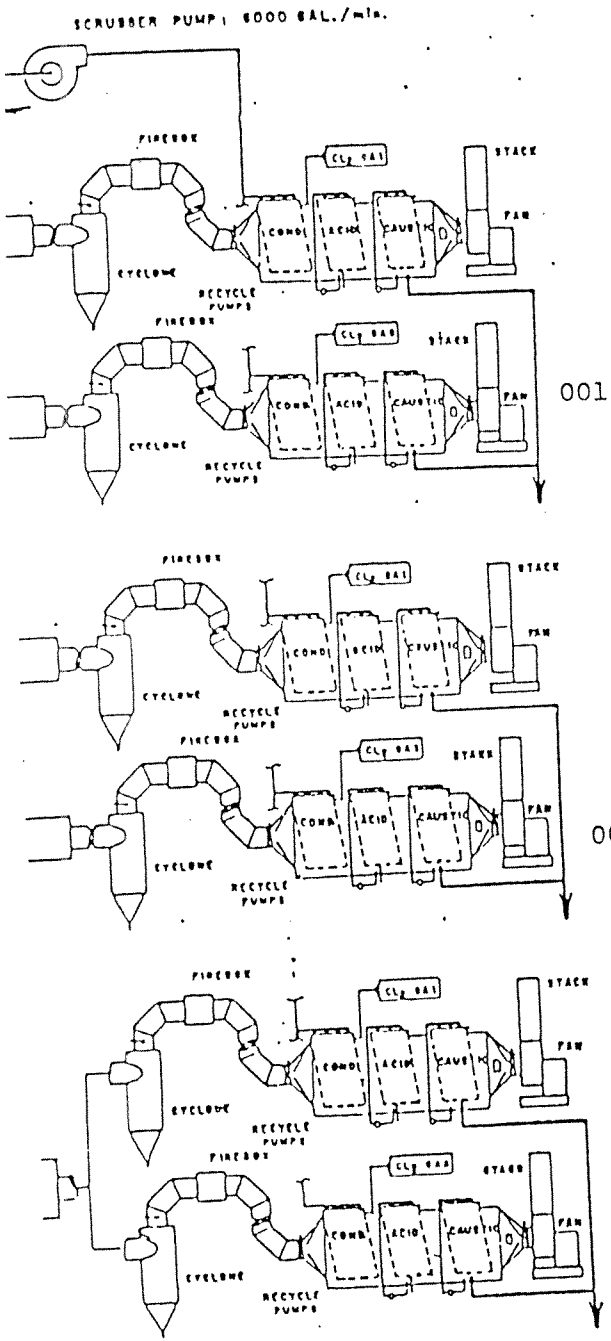
MENHADEN INDUSTRIAL PROCESS SCHEMATIC

003 Discharge is barge dump in Chesapeake Bay

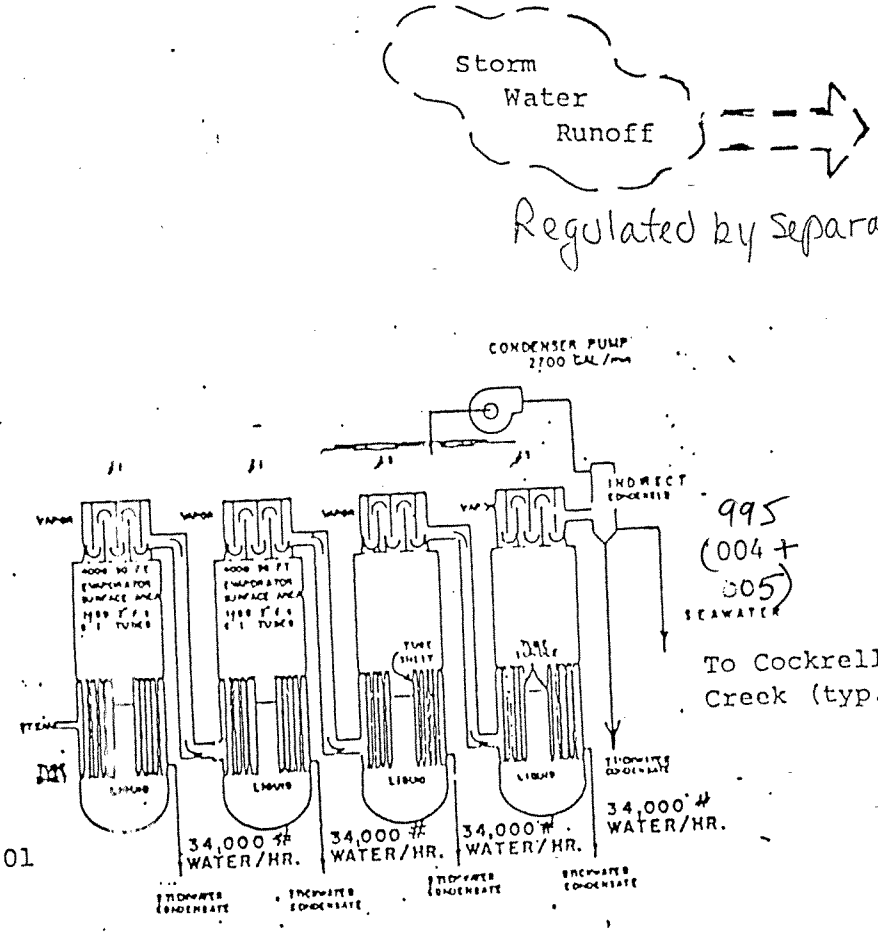
Revised 9/30/04

LOCATION:8044534475
RX TIME 09/30 '04 13:12
09/30/2004 13:37 8044534475

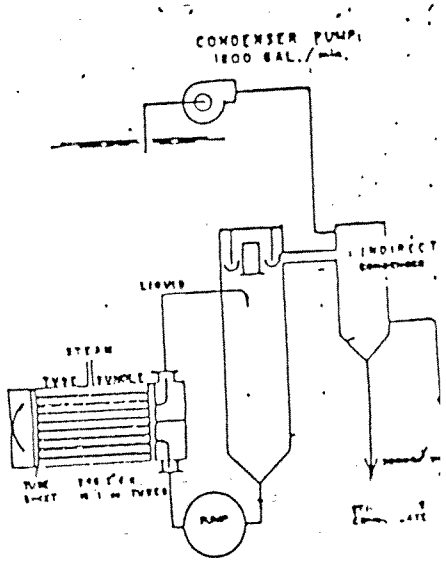
NOTE: SANITAR WASTEWATER
DIRECTLY TO SERVICE AUTHORITY.



SCRUBBERS



EVAPORATORS



CONCENTRATOR

Fact Sheet
Attachment
2c

ZAPATA HAYNIE-REEDVILLE PLANT
INDUSTRIAL WASTEWATER SOURCES

VA 0003867

NOTE: ALL CONDENSATE IS COLLECTE
PUMPED TO THE TREATMENT L

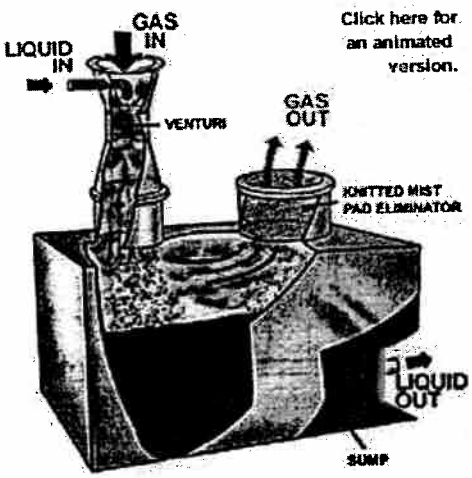
002

(except excess condensate

Omega Protein
Attachment 2d

VENTURI
Fume Scrubbers

similar to 001



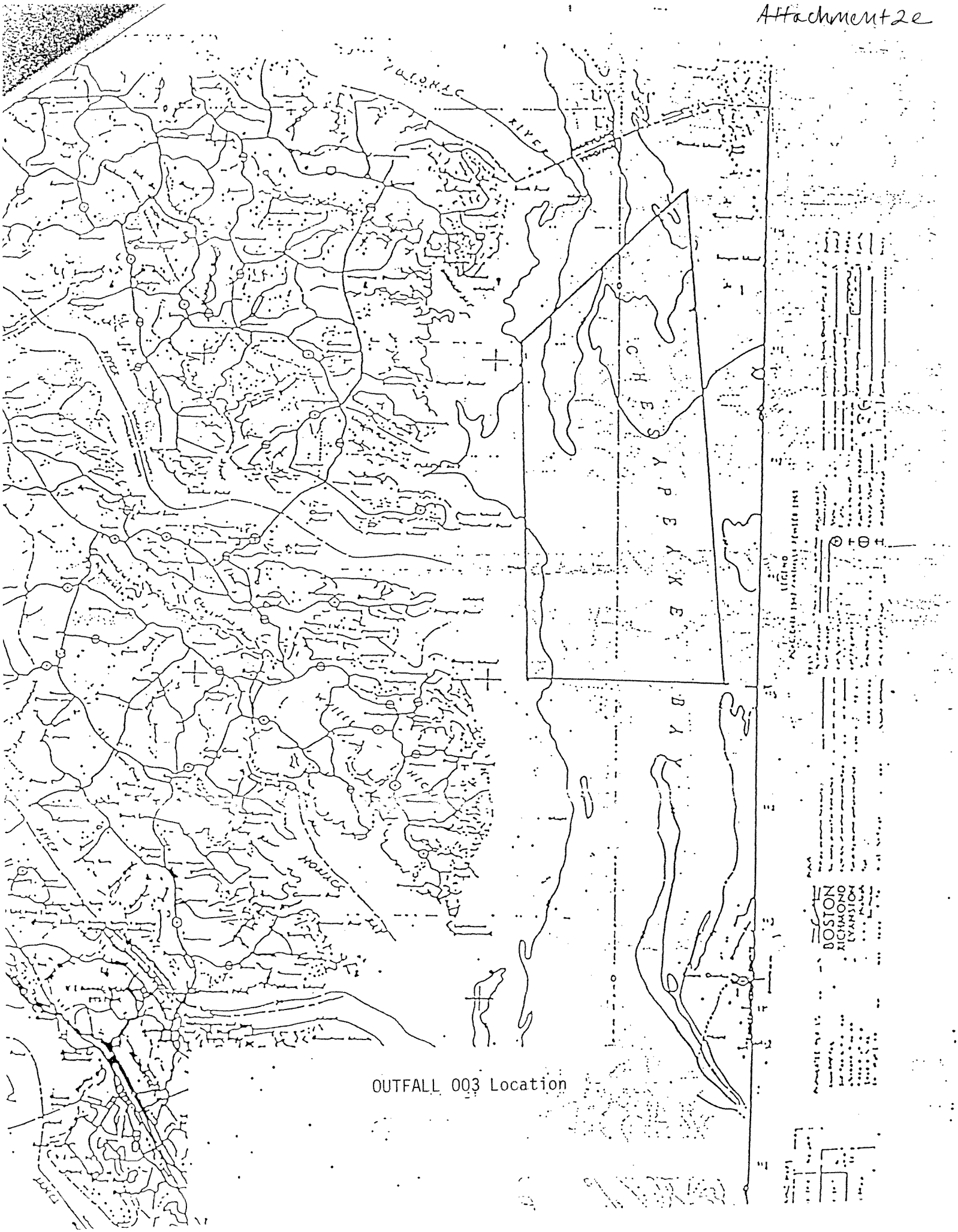
Click here for an animated version.

For an animated diagram Click here or the diagram on screen.

- Designed to treat exhaust streams containing particulates.
- Improved gas absorption through increased turbulance
- Co-Current flow.
- Materials of construction selected to suit given applications: Polypropylene, PVC, Halar, Glass reinforced as required, Mild Steel / Stainless Steel.
- Manufacture to BS4994 / BS5500.

[Contents] [Packed Column] [Venturi] [Horizontal] [Contact]

Attachment 2e



OUTFALL 003 Location

ATTACHMENT 3

Water Shed Code:VAP-C01E

Sta Id	Collection Date Time	Depth	Depth	Container I	Temp Celcius	Field Ph	Do Probe	Salinity
7-COC001.61	10/21/93 10:00	S	0.3	R	19.1	7.87	8	18
7-COC001.61	12/13/93 10:55	S	304.5	R	6.02	7.8		
7-COC001.61	2/16/94 10:30	S	0.3	R	2.7	8.19	14.4	13
7-COC001.61	4/6/94 11:30	S	0.3	R	12.4	8.48	11.3	10
7-COC001.61	6/7/94 10:30	S	0.3	R	23.1	8.08	7.2	10
7-COC001.61	6/7/94 10:40	S	2	R				
7-COC001.61	8/9/94 10:15	S	0.3	R	24.6	8.1	8.2	13.5
7-COC001.61	10/12/94 9:35	S	0.3	R				
7-COC001.61	12/15/94 11:00	S	0.3	R	7.7	8.08	9.5	16.5
7-COC001.61	2/9/95 10:30	S	0.3	R	0.8	8.85	12.8	16
7-COC001.61	6/12/95 14:00	S	0.3	R	26.7	7.83	7.15	17.2
7-COC001.61	8/11/95 14:30	B	4	R	26.85	7.88	3.3	19.3
7-COC001.61	8/11/95 14:30	M	1	R	28	8.2	6.44	19.3
7-COC001.61	8/11/95 14:30	M	3	R	27	7.96	3.85	19.3
7-COC001.61	8/11/95 14:30	S	0.3	R	28.45	8.24	7.07	19.1
7-COC001.61	9/13/95 11:50	S	0.3	R	24.98	8.05	6.36	22
7-COC001.61	12/11/95 13:00	S	0.3	R	4.09	7.8	11.06	21.2
7-COC001.61	3/18/96 10:22	S	0.3	R	7.73	7.57	11.09	14.3
7-COC001.61	6/20/96 10:30	S	0.3	R	29.5	8.65	10.31	11.8
7-COC001.61	9/19/96 9:34	S	0.3	R	22.97	7.63	6.4	13.2
7-COC001.61	12/12/96 8:45	S	0.3	R	6.61	7.75	11.73	12.2
7-COC001.61	3/10/97 13:15	S	0.3	R	9.74	8.29	12.37	9.9
7-COC001.61	6/5/97 14:15	S	0.3	R	20.56	7.66	8.32	12.9
7-COC001.61	6/6/97 12:45	S	0.4	R				
7-COC001.61	7/28/97 9:45	S	0.3	R	28.53	7.72	6.62	15.2
7-COC001.61	9/16/97 13:00	S	0.3	R	26.33	7.82	7.42	17
7-COC001.61	11/17/97 11:24	S	0.3	R	10.03	8.05	8.16	19.1
7-COC001.61	1/13/98 10:40	S	0.3	R	7.83	8	8.52	20
7-COC001.61	3/11/98 14:00	S	0.3	R	8.29	8.38	11.69	13.2
7-COC001.61	5/14/98 12:20	S	0.3	R	15.98	7.57	6.85	10.4
7-COC001.61	7/13/98 11:00	S	0.3	R	27.2	8.26	6.83	12.2

7-COC001.61	8/12/98 13:05	S	1	R	29.06	8.04	7.13	14.6
7-COC001.61	8/12/98 13:05	S	1	R				
7-COC001.61	8/24/98 12:45	S	1	R	28.4	8.07	8.28	16.3
7-COC001.61	8/24/98 12:45	S	1	R				
7-COC001.61	9/8/98 13:00	B	2	R	27.02	7.86	7.35	18.8
7-COC001.61	9/8/98 13:00	M	1	R	27.02	7.9	7.28	18.8
7-COC001.61	9/8/98 13:00	S	0.3	R	27.01	7.93	7.23	18.8
7-COC001.61	9/8/98 13:00	S	1	R				
7-COC001.61	9/15/98 12:30	S	0.3	R	26.08	8.15	8.33	15.6
7-COC001.61	9/21/98 13:00	B	2.7	R	25.85	7.62	3.11	16.7
7-COC001.61	9/21/98 13:00	M	1	R	26.06	8.09	6.2	16.6
7-COC001.61	9/21/98 13:00	M	2	R	25.87	7.79	4.12	16.6
7-COC001.61	9/21/98 13:00	S	0.3	R	26.61	8.17	7.53	16.4
7-COC001.61	9/21/98 13:00	S	1	R				
7-COC001.61	10/8/98 10:25	S	2 9	R	20.94	7.87	6.17	17.3
7-COC001.61	10/8/98 12:05	B	2	R	21.03	8.06	7.37	17.8
7-COC001.61	10/8/98 12:05	M	1	R	21.12	8.09	7.47	17.9
7-COC001.61	10/8/98 12:05	S	0.3	R	21.12	8.09	7.47	17.9
7-COC001.61	10/8/98 12:05	S	1	R				
7-COC001.61	10/22/98 12:00	B	1.7	R	17.73	7.64	6.77	20.5
7-COC001.61	10/22/98 12:00	M	1	R	17.76	7.7	6.61	20.5
7-COC001.61	10/22/98 12:00	S	0.3	R	17.74	7.71	6.65	20.5
7-COC001.61	10/22/98 12:00	S	1	R				
7-COC001.61	11/5/98 12:00	B	2.1	R	13.41	7.68	7.25	21.8
7-COC001.61	11/5/98 12:00	M	1	R	13.41	7.7	7.25	21.8
7-COC001.61	11/5/98 12:00	S	0.3	R	13.41	7.7	7.22	21.8
7-COC001.61	11/5/98 12:00	S	1	R				
7-COC001.61	11/16/98 9:30	S	0.3	R	12.2	8.02	10.34	19
7-COC001.61	11/19/98 11:41	B	2.7	R	12.44	8.05	11.55	17.6
7-COC001.61	11/19/98 11:41	M	1	R	12.34	8.27	11.74	17.5
7-COC001.61	11/19/98 11:41	M	2	R	12.43	8.2	11.37	17.5
7-COC001.61	11/19/98 11:41	S	0.3	R	12.54	8.28	12	17.5
7-COC001.61	1/13/99 11:55	S	0.3	R	3.96	7.58	14.01	21.5
7-COC001.61	3/15/99 12:15	S	0.3	R	5.22	7.7	10.4	22.1
7-COC001.61	5/10/99 12:30	S	1	R	22.2	8.02	8.9	16
7-COC001.61	5/12/99 12:45	S	0.3	R	22.41	8.42	9.7	16.8
7-COC001.61	5/24/99 12:15	S	1	R	22.98	7.92	6.78	18

7-COC001.61	5/24/99 12:15	S	1	R			
7-COC001.61	6/7/99 11:50	S	1	R	25.73	8.55	8.09	16.7
7-COC001.61	6/21/99 12:35	S	1	R	22.03	8.37	8.51	17.1
7-COC001.61	7/1/99 11:45	S	1	R	27.2	8.2	6.7	20
7-COC001.61	7/13/99 13:45	S	0.3	R	25.41	8.13	5.34	17.3
7-COC001.61	7/22/99 12:05	S	1	EB				
7-COC001.61	7/22/99 12:15	S	1	S1				
7-COC001.61	7/22/99 12:15	S	1	S2				
7-COC001.61	8/4/99 11:50	S	1	R	29.94	8.49	9.22	17.9
7-COC001.61	8/19/99 11:50	S	1	R	28.95	8.37	7.5	24
7-COC001.61	9/2/99 12:00	S	1	R	21.5	8.22	8.35	21.4
7-COC001.61	9/14/99 15:00	S	0.3	R	25.52	7.99	8.04	17.7
7-COC001.61	9/29/99 13:05	S	1	R	23.01	7.92	7.12	23.1
7-COC001.61	10/6/99 11:35	S	1	R	20.17	8.06	7.89	20.7
7-COC001.61	10/21/99 12:00	S	1	R				
7-COC001.61	11/8/99 11:44	S	0.3	R	13.66	7.95	7.06	19.5
7-COC001.61	1/24/00 11:55	S	0.3	R	1.28	7.87	11.74	19.8
7-COC001.61	3/16/00 12:00	S	0.3	R	12.61	8.16	10.28	17.1
7-COC001.61	5/18/00 12:05	S	0.3	R	25.06	8.21	8.25	13.2
7-COC001.61	5/23/00 16:30	S	1	R	21.54	8.15	8.24	14.01
7-COC001.61	6/14/00 15:15	S	1	R	25.69	7.98	4.46	14
7-COC001.61	7/6/00 15:30	B	1	R	28.89	8.22	6.16	14
7-COC001.61	7/12/00 11:25	S	0.3	R	27.9	8.45	7.65	14.51
7-COC001.61	8/1/00 14:46	B	1	R	28.58	8.54	9.62	13
7-COC001.61	9/5/00 15:30	B	1	R	25.6	7.5	3.83	14.2
7-COC001.61	9/7/00 12:35	S	0.3	R	23.47	7.57	7.14	14.4
7-COC001.61	10/26/00 15:00	B	1	R	18.36	7.99	8.15	16.2
7-COC001.61	11/7/00 10:15	S	0.3	R	13.61	8.14	9.77	16.42
7-COC001.61	1/3/01 15:15	S	0.3	R	1.05	7.9	12.21	20.5
7-COC001.61	3/7/01 11:40	S	0.3	R	5.22	7.95	10.81	17.02
7-COC001.61	5/15/01 14:30	S	0.3	R	21.5	7.77	6.6	15.6
7-COC001.61	7/17/01 14:00	S	0.3	R	28.42	8.14	8.19	15.86
7-COC001.61	9/24/01 13:30	S	0.3	R	24.98	7.79	8.51	17.74
7-COC001.61	11/19/01 15:20	S	0.3	R	13.57	7.88	9.15	19.6
7-COC001.61	11/19/01 15:20	S	0.7	R				
7-COC001.61	1/15/02 13:10	S	0.3	R	5.55	7.51	11.81	20.8
7-COC001.61	4/1/02 14:50	S	0.3	R	13.8	8.06	8.58	19.61

7-COC001.61	5/1/02 14:30	S	0.3	R	20.31	8.1	9.79	18.52
7-COC001.61	8/28/02 14:45	S	0.3	R	26.41	7.37	4.5	19.23
7-COC001.61	10/28/02 15:00	S	0.3	R	15.96	7.49	7.86	21.68
7-COC001.61	12/4/02 13:30	S	0	EB				
7-COC001.61	12/4/02 13:30	S	0.3	S1	5.43	8.1	11.79	18.92
7-COC001.61	12/4/02 13:30	S	0.3	S2				
7-COC001.61	2/5/03 14:10	S	0.3	R	3.64	7.89	13.79	15.93
7-COC001.61	4/29/03 14:30	S	0.3	R	19.64	7.96	9.79	10.9
7-COC001.61	6/11/03 14:35	S	0.3	R	25.29	8.29	9.16	11.97
7-COC001.61	8/4/03 15:00	S	0.3	R	28.55	8.11	7.52	12.55
7-COC001.61	10/6/03 16:25	S	0.3	R	19.7	7.85	7.54	12.65
					28.41	**8.37**		**17.0**
					90th %ile	**90th %ile**		**Average**

Mosca,Denise

From: Jennifer V. Palmore@RCHMD@DEQ
Sent: Tuesday, October 23, 2001 7:30 PM
To: DMMosca
Subject: re: Omega VA0003867 data

BEYOND.RTF

Using the entire period of record (1984-June 2001) and the entire water column, the following are the results of the data analysis for CB 5.4:

90th percentile pH - 8.4 SU
90th percentile temperature - 25.9 deg. C
Average salinity - 19.0 ppt

Hope that helps. Let me know if you have any questions.

Thanks.

Jennifer Palmore
Environmental Engineer, Senior
Dept. of Environmental Quality - Piedmont Regional Office
(804) 527-5058
---------- Original Text ----------

From: Denise M. Mosca@KLMCK@DEQ, on 09/07/2001 11:59 AM:

Hi Jennifer,
thanks again for your prompt response for the Cockrell's Creek data yesterday. The last time I worked on this permit, for the 003 Ches. Bay discharge, I used data from CB 54 from 5/94 to 10/96. I have a note, after 1996, no more pH and temperature data. Is this still the case, and to your knowledge, should I continue to use the 90th percentiles pH and temperature and mean salinity from before? Their bay discharge is allowed to a box delineated by lat/long and CB 54 appeared to be central to that area. I am not in a hurry for this information, I don't expect the permit application for another month.
thanks a bunch,
denise

Denise M. Mosca
Environmental Engineer Sr.
DEQ-Kilmarnock Satellite Office
P.O. Box 669
Kilmarnock, Va. 22482
804-435-3181 telephone
804-435-0485 fax

ATTACHMENT 4

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

2004 Fact Sheets for Category 5 Waters

RIVER BASIN: Chesapeake Bay/Atlantic/Small Coastal Basins

CITY/COUNTY: Northumberland

STREAM NAME: Cockrell Creek

HYDROLOGIC UNIT: 02080102

TMDL ID: VAP-C01E-08

ASSESSMENT CATEGORY: 5B

SEGMENT SIZE: 1.09 - Sq. Mi.

INITIAL LISTING: 1998 **TMDL SCHEDULE:** 2010

UPSTREAM LIMIT:

DESCRIPTION: Upstream condemnation boundary

RIVER MILE: 3.49

LATITUDE: 37.8592 **LONGITUDE:** -76.2944

DOWNSTREAM LIMIT:

DESCRIPTION: Downstream condemnation boundary

RIVER MILE: 0.12

LATITUDE: 37.3183 **LONGITUDE:** -76.2861

Described in VDH Notice and Description of Shellfish Condemnation Number 002

CLEAN WATER ACT GOAL AND USE SUPPORT:

Shellfishing Use - Not Supporting

IMPAIRMENT CAUSE: VDH Shellfish Restriction

VDH-DSS Shellfish Condemnation 002A, 9/14/1993

IMPAIRMENT SOURCE: Unknown

Source is unknown.

SEGMENT PROPOSED FOR TMDL DELISTING?: NO

SEGMENT PROPOSED FOR SHELLFISH DELISTING?: NO

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

2004 Fact Sheets for Category 5 Waters

RIVER BASIN: Chesapeake Bay/Atlantic/Small Coastal Basins

CITY/COUNTY: Lancaster, Northumberland

STREAM NAME: CHESAPEAKE BAY - VA portion of CB5MH

HYDROLOGIC UNIT: 02080101

TMDL ID: VACB-R01E-CB5

ASSESSMENT CATEGORY: 5A

SEGMENT SIZE: 215 - Sq. Mi.

INITIAL LISTING: 1998 **TMDL SCHEDULE:** 2010

UPSTREAM LIMIT:

DESCRIPTION:

RIVER MILE:

LATITUDE: **LONGITUDE:**

DOWNSTREAM LIMIT:

DESCRIPTION:

RIVER MILE:

LATITUDE: **LONGITUDE:**

Segment encompasses Bay mainstem open water from the MD-VA state line southward to line running from North shore mouth of Rappahannock River to Tangier Island. Includes monitoring stations CB5.4, CB5.4W, CB5.5. Contains parts of 2002 303d segments VACB-R01E-02 and VACB-R01E-05

CLEAN WATER ACT GOAL AND USE SUPPORT:

Aquatic Life Use - Not Supporting, Aquatic Life Use - Not Supporting

IMPAIRMENT CAUSE: Dissolved Oxygen, Estuarine Bioassessments (Benthos), EPA Overlisting (Nutrients)

This segment is non-supporting for the Clean Water Act's Aquatic Life Use Support Goal for the 2004 305(b) report due to dissolved oxygen criteria violations in Deep Water and Deep Channel areas (< 4.0 mg/l Violation rate of 65% Deep Channel, 24% Deep water, .2% Open Water) observed at water quality monitoring stations CB5.4, CB5.4W, CB5.5. The segment is also non-supporting for Aquatic Life Use Support Goal because of impaired benthic communities. This segment was also listed as impaired in 1998 by EPA due to nutrient enrichment concerns.

IMPAIRMENT SOURCE:	Nonpoint Sources, Point Sources, Sources Ouside State Jurisdiction, Unknown, Nonpoint Sources, Point Sources, Sources Ouside State Jurisdiction

Anthropogenic Eutrophication

SEGMENT PROPOSED FOR TMDL DELISTING?:	NO
SEGMENT PROPOSED FOR SHELLFISH DELISTING?:	NO

ATTACHMENT 5

4010 WEST F[illegible] S[illegible]

State Water [illegible]nt Board

P. O. Bo[illegible] 11143

RICHMOND, VA.

Omega Fact Sheet

SUBJECT: Menhaden Industries Permit Reissuance - Cockrell Creek Wasteload Allocation - Northumberland County

TO: File - Kilmarnock Office

FROM: G. T. Yagel

DATE: August 15, 1979

COPIES: L. S. McBride, L. G. Lawson, A. J. Anthony, J. R. Bell, F. K. Cunningham, Dale F. Jones, Burton R. Tuxford

In anticipation of this division's responsibilities for the reissuance of permits for two menhaden industries in Northumberland County, the issue of wasteload allocation for $CBOD_5$ has been under consideration for more than a year. The deadline date for the reissuance is January 1980. No attempt will be made to include in this memorandum a summary of all of the items brought forth in many conferences with VIMS, the permittee consultants, and other staff members. That information can be found in our regional office file. The purpose of this memorandum is to set forth conclusions reached during a conference with personnel of BAT, BWCM, BE, and TRO-DSP on August 7, 1979 at 10:30 a.m. Personnel involved are listed below:

A. J. Anthony	- BAT
J. R. Bell	- BAT
Dale F. Jones	- BWCM
Burton R. Tuxford	- BWCM
Anne Field	- BE
G. T. Yagel	- TRO-DSP

1. VIMS model of Cockrell Creek has been verified and will be utilized as the basis for wasteload allocation of the total loading from these menhaden industries during the drafting of limitations for reissued permits.

2. In accordance with the VIMS model, 5,000 pounds per day of carbonaceous BOD is the total limit allowable for all discharges into Cockrell Creek in order that 5.0 m/l of DO will be maintained in the upper layer of that receiving stream. 100 pounds per day of that total will be reserved for the Reedville Sanitary District sewage treatment facilities in order that growth may be allowed, leaving the industries with 4,900 pounds per day.

3. The 4,900 pounds total loading is considered a daily average and not a daily maximum.

4. The upper layer of Cockrell Creek, as identified in the VIMS model will be used to determine wasteload allocation which is agreed to by BWCM.

Omega Fact Sheet

5. Suspended Solids loading will be reduced in the reissued permits by the same proportion as the $CBOD_5$.

6. Net loading methodology used in the past for calculating daily loading from each industry will be deleted.

7. Alteration of the water quality standards now applicable to Cockrell Creek can only be accomplished in accordance with Section 35.1550 appearing in the Federal Register/Volume 44 No.101/Wednesday, May 23, 1979. It was Anne Field's opinion that relaxation of existing standards could be accomplished only if economic data, provided by each industry, demonstrated that compliance with wasteload allocations planned would necessitate termination of the operations of these industries.

8. After considering all alternatives for allocation methodology, it was decided that productivity capability of each industry would be used as the basis for determining the percentage of allowable loading of waste to be allocated to each industry during the drafting of permit limits for permit reissuance. TRO-DSP personnel will confer with the management of each industry on August 20, 1979 for the purpose of explaining the allocation methodology agreed upon in securing production capacity data.

9. In response to F. K. Cunningham and G. T. Yagel's memorandum to Dale Jones, dated August 6, 1979, comments from Dale Phillips regarding the approach planned for wasteload allocation and the use of the VIMS model are expected prior to August 20, 1979.

The writer is anticipating that at least one of these industries may be requesting a hearing before the Board after they receive notice of the allocation offered them, for the purpose of contesting our decision in accordance with the provisions of Regulation #6 and the current NPDES Permit Issuance Manual. During that hearing, economic data may be provided by each or both of these industries. That data probably should include dollar value of the final product exported from each of these plants to their markets, other socio-economic factors, which only the industries can provide, number of employees affected by possible termination of production, and production data for the 1973-1974 seasons as compared to that data available for the 1977-1978 production seasons.

/bj

Omega Fact Sheet

HYDROGRAPHY AND HYDRODYNAMICS OF VIRGINIA ESTUARIES

IX. Mathematical Water Quality Study of Great Wicomico River and Cockrell Creek

by

P. V. Hyer
J. Jacobson

PREPARED UNDER

THE COOPERATIVE STATE AGENCIES PROGRAM

OF

THE VIRGINIA STATE WATER CONTROL BOARD AND
THE VIRGINIA INSTITUTE OF MARINE SCIENCE

Project Officers

Dale Jones
Michael Bellanca

Virginia State Water Control Board

Special Report No. 120
in Applied Marine Science and
Ocean Engineering

Virginia Institute of Marine Science
Gloucester Point, Virginia 23062

William J. Hargis, Jr.
Director

September 1976

Omega Fact Sheet

III. Description of Study Area

The drainage area of the Great Wicomico River takes in a portion of Northumberland County (see figure 1). This region is rural, with about half the land area covered by forest. Farming, commercial fishing and fish processing are the financial mainstays for the area.

Mean daily minimum temperatures are approximately thirty degrees and sixty-nine degrees Fahrenheit (minus one and twenty-one degrees Celsius) for January and July, respectively. The corresponding mean daily maximum temperatures are forty-eight degrees and eighty-eight degrees Fahrenheit respectively (nine and thirty-one degrees Celsius). Precipitation in the drainage basin exceeds forty-six inches (117 cm) per year. Autumn is drier than the rest of the year. Precipitation in the summer tends to occur as brief, heavy thundershowers, rather than as the more prolonged storms that occur throughout the rest of the year.

The Great Wicomico River empties directly into Chesapeake Bay. The land area of the drainage basin is only 70.6 square miles (182.8 km^2), resulting in relatively little freshwater inflow to the river. Tidal action is also weak, with the tidal current amplitude being on the order of 0.5 ft/sec (15 cm/sec) or less. Since the stream is short, there is very little time lag in the upstream propagation of the tidal wave.

Omega Fact Shee

Cockrell Creek is a tributary to the Great Wicomico. The creek empties into the river close to the river mouth. The creek has characteristics similar to the river; small drainage area (4.6 square miles, or 11.9 km^2) weak tidal action and low freshwater input. Two fish processing plants as well as the town of Reedville are located on Cockrell Creek. During the summer, the two plants introduce a total of about 5000 lb/day (2300 kg/day) of five-day carbonaceous BOD and about 900 lb/day (410 kg/day) of organic mitrogen and ammonia (as N).

ATTACHMENT 6

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

Wastewater Facility Inspection Report

Facility Name:	Omega Protein	**Facility No.:**	VA0003867
~~City~~/County:	Northumberland	**Inspection Agency:**	DEQ
Inspection Date:	Oct. 9, 2002 (1021-1618 hrs)	**Date Form Completed:**	October 18, 2001 365
Inspector:	Steven G. Stell	**Time Spent:**	16 hrs. w/ travel & report
Reviewed By:	CMW 10/21/02	**Unannounced Insp.?**	No
		FY-Scheduled Insp.?	Yes

Present at Inspection: Andy Hall (Plant Manager)

TYPE OF FACILITY:

Domestic		Industrial	
[ ] Federal	[ ] Major	[x] Major	[ ] Primary
[ ] Non-Federal	[ ] Minor	[ ] Minor	[ ] Secondary

Population Served: approx.: (N/A)

Number of Connections: approx.: 1

TYPE OF INSPECTION:

[x] Routine — Date of last inspection: September 12, 2001

[ ] Compliance — Agency: DEQ/PRO

[ ] Reinspection

EFFLUENT MONITORING: ***See Discharge Monitoring Reports (DMR) in file***

Last month average: BOD: ___ mg/L TSS: ___ mg/L Flow: __ MGD
(Influent) Date:
Other: _____

Last month: BOD: ___ mg/L TSS: ___ mg/L Flow:___ MGD
(Effluent) Date:
Other: _____

Quarter average: BOD: ___ mg/L TSS: ___ mg/L Flow: ___ MGD
(Effluent) Date:
Other: _____

CHANGES AND/OR CONSTRUCTION

DATA VERIFIED IN PREFACE	[x]Updated	[ ] No changes	
Has there been any new construction?	[x] Yes*	[ ] No	
If yes, were plans and specifications approved?	[ ] Yes	[ ] No*	[x] N/A
DEQ approval date:	001 Diffuser (approval date not ascertained)		

(A) PLANT OPERATION AND MAINTENANCE

1. Class and number of licensed operators: Class I – 0, Class II – 0, Class III – 1, Class IV – 0, Trainee - 0
2. Hours per day plant is staffed: WWTF: 1-2 hrs; Factory Security: 24 hrs/day
3. Describe adequacy of staffing: [ ] Good [x] Average [ ] Poor*
4. Does the plant have an established program for training personnel? [ ] Yes [x] No
5. Describe the adequacy of the training program: [ ] Good [ ] Average [x] Poor*
6. Are preventive maintenance tasks scheduled? [x] Yes [ ] No*
7. Describe the adequacy of maintenance: [ ] Good [ ] Average [x] Poor*
8. Does the plant experience any organic/hydraulic overloading? [ ] Yes* [x] No

   If yes, identify cause and impact on plant: N/A
9. Any bypassing since last inspection? [ ] Yes* [x] No
10. Is the on-site electric generator operational? [ ] Yes [ ] No* [x] N/A
11. Is the STP alarm system operational? [ ] Yes [ ] No * [x] N/A
12. How often is the standby generator exercised? [ ] Weekly [ ] Monthly [x] Other: N/A

    Power Transfer Switch? [ ] Weekly [ ] Monthly [x] Other: N/A

    Alarm System? [ ] Weekly [ ] Monthly [x] Other: N/A
13. When were the cross connection control devices last tested on the potable water service? N/A
14. Is sludge disposed in accordance with the approved sludge disposal plan? [ ] Yes [ ] No* [x] N/A
15. Is septage received by the facility? [ ] Yes [x] No

    Is septage loading controlled? [ ] Yes [ ] No * [x] N/A

    Are records maintained? [ ] Yes [ ] No* [x] N/A
16. Overall appearance of facility: [ ] Good [ ] Average [x] Poor*

Comments: #1 - Lyell Jett is now a licensed Class III Operator and all wastewater process changes and adjustments must be done under his direct supervision. #4 & #5 - No formal training program exists for the wastewater treatment system. #7 - The lagoon aeration system continues to have leaks and berm damage. Additionally, a number of seeps were observed on the outside berm of the lagoon. This may have been aggravated by increasing the operational depth of the lagoon in recent years. #16 - The lagoon system appears to discharging a better quality effluent, however see Summary.

(B) PLANT RECORDS

1. Which of the following records does the plant maintain?

Operational Logs for each unit process	[ ] Yes	[x] No*	[ ] N/A
Instrument maintenance and calibration	[x] Yes	[ ] No*	[ ] N/A
Mechanical equipment maintenance	[x] Yes	[ ] No*	[ ] N/A
Industrial waste contribution **(Municipal Facilities)**	[ ] Yes	[ ] No*	[x] N/A

2. What does the operational log contain?

Visual Observations	[ ] Yes	[x] No	[ ] N/A
Flow Measurement	[x] Yes	[ ] No	[ ] N/A
Laboratory Results	[x] Yes	[ ] No	[ ] N/A
Process Adjustments	[x] Yes	[ ] No*	[ ] N/A
Control Calculations	[ ] Yes	[ ] No	[x] N/A
Other:	N/A		

3. What do the mechanical equipment records contain:

As built plans and specs?	[ ] Yes	[x] No*	[ ] N/A
Spare parts inventory?	[ ] Yes	[x] No*	[ ] N/A
Manufacturers instructions?	[ ] Yes	[x] No*	[ ] N/A
Equipment/parts suppliers?	[ ] Yes	[x] No*	[ ] N/A
Lubrication schedules?	[ ] Yes	[x] No*	[ ] N/A
Other:	N/A		
Comments:	None		

4. What do the industrial waste contribution records contain: ***(Applicable to municipal facilities only)***

Waste characteristics?	[ ] Yes	[ ] No*	[x] N/A
Locations and discharge types?	[ ] Yes	[ ] No*	[x] N/A
Impact on plant?	[ ] Yes	[ ] No*	[x] N/A
Other:	N/A		
Comments:	None		

5. Are the following records maintained at the plant:

Equipment maintenance records	[x] Yes	[ ] No*	[ ] N/A
Operational Log	[x] Yes	[ ] No*	[ ] N/A
Industrial contributor records	[ ] Yes	[ ] No*	[x] N/A
Instrumentation records	[x] Yes	[ ] No*	[ ] N/A
Sampling and testing records	[x] Yes	[ ] No*	[ ] N/A

6. Are records maintained at a different location? [ ] Yes [x] No
   Where are the records maintained? All are available on site.

7. Were the records reviewed during the inspection [x] Yes [ ] No

8. Are the records adequate and the O & M Manual current? [ ] Yes [x] No* [ ] N/A
   O&M Manual date written: July 27, 1998
   Date DEQ approved O&M: (not ascertained)

9. Are the records maintained for required 3-year period? [x] Yes [ ] No*

Comments: #1 - No operational log per se. Maintenance notes and lab results kept in logs. #3 - Few mechanical equipment records are maintained. There is little mechanical equipment (blowers and aerators), however improved maintenance records should be developed. #8 - The current O&M Manual solely addresses sampling. With the reissuance of the Permit a more in depth O&M Manual will be required to be submitted for DEQ approval.

(C) SAMPLING

1.	Are sampling locations capable of providing representative samples?	[x] Yes	[ ] No*	[ ] N/A
2.	Do sample types correspond to those required by the permit?	[x] Yes	[ ] No*	[ ] N/A
3.	Do sampling frequencies correspond to those required by the permit?	[x] Yes	[ ] No*	[ ] N/A
4.	Are composite samples collected in proportion to flow?	[x] Yes	[ ] No*	[ ] N/A
5.	Are composite samples refrigerated during collection?	[x] Yes	[ ] No*	[ ] N/A
6.	Does plant maintain required records of sampling?	[x] Yes	[ ] No*	[ ] N/A
7.	Does plant run operational control tests?	[x] Yes	[ ] No*	[ ] N/A

Comments:

(D) TESTING

1. Who performs the testing?
   [x] Plant/ Lab
   [ ] Central Lab
   [x] Commercial Lab - Name: **Clifford & Assoc.**

If plant performs any testing, complete 2-4.

2.	What method is used for chlorine analysis?	N/A		
3.	Is sufficient equipment available to perform required tests?	[x] Yes	[ ] No*	[ ] N/A
4.	Does testing equipment appear to be clean and/or operable?	[x] Yes	[ ] No*	[ ] N/A

Comments: Please see enclosed DEQ *Laboratory Inspection Report*.

(E) FOR INDUSTRIAL FACILITIES W/ TECHNOLOGY BASED LIMITS

1. Is the production process as described in the permit application? (If no, describe changes in comments)

   [x] Yes [ ] No* [ ] N/A

2. Do products and production rates correspond to the permit application? (If no, list differences in comments section)

   [x] Yes [ ] No* [ ] N/A

3. Has the State been notified of the changes and their impact on plant effluent?

   [ ] Yes [ ] No* [x] N/A

Comments: None

FOLLOW UP TO COMPLIANCE RECOMMENDATIONS FROM THE September 12, 2001 DEQ INSPECTION:

1. Repair aeration line leaks. ***[Done but continuing failures]***
2. Repair berm damage (holes at aeration line leaks and animal burrows). **[Done but continuing failures.]**

FOLLOW UP TO GENERAL RECOMMENDATIONS FROM THE September 12, 2001 DEQ INSPECTION:

1. Continue to manage burrowing animals to prevent berm damage. **[Performed as needed.]**

INSPECTION REPORT SUMMARY

Compliance Recommendations/Request for Corrective Action:

1. Immediately take measures to reduce berm seepage and reduce potential for berm failure. It is highly recommended that a certified engineer determine permanent corrective actions and immediate controls. Initial measures may include lowering the lagoon level (head) somewhat. Permanent corrective actions must include evaluation of integrity of berm liner and repairs if necessary; and properly repairing the berm where all seeps are occurring.
2. Repair aeration line leaks ***(repeat Compliance Recommendation)***.
3. Repair berm damage; holes were observed at aeration line leaks ***(repeat Compliance Recommendation)***.
4. Repair lagoon curtain that has come loose from support system.
5. Thoroughly inspect all curbed and containment areas of the factory site, and repair damaged areas. At least one area of a containment wall was noted as needing such repair during the inspection.

General Recommendations/Observations:

1. It is suggested that the facility look into replacing the current aeration system with a more oxygen transfer efficient (and likely more energy efficient) system. It appears that the current system requires high maintenance, is inefficient (air leaks observed), and is causing damage to the lagoon berm.
2. With reissuance of the Permit a detailed Operations and Maintenance (O&M) Manual will be required to be submitted for DEQ approval (within 90 days of issuance). Please anticipate this requirement.
3. Continue to manage burrowing animals to prevent berm damage.

Comments:

There are no groundwater monitoring wells surrounding the wastewater lagoon. A number of seeps were observed along the outside wall of the berm of this lagoon. The ground around these areas was soft; the area has experienced drought conditions for an extended time.

The factory area is curbed and bermed to contain and recycle runoff and spills from within this area (to Stick Water Tank). A locked valve prevents runoff from leaving the sump collection area. Only the Plant Manager has access to this key. In the off season the area is cleaned up and monitored routinely to prevent contaminated runoff from leaving the site.

Outfall 006 is the outfall identified in the most recent permit reissuance that combines former Outfalls 001, 004, and 005. Outfall 006 is the wastestream for the scrubbers (air pollution control equipment) and an emergency discharge for the evaporator condensate and noncontact cooling water from the evaporators. The company has installed a diffuser to be used for Outfall 001 as a means of reducing the potential impact of levels of cyanide present.

Best Management Practices (BMP) monthly reports are submitted along with the Discharge Monitoring Report (DMR). Each vessel (currently 10 boats) reportedly maintains a "Bailing Water Discharge Log", as per the Permit, which documents location and amount of refrigeration water discharged to the Chesapeake Bay. These reports are turned into the facility at the end of the season (~May through December).

Fish meal and fish oils are produced. The oils are stored in above ground storage tanks which are protected by spill containment measures (diked). The former factory across the river has been idled and is mostly demolished, however meal and oils are stored at that site too. Containment areas also protect #6 Fuel Oil and diesel above ground storage tanks.

Areas of emphasis (Compliance Assessment) – check all that apply:

[x] Yes	[ ] No		Operational Units
[ ] Yes	[x] No		Evaluation of O & M Manual
[ ] Yes	[x] No		Maintenance Records
[ ] Yes	[ ] No	[x] N/A	Pathogen Reduction & Vector Attraction Reduction
[ ] Yes	[ ] No	[x] N/A	Sludge Disposal Plan
[ ] Yes	[ ] No	[x] N/A	Groundwater Monitoring Plan
[x] Yes	[ ] No	[ ] N/A	Storm Water Pollution Prevention Plan
[ ] Yes	[x] No	[ ] N/A	Permit Special Conditions
[ ] Yes	[x] No	[ ] N/A	Permit Water Quality Chemical Monitoring
[x] Yes	[ ] No	[ ] N/A	Laboratory Records (see Lab Report)

UNIT PROCESS: Ponds/Lagoons

1.	Type:	[x] Aerated	[ ] Unaerated	[ ] Polishing	
2.	No. of cells:	2			
	Number in Operation:	2			
3.	Color:	[x] Green	[ ] D. Brown	[ ] L. Brown	[ ] Grey
		[ ] Other__			
4.	Odor:	[ ] Septic *	[ ] Earthy	[x] None	
		[ ] Other:_____			
5.	System operated in:	[x] Series	[ ] Parallel	[ ] N/A	
6.	If aerated, are lagoon contents mixed adequately?	[x] Yes	[ ] No *	[ ] N/A	
7.	If aerated, is aeration system operating properly?	[x] Yes	[ ] No *	[ ] N/A	
8.	Evidence of following problems:				
	a. Vegetation in lagoon or dikes?	[ ] Yes *	[x] No		
	b. Rodents burrowing on dikes?	[x] Yes *	[ ] No		
	c. Erosion?	[ ] Yes *	[x] No		
	d. Sludge bars?	[ ] Yes *	[x] No		
	e. Excessive foam?	[ ] Yes *	[x] No		
	f. Floating material?	[ ] Yes *	[x] No		
9.	Fencing intact?	[x] Yes	[ ] No *		
10.	Grass maintained properly:	[x] Yes	[ ] No		
11.	Level control valves working properly?	[x] Yes	[ ] No *	[ ] N/A	
12.	Effluent discharge elevation:	[x] Top	[ ] Middle	[ ] Bottom	
13.	Available freeboard:	approx. 1 ft.			
14.	Appearance of effluent:	[x] Good	[ ] Fair	[ ] Poor *	
15.	Are monitoring wells present?	[ ] Yes	[x] No		
	Are wells adequately protected from runoff?	[ ] Yes	[ ] No *	[x] N/A	
	Are caps on and secured?	[ ] Yes	[ ] No *	[x] N/A	
16.	General condition:	[ ] Good	[ ] Fair	[x] Poor*	

Comments: The two aerated lagoons operate in series and receive condensate water from the evaporators. The plant distillers are occasionally cleaned with H_2SO_4 or HNO_3. This cleaning solution is placed in a tank and metered into the lagoon system. Each lagoon has a curtain to improve biological treatment and extend retention time. The first lagoon is equipped with mechanical aspirator aerators and finer aeration diffusers are in place in the second lagoon. A fish net has been installed in the second lagoon to encourage attached biological growth. A return pump has been added pumping off the bottom of the second lagoon and back to the first lagoon. The lagoon appears to be discharging a better quality effluent. Four blowers (two in each building) are used to provide diffused air 24 hours/day. The wastewater level is lowered when the aeration lines need servicing. #3 - The first lagoon is light green and the second is darker green. #8. - A large hole exists on the berm where PVC aeration piping has deteriorated and leaks. Air leaks were observed and heard. Facility has replaced some piping with ductile pipe. #12. - The top discharge is located at a fixed level during discharge. #16 - A number of seeps were observed on the outside of the berm (see Summary). The curtain in the second lagoon had come loose.

UNIT PROCESS: Flow Measurement

Outfall 002

[ ] Influent **[ ] Intermediate** **[x] Effluent**

1. Type measuring device: 90° v-notch weir w/ultrasonic sensor
2. Present reading: meter indicating '2.81 inches = 27 gpm'
3. Bypass channel? [ ] Yes [x] No
   Metered? [ ] Yes [ ] No* [x] N/A
4. Return flows discharged upstream from meter? [ ] Yes [x] No
   If Yes, identify: _____
5. Device operating properly? [x] Yes [ ] No*
6. Date of last calibration: 4/24/2002
7. Evidence of following problems:
   a. Obstructions? [ ] Yes* [x] No
   b. Grease? [ ] Yes* [x] No
8. General condition: [x] Good [ ] Fair [ ] Poor*

Comments: Outfall 002 is the discharge from the aerated lagoons. The automatic sampler at this location is tied into the flow meter for flow proportional sampling. #2 - The above figures translate to 0.234 feet and approximately 28.5 gpm using an ISCO flow table, which is reasonably close to the observed instantaneous reading. The staff gauge may not be properly zeroed to the V-Notch zero discharge point and is not used as a measuring device. A totalizer and instantaneous readout is displayed.

UNIT PROCESS: Flow Measurement

Outfall 006

[ ] Influent **[ ] Intermediate** **[x] Effluent**

1. Type measuring device: None
2. Present reading: Based on pump run times (not obtained during this inspection)
3. Bypass channel? [ ] Yes [x] No
   Metered? [ ] Yes [ ] No* [x] N/A
4. Return flows discharged upstream from meter? [ ] Yes [x] No
   If Yes, identify: N/A
5. Device operating properly? [ ] Yes [ ] No* [x] N/A
6. Date of last calibration: N/A
7. Evidence of following problems:
   a. Obstructions? [ ] Yes* [x] No
   b. Grease? [ ] Yes* [x] No
8. General condition: [x] Good [ ] Fair [ ] Poor*

Comments: Outfall 006 is an outfall that combines former Outfalls 001, 004 and 005. This is "contact" cooling water from the Air Pollution Scrubbers. The automatic sampler collects 100 mL of sample every nine minutes for the 24 hr. composite. A diffuser has been installed for Outfall 001, which will be totally segregated from the current Outfall 006 with Permit reissuance.

UNIT PROCESS: Effluent/Plant Outfall

1. Type outfall: [x] Shore based (006) [x] Submerged (002 & proposed 001)

2. Type if shore based: [ ] Wingwall [x] Headwall [ ] Rip Rap [ ] N/A

3. Flapper valve? [ ] Yes [x] No

4. Erosion of bank? [ ] Yes* [x] No [ ] N/A

5. Effluent plume visible? [ ] Yes * [x] No

Comments: There is a diffuser for Outfall 002, and a diffuser for proposed 001.

6. Condition of outfall and supporting structures: [x] Good [ ] Fair [ ] Poor *

7. Final effluent, evidence of following problems:

   a. Oil sheen? [ ] Yes* [x] No

   b. Grease? [ ] Yes* [x] No

   c. Sludge bar? [ ] Yes* [x] No

   d. Turbid effluent? [ ] Yes* [x] No

   e. Visible foam? [ ] Yes* [x] No

   f. Unusual odor? [ ] Yes* [x] No

Comments: There were no unusual conditions noted at either outfall. Sediment samples for cyanide were obtained at the water intake and at mid-channel in front of the old AMPRO factory.

cc:

[x] Owner: c/o Mr. Lyell Jett - General Manager

[ ] Operator:_____

[ ] Local Health Department:_____

[ ] VDH Engineering Field Office: Field Office

[ ] VDH/Central Office - DWE

[x] DEQ - OWPS, attn: Bill Purcell

[x] DEQ - Regional Office File

[x] EPA - Region III

ATTACHMENT 7

§ 408.143 [Reserved]

§ 408.144 Pretreatment standards for existing sources.

The pretreatment standards under section 307(b) of the Act for a source within the tuna processing subcategory which is a user of a publicly owned treatment works and a major contributing industry as defined in 40 CFR Part 128 (and which would be an existing point source subject to section 301 of the Act, if it were to discharge pollutants to the navigable waters), shall be the standard set forth in 40 CFR Part 128, except that, for the purpose of this section, 40 CFR 128.121, 128.122, 128.132, and 128.133 shall not apply. The following pretreatment standard establishes the quantity or quality of pollutants or pollutant properties controlled by this section which may be discharged to a publicly owned treatment works by a point source subject to the provisions of this subpart.

Pollutant or pollutant property	Pretreatment standard
pH	No limitation.
BOD5	Do.
Oil and grease	Do.

§ 408.145 Standards of performance for new sources.

The following standards of performance establish the quantity or quality of pollutants or pollutant properties, controlled by this section, which may be discharged by a new source subject to the provisions of this subpart:

Effluent characteristic	Effluent limitations: Maximum for any 1 day	Effluent limitations: Average of daily values for 30 consecutive days shall not exceed—
	Metric units (kg/kkg of seafood)	
BOD5	20	8.1
TSS	7.5	3.0
Oil and grease	1.9	0.76
pH	(1)	(1)
	English units (lb/1,000 lb of seafood)	
BOD5	20	8.1
TSS	7.5	3.0
Oil and grease	1.9	0.76
pH	(1)	(1)

1 Within the range 6.0 to 9.0.

§ 408.146 Pretreatment standards for new sources.

The pretreatment standards for incompatible pollutants under section 307(c) of the Act for a source within the tuna processing subcategory, which is a user of a publicly owned treatment works (and which would be a new source subject to section 306 of the Act if it were to discharge pollutants to the navigable waters), shall be the standard set forth in 40 CFR Part 128, except for §128.133. Subject to the provisions of 40 CFR Part 128, process waste waters from a new source subject to the provisions of this subpart may be introduced into a publicly owned treatment works.

§408.147 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT).

Except as provided in §§125.30 through 125.32, any existing point source subject to this subpart shall achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT): The limitations shall be the same as those specified for conventional pollutants (which are defined in §401.16 in §408.142 of this subpart for the best practicable control technology currently available (BPT).

[408.147 added by 51 FR 24996, July 9, 1986]

Subpart O—Fish Meal Processing Subcategory

§ 408.150 Applicability; description of the fish meal processing subcategory.

The provisions of this subpart are applicable to discharges resulting from the processing of menhaden on the Gulf and Atlantic Coasts and the processing of anchovy on the West Coast into fish meal, oil and solubles.

§ 408.151 Specialized definitions.

For the purpose of this subpart:

(a) Except as provided below, the general definitions, abbreviations and methods of analysis set forth in Part 401 of this chapter shall apply to this subpart.

(b) The term "seafood" shall mea the raw material, including freshwat and saltwater fish and shellfish, to b processed, in the form in which it received at the processing plant.

§ 408.152 Effluent limitations guidelin representing the degree of effluent r duction attainable by the application the best practicable control technolo currently available.

(a) In establishing the limitatio set forth in this section, EPA took int account all information it was able t collect, develop and solicit with r spect to factors (such as age and siz of plant, raw materials, manufacturin processes, products produced, trea ment technology available, energy re quirements and costs) which ca affect the industry subcategorizatio and effluent levels established. It i however, possible that data whic would affect these limitations hav not been available and, as a resul these limitations should be adjuste for certain plants in this industry. A individual discharger or other interest ed person may submit evidence to th Regional Administrator (or to th State, if the State has the authority t issue NPDES permits) that factors re lating to the equipment or facilities i volved, the process applied, or othe such factors related to such discharge are fundamentally different from th factors considered in the establis ment of the guidelines. On the basis c such evidence or other available info mation, the Regional Administrato (or the State) will make a written fin ing that such factors are or are n fundamentally different for that faci ity compared to those specified in th Development Document. If such fu damentally different factors are foun to exist, the Regional Administrato or the State shall establish for the di charger effluent limitations in th NPDES permit either more or le stringent than the limitations estal lished herein, to the extent dictate by such fundamentally different fa tors. Such limitations must be a proved by the Administrator of th Environmental Protection Agenc The Administrator may approve c disapprove such limitations, specif other limitations, or initiate proce ings to revise these regulations.

(b) The following limitations esta lish the quantity or quality of pollu ants or pollutant properties, co trolled by this section, which may b

Omega Fact Sheet Attachment 7

discharged by a point source subject to the provisions of this subpart after application of the best practicable control technology currently available:

(1) Any menhaden or anchovy fish meal reduction facility which utilizes a solubles plant to process stick water or bail water shall meet the following limitations.

Effluent characteristic	Effluent limitations: Maximum for any 1 day	Effluent limitations: Average of daily values for 30 consecutive days shall not exceed—
	Metric units (kilograms per 1,000 kg of seafood)	
BOD5	7.0	3.9
TSS	3.7	1.5
Oil and grease	1.4	0.76
pH	(1)	(1)
	English units (pounds per 1,000 lb of seafood)	
BOD5	7.0	3.9
TSS	3.7	1.5
Oil and grease	1.4	0.76
pH	(1)	(1)

[1] Within the range 6.0 to 9.0.

(2) Any menhaden or anchovy fish meal reduction facility not covered under § 408.152(b)(1) shall meet the following limitations:

Effluent characteristic	Effluent limitations: Maximum for any 1 day	Effluent limitations: Average of daily values for 30 consecutive days shall not exceed—
	Metric units (kg/kkg of seafood)	
BOD5	3.5	2.8
TSS	2.6	1.7
Oil and grease	3.2	1.4
pH	(1)	(1)
	English units (lb/1,000 lb of seafood)	
BOD5	3.5	2.8
TSS	2.6	1.7
Oil and grease	3.2	1.4
pH	(1)	(1)

[1] Within the range 6.0 to 9.0.

§ 408.153 [Reserved]

§ 408.154 Pretreatment standards for existing sources.

The pretreatment standard under section 307(b) of the Act for a source within the fish meal processing subcategory which is a user of a publicly owned treatment works and a major contributing industry as defined in Part 128 of this chapter (and which would be an existing point source subject to section 301 of the Act, if it were to discharge pollutants to the navigable waters), shall be the standard set forth in Part 128 of this chapter except that, for the purpose of this section, §§ 128.121, 128.122, 128.132 and 128.133 of this chapter shall not apply. The following pretreatment standard establishes the quantity or quality of pollutants or pollutant properties controlled by this section which may be discharged to a publicly owned treatment works by a point source subject to the provisions of this subpart.

Pollutant or pollutant property	Pretreatment standard
BOD5	No limitation.
TSS	Do.
pH	Do.
Oil and grease	Do.

§ 408.155 Standards of performance for new sources.

The following standards of performance establish the quantity or quality of pollutants or pollutant properties, controlled by this section, which may be discharged by a new source subject to the provisions of this subpart:

Effluent characteristic	Effluent limitations: Maximum for any 1 day	Effluent limitations: Average of daily values for 30 consecutive days shall not exceed—
	Metric units (kilograms per 1,000 kg of seafood)	
BOD5	6.7	3.8
TSS	3.7	1.5
Oil and grease	1.4	0.76
pH	(1)	(1)
	English units (pounds per 1,000 lb of seafood)	
BOD5	6.7	3.8
TSS	3.7	1.5
Oil and grease	1.4	0.76
pH	(1)	(1)

[1] Within the range 6.0 to 9.0.

§ 408.156 Pretreatment standards for new sources.

The pretreatment standard under section 307(c) of the Act for a new source within the fish meal processing subcategory which is a user of a publicly owned treatment works and a major contributing industry as defined in Part 128 of this chapter (and which would be a new source subject to section 306 of the Act, if it were to discharge pollutants to the navigable waters), shall be the same standard as set forth in Part 128 of this chapter, for existing sources, except that, for the purpose of this section, §§ 128.121, 128.122, 128.132 and 128.133 of this chapter shall not apply. The following pretreatment standard establishes the quantity or quality of pollutants or pollutant properties controlled by this section which may be discharged to a publicly owned treatment works by a new source subject to the provisions of this subpart:

Pollutant or pollutant property	Pretreatment standard
BOD5	No limitation.
TSS	Do.
pH	Do.
Oil and grease	Do.

§408.157 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT).

Except as provided in §§125.30 through 125.32, any existing point source subject to this subpart shall achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT): The limitations shall be the same as those specified for conventional pollutants (which are defined in §401.16 in §408.152 of this subpart for the best practicable control technology currently available (BPT).

[408.157 added by 51 FR 24996, July 9, 1986]

Subpart P—Alaskan Hand-Butchered Salmon Processing Subcategory

§ 408.160 Applicability; description of the Alaskan hand-butchered salmon processing subcategory.

The provisions of this subpart are applicable to discharges resulting from the hand-butchering of salmon in Alaska.

[Sec. 408.160]

TABLE IV

Omega Protein Calculation of Conventional Limits (strikethrough from 1997 modification and present reissuance)

Production (from 2C Application) ~~3,200,000~~ 2,400,000 Kg: Calculation of Technology Limits for 001, 002, 003

*Long Term Average Loadings Used from 2C application.			Scrubber 001 ~~5~~ 3.037MGD ~~908~~ 160 kg/d BOD Long Term Avg ~~416~~ 199 kg/d TSS, ~~101~~ kg/d O&G		Lagoon 002 ~~0.26~~ 0.25 MGD ~~186~~ 22.2 kg/d BOD Long Term Avg ~~109~~ 50.8 kg/d TSS, ~~7.5~~ 3.6 kg/d O&G		Barge 003 ~~0.3~~ 0.4 MGD 464 kg/d BOD Long Term Avg 12.8 kg/d TSS, 23.1 kg/d O&G (no changes other than flow)	
	Multiplier K/KKG	Total Kg/D = (Production x multiplier/1000)		Kg/D total x (proportion 001 loading/total loading)		Kg/D total x (proportion 002 loading/total loading)		Kg/D total x (proportion 003 loading/total loading)
BOD$_5$	Avg 3.9	~~12480~~ 9360	001 BOD Loading/Total Loading = ~~698/4046 = 0.5178~~ 160/646.2 = 0.2476	~~12480 x .5178 = 6462~~ 9360 x .2476 = 2317.536 Kg/d	002 BOD Loading/Total Loading = ~~186/1348 = 0.1380~~ 22.2/646.2 = 0.0344	~~1722~~ Kg/d 9360 x .0344 = 321.984	003 BOD Loading/Total Loading = ~~464/1348 646.2= 0.3442~~ 0.7180	~~4296~~ Kg/d 9360 x .7180 = 6720.89 use 4296
Total BOD Loading* = ~~698 + 186 + 464 = 1348 kg/d~~ 160 + 22.2 + 464 = 646.2 kg/d	Max 7.0	~~22400~~ 16800		~~22400 x .5178 = 11599~~ 16800 x .2476 = 4159.68		~~3091~~ 16800 x .0344 = 577.92		~~7710~~ 16800 x .7180 = 12062.4 use 7710
TSS	Avg 1.5	~~4800~~ 3600	001 TSS Loading/Total Loading = ~~0.7735~~ 199/262.6 = 0.7578	~~3713~~ 3600 x .7578 = 2728.08	002 TSS Loading/Total Loading = ~~0.2027~~ 50.8/262.8 = .1935	~~973~~ 3600 x .1935 = 696.4	003 TSS Loading/Total Loading = ~~0.0238~~ 12.8/262.6 = .0487	~~114~~ 3600 x .0487 = 175.476 use 114
Total TSS Loading* = ~~416 + 109 + 12.8 = 538~~ 199 + 50.8 + 12.8 = 262.6 kg/d	Max 3.7	~~11,840~~ 8880		~~9158~~ 8880 x .7578 = 6729.264		~~2400~~ 8880 x .1935 = 1718.28		~~282~~ 8880 x .0487 = 432.456 use 282
O&G	Avg 0.76	~~2432~~ 1824	001 O&G Loading/Total Loading = ~~0.7682~~ 54.3/81 = 0.6704	~~1868~~ 1824 x .6704 = 1222.7549	002 O&G Loading/Total Loading = ~~0.0568~~ 3.6/81 = .0444	~~138~~ 1824 x .0444 = 81.0667	003 O&G Loading/Total Loading = ~~0.1750~~ 23.1/81 = 0.2852	~~426~~ 1824 x .2852 = 520.1778 use 426
Total O&G Loading* = ~~101 + 7.5 + 23.1 = 132~~ 54.3+3.6 +23.1= 81 Kg/d	Max 1.4	~~4480~~ 3360		~~3442~~ 3360 x .6704 = 2252.4444		~~254~~ 3360 x .0444 = 149.3333		~~784~~ 3360 x .2852 = 958.2222 use 784

HOWEVER, WQS DICTATE TOTAL ALLOWABLE BOD DISCHARGE TO CREEK IS 4900 LB/DAY AFTER THE WLA FOR THE REEDVILLE WWTP HAS BEEN SUBTRACTED. FRED CUNNINGHAM'S FACT SHEET DATED 8/29/84 ALLOWED A TOTAL OF 2223 KG/D. THIS HAS BEEN ALLOCATED IN ITS ENTIRETY TO OMEGA PROTEIN WITH THE 1997 PERMIT MODIFICATION.

THEREFORE THE SUM OF BOD FOR 001 AND 002, THE TWO PROCESS OUTFALLS DISCHARGING TO CREEK, CANNOT EXCEED 2223 KG/D, AND WQS LIMITS APPLY TO THESE 2 OUTFALLS. 003 IS LIMITED BY TECHNOLOGY LIMITS.

		Kg/d Total Wasteload Allocation 001+002 (from previous permit)	Scrubber 001 ~~5~~ 3.037 MGD		Lagoon 002 ~~0.26~~ 0.25 MGD	
BOD_5	Avg	2223	001 BOD Loading/Total Loading = ~~.7896~~ 160/182.2 = 0.8782	~~2223 x .7896 = 1755~~ 2222 x .8782 = 1952.24 use 1755/rounded to 1700 Kg/d	002 BOD Loading/Total Loading = ~~0.2104~~ 22.2/182.2 = 0.1218	~~468~~ 2223 x .1218 = 270.76 use 468, rounded to 470 Kg/d
Total BOD Loading* = ~~698 + 186 = 884~~ 160 + 22.2 = 182.2 kg/d	Max	3979		~~3979 x .7896 = 3142~~ 3979 x .8782 = 3494.36 use 3142 rounded to 3100		~~837~~ 3989 x .1218 = 485.86 use 837, rounded to 840
TSS	Avg	826	001 TSS Loading/Total Loading = ~~.7924~~ 199/249.8 = .7966	~~826 x .7924 = 655~~ 826 x .7966 = 657.99 use 655, rounded to 650	002 TSS Loading/Total Loading = ~~0.2076~~ 50.8/249.8 = 0.0234	~~171~~ 826 x .2034 = 168 use 168, rounded to 160
Total TSS Loading* = ~~416 + 109 = 525~~ 199+50.8= 249.8 kg/d	Max	2031		~~1609~~ 2031 x .7966 = 1617.89 use 1609, rounded to 1600		~~422~~ 2031 x .2034 = 413.11 use 413, rounded to 410
O&G	Avg	400	001 O&G Loading/Total Loading = ~~0.6309~~ 54.3/57.9 = .9378	~~372~~ 400 x .9378 = 375 use 372, rounded to 370	002 O&G Loading/Total Loading = ~~0.0691~~ 3.6/57.9 = .0622	~~27.6~~ 400 x .0622 = 24.88 use 24.9, rounded to 25
Total O&G Loading* = ~~101 + 7.5 = 108.5~~ 54.3 + 3.6 = 57.9 Kg/d	Max	736		~~685~~ 736 x .9378 = 690 use 685, rounded to 680		~~50.9~~ 736 x .0622 = 45.78 use 45.8, rounded to 46

NPDES PERMIT PROGRAM

Omega Fact Sheet

Fact Sheet

1. Facility name and address:

Zapata Haynie Corp.
P. O. Box 175
Reedville, VA 22539

Location:
State Road 659
Reedville, VA 22539

2. Permit No.: VA0003867
First issue date: January 24, 1975
Expiration date: January 24, 1985

3. Owner contact: William P. Poluk
General Manager

Phone No. 804-453-4211

4. Permit drafted by: J. Cunningham Date: 8/29/84

5. Headquarters: _____ Date: _____

Waived /_/ Non-waived /X/

Date to EPA: 9/12/84 Date returned by EPA: _____

Comments received from EPA: Yes /_/ No /_/

6. Category: Menhaden Reduction Plant SIC Code(s) 2077

7. Number of Outfalls: 001 - Air scrubber wastewater discharged into Cockrell Creek.

002 - Treated condensate from two-cell lagoon system discharged into Cockrell Creek.

003 - Condensate barged to Chesapeake Bay; this discharge will occur only during emergencies or peak production periods.

004 - Non-contact cooling water from Evaporator System discharged into Cockrell Creek.

8. Description of Discharge:

(X) Major
(X) Industrial
(X) Existing

(X) Renewal
(X) Effluent Limited
(X) Water Quality Limited

9. Description of the Discharge - See attached sheet - Table 2.

[illegible] process stickwater and bailwater. The discharge results from processing of menhaden into fishmeal, oil and solubles.

Omega Fact Sheet

11. Wastewater Treatment Facilities:
Evaporator - concentrates stickwater and bailwater into fish solubles.
Lagoon System - will treat all condensate from evaporator system.

12. Location of Discharges: See attached sheets.

	Outfall 001, 002, 004	Outfall 003
Receiving Stream:	Cockrell Creek	Chesapeake Bay
Basin:	Chesapeake Bay, Atlantic Ocean & Small Coastal Basin	Chesapeake Bay, Atlantic Ocean & Small Coastal Basin
Section:	2	2
Class:	II	II
Special Standard:	a	a

Applicable State Water Quality Standards:

pH	6.0 - 8.5	6.0 - 8.5
D.O.	5.0 mg/l avg.	5.0 mg/l avg.
Temperature	3°C rise above natural	3°C rise above natural
Bacteria	14/100 ml-MPN (Median)	14/100 ml-MPN (Median)

13. Section 301(b)(1)A of the Clean Water Act requires that point sources other than a POTW achieve effluent limitations based on the application of Best Conventional Technology (BCT) of conventional pollutants. The combined discharges from outfalls 001, 002, and 003 must meet BCT effluent limitations.

Section 302(a) of the Act requires that effluent limitations for point sources shall be established which are necessary to meet water quality standards. Since Cockrell Creek is a water quality limiting stream, the discharges from outfalls 001 and 002 must also meet water quality limits as determined by the mathematical model of Cockrell Creek. Outfall 004 discharges non-contact cooling water.

14. Effluent Limitations: Effluent limits for Cockrell Creek are based on a mathematical water quality study as developed by the Virginia Institute of Marine Science. This two-layer mathematical model of Cockrell Creek shows that the lower layer appears to be controlled by bottom benthic demand and not affected by the point source loadings. An average of 2,268 kg/day of carbonaceous BOD_5 will maintain an average of 5.0 mg/l dissolved oxygen in the upper layer of Cockrell Creek. 45.4 kg/day of that total will be reserved for the Reedville Sanitary District sewage treatment plant to allow for future growth, leaving the two menhaden plants with 2222.6 kg/day. Average Total Suspended Solids and average Oil and Grease are reduced by the same percentage as the BOD_5 loading was reduced by the model. Maximum values for BOD_5, and Oil and Grease are based on the same factor as found in the Federal Register for these parameters.

The BOD_5 effluent limitation for outfall 001 is net based. The intake water for outfall 001 is taken from the same body of water into which the discharge is made (Cockrell Creek). Because the discharge from outfall 001 is the result of wastewater from the air scrubber system, the pollutants present in the intake water will not be removed through the system.

[illegible] water quality standards are being met. The mathematical model was run with a continuous BOD_5 loading at steady state conditions, meeting an average of 5.0 mg/l dissolved oxygen in the upper layer of the creek. Under these conditions, the model segment of the creek in which the intake and discharge points are located contains an average BOD_5 of 2.9 mg/l. This background concentration will be subtracted from the BOD_5 effluent concentration for outfall 001 to calculate the net based limitation. This information meets the criteria contained in 40 CFR, Section 122.63 (h) for granting a net limitation.

Omega Fact Sheet

Effluent limitations for the Cockrell Creek discharges and the BCT limitations which include the Bay discharge are contained in Table I.

15. Monitoring: Because of the size of the discharge the plant is required to monitor BOD_5 and TSS with a 24-hour composite sample every day of operation. Oil and Grease is monitored once per week with a grab sample. Because the Oil & Grease discharge is well below effluent limitations, the monitoring frequency is adequate.

16. Schedule of Compliance: Not applicable.

17. Special Conditions: See attached sheet.

18. Addditional Information: The application, proposed permit, comments received, and other information are on file and may be inspected and copied at:

State Water Control Board
Tidewater Regional Office
Division of Special Projects
Church Street
P. O. Box 669
Kilmarnock, VA 22482 (Tel: 804-435-3181)

Name of person to contact: G. T. Yagel, during the hours of 8:15 a.m. and 5:00 p.m. on business days.

Any person may comment in writing to the Board on the proposed permit no later than . All comments received within the 30-day period will be considered in the formulation of final determinations regarding the application. All comments should include the name, address and telephone number of the writer and a concise statement of the factual basis for the comments.

(X) Final Limitation

( ) Interim Limitation

(INDUSTRIAL)

Effective Dates: From

To

OUTFALL 001, 002

Parameter	BASIS							BASED ON			
	Effluent Guidelines			Best Profes. Judgment			Water * Quality Stds.	Multiplier	Production	Permit Limit	
	BPT (Prop) (Promul)	BAT (Prop) (Promul)	NSPS (Prop) (Promul)	BCT	BPT	BAT				kg/day	std prod
BOD_5							5		2223	AVG. 1356 / MAX. 2427	847 / 1552
TSS							5			AVG. 504 / MAX. 1239	322 / 792
Oil & Grease							5			AVG. 244 / MAX. 449	156 / 287
pH										6.0 - 8.5	
Flow											

*1. Per 208 Plan and date _____
2. Per 303(c) Plan and date _____
3. Per EPA and date _____
4. Per 401 Certification and date _____
5. Other Mathematical water quality study of Cockrell Creek.
6. Include toxic chart from previous rationale document (Separate Sheet)

Omega Fact Sheet

(X) Final Limitation

( ) Interim Limitation

(INDUSTRIAL)

Effective Dates: From

To

OUTFALL 001, 002, 003

Parameter	BASIS							BASED ON		
	Effluent Guidelines			Best Profes. Judgment			Water * Quality Stds.	Multiplier	Production	Permit Limit
	BCT (Prop) (Promul)	BAT (Prop) (Promul)	NSPS (Prop) (Promul)							
	BCT Promul.			BCT	BPT	BAT		kg/kkg	kg	kg/day
BOD_5	X							AVG. 3.9 MAX. 7.0	1,539,534	6004 10,777
TSS	X							AVG. 1.5 MAX. 3.7		2309 5696
Oil & Grease	X							AVG. .76 MAX. 1.4		1170 2155
pH	X									
Flow										

*1. Per 208 Plan and date _____
2. Per 303(c) Plan and date _____
3. Per EPA and date _____
4. Per 401 Certification and date _____
5. Other _____
6. Include toxic chart from previous rationale document (Separate Sheet)

Omega Fact Sheet

( ) Interim Limitation

Outfall 004

To

Parameter	BASIS							BASED ON			
	Effluent Guidelines			Best Profes. Judgment			Water * Quality Stds.	Multiplier	Production	Permit Limit	Frequ
	BPT (Prop) (Promul)	BAT (Prop) (Promul)	NSPS (Prop) (Promul)	BCT	BPT	BAT					
Temperature							No limit				1/Day
pH							6.0-8.5				1/Day

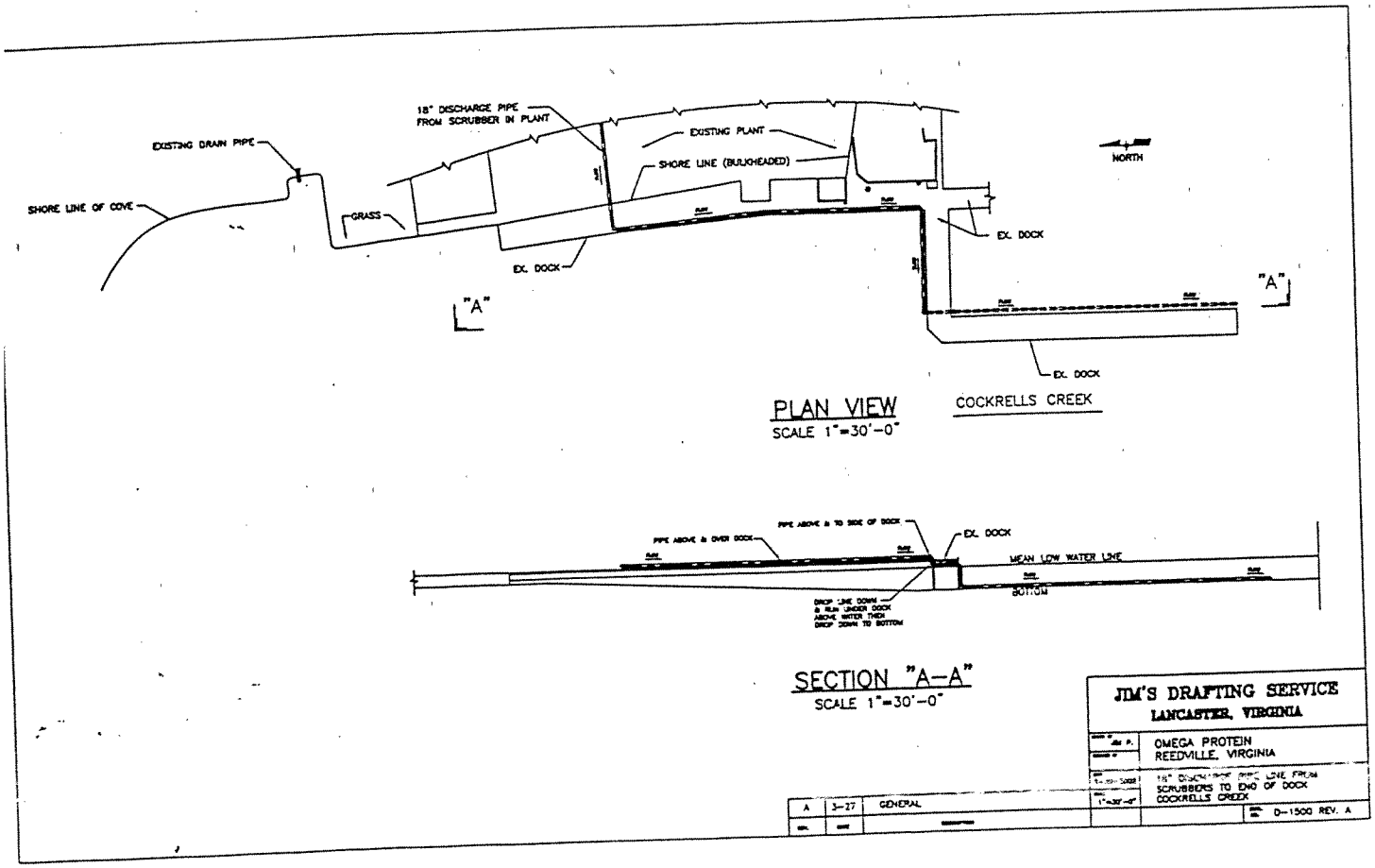
*1. Per 208 Plan and date _____
2. Per 303(c) Plan and date _____
3. Per EPA and date _____
4. Per 401 Certification and date _____
5. Other _____
6. Include toxic chart from previous rationale document (Separate Sheet)

Omega Fact Sheet

ATTACHMENT 8

ATTACHMENT 8

DEC 2002
KRO



DENISE 12/11/02

Enclosed is a copy of the diffuser you requested.

Lyell Jett

Attachment 8

Mosca,Denise

From: Bill Black [bilenpro@swbell.net]
Sent: Tuesday, December 31, 2002 10:38 AM
To: Mosca,Denise
Subject: RE: Omega 001

107-0797_IMG.JPG

Denise, The diffuser is not actually under a dock but placed along side a dock. The diffuser pipe lays against the outer pilings. The picture I have attached shows the dock. The contractor worked alongside the pump equipment you see on the dock and lowered the diffuser over the side, so to speak. Yes, Dale and I discussed this location and he did not express any concern to me. The ports are oriented so the water goes horizontal and away from the dock, to the left of where I was standing when I took the picture.

The placement of the barrier will have no effect on the dispersal characteristics of the diffuser. On Thursday, I will fax a sketch to you that shows the relative positioning of the barrier, diffuser orientation and the intake.

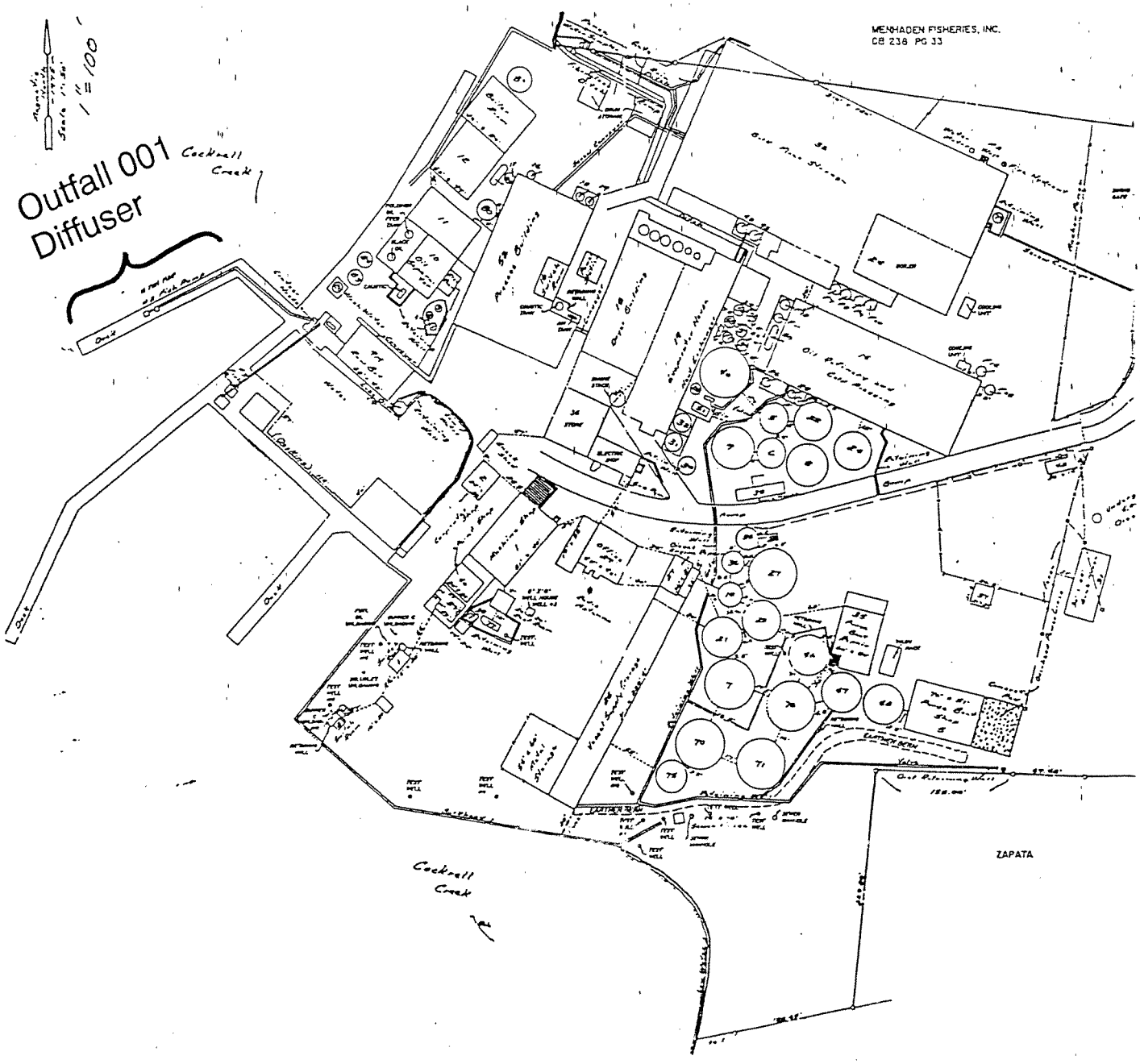
Bill

-----Original Message-----
From: Mosca,Denise [mailto:dmmosca@deq.state.va.us]
Sent: Tuesday, December 31, 2002 8:37 AM
To: Bill Black (E-mail)
Subject: Omega 001

Hi Bill--
Wanted to clarify that the ammonia going away for 001 is dependent on the antibacksliding argument holding up. Also wanted to ask you more about the 001 diffuser. Did you and Dale discuss that it was to be placed under a dock? Also, would you expect the placement of the old ship planned for next year to further separate contact cooling water intake and outfall to have any effect on the dispersal characteristics of the diffuser?
thanks,
denise
Happy New Year

Denise M. Mosca
Environmental Engineer Sr.
DEQ-Kilmarnock Field Office
P.O. Box 669
Kilmarnock, Va. 22482
804-435-3181
fax 804-435-0485

Attachment 8



Location Map
Outfall 001

Omega Protein, Inc.
Reedville, VA January 2002

Scale Approx. 1" = 150'

Attachment 8

Mosca,Denise

From: Phillips,Dale <mdphillips@deq.state.va.us>
Sent: Tuesday, March 05, 2002 1:02 PM
To: DMMosca
Subject: RE: Cormix

OVERFLOW.TXT BEYOND.RTF

-- The message text was too large.
-- The entire text of the message can be found in the Overflow.txt attachment.

I calculated the average differently than Jon (did not include the slack tide run). Bill suggested the diffuser changes to get the velocity down a little and the more appropriate average (include the slack tide run).
Dale.
> -----Original Message-----
> From: Mosca,Denise
> Sent: Tuesday, March 05, 2002 8:01 AM
> To: Phillips,Dale
> Subject: RE: Cormix
>
> So the refinements were not as beneficial as was hoped, the dilution ratio is
> smaller with this arrangement (106:1 vs. 158:1). Why is that?
> denise
>
> Denise M. Mosca
> Environmental Engineer Sr.
> DEQ-Kilmarnock Satellite Office
> P.O. Box 669
> Kilmarnock, Va. 22482
> 804-435-3181 telephone
> 804-435-0485 fax
> ---------- Original Text ----------
>
> From: "Phillips,Dale" <mdphillips@deq.state.va.us>, on 3/5/2002 7:57 AM:
>
>
> -- The message text was too large.
> -- The entire text of the message can be found in the Overflow.txt attachment.
>
> Denise,
>
> The diffuser has been somewhat redesigned and the new dilution is as
> recommended. Nothing else in the model was changed. I suggest the use 106:1
> for calculating permit limits.
>
> Dale.
>
> > -----Original Message-----
> > From: Mosca,Denise
> > Sent: Tuesday, March 05, 2002 7:19 AM
> > To: Phillips,Dale
> > Subject: fwd: Cormix
> >

Attachment 8

> > Hi Dale--
> > here the refinements Omega's consultant talked about for the diffuser.
> Would
> > you please look at them and advise if there are any changes to the
dilution
> > ratio you recommended last week?
> > thanks,
> > denise
> >
> > Denise M. Mosca
> > Environmental Engineer Sr.
> > DEQ-Kilmarnock Satellite Office
> > P.O. Box 669
> > Kilmarnock, Va. 22482
> > 804-435-3181 telephone
> > 804-435-0485 fax
> > ---------- Original Text ----------
> >
> > From: "Bill Black" <bilenpro@swbell.net>, on 3/4/2002 10:37 AM:
> > To: Denise M. Mosca@KLMCK@DEQ
> >
> > Hi Denise, before you use that dilution ratio in Dale's email of last
> > week, I just talked to him about some port changes. After receiving his
> > reply of last week, I analyzed port openings, number of ports and water
> > pressures and realized I needed some larger openings. Therefore, I have
> > attached the revised Cormix runs for Dale's review. He said for you to
> > send them on to him and he could provide a quick turn around.
> >
> > The only changes from the previous runs that Dale reviewed are: Number
> > of ports and port diameters. I now have 22 ports at 4 inches diameter.
> > When the three conditions are averaged (at slack, one hour before slack
> > and one hour after slack) the new diffusion will be 106:1 subject to
> > Dale's review.
> >
> > Bill
> >
> >
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Attachment 8.

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Attachment 8

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in
> > Dale&#8217;s email of last week, I just talked to him about some port
> changes. After
> > receiving his reply of last week, I analyzed port openings, number of
ports
> and
> > water pressures and realized I needed some larger openings. Therefore, I
have
> > attached the revised Cormix runs for Dale&#8217;s review.<span
> > style='mso-spacerun:yes'>  </span>He said for you to send them on to
him
> > and he could provide a quick turn around.<o:p></o:p></span></font></p>
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Dale
> > reviewed are:<span style='mso-spacerun:yes'>  </span>Number of ports
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> > port diameters.<span style='mso-spacerun:yes'>  </span>I now have 22
> ports
> > at 4 inches diameter.<span style='mso-spacerun:yes'>  </span>When the
> > three conditions are averaged (at slack, one hour before slack and one hour
> > after slack) the new diffusion will be 106:1 subject to Dale&#8217;s
> review.<o:p></o:p></span></font></p>
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Attachment 8

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> >  Tidal Simulation at TIME =     1.000 h
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> >  UA   =      .100 F    =      .136 USTAR = .1304E-01
> >  UW   =     2.000 UWSTAR= .2198E-02
> >  Uniform density environment>
> >  STRCND=  U        RHOAM =  999.7000
> >
> > DIFFUSER DISCHARGE PARAMETERS (metric units)
> >  Diffuser type:    DITYPE= unidirectional_perpendicular
> >  BANK  =  LEFT     DISTB =    57.50  YB1   =    30.00  YB2   =    85.00
> >  LD    =    55.00  NOPEN =   22      SPAC  =     2.62
> >  D0    =      .100 A0    =      .008 H0    =      .25
> >  Nozzle/port arrangement:  unidirectional_without_fanning
> >  GAMMA =    90.00  THETA =      .00  SIGMA =      .00  BETA  =    90.00
> >  U0    =     1.042 Q0    =      .180      = .1800E+00
> >  RHO0  =  992.7000  DRHO0 = .7000E+01  GP0   = .6867E-01
> >  C0    = .4000E+02  CUNITS=  degC
> >  IPOLL =  3        KS    = .2000E-05  KD    = .0000E+00
> >
> > FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
> >. q0    = .3273E-02  m0    = .3410E-02  j0    = .2248E-03  SIGNJ0=     1.0
> >  Associated 2-d length scales (meters)
> >  IQ=B  =      .003 IM    =      .92  Im    =      .34
> >  Imp   =  99999.00  Ibp   =  99999.00  Ia    =  99999.00
```

Attachment 8

```
> >
> > FLUX VARIABLES - ENTIRE DIFFUSER (metric units)
> > Q0   = .1800E+00  M0   = .1875E+00  J0   = .1236E-01
> > Associated 3-d length scales (meters)
> > LQ   =     .42  LM   =    2.56  Lm   =    4.33  Lb   =    12.36
> >                          Lmp  = 99999.00  Lbp  = 99999.00
> > Tidal:          Tu   =   .2291 h Lu   =    18.900 Lmin  =
1.444
> >
> > NON-DIMENSIONAL PARAMETERS
> > FR0  =    70.92  FRD0 =    12.57  R    =    10.41
> > (slot)          (port/nozzle)
> >
> > FLOW CLASSIFICATION
> > 2222222222222222222222222222222222222222222
> > 2  Flow class (CORMIX2)     =   MU2   2
> > 2  Applicable layer depth HS =    5.00  2
> > 2222222222222222222222222222222222222222222
> >
> > MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
> > C0   = .4000E+02  CUNITS=  degC
> > NTOX  =  0
> > NSTD  =  0
> > REGMZ =  0
> > XINT  =  6600.00  XMAX  =  6600.00
> >
> > X-Y-Z COORDINATE SYSTEM:
> >    ORIGIN is located at the bottom and the diffuser mid-point:
> >       57.50 m  from the LEFT  bank/shore.
> >    X-axis points downstream, Y-axis points to left, Z-axis points upward.
> > NSTEP = 25 display intervals per module
> >
> > NOTE on dilution/concentration values for this HEATED DISCHARGE (IPOLL=3):
> >    S  = hydrodynamic dilutions, include buoyancy (heat) loss effects, but>
> >       provided plume has surface contact
> >    C  = corresponding temperature values (always in "degC"!),
> >       include heat loss, if any
> >
>
-----------------------------------------------------------------------
>
> >
>
-----------------------------------------------------------------------
>
> > BEGIN MOD201: DIFFUSER DISCHARGE
> MODULE
> >
> > Due to complex near-field motions:  EQUIVALENT SLOT DIFFUSER (2-D)
GEOMETRY
> >
> > Profile definitions:
> >    BV = Gaussian 1/e (37%) half-width, in vertical plane normal to
trajectory
> >    BH = top-hat half-width, in horizontal plane normal to trajectory
> >    S  = hydrodynamic centerline dilution
> >    C  = centerline concentration (includes reaction effects, if any)
> >
> >       X      Y      Z      S      C      BV     BH
> >      .00    .00    .25    1.0  .400E+02   .00   27.50
> >
> > END OF MOD201: DIFFUSER DISCHARGE
> MODULE
> >
```

Attachment 8

```
>
-----------------------------------------------------------------------
>
> >
>
-----------------------------------------------------------------------
>
> > BEGIN MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING
> DIFFUSER
> >
> > In this laterally contracting zone the diffuser plume becomes VERTICALLY
> FULLY
> > MIXED over the entire layer depth (HS =    5.00m).
> >  Full mixing is achieved after a plume distance of about five
> >  layer depths from the diffuser.
> >
> > Profile definitions:
> >  BV = layer depth (vertically mixed)>
> >  BH = top-hat half-width, in horizontal plane normal to trajectory
> >  S  = hydrodynamic average (bulk) dilution
> >  C  = average (bulk) concentration (includes reaction effects, if any)
> >
```

	X	Y	Z	S	C	BV	BH
> >	.00	.00	.25	1.0	.400E+02	.00	27.50
> >	1.10	.00	.34	32.2	.124E+01	.22	27.40
> >	2.20	.00	.43	44.8	.893E+00	.44	27.32
> >	3.30	.00	.52	54.3	.736E+00	.66	27.24
> >	4.40	.00	.61	62.2	.643E+00	.88	27.17
> >	5.50	.00	.70	69.1	.579E+00	1.10	27.11
> >	6.60	.00	.79	75.2	.532E+00	1.32	27.06
> >	7.70	.00	.88	80.7	.496E+00	1.54	27.01
> >	8.80	.00	.97	85.7	.467E+00	1.76	26.96
> >	9.90	.00	1.06	90.4	.443E+00	1.98	26.92
> >	11.00	.00	1.15	94.7	.422E+00	2.20	26.89
> >	12.10	.00	1.24	98.8	.405E+00	2.42	26.85
> >	13.20	.00	1.33	102.6	.390E+00	2.64	26.82
> >	14.30	.00	1.42	106.2	.377E+00	2.86	26.79
> >	15.40	.00	1.51	109.6	.365E+00	3.08	26.77
> >	16.50	.00	1.60	112.9	.354E+00	3.30	26.74
> >	17.60	.00	1.69	116.0	.345E+00	3.52	26.72
> >	18.70	.00	1.78	119.0	.336E+00	3.74	26.71
> >	19.80	.00	1.87	121.8	.328E+00	3.96	26.69
> >	20.90	.00	1.96	124.5	.321E+00	4.18	26.68
> >	22.00	.00	2.05	127.2	.315E+00	4.40	26.67
> >	23.10	.00	2.14	129.7	.308E+00	4.62	26.66
> >	24.20	.00	2.23	132.1	.303E+00	4.84	26.66
> >	25.30	.00	2.32	134.5	.297E+00	5.00	26.66
> >	26.40	.00	2.41	136.8	.292E+00	5.00	26.65
> >	27.50	.00	2.50	139.0	.288E+00	5.00	26.65

```
> > Cumulative travel time =        258. sec
> >
> > END OF MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING
> DIFFUSER
> >
>
-----------------------------------------------------------------------
>
> >
>
-----------------------------------------------------------------------
>
>
> > BEGIN MOD251: DIFFUSER PLUME IN
> CO-FLOW
```

Omega Protein, Attachment 8

```
> >
> > Phase 1: Vertically mixed, Phase 2: Re-stratified
> >
> >
>
-----------------------------------------------------------------------
>
> > Phase 2: The flow has RESTRATIFIED at the beginning of this zone.
> >
> > This flow region is INSIGNIFICANT in spatial extent and will be by-passed.
> >
> > END OF MOD251: DIFFUSER PLUME IN
> CO-FLOW
> >
>
-----------------------------------------------------------------------
>
> > ** End of NEAR-FIELD REGION (NFR) **
> >
> > The initial plume WIDTH values in the next far-field module will be
> >  CORRECTED by a factor  1.07 to conserve the mass flux in the far-field!
> >
>
-----------------------------------------------------------------------
>
> > BEGIN MOD241: BUOYANT AMBIENT
> SPREADING
> >
> > Profile definitions:
> >   BV = top-hat thickness, measured vertically
> >   BH = top-hat half-width, measured horizontally in y-direction
> >   ZU = upper plume boundary (Z-coordinate)
> >   ZL = lower plume boundary (Z-coordinate)
> >   S  = hydrodynamic average (bulk) dilution
> >   C  = average (bulk) concentration (includes reaction effects, if any)
> >
> > Plume Stage 1 (not bank attached):
> >     X      Y      Z      S      C      BV      BH      ZU
ZL
> >   27.50    .00   5.00  139.0  .288E+00  5.00   28.39   5.00
.00
> >   31.85    .00   5.00  138.7  .288E+00  4.83   29.80   5.00
.17
> >   36.19    .00   5.00  138.5  .289E+00  4.68   31.18   5.00
.32
> >   40.54    .00   5.00  138.3  .289E+00  4.55   32.53   5.00
> .45>
> >   44.88    .00   5.00  138.1  .290E+00  4.42   33.85   5.00
.58
> >   49.23    .00   5.00  138.0  .290E+00  4.31   35.15   5.00
.69
> >   53.57    .00   5.00  137.9  .290E+00  4.21   36.42   5.00
.79
> >   57.92    .00   5.00  137.9  .290E+00  4.12   37.67   5.00
.88
> >   62.26    .00   5.00  137.9  .290E+00  4.04   38.90   5.00
.96
> >   66.61    .00   5.00  138.0  .290E+00  3.96   40.11   5.00
1.04
> >   70.95    .00   5.00  138.1  .290E+00  3.89   41.30   5.00
1.11
> >   75.30    .00   5.00  138.3  .289E+00  3.82   42.48   5.00
1.18
> >   79.64    .00   5.00  138.5  .289E+00  3.76   43.64   5.00
```

Omega Protein
Attachment 8

```
1.24
> >    83.99    .00   5.00   138.8  .288E+00  3.70   44.78   5.00
1.30
> >    88.33    .00   5.00   139.2  .287E+00  3.65   45.91   5.00
1.35
> >    92.68    .00   5.00   139.6  .287E+00  3.60   47.02   5.00
1.40
> >    97.02    .00   5.00   140.0  .286E+00  3.56   48.12   5.00
1.44
> >   101.37    .00   5.00   140.5  .285E+00  3.52   49.21   5.00
1.48
> >   105.71    .00   5.00   141.1  .284E+00  3.48   50.29   5.00
1.52
> >   110.06    .00   5.00   141.7  .282E+00  3.44   51.35   5.00
1.56
> >   114.40    .00   5.00   142.3  .281E+00  3.41   52.41   5.00
1.59
> >   118.75    .00   5.00   143.0  .280E+00  3.38   53.45   5.00
1.62
> >   123.09    .00   5.00   143.8  .278E+00  3.35   54.49   5.00
1.65
> >   127.44    .00   5.00   144.6  .277E+00  3.32   55.51   5.00
1.68
> >   131.78    .00   5.00   145.5  .275E+00  3.30   56.52   5.00
1.70
> >   136.13    .00   5.00   146.4  .273E+00  3.28   57.53   5.00
1.72
> > Cumulative travel time =       1344. sec
> >
> >
>
-----------------------------------------------------------------------
>
> > Plume is ATTACHED to LEFT  bank/shore.
> >   Plume width is now determined from LEFT  bank/shore.
> >
> > Plume Stage 2 (bank attached):
> >      X      Y      Z      S      C      BV     BH     ZU
ZL>
> >   136.13   57.50   5.00   144.9  .276E+00  3.28   115.00   5.00
1.72
> >   145.41   57.50   5.00   146.6  .273E+00  3.28   117.10   5.00
1.72
> > Cumulative travel time =       1436. sec
> >
> > CORMIX prediction has been TERMINATED at last prediction interval.
> >   Limiting distance due to TIDAL REVERSAL has been
reached.
> >
> > END OF MOD241: BUOYANT AMBIENT
> SPREADING
> >
>
-----------------------------------------------------------------------
>
> >
>
-----------------------------------------------------------------------
>
> > CORMIX2: Submerged Multiport Diffuser Discharges       End of Prediction
File
> >
2222222222222222222222222222222222222222222222222222222222222222222222222222222
> >
```

Omega Protein, Attachment 8

```
> > CORMIX2 PREDICTION FILE:
> >
2222222222222222222222222222222222222222222222222222222222222222222222222222222
> >                    CORNELL MIXING ZONE EXPERT SYSTEM
> > Subsystem CORMIX2:                          Subsystem
version:
> >  Submerged Multiport Diffuser Discharges
CORMIX_v.3.20_____September_1996
> >
>
-----------------------------------------------------------------------
>
> >
>
-----------------------------------------------------------------------
>
> > CASE DESCRIPTION
> >  Site name/label:        Before^Slack
> >  Design case:            change^diffuser^ports
> >  FILE NAME:              cormix\sim\before1r.cx2
> >  Time of Fortran run:    03/02/02--13:17:59
> >
> > ENVIRONMENT PARAMETERS (metric units)
> >  Bounded section
> >  BS   =   610.00  AS   =   3660.00  QA   =   366.00  ICHREG= 2
> >  HA   =     6.00  HD   =     5.00
> >  Tidal Simulation at TIME =    -1.000 h
> >  PERIOD=   12.40 h UAmax =      .300 dUa/dt=      .100 (m/s)/h>
> >  UA   =     .100 F    =     .136 USTAR = .1304E-01
> >  UW   =    2.000 UWSTAR= .2198E-02
> >  Uniform density environment
> >  STRCND=  U        RHOAM =  999.7000
> >
> > DIFFUSER DISCHARGE PARAMETERS (metric units)
> >  Diffuser type:    DITYPE= unidirectional_perpendicular
> >  BANK =  LEFT     DISTB =    57.50  YB1   =    30.00  YB2   =    85.00
> >  LD   =    55.00  NOPEN =  22      SPAC  =     2.62
> >  D0   =     .100 A0   =     .008 H0   =     .25
> >  Nozzle/port arrangement:   unidirectional_without_fanning
> >  GAMMA =    90.00  THETA =     .00  SIGMA =     .00  BETA  =    90.00
> >  U0   =    1.042 Q0   =     .180     = .1800E+00
> >  RHO0  =  992.7000  DRHO0 = .7000E+01  GP0   = .6867E-01
> >  C0   = .4000E+02  CUNITS=  degC
> >  IPOLL =  3        KS    = .2000E-05  KD    = .0000E+00
> >
> > FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
> >  q0   = .3273E-02  m0   = .3410E-02  j0   = .2248E-03  SIGNJ0=     1.0
> >  Associated 2-d length scales (meters)
> >  lQ=B =     .003 lM   =     .92  lm   =     .34
> >  lmp  =  99999.00  lbp  =  99999.00  la   =  99999.00
> >
> > FLUX VARIABLES - ENTIRE DIFFUSER (metric units)
> >  Q0   = .1800E+00  M0   = .1875E+00  J0   = .1236E-01
> >  Associated 3-d length scales (meters)
> >  LQ   =     .42  LM   =    2.56  Lm   =    4.33  Lb   =    12.36
> >                          Lmp  =  99999.00  Lbp  =  99999.00
> >  Tidal:          Tu   =   .2291 h Lu   =    18.900 Lmin  =
1.444
> >
> > NON-DIMENSIONAL PARAMETERS
> >  FR0  =    70.92  FRD0 =    12.57  R    =    10.41
> >  (slot)          (port/nozzle)
> >
> > FLOW CLASSIFICATION
```

Omega Protein
Attachment 8

```
> > 2222222222222222222222222222222222222222
> > 2  Flow class (CORMIX2)     =   MU2   2
> > 2  Applicable layer depth HS =    5.00  2
> > 2222222222222222222222222222222222222222
> >
> > MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS>
> > C0    = .4000E+02  CUNITS=  degC
> > NTOX  = 0
> > NSTD  = 0
> > REGMZ = 0
> > XINT  =  6600.00  XMAX  =  6600.00
> >
> > X-Y-Z COORDINATE SYSTEM:
> >    ORIGIN is located at the bottom and the diffuser mid-point:
> >        57.50 m  from the LEFT  bank/shore.
> >    X-axis points downstream, Y-axis points to left, Z-axis points upward.
> > NSTEP = 25 display intervals per module
> >
> > NOTE on dilution/concentration values for this HEATED DISCHARGE (IPOLL=3):
> >   S  = hydrodynamic dilutions, include buoyancy (heat) loss effects, but
> >        provided plume has surface contact
> >   C  = corresponding temperature values (always in "degC"!),
> >        include heat loss, if any
> >
>
-----------------------------------------------------------------
>
> >
>
-----------------------------------------------------------------
>
> > BEGIN MOD201: DIFFUSER DISCHARGE
> MODULE
> >
> >  Due to complex near-field motions:  EQUIVALENT SLOT DIFFUSER (2-D)
GEOMETRY
> >
> >  Profile definitions:
> >   BV = Gaussian 1/e (37%) half-width, in vertical plane normal to
trajectory
> >   BH = top-hat half-width, in horizontal plane normal to trajectory
> >   S  = hydrodynamic centerline dilution
> >   C  = centerline concentration (includes reaction effects, if any)
> >
> >      X      Y      Z      S      C       BV      BH
> >     .00    .00    .25    1.0  .400E+02   .00   27.50
> >
> > END OF MOD201: DIFFUSER DISCHARGE
> MODULE
> >
>
-----------------------------------------------------------------
>
> >
>
-----------------------------------------------------------------
>
> > BEGIN MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING
> DIFFUSER
> >
> >  In this laterally contracting zone the diffuser plume becomes VERTICALLY
> FULLY
> >   MIXED over the entire layer depth (HS =    5.00m).
> >    Full mixing is achieved after a plume distance of about five>
```

Omega Protein, Attachment 8,

> > layer depths from the diffuser.
> >
> > Profile definitions:
> > BV = layer depth (vertically mixed)
> > BH = top-hat half-width, in horizontal plane normal to trajectory
> > S = hydrodynamic average (bulk) dilution
> > C = average (bulk) concentration (includes reaction effects, if any)
> >

> >	X	Y	Z	S	C	BV	BH
> >	.00	.00	.25	1.0	.400E+02	.00	27.50
> >	1.10	.00	.34	32.3	.124E+01	.22	27.40
> >	2.20	.00	.43	45.3	.884E+00	.44	27.32
> >	3.30	.00	.52	55.2	.725E+00	.66	27.24
> >	4.40	.00	.61	63.5	.630E+00	.88	27.17
> >	5.50	.00	.70	70.8	.565E+00	1.10	27.11
> >	6.60	.00	.79	77.4	.517E+00	1.32	27.06
> >	7.70	.00	.88	83.4	.480E+00	1.54	27.01
> >	8.80	.00	.97	89.0	.449E+00	1.76	26.96
> >	9.90	.00	1.06	94.3	.424E+00	1.98	26.92
> >	11.00	.00	1.15	99.2	.403E+00	2.20	26.89
> >	12.10	.00	1.24	103.9	.385E+00	2.42	26.85
> >	13.20	.00	1.33	108.4	.369E+00	2.64	26.82
> >	14.30	.00	1.42	112.7	.355E+00	2.86	26.79
> >	15.40	.00	1.51	116.8	.342E+00	3.08	26.77
> >	16.50	.00	1.60	120.8	.331E+00	3.30	26.74
> >	17.60	.00	1.69	124.6	.321E+00	3.52	26.72
> >	18.70	.00	1.78	128.3	.312E+00	3.74	26.71
> >	19.80	.00	1.87	131.9	.303E+00	3.96	26.69
> >	20.90	.00	1.96	135.4	.295E+00	4.18	26.68
> >	22.00	.00	2.05	138.8	.288E+00	4.40	26.67
> >	23.10	.00	2.14	142.1	.282E+00	4.62	26.66>
> >	24.20	.00	2.23	145.3	.275E+00	4.84	26.66
> >	25.30	.00	2.32	148.4	.270E+00	5.00	26.66
> >	26.40	.00	2.41	151.4	.264E+00	5.00	26.65
> >	27.50	.00	2.50	154.4	.259E+00	5.00	26.65

> > Cumulative travel time = 258. sec
> >
> > END OF MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING
> DIFFUSER
> >
>

>
> >
>

>
> > BEGIN MOD251: DIFFUSER PLUME IN
> CO-FLOW
> >
> > Phase 1: Vertically mixed, Phase 2: Re-stratified
> >
> >
>

>
> > Phase 2: The flow has RESTRATIFIED at the beginning of this zone.
> >
> > This flow region is INSIGNIFICANT in spatial extent and will be by-passed.
> >
> > END OF MOD251: DIFFUSER PLUME IN
> CO-FLOW
> >
>

Attachment 8.

>
> > ** End of NEAR-FIELD REGION (NFR) **
> >
> > The initial plume WIDTH values in the next far-field module will be
> > CORRECTED by a factor 1.07 to conserve the mass flux in the far-field!
> >
>

>
> > BEGIN MOD241: BUOYANT AMBIENT
> SPREADING
> >
> > Profile definitions:
> > BV = top-hat thickness, measured vertically
> > BH = top-hat half-width, measured horizontally in y-direction
> > ZU = upper plume boundary (Z-coordinate)
> > ZL = lower plume boundary (Z-coordinate)
> > S = hydrodynamic average (bulk) dilution
> > C = average (bulk) concentration (includes reaction effects, if any)
> >
> > Plume Stage 1 (not bank attached):

> >	X	Y	Z	S	C	BV	BH	ZU	ZL
> >	27.50	.00	5.00	154.4	.259E+00	5.00	28.39	5.00	.00
> >	31.85	.00	5.00	156.2	.256E+00	4.83	29.80	5.00	.17
> >	36.19	.00	5.00	157.9	.253E+00	4.68	31.18	5.00	> .32>
> >	40.54	.00	5.00	159.5	.251E+00	4.55	32.53	5.00	.45
> >	44.88	.00	5.00	161.2	.248E+00	4.42	33.85	5.00	.58
> >	49.23	.00	5.00	162.7	.246E+00	4.31	35.15	5.00	.69
> >	53.57	.00	5.00	164.3	.243E+00	4.21	36.42	5.00	.79
> >	57.92	.00	5.00	165.8	.241E+00	4.12	37.67	5.00	.88
> >	62.26	.00	5.00	167.4	.239E+00	4.04	38.90	5.00	.96
> >	66.61	.00	5.00	168.9	.237E+00	3.96	40.11	5.00	1.04
> >	70.95	.00	5.00	170.5	.235E+00	3.89	41.30	5.00	1.11
> >	75.30	.00	5.00	172.0	.233E+00	3.82	42.48	5.00	1.18
> >	79.64	.00	5.00	173.6	.230E+00	3.76	43.64	5.00	1.24
> >	83.99	.00	5.00	175.1	.228E+00	3.70	44.78	5.00	1.30
> >	88.33	.00	5.00	176.7	.226E+00	3.65	45.91	5.00	1.35
> >	92.68	.00	5.00	178.3	.224E+00	3.60	47.02	5.00	1.40
> >	97.02	.00	5.00	179.9	.222E+00	3.56	48.12	5.00	1.44
> >	101.37	.00	5.00	181.6	.220E+00	3.52	49.21	5.00	1.48
> >	105.71	.00	5.00	183.3	.218E+00	3.48	50.29	5.00	1.52
> >	110.06	.00	5.00	185.0	.216E+00	3.44	51.35	5.00	1.56

Omega Protein
Attachment 8.

```
> >    114.40     .00    5.00    186.7  .214E+00  3.41    52.41    5.00
1.59
> >    118.75     .00    5.00    188.5  .212E+00  3.38    53.45    5.00
1.62
> >    123.09     .00    5.00    190.3  .210E+00  3.35    54.49    5.00
1.65>
> >    127.44     .00    5.00    192.1  .208E+00  3.32    55.51    5.00
1.68
> >    131.78     .00    5.00    193.9  .206E+00  3.30    56.52    5.00
1.70
> >    136.13     .00    5.00    195.8  .204E+00  3.28    57.53    5.00
1.72
> > Cumulative travel time =        1344. sec
> >
> >
>
-----------------------------------------------------------------------
>
> > Plume is ATTACHED to LEFT bank/shore.
> >  Plume width is now determined from LEFT bank/shore.
> >
> > Plume Stage 2 (bank attached):
> >      X       Y       Z       S       C       BV      BH      ZU
ZL
> >    136.13   57.50    5.00   195.4  .205E+00  3.28   115.00    5.00
1.72
> >    156.21   57.50    5.00   202.7  .197E+00  3.28   119.55    5.00
1.72
> >    176.29   57.50    5.00   210.5  .190E+00  3.29   124.02    5.00
1.71
> >    196.37   57.50    5.00   219.0  .183E+00  3.31   128.40    5.00
1.69
> >    198.30   57.50    5.00   219.8n
```

max flows
realistic temps
(from DMRs)

Omega Temp Std - Cooling Water Flows

001 = contact cooling water max flow 7.17 MGD
004, 005 = noncontact cooling water max flows 12.4, 12.9 MGD
total $Q_d = 32.47$

from DMRs -

	5/98	6/98	7/98	8/98
001 avg	27.7	32.7	37.3	35.3
max	36	39	42	40.0
004 avg	28.9	30.4	36.3	34.7
max	34	37	43	39

use 45° for both C_d
C_s = 90th percentile 25

$$C_m = \frac{Q_s C_s + Q_d C_d}{Q_s + Q_d}$$

$$= \frac{(288.34)(28.5) + (32.47)(45)}{288.34 + 32.47}$$

288.34 MGD use as flow of Cockrell Creek, from 1992 Fact Sheet

$$= 30.17 < 31.5 \text{ OK}$$

at low temps, say, 8°C

	10/97	11/97	use
001	35.0	27.0	12/97 26.0
MAX 004	31.0	24.0	22.0

$$C_{m_{004 \text{ or } 5}} = \frac{288.34(8°) + (25.3)(22°C)}{288.34 + 25.3} = 9.13$$

$$C_{m_{001}} = \frac{(288.34 + 25.3)(9.13) + (7.17)(26.0)}{(288.34 + 25.3) + 7.17}$$

$$= 9.51°C << 11°C \text{ OK}$$

Table V

EVALUATION OF EFFLUENT CHARACTERIZATION DATA 001 outfall
Receiving Stream: Hardness: NA (Saltwater Limits apply) Flow: 3.82 MGD

PARAMETER	EFFLUENT CONCEN-TRATION ug/1	VIRGINIA ACUTE CRITERIA SALTWATER ug/1	VIRGINIA CHRONIC CRITERIA SALTWATER ug/1	Multiplier of 106 determined by Dale Phillips with Cormix model. PROJECTED IN STREAM CONCENTRATION		COMMENTS
				AVG FLOW		Data from 2C application/Attachment D evaluated and all units ug/l, unless otherwise specified *Measured as Dissolved species
				Acute (WLA_a)	Chronic (WLA_c)	
						Acute (WLA_a) and Chronic (WLA_c) are calculated as follows: 26x acute and chronic standards for estuarine, per 93-015) ug/l
Antimony	<5	4300 (Human Health standard)			460000 Human Health WLA	Value is below detection
Aldrin	<0.5, <0.05	0.0014HH	0.13	140	0.15HH	All data below QL of 0.5
Ammonia	17.1, 33.1,13.2,21.3, 0.99,0.99,8.8,14.4,6.16,12,47, 15.4,7.28,4.76, 3.07, 2.38,4.86, 17.7, 7.56, 13.4,11.8, 7, 14.8, mg/l	1.4	0.21	150	23	No limit indicated after evaluation

001 p.1

PARAMETER	EFFLUENT CONCEN-TRATION ug/1	VIRGINIA ACUTE CRITERIA SALTWATER ug/1	VIRGINIA CHRONIC CRITERIA SALTWATER ug/1	Multiplier of 106 determined by Dale Phillips with Cormix model. PROJECTED IN STREAM CONCENTRATION		COMMENTS
				AVG FLOW		Data from 2C application/Attachment D evaluated and all units ug/l, unless otherwise specified
				Acute (WLA_a)	Chronic (WLA_c)	*Measured as Dissolved species
Arsenic-trivalent, inorganic	<50	69*	36*	7300	3800	Acute (WLA_a) and Chronic (WLA_c) are calculated as follows: 26x acute and chronic standards for estuarine, per 93-015) ug/l All data below lab QL of 50
Cadmium	8	40*	8.8*	4200	930	No limit indicated after evaluation
Chlordane	<1, <0.2	0.009	0.004 0.022HH	9.5	0.42 2.3 HH	Program indicates all data below QL, though <1 not less than DEQ required QL of 0.2—rerun 9/02 at 0.2 QL
Chlorpyrifos (Dursban)	<0.1	0.011	0.0056	1.2	0.59	Value below detection
Chromium-hexavalent	<10	1100*	50*	120000*	5300	Data below QL level
Chromium-trivalent	No data required		No Saltwater value			Limit not evaluated
Copper, Dissolved	68,53,59,62,66, 68,74,48,41,88	9.3*	6.0*	990	640	No limit indicated after evaluation
Cyanide, Total	30,90,120,170, 299,205,48,14, 59,5,<5,10,19,9 ,89,70,48,198,7 5,341,170, 329, 2094, 2614,	1.0	1.0 220000HH	110	110 23,000, 000 HH	Mo. Avg limit of 96 ug/l, Max Daily limit of 110 ug/l determined

PARAMETER	EFFLUENT CONCEN-TRATION ug/1	VIRGINIA ACUTE CRITERIA SALTWATER ug/1	VIRGINIA CHRONIC CRITERIA SALTWATER ug/1	Multiplier of 106 determined by Dale Phillips with Cormix model. PROJECTED IN STREAM CONCENTRATION		COMMENTS
				AVG FLOW		Data from 2C application/Attachment D evaluated and all units ug/l, unless otherwise specified *Measured as Dissolved species
				Acute (WLA_a)	Chronic (WLA_c)	
						Acute (WLA_a) and Chronic (WLA_c) are calculated as follows: 26x acute and chronic standards for estuarine, per 93-015) ug/l
	1135, 263, <5					
DDD	<0.15, <0.1		0.0084 Human Health Standard		0.89 human health WLA	Value is less than detection—however, specified QL is 0.1; sample retested 9/02 at QL 0.1 ug/l
DDE	<0.05, <0.05		0.0059 Human Health Standard		0.63 human health WLA	Value is less than detection
DDT	<0.15, <0.1	0.13	0.001 0.0059HH	14	0.11 0.63HH	Value is less than detection—however, specified QL is 0.1. sample retested 9/02 at QL 0.1
Demeton	<2		0.1		11	Value is less than detection
Dieldrin	<0.05, <0.05	0.71	0.0019 0.0014HH	75	0.20 0.15HH	Value is less than detection
Endosulfan	<0.15, <0.05	0.034	0.0087 240HH	3.6	0.92 25000HH	Value is less than detection—however, specified QL is 0.1. Sample retested 9/02 at QL 0.05
Endrin	<0.15, <0.1	0.037	0.0023 0.81HH	3.9	0.24 86HH	Value is less than detection—however, specified QL is 0.1. Sample retested 9/02 at QL 0.1.

PARAMETER	EFFLUENT CONCEN-TRATION ug/1	VIRGINIA ACUTE CRITERIA SALTWATER ug/1	VIRGINIA CHRONIC CRITERIA SALTWATER ug/1	Multiplier of 106 determined by Dale Phillips with Cormix model. PROJECTED IN STREAM CONCENTRATION		COMMENTS
				AVG FLOW		Data from 2C application/Attachment D evaluated and all units ug/l, unless otherwise specified
				Acute (WLA_a)	Chronic (WLA_c)	*Measured as Dissolved species
Guthion	<20 mg/l		0.01		1.1	Acute (WLA_a) and Chronic (WLA_c) are calculated as follows: 26x acute and chronic standards for estuarine, per 93-015) ug/l Value is less than detection
Heptachlor	<0.05, <0.05	0.053	0.0036 0.0021HH	5.6	0.38 0.22HH	Value is less than detection
Hydrogen Sulfide	2.5 mg/l		2.0		210	No limit indicated after evaluation
Iron	Total Iron believed absent		No Saltwater Value			Limit not evaluated
Kepone	<2 ug/l		0			Value is less than detection
Lead	<1	240	9.3	25000	990	Value is less than detection
Lindane (Hexa-chlorocyclohexane)	<0.04	0.16	0.63HH	17	67HH	Value is less than detection
Malathion	<2 ug/l		0.1		11	Value is less than detection
Manganese	89		50		5350	No limit indicated after evaluation
Mercury	<0.2	1.8 *	0.94 * 0.051HH	190	100 5.4HH	Value is less than detection
Methoxychlor	<0.4 ug/l, <2		0.03		3.2	Value is less than detection

PARAMETER	EFFLUENT CONCEN-TRATION ug/1	VIRGINIA ACUTE CRITERIA SALTWATER ug/1	VIRGINIA CHRONIC CRITERIA SALTWATER ug/1	Multiplier of 106 determined by Dale Phillips with Cormix model. PROJECTED IN STREAM CONCENTRATION		COMMENTS
				AVG FLOW		Data from 2C application/Attachment D evaluated and all units ug/l, unless otherwise specified
				Acute (WLA_a)	Chronic (WLA_c)	*Measured as Dissolved species
Mirex	<0.1		0			Acute (WLA_a) and Chronic (WLA_c) are calculated as follows: 26x acute and chronic standards for estuarine, per 93-015) ug/l Value is less than detection
Nickel	<5	74*	8.2*	7800	870 490,000HH	Value less than detection
PCB-1016	<1 mg/l, <1 ug./l		0.03		3.2	Value less than detection however, specified QL is 1 ug/l/ Test repeated 9/02
PCB-1221	<1 mg/l, <1 ug/l		0.03		3.2	Value less than detection however, specified QL is 1 ug/l/ Test repeated 9/02
PCB-1232	<1 mg/l, <1 ug/l		0.03		3.2	Value less than detection however, specified QL is 1 ug/l/ Test repeated 9/02
PCB-1242	<1 mg/l, <1 ug/l		0.03		3.2	Value less than detection However, specified QL is 1ug/l/ Test repeated 9/02
PCB-1248	<1 mg/l, <1 ug/l		0.03		3.2	Value less than detection however, specified QL is 1 ug/l/ Test repeated 9/02
PCB-1254	<1 mg/l, <1 ug/l		0.03		3.2	Value less than detection however, specified QL is 1 ug/l/ Test repeated 9/02
PCB-1260	<1 mg/l, <1 ug/l		0.03		3.2	Value less than detection however, specified QL is 1 ug/l/ Test repeated 9/02
Phenol	<10		4600000 Human Health Standard		490,000,000	Value less than detection

PARAMETER	EFFLUENT CONCEN-TRATION ug/1	VIRGINIA ACUTE CRITERIA SALTWATER ug/1	VIRGINIA CHRONIC CRITERIA SALTWATER ug/1	Multiplier of 106 determined by Dale Phillips with Cormix model. PROJECTED IN STREAM CONCENTRATION		COMMENTS
				AVG FLOW		Data from 2C application/Attachment D evaluated and all units ug/l, unless otherwise specified
				Acute (WLA_a)	Chronic (WLA_c)	*Measured as Dissolved species
Phthalate Esters	Believed absent		3.0			Acute (WLA_a) and Chronic (WLA_c) are calculated as follows: 26x acute and chronic standards for estuarine, per 93-015) ug/l Limit not evaluated
Selenium	<5	300*	71* 11000HH	32000	7500 1200000 HH	Value is less than detection.
Silver	3.2,2.68,3.17,2.69,2.41,2.07,2.77,2.95, 27, 6.23	2.0*		210		No limit indicated after evaluation
Toxaphene	<1, <1	0.21	0.0002 0.0075HH	22	0.021 0.8HH	Value less than detection
2-(2,4,5-Trichlorophenoxy) Propionic Acid (Silvex)	<0.002		50		5350	Value less than detection
Tributyltin	<0.5	0.38	0.001	40	0.11	Value less than detection
Zinc	<20	90*	81* 69000HH	9500	8600 7300000 HH	Value is less than detection.
Base Neutral Extractables						
Acenapthene	<10		2700 Human Health Std		290000 Human Health WLA	Value is less than detection

PARAMETER	EFFLUENT CONCEN-TRATION ug/1	VIRGINIA ACUTE CRITERIA SALTWATER ug/1	VIRGINIA CHRONIC CRITERIA SALTWATER ug/1	Multiplier of 106 determined by Dale Phillips with Cormix model. PROJECTED IN STREAM CONCENTRATION		COMMENTS
				AVG FLOW		Data from 2C application/Attachment D evaluated and all units ug/l, unless otherwise specified *Measured as Dissolved species
				Acute (WLA_a)	Chronic (WLA_c)	
						Acute (WLA_a) and Chronic (WLA_c) are calculated as follows: 26x acute and chronic standards for estuarine, per 93-015) ug/l
Anthracene	<10		110000 Human Health Std		12000000 Human Health WLA	Value is less than detection
Benzo(a)anthracene	<10		0.49 Human Health Std		52 Human Health WLA	Value is less than detection
Benzo(b)fluoranthene	<10		0.49 Human Health Std		52 Human Health WLA	Value is less than detection
Benzo(k)fluoranthene	<10		0.49 Human Health Std		52 Human Health WLA	Value is less than detection
Benzo(a)pyrene	<10		0.49 Human Health Std		52 Human Health WLA	Value is less than detection
Butyl Benzyl phthalate	<10		5200 Human Health Std		550000 Human Health WLA	Value is less than detection

PARAMETER	EFFLUENT CONCEN-TRATION ug/1	VIRGINIA ACUTE CRITERIA SALTWATER ug/1	VIRGINIA CHRONIC CRITERIA SALTWATER ug/1	Multiplier of 106 determined by Dale Phillips with Cormix model. PROJECTED IN STREAM CONCENTRATION		COMMENTS
				AVG FLOW		Data from 2C application/Attachment D evaluated and all units ug/l, unless otherwise specified
				Acute (WLA_a)	Chronic (WLA_c)	*Measured as Dissolved species
						Acute (WLA_a) and Chronic (WLA_c) are calculated as follows: 26x acute and chronic standards for estuarine, per 93-015) ug/l
Chrysene	<10		0.49 Human Health Std		52 Human Health WLA	Value is less than detection
Dibenz(a,h)anthracene	<10		0.49 Human Health Std		52 Human Health WLA	Value is less than detection
Dibutyl phthalate	<10		12000 Human Health Std		1300000 Human Health WLA	Value is less than detection
1, 2 Dichlorobenzene	<10		17000 Human Health Std		1800000 Human Health WLA	Value is less than detection
1, 3 Dichlorobenzene	<10		2600 Human Health Std		280000 Human Health WLA	Value is less than detection
1, 4 Dichlorobenzene	<10		2600 Human Health Std		280000 Human Health WLA	Value is less than detection

PARAMETER	EFFLUENT CONCEN-TRATION ug/1	VIRGINIA ACUTE CRITERIA SALTWATER ug/1	VIRGINIA CHRONIC CRITERIA SALTWATER ug/1	Multiplier of 106 determined by Dale Phillips with Cormix model. PROJECTED IN STREAM CONCENTRATION		COMMENTS
				AVG FLOW		Data from 2C application/Attachment D evaluated and all units ug/l, unless otherwise specified *Measured as Dissolved species
				Acute (WLA_a)	Chronic (WLA_c)	
						Acute (WLA_a) and Chronic (WLA_c) are calculated as follows: 26x acute and chronic standards for estuarine, per 93-015) ug/l
Diethylphthalate	<10		120000 Human Health Std		13000000 Human Health WLA	Value is less than detection
Di-2-ethylhexlyphthalate	<10		59 Human Health Std		6300 Human Health WLA	Value is less than detection
2,4-Dinitrotoluene	<10		91 Human Health Std		9600 Human Health WLA	Value is less than detection
Fluoranthene	<10		370 Human Health Std		9000 luman lealth WLA	Value is less than detection
Fluorene	<10		14000 Human Health Std		1500000 Human Health WLA	Value is less than detection
Ideno(1,2,3-cd)pyrene	<10		0.49 Human Health Std		52 Human Health WLA	Value is less than detection
Isophorone	<10		26000 Human Health Std.		2,800,000	Value is less than detection

PARAMETER	EFFLUENT CONCEN-TRATION ug/1	VIRGINIA ACUTE CRITERIA SALTWATER ug/1	VIRGINIA CHRONIC CRITERIA SALTWATER ug/1	Multiplier of 106 determined by Dale Phillips with Cormix model. PROJECTED IN STREAM CONCENTRATION		COMMENTS
				AVG FLOW		Data from 2C application/Attachment D evaluated and all units ug/l, unless otherwise specified *Measured as Dissolved species
				Acute (WLA_a)	Chronic (WLA_c)	
						Acute (WLA_a) and Chronic (WLA_c) are calculated as follows: 26x acute and chronic standards for estuarine, per 93-015) ug/l
					Human Health WLA	
Pyrene	<10		11000 Human Health Std		1200000 Human Health WLA	Value is less than detection
1,2,4-Trichlorobenzene	<10		940 Human Health Std		100000 Human Health WLA	Value is less than detection
Volatiles						
Benzene	<5		710 Human Health Std		75000 Human Health WLA	Value is less than detection
Bromoform	<5		3600 Human Health Std		380000 Human Health WLA	Value is less than detection
Carbon Tetrachloride	<5		44 Human Health Std		4700 Human Health Std	Value is less than detection
Chlorodibromomethane	<5		340 Human Health Std		36000	Value is less than detection

ZAPATA CORMIX DIFFUSER ANALYSIS 9-16-98

DISCHARGE DATA

	SHORT	LONG
LENGTH OF DIFFUSER LINE:	6.1 m	12.2 m
BANK DIRECTION:	LEFT	LEFT
DISTANCE TO FIRST NOZZLE:	4.6 m	6.1 m
DISTANCE TO LAST NOZZLE:	10.7 m	18.3 m
ALIGNMENT ANGLE:	90	90
NUMBER OF OPENINGS:	13	8
SINGLE PORTS:	YES (A)	YES (A)
DIAMETER OF PORTS:	0.1 m	0.1 m
CONTRACTION COEFFICIENT:	1.0	1.0
HEIGHT OF PORT CENTERS:	0.3048 m	0.28 m
UNIDIRECTIONAL OR ALTERNATING:	ALTERNATING (B)	UNIDIRECTIONAL (A)
AVERAGE VERTICAL ANGLE:	—	~~90~~ 45
RELATIVE ORIENTATION ANGLE:	—	90
SAME DIRECTION OR FANNED OUT:	SAME (A)	SAME (A)
HORIZONTAL ANGLE OF DISCHARGE:	—	0
DIFFUSER FLOW RATE:	0.0131 m/s	0.0131 m/s
FRESHWATER EFFLUENT:	YES	YES
TEMPERATURE:	27.7°C	27.7°C
HEATED DISCHARGE:	NO	NO
UNITS:	PPB	PPB
CONCENTRATION:	1000	1000
CONSERVATIVE SUBSTANCE:	YES	YES

ZAPATA CORMIX DIFFUSER ANALYSIS 9.16.98

MIXING ZONE SPECIFICATION

EFFLUENT TOXIC BY USEPA STANDARDS: NO

AMBIENT WATER QUALITY STANDARD: NO

RMZ SPECIFICATION: NO

MAX DISTANCE OF REGION OF INTEREST: 6,000 m

NUMBER OF OUTPUT DISPLAY STEPS: 10

ZAPATA CORMIX DIFFUSER ANALYSIS 9.16.98

SUMMARY OF RESULTS

① SHORT DIFFUSER

FILE	AMBIENT SCENARIO	S
ZAPATA1	AFTER-SLACK	97.3
ZAPATA2	SLACK	5.8
ZAPATA3	BEFORE-SLACK	105.6

CONSERVATIVE AVERAGE = (97.3 + 5.8) / 2 = 51.6 SAY 50:1

② LONG DIFFUSER

ZAPATA4	AFTER-SLACK	197.9
ZAPATA 5	SLACK	5.1
ZAPATA 6	BEFORE-SLACK	210.8

CONSERVATIVE AVERAGE = (197.9 + 5.1) / 2 = 101.5 SAY 100:1

Attachment 4
1/24

```
CORMIX2 PREDICTION FILE:
22222222222222222222222222222222222222222222222222222222222222222222222222222
                    CORNELL MIXING ZONE EXPERT SYSTEM
                                                          Subsystem version:
Subsystem CORMIX2:
 Submerged Multiport Diffuser Discharges    CORMIX v.3.20     September 1996
-------------------------------------------------------------------------------
-------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:          ZAPATA^VA0003867
 Design case:              AFTER^SLACK^SHORT^DIFFUSER
 FILE NAME:                cormix\sim\ZAPATA1 .cx2
 Time of Fortran run:      09/16/98--16:06:30

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS     =     503.00  AS     =     766.57  QA     =     114.99  ICHREG= 1
 HA     =       1.52  HD     =       1.52
 Tidal Simulation at TIME =       1.000 h
 PERIOD=     12.40 h UAmax =        .300 dUa/dt=        .150 (m/s)/h
 UA     =       .150 F     =        .334 USTAR = .3065E-01
 UW     =     -2.000 UWSTAR= .2198E-02
 Uniform density environment
 STRCND=  U          RHOAM =  999.7000

DIFFUSER DISCHARGE PARAMETERS (metric units)
 Diffuser type:      DITYPE= alternating perpendicular
 BANK   =  LEFT      DISTB =       7.65  YB1    =       4.60  YB2    =      10.70
 LD     =      6.10  NOPEN =   13        SPAC   =        .51
 D0     =      .100  A0    =       .008  H0     =        .30
 Nozzle/port arrangement:   alternating without fanning
 GAMMA =      90.00  THETA =      90.00  SIGMA =        .00  BETA   =      90.00
 U0     =      .128  Q0    =       .013        = .1310E-01
 RHO0   =  996.3187  DRHO0 = .3381E+01  GP0    = .3317E-01
 C0     = .1000E+04  CUNITS=  PPB
 IPOLL =  1          KS    = .0000E+00  KD     = .0000E+00

FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
 q0     = .2148E-02  m0     = .2755E-03  j0     = .7123E-04  SIGNJ0=       1.0
 Associated 2-d length scales (meters)
 lQ=B   =      .017 lM     =       .16  lm     =       .01
 lmp    =  99999.00 lbp    =  99999.00  la     =  99999.00

FLUX VARIABLES - ENTIRE DIFFUSER (metric units)
 Q0     = .1310E-01  M0     = .1681E-02  J0     = .4345E-03
 Associated 3-d length scales (meters)
 LQ     =       .32  LM     =       .40  Lm     =       .27  Lb     =       .13
                                         Lmp    =  99999.00  Lbp    =  99999.00
 Tidal:              Tu     =     .0797 h Lu     =      3.432 Lmin   =      .137

NON-DIMENSIONAL PARAMETERS
 FR0    =      5.44  FRD0   =      2.22  R      =       .85
 (slot)              (port/nozzle)

FLOW CLASSIFICATION
 2222222222222222222222222222222222222
 2  Flow class (CORMIX2)        =    MU8    2
 2  Applicable layer depth HS =      1.52  2
 2222222222222222222222222222222222222

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
```

Attachment 9 8/24

```
CO     = .1000E+04  CUNITS=  PPB
NTOX   =  0
NSTD   =  0
REGMZ  =  0
XINT   =   6000.00  XMAX   =   6000.00

:-Y-Z COORDINATE SYSTEM:
   ORIGIN is located at the bottom and the diffuser mid-point:
        7.65 m  from the LEFT  bank/shore.
   X-axis points downstream, Y-axis points to left, Z-axis points upward.
ISTEP = 10 display intervals per module
-----------------------------------------------------------------------------
-----------------------------------------------------------------------------
BEGIN MOD201: DIFFUSER DISCHARGE MODULE

Due to complex near-field motions:  EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

Profile definitions:
  BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
  BH = top-hat half-width, in horizontal plane normal to trajectory
  S  = hydrodynamic centerline dilution
  C  = centerline concentration (includes reaction effects, if any)

      X        Y        Z        S        C        BV       BH
     .00      .00      .30      1.0  .100E+04     .01     3.05

END OF MOD201: DIFFUSER DISCHARGE MODULE
-----------------------------------------------------------------------------
-----------------------------------------------------------------------------
BEGIN MOD277: UNSTABLE NEAR-FIELD ZONE OF ALTERNATING PERPENDICULAR DIFFUSER

Because of the strong ambient current the diffuser plume of this crossflowing
  discharge gets RAPIDLY DEFLECTED.
A near-field zone is formed that is VERTICALLY FULLY MIXED over the entire
  layer depth.  Full mixing is achieved at a downstream distance of about
  five (5) layer depths.

Profile definitions:
  BV = layer depth (vertically mixed)
  BH = top-hat half-width, measured horizontally in y-direction
  S  = hydrodynamic average (bulk) dilution
  C  = average (bulk) concentration (includes reaction effects, if any)

      X        Y        Z        S        C        BV       BH
     .00      .00      .30      1.0  .100E+04     .01     3.05
     .76      .00      .35     34.2  .292E+02     .16     3.05
    1.52      .00      .40     47.5  .210E+02     .32     3.06
    2.29      .00      .44     57.4  .174E+02     .47     3.06
    3.05      .00      .49     65.4  .153E+02     .62     3.06
    3.81      .00      .53     72.3  .138E+02     .77     3.06
    4.57      .00      .58     78.3  .128E+02     .92     3.07
    5.33      .00      .62     83.7  .119E+02    1.07     3.07
    6.10      .00      .67     88.6  .113E+02    1.22     3.07
    6.86      .00      .72     93.1  .107E+02    1.37     3.08
    7.62      .00      .76     97.3  .103E+02    1.52     3.08
Cumulative travel time =          101. sec

END OF MOD277: UNSTABLE NEAR-FIELD ZONE OF ALTERNATING PERPENDICULAR DIFFUSER
-----------------------------------------------------------------------------
** End of NEAR-FIELD REGION (NFR) **
```

EGIN MOD241: BUOYANT AMBIENT SPREADING

Discharge is non-buoyant or weakly buoyant.
  Therefore BUOYANT SPREADING REGIME is ABSENT.

ND OF MOD241: BUOYANT AMBIENT SPREADING

EGIN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

Vertical diffusivity (initial value) = .935E-02 m^2/s
Horizontal diffusivity (initial value) = .117E-01 m^2/s

The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

Profile definitions:
  BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
     = or equal to layer depth, if fully mixed
  BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
     measured horizontally in Y-direction
  ZU = upper plume boundary (Z-coordinate)
  ZL = lower plume boundary (Z-coordinate)
  S = hydrodynamic centerline dilution
  C = centerline concentration (includes reaction effects, if any)

Plume Stage 1 (not bank attached):

X	Y	Z	S	C	BV	BH	ZU	ZL
8.38	.00	1.52	96.4	.104E+02	1.52	3.08	1.52	.00
28.42	.00	1.52	101.1	.989E+01	1.52	3.79	1.52	.00
48.47	.00	1.52	107.7	.929E+01	1.52	4.39	1.52	.00
68.51	.00	1.52	115.9	.863E+01	1.52	4.92	1.52	.00
88.55	.00	1.52	125.6	.796E+01	1.52	5.39	1.52	.00
108.59	.00	1.52	136.4	.733E+01	1.52	5.83	1.52	.00
128.64	.00	1.52	148.3	.674E+01	1.52	6.24	1.52	.00
148.68	.00	1.52	161.1	.621E+01	1.52	6.62	1.52	.00
168.72	.00	1.52	174.5	.573E+01	1.52	6.98	1.52	.00
188.76	.00	1.52	188.5	.531E+01	1.52	7.32	1.52	.00
208.80	.00	1.52	202.8	.493E+01	1.52	7.65	1.52	.00

Cumulative travel time = 1437. sec

Plume Stage 2 (bank attached):

X	Y	Z	S	C	BV	BH	ZU	ZL
208.80	7.65	1.52	202.9	.493E+01	1.52	15.30	1.52	.00
270.00	7.65	1.52	217.1	.472E+01	1.52	15.73	1.52	.00

Cumulative travel time = 1845. sec

CORMIX prediction has been TERMINATED at last prediction interval.
  Limiting time due to TIDAL REVERSAL has been reached.

ND OF MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

ORMIX2: Submerged Multiport Diffuser Discharges End of Prediction File
22222222222222222222222222222222222222222222222222222222222222222222222222

Attachment 9 10/24

```
RMIX2 PREDICTION FILE:
22222222222222222222222222222222222222222222222222222222222222222222222222
                    CORNELL MIXING ZONE EXPERT SYSTEM
                                                          Subsystem version:
bsystem CORMIX2:
ubmerged Multiport Diffuser Discharges    CORMIX v.3.20     September 1996
-----------------------------------------------------------------------------
-----------------------------------------------------------------------------
SE DESCRIPTION
ite name/label:          ZAPATA^VA0003867
esign case:              SLACK^TIDE^SHORT^DIFFUSER
ILE NAME:                cormix\sim\ZAPATA2 .cx2
ime of Fortran run:      09/16/98--16:08:28

VIRONMENT PARAMETERS (metric units)
ounded section
S     =    503.00  AS     =    766.57  QA     =      .00  ICHREG= 1
A     =      1.52  HD     =      1.52
idal Simulation at TIME =        .000 h
ERIOD=    12.40 h UAmax =        .300 dUa/dt=       .150 (m/s)/h
A     =      .000  F      =      .334 USTAR = .0000E+00
W     =     2.000 UWSTAR= .2198E-02
niform density environment
TRCND=  U          RHOAM =  999.7000

IFFUSER DISCHARGE PARAMETERS (metric units)
Diffuser type:     DITYPE= alternating perpendicular
BANK  =  LEFT      DISTB =      7.65  YB1    =     4.60  YB2    =     10.70
LD    =     6.10  NOPEN =   13        SPAC   =      .51
D0    =     .100  A0    =      .008  H0     =      .30
Nozzle/port arrangement:   alternating without fanning
GAMMA =    90.00  THETA =     90.00  SIGMA  =      .00  BETA   =     90.00
U0    =     .128  Q0    =      .013         = .1310E-01
RHO0  =  996.3187 DRHO0 = .3381E+01  GP0    = .3317E-01
C0    = .1000E+04 CUNITS=  PPB
IPOLL =  1        KS    = .0000E+00  KD     = .0000E+00

LUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
q0    = .2148E-02  m0    = .2755E-03  j0     = .7123E-04  SIGNJ0=      1.0
Associated 2-d length scales (meters)
lQ=B  =     .017  lM    =      .16  lm     =  99999.00
lmp   =  99999.00 lbp   =  99999.00  la     =  99999.00

LUX VARIABLES - ENTIRE DIFFUSER (metric units)
Q0    = .1310E-01  M0    = .1681E-02  J0     = .4345E-03
Associated 3-d length scales (meters)
LQ    =     .32   LM    =      .40  Lm     =  99999.00  Lb     =  99999.00
                                    Lmp    =  99999.00  Lbp    =  99999.00
Tidal:             Tu    =    .0797 h Lu     =    3.432  Lmin   =      .137

ON-DIMENSIONAL PARAMETERS
FR0   =     5.44  FRD0  =      2.22  R      =  99999.00
(slot)            (port/nozzle)

LOW CLASSIFICATION
22222222222222222222222222222222222222222
2  Flow class (CORMIX2)       =    MU1V   2
2  Applicable layer depth HS =     1.52   2
22222222222222222222222222222222222222222

IXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
```

) = .1000E+04 CONITS= PPB
:OX = 0
STD = 0
EGMZ = 0
INT = 6000.00 XMAX = 6000.00

Y-Z COORDINATE SYSTEM:
ORIGIN is located at the bottom and the diffuser mid-point:
7.65 m from the LEFT bank/shore.
X-axis points downstream, Y-axis points to left, Z-axis points upward.
TEP = 10 display intervals per module

GIN MOD101: DISCHARGE MODULE (SINGLE PORT AT DIFFUSER CENTER)

Initial conditions for individual jet/plume:
Average spacing between jet/plumes: .51 m

X	Y	Z	S	C	BV	BH
.00	.00	.30	1.0	.100E+04	.05	.05

ID OF MOD101: DISCHARGE MODULE (SINGLE PORT AT DIFFUSER CENTER)

EGIN CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION

Jet/plume transition motion in weak crossflow.

Zone of flow establishment: THETAE= 90.00 SIGMAE= .00
LE = .00 XE = .00 YE = .00 ZE = .30

Profile definitions:
BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
BH = before merging: Gaussian 1/e (37%) half-width in horizontal plane normal to trajectory
after merging: top-hat half-width in horizontal plane parallel to diffuser line
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)

Individual jet/plumes before merging:

X	Y	Z	S	C	BV	BH
.00	.00	.30	1.0	.100E+04	.05	.05
.00	.00	.41	1.1	.877E+03	.06	.06
.00	.00	.52	1.5	.669E+03	.07	.07
.00	.00	.62	1.9	.526E+03	.08	.08
.00	.00	.73	2.3	.426E+03	.09	.09
.00	.00	.84	2.8	.353E+03	.10	.10
.00	.00	.94	3.4	.298E+03	.11	.11
.00	.00	1.05	3.9	.255E+03	.12	.12
.00	.00	1.16	4.5	.222E+03	.13	.13
.00	.00	1.27	5.1	.195E+03	.14	.14
.00	.00	1.37	5.8	.173E+03	.15	.15

Cumulative travel time = 7. sec
Merging of individual jet/plumes not found in this module, but interaction will occur in following module. Overall jet/plume interaction dimensions:

.00	.00	1.37	5.8	.173E+03	.15	3.10

END OF CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION

Attachment 12/24

GIN MOD232: LAYER BOUNDARY IMPINGEMENT/UPSTREAM SPREADING

Vertical angle of layer/boundary impingement = 90.00 deg
Horizontal angle of layer/boundary impingement = .00 deg

Discharge into STAGNANT AMBIENT environment:
STEADY-STATE MIXING CONDITION IS NOT POSSIBLE in this zone,
even though some ADDITIONAL DILUTION MAY OCCUR!
Also, all far-field processes will be UNSTEADY.
SIMULATION STOPS because of stagnant ambient conditions.

D OF MOD232: LAYER BOUNDARY IMPINGEMENT/UPSTREAM SPREADING

End of NEAR-FIELD REGION (NFR) **

IMULATION STOPS because of STAGNANT AMBIENT conditions.
All far-field processes will be UNSTEADY.

RMIX2: Submerged Multiport Diffuser Discharges End of Prediction File
22222222222222222222222222222222222222222222222222222222222222222222222222

Attachment 13/24
9

```
ORMIX2 PREDICTION FILE:
:22222222222222222222222222222222222222222222222222222222222222222222222222
                    CORNELL MIXING ZONE EXPERT SYSTEM
ubsystem CORMIX2:                                          Subsystem version:
ubmerged Multiport Diffuser Discharges    CORMIX v.3.20     September 1996
-----------------------------------------------------------------------------
-----------------------------------------------------------------------------
ASE DESCRIPTION
ite name/label:          ZAPATA^VA0003867
esign case:              BEFORE^SLACK^SHORT^DIFFUSER
ILE NAME:                cormix\sim\ZAPATA3 .cx2
ime of Fortran run:      09/16/98--16:10:17

NVIRONMENT PARAMETERS (metric units)
ounded section
BS    =    503.00  AS     =    766.57  QA     =    114.99  ICHREG= 1
HA    =      1.52  HD     =      1.52
idal Simulation at TIME =      -1.000 h
ERIOD=    12.40 h UAmax =        .300 dUa/dt=        .150 (m/s)/h
JA    =      .150 F      =        .334 USTAR = .3065E-01
JW    =     2.000 UWSTAR= .2198E-02
niform density environment
TRCND=  U          RHOAM =  999.7000

IFFUSER DISCHARGE PARAMETERS (metric units)
iffuser type:      DITYPE= alternating perpendicular
ANK   =  LEFT      DISTB =      7.65  YB1    =      4.60  YB2    =     10.70
D     =      6.10  NOPEN =   13       SPAC   =       .51
0     =      .100  A0    =      .008  H0     =       .30
ozzle/port arrangement:   alternating without fanning
AMMA =     90.00  THETA =     90.00  SIGMA =        .00  BETA   =     90.00
0     =      .128  Q0    =      .013        = .1310E-01
HO0   =  996.3187  DRHO0 = .3381E+01  GP0    = .3317E-01
0     = .1000E+04  CUNITS=  PPB
IPOLL =  1         KS    = .0000E+00  KD     = .0000E+00

LUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
q0    = .2148E-02  m0    = .2755E-03  j0     = .7123E-04  SIGNJ0=      1.0
ssociated 2-d length scales (meters)
lQ=B  =      .017  lM    =      .16  lm     =      .01
lmp   =  99999.00  lbp   =  99999.00  la     =  99999.00

LUX VARIABLES - ENTIRE DIFFUSER (metric units)
Q0    = .1310E-01  M0    = .1681E-02  J0     = .4345E-03
ssociated 3-d length scales (meters)
LQ    =      .32  LM    =      .40  Lm     =      .27  Lb     =      .13
                                    Lmp    =  99999.00  Lbp    =  99999.00
idal:              Tu    =    .0797 h Lu     =     3.432  Lmin   =     .137

ON-DIMENSIONAL PARAMETERS
FR0   =     5.44  FRD0  =     2.22  R      =      .85
(slot)             (port/nozzle)

LOW CLASSIFICATION
22222222222222222222222222222222222222222
2  Flow class (CORMIX2)        =    MU8    2
2  Applicable layer depth HS =     1.52   2
22222222222222222222222222222222222222222

IXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
```

```
)     = .1000E+04  CUNITS=  PPB
TOX   =  0
STD   =  0
EGMZ  =  0
INT   =   6000.00  XMAX   =  6000.00

Y-Z COORDINATE SYSTEM:
  ORIGIN is located at the bottom and the diffuser mid-point:
        7.65 m  from the LEFT  bank/shore.
  X-axis points downstream, Y-axis points to left, Z-axis points upward.
TEP = 10 display intervals per module
-----------------------------------------------------------------------
-----------------------------------------------------------------------
GIN MOD201: DIFFUSER DISCHARGE MODULE

ue to complex near-field motions:  EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

rofile definitions:
  BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
  BH = top-hat half-width, in horizontal plane normal to trajectory
  S  = hydrodynamic centerline dilution
  C  = centerline concentration (includes reaction effects, if any)

      X        Y        Z        S        C        BV       BH
     .00      .00      .30      1.0  .100E+04     .01     3.05

ND OF MOD201: DIFFUSER DISCHARGE MODULE
-----------------------------------------------------------------------
-----------------------------------------------------------------------
EGIN MOD277: UNSTABLE NEAR-FIELD ZONE OF ALTERNATING PERPENDICULAR DIFFUSER

Because of the strong ambient current the diffuser plume of this crossflowing
  discharge gets RAPIDLY DEFLECTED.
A near-field zone is formed that is VERTICALLY FULLY MIXED over the entire
  layer depth.  Full mixing is achieved at a downstream distance of about
  five (5) layer depths.

Profile definitions:
  BV = layer depth (vertically mixed)
  BH = top-hat half-width, measured horizontally in y-direction
  S  = hydrodynamic average (bulk) dilution
  C  = average (bulk) concentration (includes reaction effects, if any)

      X        Y        Z        S        C        BV       BH
     .00      .00      .30      1.0  .100E+04     .01     3.05
     .76      .00      .35     34.6  .289E+02     .16     3.05
    1.52      .00      .40     48.4  .207E+02     .32     3.06
    2.29      .00      .44     58.9  .170E+02     .47     3.06
    3.05      .00      .49     67.8  .148E+02     .62     3.06
    3.81      .00      .53     75.5  .132E+02     .77     3.06
    4.57      .00      .58     82.5  .121E+02     .92     3.07
    5.33      .00      .62     88.9  .112E+02    1.07     3.07
    6.10      .00      .67     94.8  .105E+02    1.22     3.07
    6.86      .00      .72    100.4  .996E+01    1.37     3.08
    7.62      .00      .76    105.6  .947E+01    1.52     3.08
Cumulative travel time =          101. sec

ND OF MOD277: UNSTABLE NEAR-FIELD ZONE OF ALTERNATING PERPENDICULAR DIFFUSER
-----------------------------------------------------------------------
* End of NEAR-FIELD REGION (NFR) **
```

Attachment 9 10/24

GIN MOD241: BUOYANT AMBIENT SPREADING

ischarge is non-buoyant or weakly buoyant.
Therefore BUOYANT SPREADING REGIME is ABSENT.

D OF MOD241: BUOYANT AMBIENT SPREADING

GIN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

Vertical diffusivity (initial value) = .935E-02 m^2/s
Horizontal diffusivity (initial value) = .117E-01 m^2/s

The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

Profile definitions:
BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
= or equal to layer depth, if fully mixed
BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
measured horizontally in Y-direction
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)

Plume Stage 1 (not bank attached):

X	Y	Z	S	C	BV	BH	ZU	ZL
8.38	.00	1.52	105.4	.949E+01	1.52	3.08	1.52	.00
28.42	.00	1.52	126.0	.794E+01	1.52	3.79	1.52	.00
48.47	.00	1.52	143.4	.698E+01	1.52	4.39	1.52	.00
68.51	.00	1.52	159.2	.628E+01	1.52	4.92	1.52	.00
88.55	.00	1.52	174.1	.574E+01	1.52	5.39	1.52	.00
108.59	.00	1.52	188.4	.531E+01	1.52	5.83	1.52	.00
128.64	.00	1.52	202.3	.494E+01	1.52	6.24	1.52	.00
148.68	.00	1.52	215.7	.464E+01	1.52	6.62	1.52	.00
168.72	.00	1.52	228.8	.437E+01	1.52	6.98	1.52	.00
188.76	.00	1.52	241.5	.414E+01	1.52	7.32	1.52	.00
208.80	.00	1.52	253.8	.394E+01	1.52	7.65	1.52	.00

Cumulative travel time = 1437. sec

Plume Stage 2 (bank attached):

X	Y	Z	S	C	BV	BH	ZU	ZL
208.80	7.65	1.52	253.8	.394E+01	1.52	15.30	1.52	.00
235.64	7.65	1.52	257.7	.389E+01	1.52	15.49	1.52	.00

Cumulative travel time = 1616. sec

CORMIX prediction has been TERMINATED at last prediction interval.
Limiting distance due to TIDAL REVERSAL has been reached.

END OF MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

CORMIX2: Submerged Multiport Diffuser Discharges End of Prediction File
22222222222222222222222222222222222222222222222222222222222222222222222222222

ment 9 124

```
RMIX2 PREDICTION FILE:
2222222222222222222222222222222222222222222222222222222222222222222222222222
                    CORNELL MIXING ZONE EXPERT SYSTEM
                                                          Subsystem version:
osystem CORMIX2:
ubmerged Multiport Diffuser Discharges    CORMIX v.3.20     September 1996
-----------------------------------------------------------------------------
-----------------------------------------------------------------------------
SE DESCRIPTION
ite name/label:          ZAPATA^VA0003867
esign case:              AFTER^SLACK^-^LONG^DIFFUSER
ILE NAME:                cormix\sim\ZAPATA4 .cx2
ime of Fortran run:      09/16/98--15:18:57

VIRONMENT PARAMETERS (metric units)
ounded section
S     =    503.00  AS     =    766.57  QA     =    114.99  ICHREG= 1
A     =      1.52  HD     =      1.52
idal Simulation at TIME =      1.000 h
ERIOD=    12.40 h UAmax =       .300 dUa/dt=       .150 (m/s)/h
JA    =      .150 F      =       .334 USTAR = .3065E-01
JW    =     2.000 UWSTAR= .2198E-02
Jhiform density environment
STRCND=  U          RHOAM =  999.7000

IFFUSER DISCHARGE PARAMETERS (metric units)
Diffuser type:      DITYPE= unidirectional perpendicular
BANK  =  LEFT       DISTB =     12.20  YB1    =      6.10  YB2    =     18.30
LD    =     12.20  NOPEN =     8       SPAC   =      1.74
D0    =      .100  A0     =      .008  H0     =       .28
Nozzle/port arrangement:   unidirectional without fanning
GAMMA =     90.00  THETA =     45.00  SIGMA =        .00  BETA   =     90.00
U0    =      .208  Q0     =      .013         = .1310E-01
RHO0  =  996.3187  DRHO0 = .3381E+01  GP0    = .3317E-01
C0    = .1000E+04  CUNITS=  PPB
IPOLL =  1         KS     = .0000E+00  KD     = .0000E+00

LUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
q0    = .1074E-02  m0     = .2239E-03  j0     = .3561E-04  SIGNJ0=      1.0
Associated 2-d length scales (meters)
lQ=B  =      .005  lM     =       .21  lm     =       .01
lmp   =  99999.00  lbp    =  99999.00  la     =  99999.00

LUX VARIABLES - ENTIRE DIFFUSER (metric units)
Q0    = .1310E-01  M0     = .2731E-02  J0     = .4345E-03
Associated 3-d length scales (meters)
LQ    =       .25  LM     =       .57  Lm     =       .35  Lb     =       .13
                                       Lmp    =  99999.00  Lbp    =  99999.00
Tidal:             Tu     =    .0864 h Lu     =     4.033  Lmin   =      .174

ON-DIMENSIONAL PARAMETERS
FR0   =     15.95  FRD0   =      3.62  R      =      1.38
(slot)             (port/nozzle)

LOW CLASSIFICATION
2222222222222222222222222222222222222222222
2  Flow class (CORMIX2)        =    MU2     2
2  Applicable layer depth HS =     1.52    2
2222222222222222222222222222222222222222222

IIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
```

PARAMETER	EFFLUENT CONCEN-TRATION ug/1	VIRGINIA ACUTE CRITERIA SALTWATER ug/1	VIRGINIA CHRONIC CRITERIA SALTWATER ug/1	Multiplier of 106 determined by Dale Phillips with Cormix model. PROJECTED IN STREAM CONCENTRATION		COMMENTS
				AVG FLOW		Data from 2C application/Attachment D evaluated and all units ug/l, unless otherwise specified *Measured as Dissolved species
				Acute (WLA_a)	Chronic (WLA_c)	
						Acute (WLA_a) and Chronic (WLA_c) are calculated as follows: 26x acute and chronic standards for estuarine, per 93-015) ug/l
					Human Health WLA	
Chloroform	<5		29000 Human Health Std		3100000 Human Health WLA	Value is less than detection
Dichloromethane	<5		16000 Human Health Std		1700000 Human Health WLA	Value is less than detection
Dichlorobromomethane	<5		460 Human Health Std		49000 Human Health WLA	Value is less than detection
1, 2-Dichloroethane	<5		990 Human Health Std		110000 Human Health WLA	Value is less than detection
1,1-Dichloroethylene	<5		17000 Human Health Std		1800000 Human Health WLA	Value is less than detection
Ethylbenzene	<5		29000 Human Health Std		3100000 Human	Value is less than detection

PARAMETER	EFFLUENT CONCEN-TRATION ug/1	VIRGINIA ACUTE CRITERIA SALTWATER ug/1	VIRGINIA CHRONIC CRITERIA SALTWATER ug/1	Multiplier of 106 determined by Dale Phillips with Cormix model. PROJECTED IN STREAM CONCENTRATION		COMMENTS
				AVG FLOW		Data from 2C application/Attachment D evaluated and all units ug/l, unless otherwise specified
				Acute (WLA_a)	Chronic (WLA_c)	*Measured as Dissolved species
						Acute (WLA_a) and Chronic (WLA_c) are calculated as follows: 26x acute and chronic standards for estuarine, per 93-015) ug/l
					Health WLA	
Tetrachloroethylene	<5		89 Human Health Std		9400 Human Health Std	Value is less than detection
Vinyl Chloride	<10		61 Human Health Std		6500 Human Health Std	Value is less than detection
Acids Extractables						
2-Chlorophenol	<10		400 Human Health Std		42000 Human Health WLA	Value is less than detection
2,4-Dichlorophenol	<10		790 Human Health Std		84000 Human Health WLA	Value is less than detection
2,4-Dimethylphenol	<10		2300 Human Health Std		240000 Human Health WLA	Value is less than detection
Pentachlorophenol	<50	13	7.9 82HH	1400	840 8700HH	Value is less than detection

PARAMETER	EFFLUENT CONCEN-TRATION ug/1	VIRGINIA ACUTE CRITERIA SALTWATER ug/1	VIRGINIA CHRONIC CRITERIA SALTWATER ug/1	Multiplier of 106 determined by Dale Phillips with Cormix model. PROJECTED IN STREAM CONCENTRATION		COMMENTS
				AVG FLOW		Data from 2C application/Attachment D evaluated and all units ug/l, unless otherwise specified
				Acute (WLA_a)	Chronic (WLA_c)	*Measured as Dissolved species
						Acute (WLA_a) and Chronic (WLA_c) are calculated as follows: 26x acute and chronic standards for estuarine, per 93-015) ug/l
2,4,6-Trichlorophenol	<10		65 Human Health Std		6900 Human Health WLA	Value is less than detection

SALTWATER AND TRANSITION ZONES
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Omega Protein 001
Receiving Stream: Cockrell's Creek

Permit No.: VA0003867

Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information

Mean Hardness (as CaCO3) =	NA	mg/l
90th % Temperature (Annual) =	28.41	(° C)
90th % Temperature (Winter) =		(° C)
90th % Maximum pH =	8.37	
10th % Maximum pH =		
Tier Designation (1 or 2) =	1	
Early Life Stages Present Y/N =	Y	
Tidal Zone =	1	(1 = saltwater, 2 = transition zone)
Mean Salinity =	17	(g/kg)

Mixing Information

Design Flow (MGD)	4.1
Acute WLA multiplier	106
Chronic WLA multiplier	106
Human health WLA multiplier	106

Effluent Information

Mean Hardness (as CaCO3) =	NA	mg/L
90 % Temperature (Annual) =	38	(° C)
90 % Temperature (Winter) =	22	(° C)
90 % Maximum pH =	8.73	SU
10 % Maximum pH =		SU
Discharge Flow =	4.1	MGD

Parameter	Background	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			**Most Limiting Allocations**		
(ug/l unless noted)	Conc.	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	**Acute**	**Chronic**	**HH**
Acenapthene	0	--	--	2.7E+03	--	--	2.9E+05	--	--	--	--	--	--	--	--	**2.9E+05**
Acrolein		--	--	7.3E+02	--	--	8.3E+04	--	--	--	--	--	--	--	--	**8.3E+04**
Acrylonitrile[c]		--	--	6.6E+00	--	--	7.0E+02	--	--	--	--	--	--	--	--	**7.0E+02**
Aldrin [c]	0	1.3E+00	--	1.4E-03	1.4E+02	--	1.5E-01	--	--	--	--	--	--	**1.4E+02**	--	**1.5E-01**
Ammonia-N (mg/l) - Annual	0	1.4E+00	2.1E-01	--	1.5E+02	2.3E+01	--	--	--	--	--	--	--	**1.5E+02**	**2.3E+01**	--
Ammonia-N (mg/l) - Winter	0	1.0E+01	1.5E+00	--	1.1E+03	1.6E+02	--	--	--	--	--	--	--	**1.1E+03**	**1.6E+02**	--
Anthracene	0	--	--	1.7E+05	--	--	1.2E+07	--	--	--	--	--	--	--	--	**1.2E+07**
Antimony	0	--	--	4.3E+03	--	--	4.6E+05	--	--	--	--	--	--	--	--	**4.6E+05**
Arsenic	0	6.9E+01	3.6E+01	-	7.3E+03	3.8E+03	--	--	--	--	--	--	--	**7.3E+03**	**3.8E+03**	--
Benzene [c]	0	--	--	7.1E+02	--	--	7.5E+04	--	--	--	--	--	--	--	--	**7.5E+04**
Benzidine[c]		--	--	5.4E-03	--	--	5.7E-01	--	--	--	--	--	--	--	--	**5.7E-01**
Benzo (a) anthracene [c]	0	--	--	4.9E-01	--	--	5.2E+01	--	--	--	--	--	--	--	--	**5.2E+01**
Benzo (b) fluoranthene [c]	0	--	--	4.9E-01	--	--	5.2E+01	--	--	--	--	--	--	--	--	**5.2E+01**
Benzo (k) fluoranthene [c]	0	--	--	4.9E-01	--	--	5.2E+01	--	--	--	--	--	--	--	--	**5.2E+01**
Benzo (a) pyrene [c]	0	--	--	4.9E-01	--	--	5.2E+01	--	--	--	--	--	--	--	--	**5.2E+01**
Bis2-Chloroethyl Ether		--	--	1.4E+01	--	--	1.5E+03	--	--	--	--	--	--	--	--	**1.5E+03**
Bis2-Chloroisopropyl Ether		--	--	1.7E+05	--	--	1.8E+07	--	--	--	--	--	--	--	--	**1.8E+07**
Bromoform [c]	0	--	--	3.6E+03	--	--	3.8E+05	--	--	--	--	--	--	--	--	**3.8E+05**
Butylbenzylphthalate	0	--	--	5.2E+03	--	--	5.5E+05	--	--	--	--	--	--	--	--	**5.5E+05**
Cadmium	0	4.0E+01	8.8E+00	--	4.2E+03	9.3E+02	--	--	--	--	--	--	--	**4.2E+03**	**9.3E+02**	--
Carbon Tetrachloride [c]	0	--	--	4.4E+01	--	--	4.7E+03	--	--	--	--	--	--	--	--	**4.7E+03**
Chlordane [c]	0	9.0E-02	4.0E-03	2.2E-02	9.5E+00	4.2E-01	2.3E+00	--	--	--	--	--	--	**9.5E+00**	**4.2E-01**	**2.3E+00**
TRC	0			--			--	--	--	--	--	--	--	--	--	--
Chlorine Prod. Oxidant	0	1.3E+01	7.5E+00	-	1.4E+03	8.0E+02	--	--	--	--	--	--	--	**1.4E+03**	**8.0E+02**	--

Parameter	Background	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			**Most Limiting Allocations**		
(ug/l unless noted)	Conc.	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	**Acute**	**Chronic**	**HH**
Chlorobenzene		--	--	2.1E+04	--	--	2.2E+06	--	--	--	--	--	--	--	--	**2.2E+06**
Chlorodibromomethane[C]	0	--	--	3.4E+02	--	--	3.6E+04	--	--	--	--	--	--	--	--	**3.6E+04**
Chloroform [C]	0	--	--	2.9E+04	--	--	3.1E+06	--	--	--	--	--	--	--	--	**3.1E+06**
2-Chloronaphthalene	0	--	--	4.3E+03	--	--	4.6E+05	--	--	--	--	--	--	--	--	**4.6E+05**
2-Chlorophenol	0	--	--	4.0E+02	--	--	4.2E+04	--	--	--	--	--	--	--	--	**4.2E+04**
Chlorpyrifos	0	1.1E-02	5.6E-03	--	1.2E+00	5.9E-01	--	--	--	--	--	--	--	**1.2E+00**	**5.9E-01**	--
Chromium III	0			--			--	--	--	--	--	--	--	--	--	--
Chromium VI	0	1.1E+03	5.0E+01	--	1.2E+05	5.3E+03	--	--	--	--	--	--	--	**1.2E+05**	**5.3E+03**	--
Chrysene [C]	0	--	--	4.9E-01	--	--	5.2E+01	--	--	--	--	--	--	--	--	**5.2E+01**
Copper	0	9.3E+00	6.0E+00	--	9.9E+02	6.4E+02	--	--	--	--	--	--	--	**9.9E+02**	**6.4E+02**	--
Cyanide	0	1.0E+00	1.0E+00	2.2E+05	1.1E+02	1.1E+02	2.3E+07	--	--	--	--	--	--	**1.1E+02**	**1.1E+02**	**2.3E+07**
DDD [C]	0	--	--	8.4E-03	--	--	8.9E-01	--	--	--	--	--	--	--	--	**8.9E-01**
DDE [C]	0	--	--	6.0E-03	--	--	6.3E-01	--	--	--	--	--	--	--	--	**6.3E-01**
DDT [C]	0	1.3E-01	1.0E-03	5.9E-03	1.4E+01	1.1E-01	6.3E-01	--	--	--	--	--	--	**1.4E+01**	**1.1E-01**	**6.3E-01**
Demeton	0	--	1.0E-01	--	--	1.1E+01	--	--	--	--	--	--	--	--	**1.1E+01**	--
Dibenz(a,h)anthracene [C]	0	--	--	4.9E-01	--	--	5.2E+01	--	--	--	--	--	--	--	--	**5.2E+01**
Dibutyl phthalate	0	--	--	1.2E+04	--	--	1.3E+06	--	--	--	--	--	--	--	--	**1.3E+06**
Dichloromethane (Methylene Chloride)[C]	0	--	--	1.6E+04	--	--	1.7E+06	--	--	--	--	--	--	--	--	**1.7E+06**
1,2-Dichlorobenzene	0	--	--	1.7E+04	--	--	1.8E+06	--	--	--	--	--	--	--	--	**1.8E+06**
1,3-Dichlorobenzene	0	--	--	2.6E+03	--	--	2.8E+05	--	--	--	--	--	--	--	--	**2.8E+05**
1,4-Dichlorobenzene	0	--	--	2.6E+03	--	--	2.8E+05	--	--	--	--	--	--	--	--	**2.8E+05**
3,3-Dichlorobenzidine[C]	0	--	--	7.7E-01	--	--	8.2E+01	--	--	--	--	--	--			
Dichlorobromomethane [C]	0	--	--	4.6E+02	--	--	4.9E+04	--	--	--	--	--	--	--	--	**4.9E+04**
1,2-Dichloroethane [C]	0	--	--	9.9E+02	--	--	1.0E+05	--	--	--	--	--	--	--	--	**1.0E+05**
1,1-Dichloroethylene	0	--	--	1.7E+04	--	--	1.8E+06	--	--	--	--	--	--	--	--	**1.8E+06**
1,2-trans-dichloroethylene	0	--	--	1.4E+05	--	--	1.5E+07	--	--	--	--	--	--	--	--	**1.5E+07**
2,4-Dichlorophenol	0	--	--	7.9E+02	--	--	8.4E+04	--	--	--	--	--	--	--	--	**8.4E+04**
1,2-Dichloropropane[C]	0	--	--	3.9E+02	--	--	4.1E+04	--	--	--	--	--	--	--	--	**4.1E+04**
1,3-Dichloropropene	0	--	--	1.7E+03	--	--	1.8E+05	--	--	--	--	--	--	--	--	**1.8E+05**
Dieldrin [C]	0	7.1E-01	1.9E-03	1.4E-03	7.5E+01	2.0E-01	1.5E-01	--	--	--	--	--	--	**7.5E+01**	**2.0E-01**	**1.5E-01**
Diethyl Phthalate	0	--	--	1.2E+05	--	--	1.3E+07	--	--	--	--	--	--	--	--	**1.3E+07**
Di-2-Ethylhexyl Phthalate [C]	0	--	--	5.9E+01	--	--	6.3E+03	--	--	--	--	--	--	--	--	**6.3E+03**
2,4-Dimethylphenol	0	--	--	2.3E+03	--	--	2.4E+05	--	--	--	--	--	--	--	--	**2.4E+05**
Dimethyl Phthalate	0	--	--	2.9E+06	--	--	3.1E+08	--	--	--	--	--	--	--	--	**3.1E+08**
Di-n-Butyl Phthalate	0	--	--	1.2E+04	--	--	1.3E+06	--	--	--	--	--	--	--	--	**1.3E+06**
2,4 Dinitrophenol	0	--	--	1.4E+04	--	--	1.5E+06	--	--	--	--	--	--	--	--	**1.5E+06**
2-Methyl-4,6-Dinitrophenol	0	--	--	7.65E+02	--	--	8.1E+04	--	--	--	--	--	--	--	--	**8.1E+04**
2,4-Dinitrotoluene [C]	0	--	--	9.1E+01	--	--	9.6E+03	--	--	--	--	--	--	--	--	**9.6E+03**
Dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin) (ppq)	0	--	--	1.2E-06	--	--	1.3E-04	--	--	--	--	--	--	--	--	**1.3E-04**
1,2-Diphenylhydrazine[C]	0	--	--	5.4E+00	--	--	5.7E+02	--	--	--	--	--	--	--	--	**5.7E+02**
Alpha-Endosulfan	0	3.4E-02	8.7E-03	2.4E+02	3.6E+00	9.2E-01	2.5E+04	--	--	--	--	--	--	**3.6E+00**	**9.2E-01**	**2.5E+04**

Parameter	Background	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			Most Limiting Allocations		
(ug/l unless noted)	Conc.	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH
Beta-Endosulfan	0	3.4E-02	8.7E-03	2.4E+02	3.6E+00	9.2E-01	2.5E+04	--	--	--	--	--	--	3.6E+00	9.2E-01	2.5E+04
Endosulfan Sulfate	0	--	--	2.4E+02	--	--	2.5E+04	--	--	--	--	--	--	--	--	2.5E+04
Endrin	0	3.7E-02	2.3E-03	8.1E-01	3.9E+00	2.4E-01	8.6E+01	--	--	--	--	--	--	3.9E+00	2.4E-01	8.6E+01
Endrin Aldehyde	0	--	--	8.1E-01	--	--	8.6E+01	--	--	--	--	--	--	--	--	8.6E+01
Ethylbenzene	0	--	--	2.9E+04	--	--	3.1E+06	--	--	--	--	--	--	--	--	3.1E+06
Fluoranthene	0	--	--	3.7E+02	--	--	3.9E+04	--	--	--	--	--	--	--	--	3.9E+04
Fluorene	0	--	--	1.4E+04	--	--	1.5E+06	--	--	--	--	--	--	--	--	1.5E+06
Guthion	0	--	1.0E-02	--	--	1.1E+00	--	--	--	--	--	--	--	--	1.1E+00	--
Heptachlor [C]	0	5.3E-02	3.6E-03	2.1E-03	5.6E+00	3.8E-01	2.2E-01	--	--	--	--	--	--	5.6E+00	3.8E-01	2.2E-01
Heptachlor Epoxide[C]	0	5.3E-02	3.6E-03	1.1E-03	5.6E+00	3.8E-01	1.2E-01	--	--	--	--	--	--	5.6E+00	3.8E-01	1.2E-01
Hexachlorobenzene[C]	0	--	--	7.7E-03	--	--	8.2E-01	--	--	--	--	--	--	--	--	8.2E-01
Hexachlorobutadiene[C]	0	--	--	5.0E+02	--	--	5.3E+04	--	--	--	--	--	--	--	--	5.3E+04
Hexachlorocyclohexane Alpha-BHC[C]	0	--	--	1.3E-01	--	--	1.4E+01	--	--	--	--	--	--	--	--	1.4E+01
Hexachlorocyclohexane Beta-BHC[C]	0	--	--	4.6E-01	--	--	4.9E+01	--	--	--	--	--	--	--	--	4.9E+01
Hexachlorocyclohexane Gamma-BHC[C] (Lindane)	0	1.6E-01	--	6.3E-01	1.7E+01	--	6.7E+01	--	--	--	--	--	--	1.7E+01	--	6.7E+01
Hexachlorocyclopentadiene	0	--	--	1.7E+04	--	--	1.8E+06	--	--	--	--	--	--	--	--	1.8E+06
Hexachloroethane[C]	0	--	--	8.9E+01	--	--	9.4E+03	--	--	--	--	--	--	--	--	9.4E+03
Hydrogen Sulfide	0	--	2.0E+00		--	2.1E+02	--	--	--	--	--	--	--	--	2.1E+02	--
Indeno (1,2,3-cd) pyrene C	0	--	--	4.9E-01	--	--	5.2E+01	--	--	--	--	--	--	--	--	5.2E+01
Isophorone[C]	0	--	--	2.6E+04	--	--	2.8E+06	--	--	--	--	--	--	--	--	2.8E+06
Kepone	0	--	0.0E+00	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00	--
Lead	0	2.4E+02	9.3E+00	--	2.5E+04	9.9E+02	--	--	--	--	--	--	--	2.5E+04	9.9E+02	--
Malathion	0	--	1.0E-01	--	--	1.1E+01	--	--	--	--	--	--	--	--	1.1E+01	--
Mercury	0	1.8E+00	9.4E-01	5.1E-02	1.9E+02	1.0E+02	5.4E+00	--	--	--	--	--	--	1.9E+02	1.0E+02	5.4E+00
Methyl Bromide	0	--	--	4.0E+03	--	--	4.2E+05	--	--	--	--	--	--	--	--	4.2E+05
Methoxychlor	0	--	3.0E-02	--	--	3.2E+00	--	--	--	--	--	--	--	--	3.2E+00	--
Mirex	0	--	0.0E+00	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00	--
Monochlorobenzene	0	--	--	2.1E+04	--	--	2.2E+06	--	--	--	--	--	--	--	--	2.2E+06
Nickel	0	7.4E+01	8.2E+00	4.6E+03	7.8E+03	8.7E+02	4.9E+05	--	--	--	--	--	--	7.8E+03	8.7E+02	4.9E+05
Nitrobenzene	0	--	--	1.9E+03	--	--	2.0E+05	--	--	--	--	--	--	--	--	2.0E+05
N-Nitrosodimethylamine[C]	0	--	--	8.1E+01	--	--	8.6E+03	--	--	--	--	--	--	--	--	8.6E+03
N-Nitrosodiphenylamine[C]	0	--	--	1.6E+02	--	--	1.7E+04	--	--	--	--	--	--	--	--	1.7E+04
N-Nitrosodi-n-propylamine[C]	0	--	--	1.4E+01	--	--	1.5E+03	--	--	--	--	--	--	--	--	1.5E+03
Parathion	0			--			--	--	--	--	--	--	--	--	--	--
PCB-1016	0	--	3.0E-02	--	--	3.2E+00	--	--	--	--	--	--	--	--	3.2E+00	--
PCB-1221	0	--	3.0E-02	--	--	3.2E+00	--	--	--	--	--	--	--	--	3.2E+00	--
PCB-1232	0	--	3.0E-02	--	--	3.2E+00	--	--	--	--	--	--	--	--	3.2E+00	--
PCB-1242	0	--	3.0E-02	--	--	3.2E+00	--	--	--	--	--	--	--	--	3.2E+00	--
PCB-1248	0	--	3.0E-02	--	--	3.2E+00	--	--	--	--	--	--	--	--	3.2E+00	--
PCB-1254	0	--	3.0E-02	--	--	3.2E+00	--	--	--	--	--	--	--	--	3.2E+00	--

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			Most Limiting Allocations		
		Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH
PCB-1260	0	--	3.0E-02	--	--	3.2E+00	--	--	--	--	--	--	--	--	3.2E+00	--
PCB Total[C]	0	--	--	1.7E-03	--	--	1.8E-01	--	--	--	--	--	--	--	--	1.8E-01
Pentachlorophenol [C]	0	1.3E+01	7.9E+00	8.2E+01	1.4E+03	8.4E+02	8.7E+03	--	--	--	--	--	--	1.4E+03	8.4E+02	8.7E+03
Phenol	0	--	--	4.6E+06	--	--	4.9E+08	--	--	--	--	--	--	--	--	4.9E+08
Phosphorus (Elemental)	0	--	0.1	-	--	1.1E+01	--	--	--	--	--	--	--	--	1.1E+01	--
Pyrene	0	--	--	1.1E+04	--	--	1.2E+06	--	--	--	--	--	--	--	--	1.2E+06
Radionuclides (pCi/l except Beta/Photon)	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Gross Alpha Activity	0	--	--	1.5E+01	--	--	1.6E+03	--	--	--	--	--	--	--	--	1.6E+03
Beta and Photon Activity (mrem/yr)	0	--	--	4.0E+00	--	--	4.2E+02	--	--	--	--	--	--	--	--	4.2E+02
Strontium-90	0	--	--	8.0E+00	--	--	8.5E+02	--	--	--	--	--	--	--	--	8.5E+02
Tritium	0	--	--	2.0E+04	--	--	2.1E+06	--	--	--	--	--	--	--	--	2.1E+06
Selenium	0	3.0E+02	7.1E+01	1.1E+04	3.2E+04	7.5E+03	1.2E+06	--	--	--	--	--	--	3.2E+04	7.5E+03	1.2E+06
Silver	0	2.0E+00	--	--	2.1E+02	--	--	--	--	--	--	--	--	2.1E+02	--	--
1,1,2,2-Tetrachloroethane[C]	0	--	--	1.1E+02	--	--	1.2E+04	--	--	--	--	--	--	--	--	1.2E+04
Tetrachloroethylene[C]	0	--	--	8.9E+01	--	--	9.4E+03	--	--	--	--	--	--	--	--	9.4E+03
Thallium	0	--	--	6.3E+00	--	--	6.7E+02	--	--	--	--	--	--	--	--	6.7E+02
Toluene	0	--	--	2.0E+05	--	--	2.1E+07	--	--	--	--	--	--	--	--	2.1E+07
Toxaphene [C]	0	2.1E-01	2.0E-04	7.5E-03	2.2E+01	2.1E-02	8.0E-01	--	--	--	--	--	--	2.2E+01	2.1E-02	8.0E-01
Tributyltin	0	3.8E-01	1.0E-03	--	4.0E+01	1.1E-01	--	--	--	--	--	--	--	4.0E+01	1.1E-01	--
1,2,4-Trichlorobenzene	0	--	--	9.4E+02	--	--	1.0E+05	--	--	--	--	--	--	--	--	1.0E+05
1,1,2-Trichloroethane[C]	0	--	--	4.2E+02	--	--	4.5E+04	--	--	--	--	--	--	--	--	4.5E+04
Trichloroethylene [C]	0	--	--	8.1E+02	--	--	8.6E+04	--	--	--	--	--	--	--	--	8.6E+04
2,4,6-Trichlorophenol [C]	0	--	--	6.5E+01	--	--	6.9E+03	--	--	--	--	--	--	--	--	6.9E+03
Vinyl Chloride[C]	0	--	--	6.1E+01	--	--	6.5E+03	--	--	--	--	--	--	--	--	6.5E+03
Zinc	0	9.0E+01	8.1E+01	6.9E+04	9.5E+03	8.6E+03	7.3E+06	--	--	--	--	--	--	9.5E+03	8.6E+03	7.3E+06

Notes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
2. Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
3. Metals measured as Dissolved, unless specified otherwise
4. "C" indicates a carcinogenic parameter
5. For transition zone waters, spreadsheet prints the lesser of the freshwater and saltwater water quality criteria.
6. Regular WLA = (WQC x WLA multiplier) - (WLA multiplier - 1)(background conc.)
7. Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
   = (0.1(WQC - background conc.) + background conc.) for human health
8. Antideg. WLA = (Antideg. Baseline)(WLA multiplier) - (WLA multiplier - 1)(background conc.)

Metal	Site Specific Target Value (SSTV)
Antimony	4.6E+05
Arsenic III	2.3E+03
Cadmium	5.6E+02
Chromium III	#VALUE!
Chromium VI	3.2E+03
Copper	3.8E+02
Lead	5.9E+02
Mercury	5.4E+00
Nickel	5.2E+02
Selenium	4.5E+03
Silver	8.5E+01
Zinc	3.8E+03

Note: do not use QL's lower than the minimum QL's provided in agency guidance

4/29/04 4:26:28 PM

Facility = Omega 001
Chemical = Ammonia
Chronic averaging period = 30
WLAa = 150
WLAc = 23
Q.L. = 0.2
# samples/mo. = 2
# samples/wk. = 1

Summary of Statistics:

observations = 23
Expected Value = 13.7886
Variance = 302.388
C.V. = 1.261130
97th percentile daily values = 53.6816
97th percentile 4 day average = 34.6324
97th percentile 30 day average= 19.7605
< Q.L. = 0
Model used = lognormal

No Limit is required for this material

The data are:

17.1
33.1
13.2
21.3
0.99
0.99
8.8
14.4
6.16
12
47
15.4
7.28
4.76
3.07
2.38
4.86
17.7
7.56
13.4
11.8
7
14.8

4/29/04 4:28:31 PM

Facility = Omega 001
Chemical = Copper
Chronic averaging period = 4
WLAa = 990
WLAc = 640
Q.L. = 41
# samples/mo. = 2
# samples/wk. = 1

Summary of Statistics:

observations = 10
Expected Value = 62.8836
Variance = 196.967
C.V. = 0.223182
97th percentile daily values = 92.9159
97th percentile 4 day average = 77.0420
97th percentile 30 day average= 67.7033
< Q.L. = 0
Model used = lognormal

No Limit is required for this material

The data are:

68
53
59
62
66
68
74
48
41
88

4/29/04 4:30:46 PM

Facility = Omega 001
Chemical = Silver
Chronic averaging period = 4
WLAa = 210
WLAc =
Q.L. = 2.07
# samples/mo. = 2
# samples/wk. = 1

Summary of Statistics:

observations = 10
Expected Value = 4.94034
Variance = 18.7430
C.V. = 0.876320
97th percentile daily values = 15.3700
97th percentile 4 day average = 9.95321
97th percentile 30 day average= 6.42712
< Q.L. = 0
Model used = lognormal

No Limit is required for this material

The data are:

3.2
2.68
3.17
2.69
2.41
2.07
2.77
2.95
6.23
27

Attachment 5/001

2/14/03 2:14:48 PM

Facility = Omega 001
Chemical = Cyanide
Chronic averaging period = 4
WLAa = 110
WLAc = 110
Q.L. = 5
# samples/mo. = 2
# samples/wk. = 1

Summary of Statistics:

observations = 27
Expected Value = 344.763
Variance = 1589240
C.V. = 3.656567
97th percentile daily values = 2102.65
97th percentile 4 day average = 1616.55
97th percentile 30 day average= 777.698
< Q.L. = 2
Model used = delta lognormal

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 110
Average Weekly limit = 110
Average Monthly LImit = 95.9136160182705 rounded to 96

The data are:

30
90
120
170
299
205
48
14
59
5
0 < 5
10
19
9
89
70
48
198
75
341

170
329
2094
2614
1135
263
0 <5

Attachment 5/101

Omega Protein
Attachment 5/001

1/7/03 11:17:23 AM

Facility = Omega 001
Chemical = Chlorine
Chronic averaging period = 4
WLAa = 1400
WLAc = 800
Q.L. = 100
# samples/mo. = 30
# samples/wk. = 8

Summary of Statistics:

observations = 1
Expected Value = 1000
Variance = 360000
C.V. = 0.6
97th percentile daily values = 2433.41
97th percentile 4 day average = 1663.79
97th percentile 30 day average= 1206.05
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 1170.05982724258 rounded to 1200
Average Weekly limit = 697.946637760077
Average Monthly LImit = 579.906413372785 rounded to 580

The data are:

1000

9/27/04 8:28:28 AM

Facility = Omega Protein 001
Chemical = cadmium
Chronic averaging period = 4
WLAa = 4200
WLAc = 930
Q.L. = 5
# samples/mo. = 2
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 8
Variance = 23.04
C.V. = 0.6
97th percentile daily values = 19.4673
97th percentile 4 day average = 13.3103
97th percentile 30 day average= 9.64842
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

8

9/27/04 8:31:17 AM

Facility = Omega 001
Chemical = Hydrogen Sulfide
Chronic averaging period = 4
WLAa =
WLAc = 210
Q.L. = 1
# samples/mo. = 2
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 2.5
Variance = 2.25
C.V. = 0.6
97th percentile daily values = 6.08354
97th percentile 4 day average = 4.15947
97th percentile 30 day average= 3.01513
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

2.5

9/27/04 8:32:57 AM

Facility = Omega 001
Chemical = Manganese
Chronic averaging period = 4
WLAa =
WLAc = 5350
Q.L. = 10
# samples/mo. = 2
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 89
Variance = 2851.56
C.V. = 0.6
97th percentile daily values = 216.574
97th percentile 4 day average = 148.077
97th percentile 30 day average= 107.338
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

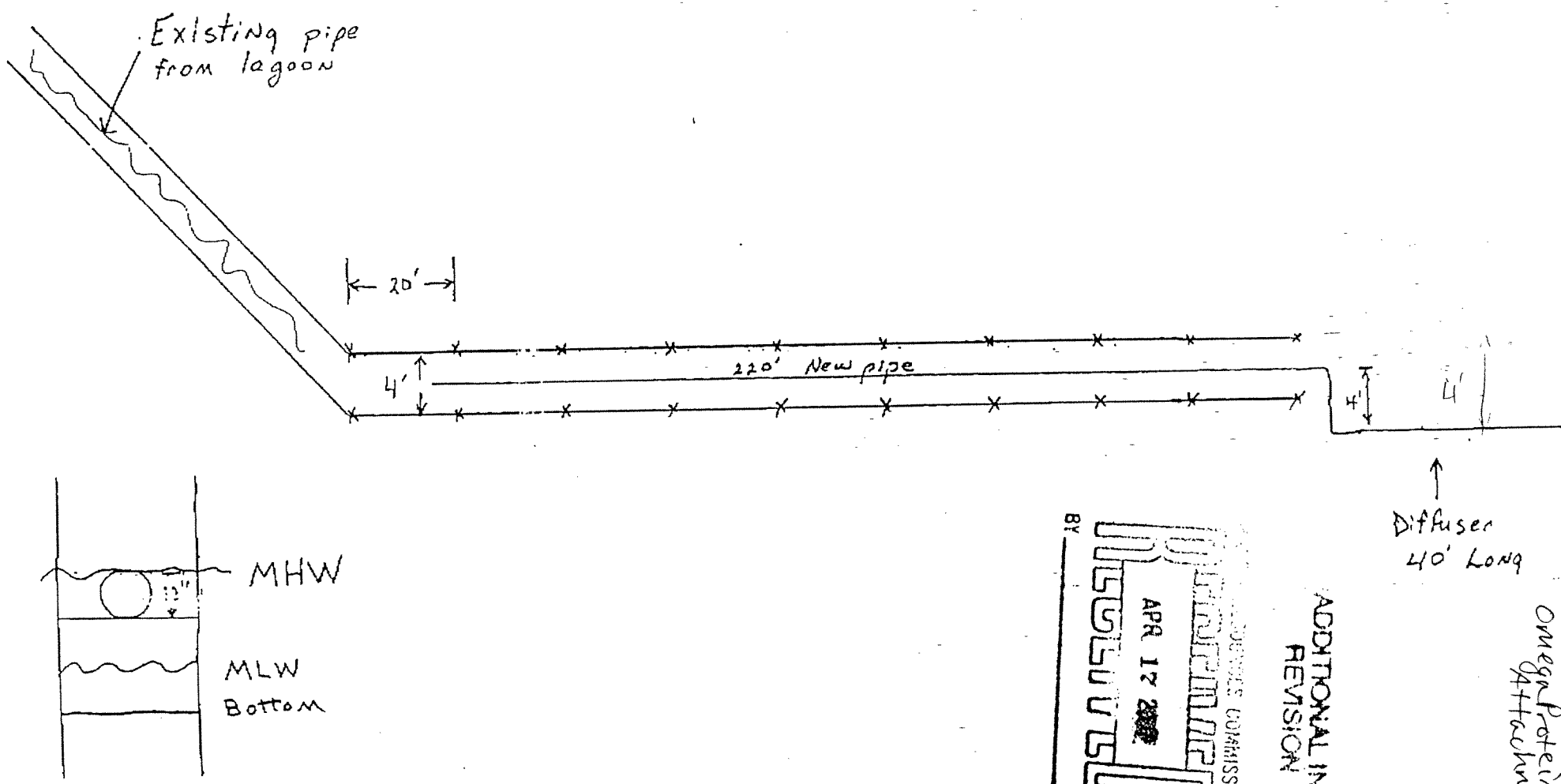
No Limit is required for this material

The data are:

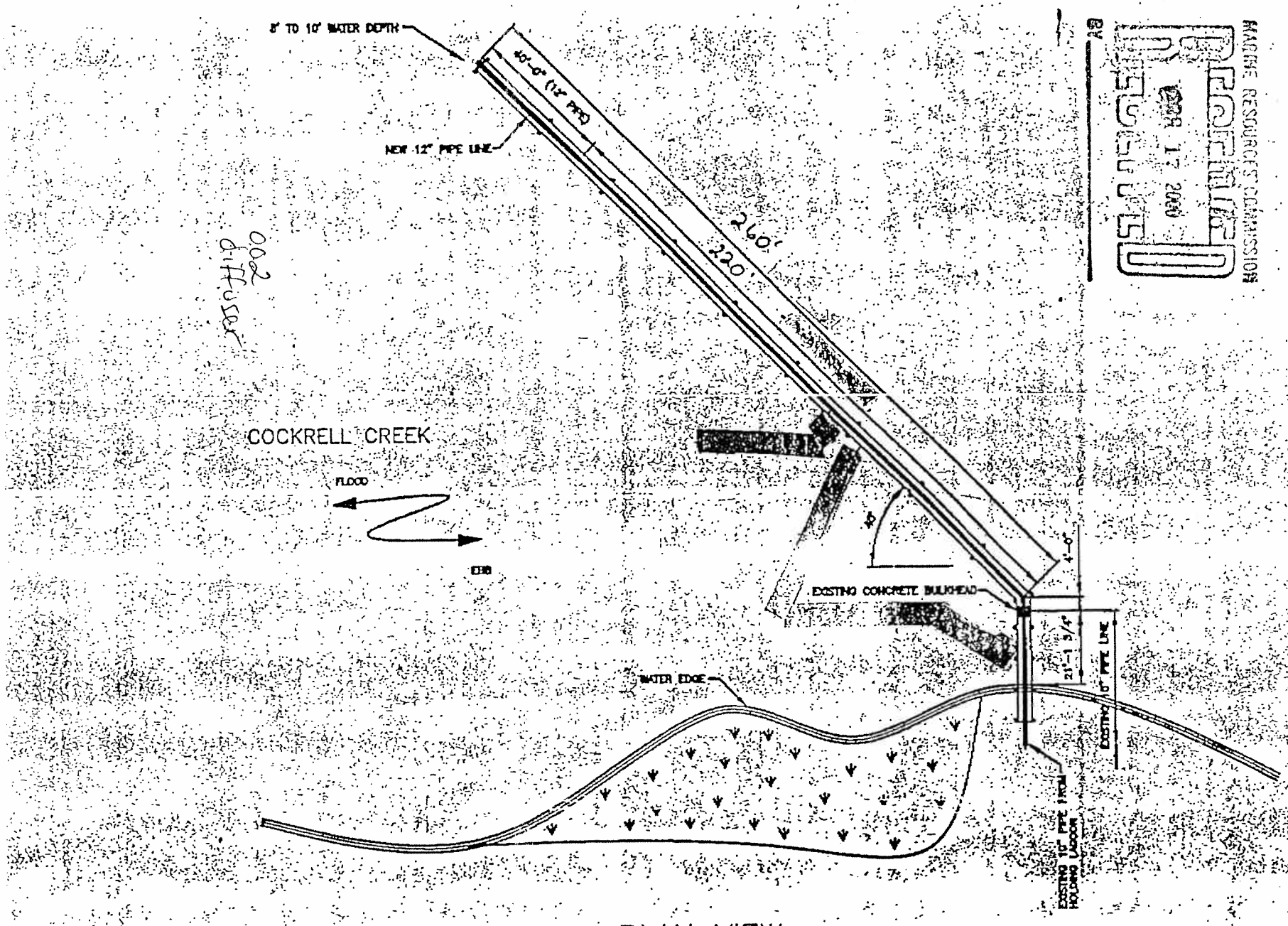
89

ATTACHMENT 9

Cross Section View 002 Diffuser
Omega Protein
Shown without walkway
Not to scale



04/17/00 07:46
OMEGA PROTEIN
ADDITIONAL INFO REVISION
APR 17 2000
BY
Omega Protein Attachment 9



PLAN VIEW

SCALE 1"=40'-0"

Attachment #9

Jon VanSoestbergen@RCHMD@DEQ

c:
rom: Maynard D. Phillips@WPS@DEQ
ubject:
ate: Monday, September 28, 1998 8:45:07 EDT
ttach:
ertify: N
orwarded by: Jon VanSoestbergen@RCHMD@DEQ

---

orwarded to: Denise M. Mosca@KLMCK@DEQ
cc: Maynard D. Phillips@WPS@DEQ
orwarded date: Monday, September 28, 1998 10:23:12 EDT
omments by: Jon VanSoestbergen@RCHMD@DEQ
omments:

enise:

ollowing are Dale's comments regarding my 9/17/1998 memo and work on the apata wasteload allocation review and CORMIX analysis. If you include this -mail as part of the file I don't see any reason to rewrite my 9/17/1998 emo. Could you please make a copy of the 9/17/1998 memo and attachment (24 ages) and send it to me. I forgot to make a copy before I gave you the cakage when you were here last week.

o address Dale's comments/questions:

ale's explanation as to why the long diffuser is better should be adequate ocumentation regarding this issue.

he circular mixing zone I describe in my 9/17/1998 is as measured from the idpoint of the diffuser. CORMIX defines the origin of the coordinate (x-y-) plane as this point. S (the hydrodynamic centerline dilution) is then as easured from this origin. Therefore, I believe my definition of the mixing one as a circle measured around the diffuser midpoint is not incorrect. owever, describing the mixing zone as extending from the diffuser in any irection is also acceptable, and would have the effect only of extending the oundary slightly further out in the y-direction toward the middle of the tream, in theory resulting in a slightly larger mixing zone. Practically, hough, the difference between the two is of the order of 10 feet in the y-irection, which in the context of water quality monitoring and model ccuracy is negligible. In any event, the final defined mixing zone will be function of the final diffuser design submitted by Zapata. You should rovide this final design to me for analysis when it is received, unless some ort of mixing zone analysis is provided as documentation with the design.

will consider this e-mail as finalizing my 9/17/1998 memorandum and my work n this project. If you have any questions or need additional information, lease don't hesitate to call me.

on.

Attachment 9

o: Maynard D. Phillips@WPS@DEQ
c: Denise M. Mosca@KLMCK@DEQ
Curtis J. Linderman@RCHMD@DEQ

cc:
rom: Jon VanSoestbergen@RCHMD@DEQ
ubject: Zapata CORMIX analysis
ate: Thursday, September 17, 1998 9:34:00 EDT
ttach:
ertify: N
orwarded by:

---

ale:

am sending you the results of the CORMIX analysis I did for Zapata today. have not yet sent the information to Denise pending your review. Please et me know if you have any concerns with the analysis. I will wait to send he package to Denise until I hear from you one way or the other.

n summary, I ended up analyzing two different diffuser designs. The first approximates the design that was included in the package provided by Denise, and the second is a design of my own. The first ("short diffuser") results in a dilution ratio of 50:1. The second ("long diffuser") results in a dilution ration of 100:1. The mixing zone for the first is 25 feet, for the second, 20 feet. The ratio used by the permit writer will depend on the final diffuser design selected by the permittee.

As we discussed yesterday, I analyzed each design 1 hr before slack tide, at slack tide, and 1 hr after slack tide. Then I averaged the most conservative two results for each diffuser to obtain the final dilution ratio. This results in a dilution ratio based on a 1-hr average flow under critical conditions, which best reflects the way the acute standard is written. My recommendation is that the selected dilution ratio be used for both acute and chronic WLA determination.

Thanks for your help on this.

Jon.

Attachment 9

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY
Piedmont Water Regional Office

4949-A Cox Road, Glen Allen, VA 23060-6296 804/527-5020

SUBJECT: Cockrell's Creek Wasteload Allocations and Dilution Analysis
Zapata Protein (USA), Inc. Discharge (VA0003867)

TO: Denise Mosca

FROM: Jon van Soestbergen

DATE: September 17, 1998

COPIES: Dale Phillips, Curt Linderman

Per your request, I have reviewed the BOD wasteload allocations for the subject discharge to Cockrell's Creek. I also constructed a CORMIX model to analyze dilution ratios at the discharge associated with different diffuser designs. Two discharges (Ampro Fisheries and Zapata Protein) previously competed for the available assimilative capacity of the receiving stream, and previous models and analyses simulated both discharges to allocate wasteloads. However, the Ampro discharge was terminated. The purpose of this review was to determine if the BOD wasteload previously allocated to Ampro was available in part, or in total, to Zapata. The CORMIX analysis of a diffuser for outfall number 002 was performed to determine the dilution ratio for establishing wasteload allocations for conservative parameters.

BOD Wasteload Allocation Review

In September 1976, the Virginia Institute of Marine Sciences (VIMS) completed a mathematical water quality study of the Great Wicomico River and Cockrell's Creek. The model determined that an average of 5,000 lbs/day of BOD_5 would maintain water quality standards in the upper layer of the creek, which was the only layer used to determine the pollutant loading to the creek. Of this total, 4,900 lbs/day would be allocated to Ampro (then known as Standard Products) and Zapata.

My review of the available information leads me to conclude that the total allowable loading to Cockrell's Creek is 5,000 lbs/day of BOD_5, regardless of the point of discharge. Therefore, with the termination of the Ampro discharge, the entire 4,900 lbs/day previously allocated to the two discharges is available for allocation to Zapata.

CORMIX Diffuser Analysis

Zapata currently proposes to discharge through a total of four outfalls to Cockrell's Creek, but only outfall 002 was considered for a diffuser. The proposed discharge flow from this outfall is 0.300 mgd. The complex design of the diffuser included with the permit fact sheet can not be accurately analyzed using the CORMIX model. However, by simplifying the design somewhat, the expected dilution the diffuser will provide could be estimated. In addition to analyzing the design of this diffuser, a modified design was analyzed which affords better dilution in the near field.

Two diffuser designs were analyzed; one which closely approximates the design included in the fact sheet ("short diffuser") and one which affords better dilution ("long diffuser"). For each case, dilution was analyzed relative to one-hour averages under critical conditions, which most closely approximates the way the acute standards are written.

Attachment 9.

"Short Diffuser" - This diffuser design consists of a 12-inch diameter pipe extending 35 feet perpendicular to the east bank of the creek into water of approximately 5 foot depth. The diffuser line (the part with holes) starts 15 feet from the shore and extends to the end of the diffuser (20 feet). There are 13 holes of 4 inch diameter in the top of the pipe, and the end is blocked such that all flow is directed upward through the diffuser ports (holes). A rough sketch of the diffuser is attached.

This "short diffuser" design results in a dilution of 50:1 at the boundary of the mixing zone. This dilution ratio should be used to determine both acute and chronic WLAs for the discharge. The associated mixing zone boundary is 7.62 meters (25 feet) measured in a circle from the diffuser midpoint.

"Long Diffuser" - This diffuser consists of a 12-inch diameter pipe extending 60 feet perpendicular to the east bank of the creek, also into water of approximately 5 foot depth. The diffuser line starts 20 feet from shore and extends to the end of the diffuser (40 feet). There are 8 holes of 4 inch diameter, located such that flow will be directed in a 45 degree angle toward the water surface in the downstream direction during ebb tide. Again, the end of the pipe is closed so that all flow discharges through the diffuser ports. A rough sketch of the diffuser is attached.

This "long diffuser" design results in a dilution of 100:1 at the boundary of the mixing zone. This dilution should be used for both the acute and chronic WLAs for the discharge. The associated mixing zone boundary is 6.10 meters (20 feet) measured in a circle from the diffuser midpoint.

Conclusions and Recommendation

The BOD_5 wasteload available to Zapata Protein is 4,900 lbs/day.

If the "short diffuser" is specified, a dilution ratio of 50:1 should be used. For the "long diffuser", the dilution ratio can be increased to 100:1. This shows that different diffuser designs can result in dramatically different dilution ratios, and thus need to be taken into consideration when establishing wasteload allocations and permit limits. As such, it is important that the diffuser design be specified for a wasteload allocation based on a given dilution ratio. It is recommended that the alternate diffuser designs be presented to the permittee so that the advantages of each design can be considered. The designs presented should serve only as preliminary designs. The sketches provided herewith should in no way be construed as final diffuser designs. Alternate designs not yet considered are also possible, and can be submitted by the permittee for subsequent analysis using CORMIX.

Pertinent documentation for the CORMIX analysis is included herewith. Should you have any questions or need additional information, please do not hesitate to contact me.

Attachment:

Notes and Model Runs - Zapata Cormix Diffuser Analysis - Cockrell's Creek, 09/16/1998, 24 pages

ZAPATA CORMIX DIFFUSER ANALYSIS - COCKRELL'S CREEK 9.16.98

VA DEQ - PRO J. VAN SOESTBERGEN

MODEL RUN SUMMARIES.

6 SEPARATE SCENARIOS WERE RUN TO OBTAIN AVERAGE DILUTION RATIOS RELATIVE TO THE ACUTE STANDARD FOR TWO DIFFERENT DIFFUSER DESIGNS. THREE SCENARIOS WERE NECESSARY FOR EACH DESIGN; AFTER-SLACK (FLOW UP THE CREEK), SLACK (NO AMBIENT FLOW), AND BEFORE-SLACK (FLOW DOWN THE CREEK).

TWO DIFFUSER DESIGNS WERE SIMULATED; SHORT DIFFUSER AND LONG DIFFUSER

SHORT DIFFUSER MOST CLOSELY REPRESENTS THE PROPOSED DIFFUSER DESIGN SUBMITTED BY THE PERMITTEE. LONG DIFFUSER IS A PRO-DESIGNED ALTERNATIVE THAT RESULTS IN BETTER DILUTION IN THE NEAR-FIELD UNDER EBB OR FLOW-TIDE CONDITIONS.

THE FILES ARE AS FOLLOWS

ZAPATA 1 : AFTER-SLACK ; SHORT DIFFUSER

ZAPATA 2 : SLACK TIDE

ZAPATA 3 : BEFORE-SLACK

ZAPATA 4 : AFTER-SLACK ; LONG DIFFUSER

ZAPATA 5 : SLACK TIDE

ZAPATA 6 : BEFORE SLACK.

ALL SCENARIOS WERE RUN USING CORMIX2 ; i.e. A MULTIPORT SUBMERGED DIFFUSER.

DESIGN SKETCHES OF THE TWO DIFFUSERS ARE ATTACHED.

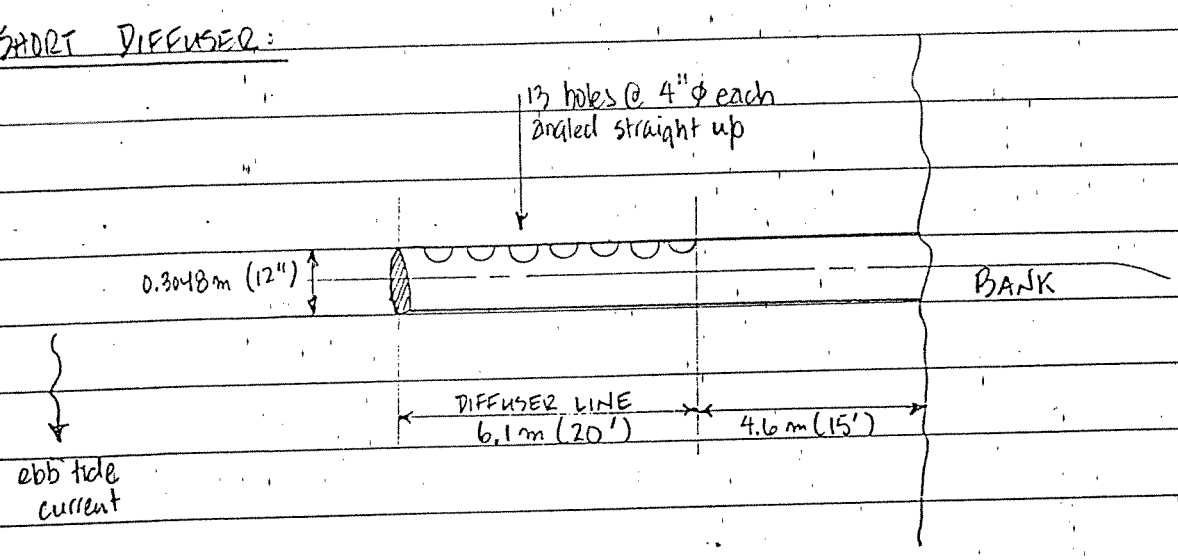
ZAPATA CORMIX DIFFUSER ANALYSIS 9-16-98

AMBIENT DATA

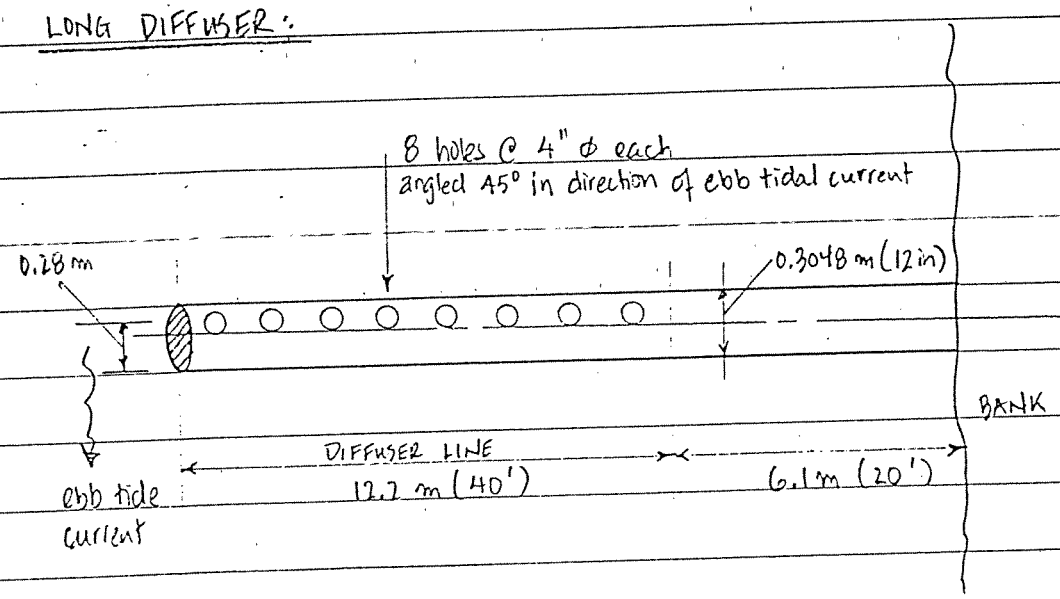
CHANNEL TYPE :	BOUNDED
WIDTH OF CHANNEL:	503 m
CHANNEL APPEARANCE:	FAIRLY STRAIGHT & UNIFORM
AVERAGE DEPTH:	1.524 m
ACTUAL DEPTH @ DISCH:	1.524 m
AMBIENT FLOW FIELD:	TIDAL REVERSING
PERIOD OF REVERSAL:	12.4 hr SEMI-DIURNAL
FLOW CONDITION :	① AFTER SLACK ; ② SLACK ; ③ BEFORE SLACK
TIME :	1.0 HR
INSTANTANEOUS AMBIENT VEL:	0.15 m/s
MAXIMUM AMBIENT VELOCITY:	0.30 m/s
MANNING'S "n" :	0.07
DENSITY CONDITIONS:	UNIFORM
FRESH OR NON-FRESH:	NON FRESH
AMBIENT DENSITY:	999.7 kg/m^3
WIND SPEED:	2 m/s

ZAPATA CORMIX DIFFUSER ANALYSIS - COCKRELL'S CREEK 9.16.98

SHORT DIFFUSER:



LONG DIFFUSER:



Attachment 9 17/24

:0 = .1000E+04 CUNITS= PPB
ITOX = 0
ISTD = 0
:EGMZ = 0
:INT = 6000.00 XMAX = 6000.00

Y-Z COORDINATE SYSTEM:
ORIGIN is located at the bottom and the diffuser mid-point:
12.20 m from the LEFT bank/shore.
X-axis points downstream, Y-axis points to left, Z-axis points upward.
:TEP = 10 display intervals per module

:GIN MOD201: DIFFUSER DISCHARGE MODULE

)ue to complex near-field motions: EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

'rofile definitions:
BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
BH = top-hat half-width, in horizontal plane normal to trajectory
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)

X	Y	Z	S	C	BV	BH
.00	.00	.28	1.0	.100E+04	.00	6.10

ID OF MOD201: DIFFUSER DISCHARGE MODULE

:GIN MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

:n this laterally contracting zone the diffuser plume becomes VERTICALLY FULLY MIXED over the entire layer depth (HS = 1.52m).
Full mixing is achieved after a plume distance of about five layer depths from the diffuser.

'rofile definitions:
BV = layer depth (vertically mixed)
BH = top-hat half-width, in horizontal plane normal to trajectory
S = hydrodynamic average (bulk) dilution
C = average (bulk) concentration (includes reaction effects, if any)

X	Y	Z	S	C	BV	BH
.00	.00	.28	1.0	.100E+04	.00	6.10
.61	.00	.33	67.6	.148E+02	.15	6.09
1.22	.00	.38	94.5	.106E+02	.30	6.09
1.83	.00	.42	114.6	.873E+01	.46	6.09
2.44	.00	.47	131.1	.763E+01	.61	6.09
3.05	.00	.52	145.3	.688E+01	.76	6.08
3.66	.00	.57	157.9	.633E+01	.91	6.08
4.27	.00	.62	169.3	.591E+01	1.07	6.08
4.88	.00	.67	179.6	.557E+01	1.22	6.08
5.49	.00	.71	189.1	.529E+01	1.37	6.08
6.10	.00	.76	197.9	.505E+01	1.52	6.08

'umulative travel time = 40. sec

'D OF MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

GIN MOD251: DIFFUSER PLUME IN CO-FLOW

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hase 1: Vertically mixed, Phase 2: Re-stratified

---

hase 2: The flow has RESTRATIFIED at the beginning of this zone.

his flow region is INSIGNIFICANT in spatial extent and will be by-passed.

ID OF MOD251: DIFFUSER PLUME IN CO-FLOW

End of NEAR-FIELD REGION (NFR) **

GIN MOD241: BUOYANT AMBIENT SPREADING

Discharge is non-buoyant or weakly buoyant.
Therefore BUOYANT SPREADING REGIME is ABSENT.

ND OF MOD241: BUOYANT AMBIENT SPREADING

GIN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

Vertical diffusivity (initial value) = .935E-02 m^2/s
Horizontal diffusivity (initial value) = .117E-01 m^2/s

The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

Profile definitions:
BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
= or equal to layer depth, if fully mixed
BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
measured horizontally in Y-direction
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)

Plume Stage 1 (not bank attached):

X	Y	Z	S	C	BV	BH	ZU	ZL
6.12	.00	1.52	197.9	.505E+01	1.52	6.12	1.52	.00
51.64	.00	1.52	171.2	.584E+01	1.52	6.97	1.52	.00
97.17	.00	1.52	180.0	.555E+01	1.52	7.73	1.52	.00
142.71	.00	1.52	201.2	.497E+01	1.52	8.42	1.52	.00
188.24	.00	1.52	228.7	.437E+01	1.52	9.05	1.52	.00
210.07	.00	1.52	243.4	.412E+01	1.52	9.34	1.52	.00

Cumulative travel time = 1400. sec

CORMIX prediction has been TERMINATED at last prediction interval.
Limiting distance due to TIDAL REVERSAL has been reached.

ND OF MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

ORMIX2: Submerged Multiport Diffuser Discharges End of Prediction File
22222222222222222222222222222222222222222222222222222222222222222222222222

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```
RMIX2 PREDICTION FILE:
22222222222222222222222222222222222222222222222222222222222222222222222222222
                    CORNELL MIXING ZONE EXPERT SYSTEM
bsystem CORMIX2:                                          Subsystem-version:
ubmerged Multiport Diffuser Discharges     CORMIX v.3.20     September 1996
-----------------------------------------------------------------------------
-----------------------------------------------------------------------------
.SE DESCRIPTION
ite name/label:          ZAPATA^VA0003867
esign case:              SLACK^-^LONG^DIFFUSER
'ILE NAME:               cormix\sim\ZAPATA5 .cx2
'ime of Fortran run:     09/16/98--15:24:46

IVIRONMENT PARAMETERS (metric units)
ounded section
S     =     503.00  AS     =     766.57  QA     =        .00  ICHREG= 1
IA    =       1.52  HD     =       1.52
'idal Simulation at TIME =        .000 h
'ERIOD=     12.40 h UAmax =        .300 dUa/dt=        .150 (m/s)/h
JA    =       .000  F      =        .334 USTAR = .0000E+00
JW    =      2.000 UWSTAR= .2198E-02
Jniform density environment
STRCND=  U          RHOAM =  999.7000

:FFUSER DISCHARGE PARAMETERS (metric units)
)iffuser type:      DITYPE= unidirectional perpendicular
BANK  =  LEFT       DISTB =     12.20  YB1    =      6.10  YB2    =     18.30
LD    =     12.20  NOPEN =    8        SPAC   =      1.74
)0    =      .100  A0     =       .008 H0     =       .28
Nozzle/port arrangement:   unidirectional without fanning
GAMMA =     90.00  THETA =     45.00  SIGMA =        .00  BETA   =     90.00
J0    =      .208  Q0     =       .013        = .1310E-01
RHO0  =  996.3187  DRHO0 = .3381E+01  GP0    = .3317E-01
C0    = .1000E+04  CUNITS=  PPB
CPOLL =  1         KS     = .0000E+00  KD     = .0000E+00

LUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
q0    = .1074E-02  m0     = .2239E-03  j0     = .3561E-04  SIGNJ0=      1.0
Associated 2-d length scales (meters)
LQ=B  =      .005  lM     =       .21  lm     =  99999.00
Lmp   =  99999.00  lbp    =  99999.00  la     =  99999.00

LUX VARIABLES - ENTIRE DIFFUSER (metric units)
Q0    = .1310E-01  M0     = .2731E-02  J0     = .4345E-03
Associated 3-d length scales (meters)
LQ    =       .25  LM     =       .57  Lm     =  99999.00  Lb     =  99999.00
                                       Lmp    =  99999.00  Lbp    =  99999.00
Tidal:             Tu     =     .0864 h Lu     =      4.033 Lmin   =      .174

ON-DIMENSIONAL PARAMETERS
FR0   =     15.95  FRD0   =      3.62  R      =  99999.00
(slot)             (port/nozzle)

LOW CLASSIFICATION
22222222222222222222222222222222222222222
2  Flow class (CORMIX2)       =    MU1V   2
2  Applicable layer depth HS =      1.52  2
22222222222222222222222222222222222222222

IXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
```

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```
:0     = .1000E+04  CUNITS=  PPB
ITOX   =  0
ISTD   =  0
:EGMZ  =  0
:INT   =   6000.00  XMAX   =  6000.00

 Y-Z COORDINATE SYSTEM:
   ORIGIN is located at the bottom and the diffuser mid-point:
       12.20 m  from the LEFT  bank/shore.
 . X-axis points downstream, Y-axis points to left, Z-axis points upward.
:TEP = 10 display intervals per module
-----------------------------------------------------------------------------
-----------------------------------------------------------------------------
:GIN MOD101: DISCHARGE MODULE (SINGLE PORT AT DIFFUSER CENTER)

      X         Y         Z         S         C         BV        BH
     .00       .00       .28       1.0   .100E+04      .05       .05

ID OF MOD101: DISCHARGE MODULE (SINGLE PORT AT DIFFUSER CENTER)
-----------------------------------------------------------------------------
-----------------------------------------------------------------------------
:GIN CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION

Jet/plume transition motion in weak crossflow.

:one of flow establishment:              THETAE=     45.00  SIGMAE=       .00
 LE    =        .00  XE    =        .00  YE    =       .00  ZE    =       .28

Profile definitions:
  BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
  BH = before merging: Gaussian 1/e (37%) half-width in horizontal plane
                       normal to trajectory
       after merging:  top-hat half-width in horizontal plane
                       parallel to diffuser line
  S  = hydrodynamic centerline dilution
  C  = centerline concentration (includes reaction effects, if any)

      X         Y         Z         S         C         BV        BH
 Individual jet/plumes before merging:
     .00       .00       .28       1.0   .100E+04      .05       .05
     .08       .00       .37       1.1   .900E+03      .06       .06
     .15       .00       .46       1.4   .703E+03      .08       .08
     .21       .00       .57       1.8   .566E+03      .09       .09
     .26       .00       .67       2.2   .465E+03      .10       .10
     .31       .00       .78       2.6   .390E+03      .11       .11
     .35       .00       .89       3.0   .331E+03      .12       .12
     .39       .00      1.01       3.5   .286E+03      .14       .14
     .42       .00      1.12       4.0   .249E+03      .15       .15
     .45       .00      1.24       4.6   .220E+03      .16       .16
     .48       .00      1.35       5.1   .195E+03      .17       .17
:umulative travel time =            6. sec
 Merging of individual jet/plumes not found in this module, but interaction
   will occur in following module.  Overall jet/plume interaction dimensions:
     .48       .00      1.35       5.1   .195E+03      .17      6.15

ID OF CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION
-----------------------------------------------------------------------------
-----------------------------------------------------------------------------
:GIN MOD232: LAYER BOUNDARY IMPINGEMENT/UPSTREAM SPREADING
```

```
Vertical angle of layer/boundary impingement     =        77.35 deg
Horizontal angle of layer/boundary impingement   =          .00 deg


Discharge into STAGNANT AMBIENT environment:
    STEADY-STATE MIXING CONDITION IS NOT POSSIBLE in this zone,
    even though some ADDITIONAL DILUTION MAY OCCUR!
  Also, all far-field processes will be UNSTEADY.
SIMULATION STOPS because of stagnant ambient conditions.

ND OF MOD232: LAYER BOUNDARY IMPINGEMENT/UPSTREAM SPREADING
-----------------------------------------------------------------------------
 End of NEAR-FIELD REGION (NFR) **

SIMULATION STOPS because of STAGNANT AMBIENT conditions.
  All far-field processes will be UNSTEADY.
-----------------------------------------------------------------------------
DRMIX2: Submerged Multiport Diffuser Discharges        End of Prediction File
222222222222222222222222222222222222222222222222222222222222222222222222222
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```
RMIX2 PREDICTION FILE:
2222222222222222222222222222222222222222222222222222222222222222222222222222
                    CORNELL MIXING ZONE EXPERT SYSTEM
                                                          Subsystem version:
bsystem CORMIX2:
ubmerged Multiport Diffuser Discharges    CORMIX v.3.20     September 1996
-----------------------------------------------------------------------------
-----------------------------------------------------------------------------
SE DESCRIPTION
ite name/label:          ZAPATA^VA0003867
esign case:              BEFORE^SLACK^-^LONG^DIFFUSER
ILE NAME:                cormix\sim\ZAPATA6 .cx2
ime of Fortran run:      09/16/98--15:26:42

VIRONMENT PARAMETERS (metric units)
ounded section
S     =    503.00  AS     =    766.57  QA     =    114.99  ICHREG= 1
A     =      1.52  HD     =      1.52
idal Simulation at TIME =     -1.000 h
ERIOD=     12.40 h UAmax =       .300 dUa/dt=       .150 (m/s)/h
A     =      .150  F      =      .334 USTAR = .3065E-01
W     =     2.000 UWSTAR= .2198E-02
niform density environment
TRCND=  U          RHOAM =  999.7000

IFFUSER DISCHARGE PARAMETERS (metric units)
iffuser type:      DITYPE= unidirectional perpendicular
ANK   =  LEFT      DISTB =     12.20  YB1    =      6.10  YB2    =     18.30
D     =     12.20  NOPEN =    8       SPAC   =      1.74
0     =      .100  A0     =      .008 H0     =       .28
ozzle/port arrangement:   unidirectional without fanning
AMMA =      90.00  THETA =     45.00  SIGMA =        .00  BETA   =     90.00
0     =      .208  Q0     =      .013        = .1310E-01
HO0   =  996.3187  DRHO0 = .3381E+01  GP0    = .3317E-01
0     = .1000E+04  CUNITS=  PPB
POLL =  1          KS     = .0000E+00  KD     = .0000E+00

UX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
0     = .1074E-02  m0     = .2239E-03  j0     = .3561E-04  SIGNJ0=      1.0
ssociated 2-d length scales (meters)
Q=B   =      .005  lM     =       .21  lm     =       .01
mp    =  99999.00  lbp    =  99999.00  la     =  99999.00

UX VARIABLES - ENTIRE DIFFUSER (metric units)
0     = .1310E-01  M0     = .2731E-02  J0     = .4345E-03
ssociated 3-d length scales (meters)
Q     =       .25  LM     =       .57  Lm     =       .35  Lb     =       .13
                                       Lmp    =  99999.00  Lbp    =  99999.00
idal:              Tu     =     .0864 h Lu     =     4.033  Lmin   =      .174

ON-DIMENSIONAL PARAMETERS
R0    =     15.95  FRD0   =      3.62  R      =      1.38
(slot)             (port/nozzle)

LOW CLASSIFICATION
2222222222222222222222222222222222222222
2  Flow class (CORMIX2)        =    MU2    2
2  Applicable layer depth HS =      1.52  2
2222222222222222222222222222222222222222

IXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
```

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```
C0     = .1000E+04   CUNITS=  PPB
NTOX   =  0
NSTD   =  0
REGMZ  =  0
XINT   =   6000.00   XMAX   =   6000.00

-Y-Z COORDINATE SYSTEM:
   ORIGIN is located at the bottom and the diffuser mid-point:
        12.20 m  from the LEFT  bank/shore.
   X-axis points downstream, Y-axis points to left, Z-axis points upward.
STEP = 10 display intervals per module
-----------------------------------------------------------------------------
-----------------------------------------------------------------------------
EGIN MOD201: DIFFUSER DISCHARGE MODULE

Due to complex near-field motions:  EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

Profile definitions:
  BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
  BH = top-hat half-width, in horizontal plane normal to trajectory
  S  = hydrodynamic centerline dilution
  C  = centerline concentration (includes reaction effects, if any)

     X        Y        Z        S        C        BV       BH
    .00      .00      .28      1.0  .100E+04     .00     6.10

ND OF MOD201: DIFFUSER DISCHARGE MODULE
-----------------------------------------------------------------------------
-----------------------------------------------------------------------------
EGIN MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

In this laterally contracting zone the diffuser plume becomes VERTICALLY FULLY
 MIXED over the entire layer depth (HS =    1.52m).
  Full mixing is achieved after a plume distance of about five
  layer depths from the diffuser.

Profile definitions:
  BV = layer depth (vertically mixed)
  BH = top-hat half-width, in horizontal plane normal to trajectory
  S  = hydrodynamic average (bulk) dilution
  C  = average (bulk) concentration (includes reaction effects, if any)

     X        Y        Z        S        C        BV       BH
    .00      .00      .28      1.0  .100E+04     .00     6.10
    .61      .00      .33     68.1  .147E+02     .15     6.09
   1.22      .00      .38     95.8  .104E+02     .30     6.09
   1.83      .00      .42    116.9  .855E+01     .46     6.09
   2.44      .00      .47    134.7  .742E+01     .61     6.09
   3.05      .00      .52    150.3  .665E+01     .76     6.08
   3.66      .00      .57    164.3  .609E+01     .91     6.08
   4.27      .00      .62    177.2  .564E+01    1.07     6.08
   4.88      .00      .67    189.1  .529E+01    1.22     6.08
   5.49      .00      .71    200.3  .499E+01    1.37     6.08
   6.10      .00      .76    210.8  .474E+01    1.52     6.08
Cumulative travel time =          40. sec

ND OF MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER
-----------------------------------------------------------------------------
-----------------------------------------------------------------------------
EGIN MOD251: DIFFUSER PLUME IN CO-FLOW
```

Phase 1: Vertically mixed, Phase 2: Re-stratified

Phase 2: The flow has RESTRATIFIED at the beginning of this zone.

This flow region is INSIGNIFICANT in spatial extent and will be by-passed.

ND OF MOD251: DIFFUSER PLUME IN CO-FLOW

---

* End of NEAR-FIELD REGION (NFR) **

EGIN MOD241: BUOYANT AMBIENT SPREADING

Discharge is non-buoyant or weakly buoyant.
Therefore BUOYANT SPREADING REGIME is ABSENT.

ND OF MOD241: BUOYANT AMBIENT SPREADING

EGIN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

Vertical diffusivity (initial value) = .935E-02 m^2/s
Horizontal diffusivity (initial value) = .117E-01 m^2/s

The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

Profile definitions:
BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
= or equal to layer depth, if fully mixed
BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
measured horizontally in Y-direction
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)

Plume Stage 1 (not bank attached):

X	Y	Z	S	C	BV	BH	ZU	ZL
6.10	.00	1.52	210.8	.474E+01	1.52	6.12	1.52	.00
51.64	.00	1.52	227.8	.439E+01	1.52	6.97	1.52	.00
97.17	.00	1.52	249.6	.401E+01	1.52	7.73	1.52	.00
142.71	.00	1.52	273.5	.366E+01	1.52	8.42	1.52	.00
188.24	.00	1.52	297.7	.336E+01	1.52	9.05	1.52	.00
233.78	.00	1.52	321.4	.311E+01	1.52	9.65	1.52	.00
238.07	.00	1.52	323.5	.309E+01	1.52	9.70	1.52	.00

Cumulative travel time = 1587. sec

CORMIX prediction has been TERMINATED at last prediction interval.
Limiting distance due to TIDAL REVERSAL has been reached.

ND OF MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

ORMIX2: Submerged Multiport Diffuser Discharges End of Prediction File
2222222222222222222222222222222222222222222222222222222222222222222222222

Table VI

EVALUATION OF EFFLUENT CHARACTERIZATION DATA
Receiving Stream: Cockrell's Creek
Hardness: NA (Saltwater Limits apply)
Flow: 0.25 MGD

PARAMETER	EFFLUENT CONCEN-TRATION ug/1	VIRGINIA ACUTE CRITERIA SALT-WATER ug/1	VIRGINIA CHRONIC CRITERIA SALTWATER Ug/1	Multiplier of 100 determined by JvS with Cormix model PROJECTED IN STREAM CONCENTRATION AVG FLOW Acute (WLA_a)	Chronic (WLA_c)	COMMENTS Data from 2C application/Attachment D evaluated and all units ug/l, unless otherwise specified *Measured as Dissolved species
						Acute (WLA_a) and Chronic (WLA_c) are calculated as follows: 26x acute and chronic standards for estuarine, per 93-015) ug/l
Antimony	<5	4300 (Human Health standard)			430000 Human Health WLA	Value is below detection
Aldrin	<0.5,<0.05	1.3	0.0014HH	130	0.14HH	All data below QL of 0.5
Ammonia, mg/l	48.3,45.4,48.2,53.2,48.5,45.9,25.2,13.4,11.8,35.3,29.4,19.6,16.5,8.4,8.4,6.44,14	1.5	0.22	150	22	Limits determined: 41-avg mo. limit, 51 max daily limit. These exceed limit determined in previous permit, revert to old limits: 38.0 mo. avg., 45 max daily limit.
Arsenic-trivalent, inorganic	<50	69*	36*	6900	3600	All data below lab QL of 50
Cadmium	<1	40*	8.8*	4000	880	All data below detection
Chlordane	<1, <0.20	0.009	0.004 0.022HH	9.0	0.4 2.2HH	Program indicates all data below QL, though <1 not less than DEQ required QL of 0.2. Retested 9/02 at 0.2 QL.
Chlorpyrifos (Dursban)	<0.1	0.011	0.0056	1.1	0.56	Value below detection
Chromium-hexavalent	<10	1100*	50*	110000	5000	Data below QL level

PARAMETER	EFFLUENT CONCEN-TRATION ug/1	VIRGINIA ACUTE CRITERIA SALT-WATER ug/1	VIRGINIA CHRONIC CRITERIA SALTWATER Ug/1	Multiplier of 100 determined by JvS with Cormix model PROJECTED IN STREAM CONCENTRATION AVG FLOW Acute (WLA_a)	 Chronic (WLA_c)	COMMENTS Data from 2C application/Attachment D evaluated and all units ug/l, unless otherwise specified *Measured as Dissolved species
Chromium-trivalent	No data required		No Saltwater value			Acute (WLA_a) and Chronic (WLA_c) are calculated as follows: 26x acute and chronic standards for estuarine, per 93-015) ug/l Limit not evaluated
Copper, Dissolved	8	9.3*	6.0*	930	600	No limit indicated after evaluation
Cyanide, Total	<10, <10, <10	1.0	1.0 220000HH	100	100 22,000, 000HH	No limit indicated after evaluation
DDD	<0.15		0.0084 Human Health Standard		0.84 human health WLA	Value is less than detection—however, specified QL is 0.1
DDE	<0.05		0.0059 Human Health Standard		0.59 human health WLA	Value is less than detection
DDT	<0.15, <0.1	0.13	0.001 0.0059HH	13	0.1 0.59HH	Value is less than detection—however, specified QL is 0.1. Retested 9/02 at 0.1 QL.
Demeton	<2		0.1		10	Value is less than detection
Dieldrin	<0.05, <0.05	0.71	0.0019 0.0014	71	0.19 0.14HH	Value is less than detection
Endosulfan	<0.15,<0.05	0.034	0.0087	34	0.88	Value is less than detection—however, specified QL is 0.1. Retested 9/02 at 0.1 QL.

PARAMETER	EFFLUENT CONCEN-TRATION ug/1	VIRGINIA ACUTE CRITERIA SALT-WATER ug/1	VIRGINIA CHRONIC CRITERIA SALTWATER Ug/1	Multiplier of 100 determined by JvS with Cormix model PROJECTED IN STREAM CONCENTRATION AVG FLOW		COMMENTS
				Acute (WLA_a)	Chronic (WLA_c)	Data from 2C application/Attachment D evaluated and all units ug/l, unless otherwise specified *Measured as Dissolved species
Endrin	<0.15, <0.10	0.037	0.0023 0.81HH	37	0.23 81HH	Acute (WLA_a) and Chronic (WLA_c) are calculated as follows: 26x acute and chronic standards for estuarine, per 93-015) ug/l Value is less than detection—however, specified QL is 0.1. Retested 9/02 at 0.1 QL.
Guthion	<20 mg/l		0.01		1	Value is less than detection
Heptachlor	<0.05, <0.05	0.053	0.0036 0.0021HH	5.3	0.36 0.21HH	Value is less than detection
Hydrogen Sulfide	<1 mg/ll		2.0		200	Value is less than detection
Iron	Total Iron believed absent		No Saltwater Value			Limit not evaluated
Kepone	<2 ug/l		0			Value is less than detection
Lead	<1	240	9.3	24000	940	Value is less than detection
Lindane (Hexa-chlorocyclohexane)	<0.04	0.16	0.63HH	16	63HH	Value is less than detection
Malathion	<2 ug/l		0.1		10	Value is less than detection
Manganese	8		50		5050	No limit indicated after evaluation
Mercury	<0.2	1.8 *	0.94 * 0.051HH	180	94 5.1HH	Value is less than detection
Methoxychlor	<0.4, 2 ug/l		0.03		3	Value is less than detection
Mirex	<0.1		0			Value is less than detection

PARAMETER	EFFLUENT CONCEN-TRATION ug/1	VIRGINIA ACUTE CRITERIA SALT-WATER ug/1	VIRGINIA CHRONIC CRITERIA SALTWATER Ug/1	Multiplier of 100 determined by JvS with Cormix model PROJECTED IN STREAM CONCENTRATION AVG FLOW		COMMENTS
				Acute (WLA_a)	Chronic (WLA_c)	Data from 2C application/Attachment D evaluated and all units ug/l, unless otherwise specified *Measured as Dissolved species
Nickel	<5	74*	8.2* 4600HH	7400	820 460000 HH	Acute (WLA_a) and Chronic (WLA_c) are calculated as follows: 26x acute and chronic standards for estuarine, per 93-015) ug/l Value less than detection
PCB-1016	<1 mg/l, <1 ug/l		0.03		3	Value less than detection however, specified QL is 1 ug/l. Retested 9/02 at 1 ug/l QL.
PCB-1221	<1 mg/l, <1 ug/l		0.03		3	Value less than detection however, specified QL is 1 ug/l Retested 9/02 at 1 ug/l QL.
PCB-1232	<1 mg/l, <1 ug/l		0.03		3	Value less than detection however, specified QL is 1 ug/l Retested 9/02 at 1 ug/l QL.
PCB-1242	<1 mg/l, <1 ug/l		0.03		3	Value less than detection however, specified QL is 1ug/l Retested 9/02 at 1 ug/l QL.
PCB-1248	<1 mg/l, <1 ug/l		0.03		3	Value less than detection however, specified QL is 1 ug/l Retested 9/02 at 1 ug/l QL.
PCB-1254	<1 mg/l, <1 ug/l		0.03		3	Value less than detection however, specified QL is 1 ug/l Retested 9/02 at 1 ug/l QL.
PCB-1260	<1 mg/l, <1 ug/l		0.03		3	Value less than detection however, specified QL is 1 ug/l Retested 9/02 at 1 ug/l QL.
Phenol	<10		4,600,000 Human Health Standard		460,000,000	Value less than detection
Phthalate Esters	believed absent		3.0			Limit not evaluated

PARAMETER	EFFLUENT CONCEN-TRATION ug/1	VIRGINIA ACUTE CRITERIA SALT-WATER ug/1	VIRGINIA CHRONIC CRITERIA SALTWATER Ug/1	Multiplier of 100 determined by JvS with Cormix model PROJECTED IN STREAM CONCENTRATION AVG FLOW		COMMENTS
				Acute (WLA_a)	Chronic (WLA_c)	Data from 2C application/Attachment D evaluated and all units ug/l, unless otherwise specified *Measured as Dissolved species
Selenium	<5	300*	71* 11000HH	30000	7100 1100000 HH	Acute (WLA_a) and Chronic (WLA_c) are calculated as follows: 26x acute and chronic standards for estuarine, per 93-015) ug/l Value is less than detection.
Silver	<1	2.0 *		200		Value is less thar
Toxaphene	<1, <1	0.21	0.0002 0.0075HH	21	0.02 0.75HH	Value less than detection
2-(2,4,5-Trichlorophenoxy) Propionic Acid (Silvex)	<0.002		50		5050	Value less than detection
Tributyltin	<0.5	0.38	0.001	38	0.1	Value less than detection
Zinc	<20	90*	81* 69000HH	9000	8100 6900000	Value is less than detection.
Base Neutral Extractables						
Acenapthene	<10		2700 Human Health Std		270000 Human Health WLA	Value is less than detection
Anthracene	<10		110000 Human Health Std		11,000,00 0 Human Health WLA	Value is less than detection
Benzo(a)anthracene	<10		0.49 Human Health Std		49 Human Health WLA	Value is less than detection

PARAMETER	EFFLUENT CONCEN-TRATION ug/1	VIRGINIA ACUTE CRITERIA SALT-WATER ug/1	VIRGINIA CHRONIC CRITERIA SALTWATER Ug/1	Multiplier of 100 determined by JvS with Cormix model PROJECTED IN STREAM CONCENTRATION AVG FLOW		COMMENTS
				Acute (WLA_a)	Chronic (WLA_c)	Data from 2C application/Attachment D evaluated and all units ug/l, unless otherwise specified *Measured as Dissolved species
						Acute (WLA_a) and Chronic (WLA_c) are calculated as follows: 26x acute and chronic standards for estuarine, per 93-015) ug/l
Benzo(b)fluoranthene	<10		0.49 Human Health Std		49 Human Health WLA	Value is less than detection
Benzo(k)fluoranthene	<10		0.49 Human Health Std		49 Human Health WLA	Value is less than detection
Benzo(a)pyrene	<10		0.49 Human Health Std		4.9 Human Health WLA	Value is less than detection
Butyl Benzyl phthalate	<10		5200 Human Health Std		520000 Human Health WLA	Value is less than detection
Chrysene	<10		0.49 Human Health Std		49 Human Health WLA	Value is less than detection
Dibenz(a,h)anthracene	<10		0.49 Human Health Std		49 Human Health WLA	Value is less than detection

PARAMETER	EFFLUENT CONCEN-TRATION ug/1	VIRGINIA ACUTE CRITERIA SALT-WATER ug/1	VIRGINIA CHRONIC CRITERIA SALTWATER Ug/1	Multiplier of 100 determined by JvS with Cormix model PROJECTED IN STREAM CONCENTRATION AVG FLOW		COMMENTS
				Acute (WLA_a)	Chronic (WLA_c)	Data from 2C application/Attachment D evaluated and all units ug/l, unless otherwise specified *Measured as Dissolved species
						Acute (WLA_a) and Chronic (WLA_c) are calculated as follows: 26x acute and chronic standards for estuarine, per 93-015) ug/l
Dibutyl phthalate	<10		12000 Human Health Std		1200000 Human Health WLA	Value is less than detection
1, 2 Dichlorobenzene	<10		17000 Human Health Std		1700000 Human Health WLA	Value is less than detection
1, 3 Dichlorobenzene	<10		2600 Human Health Std		260000 Human Health WLA	Value is less than detection
1, 4 Dichlorobenzene	<10		2600 Human Health Std		260000 Human Health WLA	Value is less than detection
Diethylphthalate	<10		120000 Human Health Std		12,000,000 Human Health WLA	Value is less than detection
Di-2-ethylhexlyphthalate	<10		59 Human Health Std		5900 Human Health WLA	Value is less than detection
2,4-Dinitrotoluene	<10		91 Human Health Std		9100 Human Health WLA	Value is less than detection

PARAMETER	EFFLUENT CONCEN-TRATION ug/1	VIRGINIA ACUTE CRITERIA SALT-WATER ug/1	VIRGINIA CHRONIC CRITERIA SALTWATER Ug/1	Multiplier of 100 determined by JvS with Cormix model PROJECTED IN STREAM CONCENTRATION AVG FLOW		COMMENTS
				Acute (WLA_a)	Chronic (WLA_c)	Data from 2C application/Attachment D evaluated and all units ug/l, unless otherwise specified *Measured as Dissolved species
						Acute (WLA_a) and Chronic (WLA_c) are calculated as follows: 26x acute and chronic standards for estuarine, per 93-015) ug/l
Fluoranthene	<10		370 Human Health Std		37000 Human Health WLA	Value is less than detection
Fluorene	<10		14000 Human Health Std		1400000 Human Health WLA	Value is less than detection
Ideno(1,2,3-cd)pyrene	<10		0.49 Human Health Std		49 Human Health WLA	Value is less than detection
Isophorone	<10		26000 Human Health Std.		2,600 ,000 Human Health WLA	Value is less than detection
Pyrene	<10		11000 Human Health Std		1100000 Human Health WLA	Value is less than detection
1,2,4-Trichlorobenzene	<10		940 Human Health Std		94000 Human Health WLA	Value is less than detection
Volatiles						

PARAMETER	EFFLUENT CONCEN-TRATION ug/1	VIRGINIA ACUTE CRITERIA SALT-WATER ug/1	VIRGINIA CHRONIC CRITERIA SALTWATER Ug/1	Multiplier of 100 determined by JvS with Cormix model PROJECTED IN STREAM CONCENTRATION AVG FLOW		COMMENTS
				Acute (WLA_a)	Chronic (WLA_c)	Data from 2C application/Attachment D evaluated and all units ug/l, unless otherwise specified *Measured as Dissolved species
						Acute (WLA_a) and Chronic (WLA_c) are calculated as follows: 26x acute and chronic standards for estuarine, per 93-015) ug/l
Benzene	<5		710 Human Health Std		71000 Human Health WLA	Value is less than detection
Bromoform	<5		3600 Human Health Std		360000 Human Health WLA	Value is less than detection
Carbon Tetrachloride	<5		44 Human Health Std		4400 Human Health Std	Value is less than detection
Chlorodibromomethane	<5		340 Human Health Std		34000 Human Health WLA	Value is less than detection
Chloroform	<5		29000 Human Health Std		2900000 Human Health WLA	Value is less than detection
Dichloromethane	<5		16000 Human Health Std		1,600,000 Human Health WLA	Value is less than detection
Dichlorobromomethane	<5		460 Human Health Std		46000 Human Health WLA	Value is less than detection

PARAMETER	EFFLUENT CONCEN-TRATION ug/1	VIRGINIA ACUTE CRITERIA SALT-WATER ug/1	VIRGINIA CHRONIC CRITERIA SALTWATER Ug/1	Multiplier of 100 determined by JvS with Cormix model PROJECTED IN STREAM CONCENTRATION AVG FLOW		COMMENTS
				Acute (WLA_a)	Chronic (WLA_c)	Data from 2C application/Attachment D evaluated and all units ug/l, unless otherwise specified *Measured as Dissolved species
						Acute (WLA_a) and Chronic (WLA_c) are calculated as follows: 26x acute and chronic standards for estuarine, per 93-015) ug/l
1, 2-Dichloroethane	<5		990 Human Health Std		99,000 Human Health WLA	Value is less than detection
1,1-Dichloroethylene	<5		17000 Human Health Std		1,700,000 Human Health WLA	Value is less than detection
Ethylbenzene	<5		29000 Human Health Std		2,900,000 Human Health WLA	Value is less than detection
Tetrachloroethylene	<5		89 Human Health Std		8900 Human Health Std	Value is less than detection
Vinyl Chloride	<10		61 Human Health Std		6100 Human Health Std	Value is less than detection
Acids Extractables						
2-Chlorophenol	<10		400 Human Health Std		40,000 Human Health WLA	Value is less than detection

PARAMETER	EFFLUENT CONCEN-TRATION ug/1	VIRGINIA ACUTE CRITERIA SALT-WATER ug/1	VIRGINIA CHRONIC CRITERIA SALTWATER Ug/1	Multiplier of 100 determined by JvS with Cormix model PROJECTED IN STREAM CONCENTRATION AVG FLOW		COMMENTS
				Acute (WLA_a)	Chronic (WLA_c)	Data from 2C application/Attachment D evaluated and all units ug/l, unless otherwise specified *Measured as Dissolved species
						Acute (WLA_a) and Chronic (WLA_c) are calculated as follows: 26x acute and chronic standards for estuarine, per 93-015) ug/l
2,4-Dichlorophenol	<10		790 Human Health Std		79,000 Human Health WLA	Value is less than detection
2,4-Dimethylphenol	<10		2300 Human Health Std		230,000 Human Health WLA	Value is less than detection
Pentachlorophenol	<50	13	7.9 82HH	1300	790 8200	Value is less than detection
2,4,6-Trichlorophenol	<10		65 Human Health Std		6500 Human Health WLA	Value is less than detection

SALTWATER AND TRANSITION ZONES
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Omega Protein 002
Receiving Stream: Cockrell's Creek

Permit No.: VA0003867

Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information

Mean Hardness (as CaCO3) =	NA	mg/l
90th % Temperature (Annual) =	28.41	(° C)
90th % Temperature (Winter) =		(° C)
90th % Maximum pH =	8.37	
10th % Maximum pH =		
Tier Designation (1 or 2) =	1	
Early Life Stages Present Y/N =	Y	
Tidal Zone =	1	(1 = saltwater, 2 = transition zone)
Mean Salinity =	17	(g/kg)

Mixing Information

Design Flow (MGD)	0.481
Acute WLA multiplier	100
Chronic WLA multiplier	100
Human health WLA multiplier	100

Effluent Information

Mean Hardness (as CaCO3) =	NA	mg/L
90 % Temperature (Annual) =	33	(° C)
90 % Temperature (Winter) =	18	(° C)
90 % Maximum pH =	7.88	SU
10 % Maximum pH =		SU
Discharge Flow =	0.481	MGD

Parameter	Background	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			**Most Limiting Allocations**		
(ug/l unless noted)	Conc.	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	**Acute**	**Chronic**	**HH**
Acenapthene	0	--	--	2.7E+03	--	--	2.7E+05	--	--	--	--	--	--	--	--	**2.7E+05**
Acrolein		--	--	7.8E+02	--	--	7.8E+04	--	--	--	--	--	--	--	--	**7.8E+04**
Acrylonitrile[C]		--	--	6.6E+00	--	--	6.6E+02	--	--	--	--	--	--	--	--	**6.6E+02**
Aldrin [C]	0	1.3E+00	--	1.4E-03	1.3E+02	--	1.4E-01	--	--	--	--	--	--	**1.3E+02**	--	**1.4E-01**
Ammonia-N (mg/l) - Annual	0	1.5E+00	2.2E-01	--	1.5E+02	2.2E+01	--	--	--	--	--	--	--	**1.5E+02**	**2.2E+01**	--
Ammonia-N (mg/l) - Winter	0	1.1E+01	1.6E+00	--	1.1E+03	1.6E+02	--	--	--	--	--	--	--	**1.1E+03**	**1.6E+02**	--
Anthracene	0	--	--	1.1E+05	--	--	1.1E+07	--	--	--	--	--	--	--	--	**1.1E+07**
Antimony	0	--	--	4.3E+03	--	--	4.3E+05	--	--	--	--	--	--	--	--	**4.3E+05**
Arsenic	0	6.9E+01	3.6E+01	--	6.9E+03	3.6E+03	--	--	--	--	--	--	--	**6.9E+03**	**3.6E+03**	--
Benzene [C]	0	--	--	7.1E+02	--	--	7.1E+04	--	--	--	--	--	--	--	--	**7.1E+04**
Benzidine[C]		--	--	5.4E-03	--	--	5.4E-01	--	--	--	--	--	--	--	--	**5.4E-01**
Benzo (a) anthracene [C]	0	--	--	4.9E-01	--	--	4.9E+01	--	--	--	--	--	--	--	--	**4.9E+01**
Benzo (b) fluoranthene [C]	0	--	--	4.9E-01	--	--	4.9E+01	--	--	--	--	--	--	--	--	**4.9E+01**
Benzo (k) fluoranthene [C]	0	--	--	4.9E-01	--	--	4.9E+01	--	--	--	--	--	--	--	--	**4.9E+01**
Benzo (a) pyrene [C]	0	--	--	4.9E-01	--	--	4.9E+01	--	--	--	--	--	--	--	--	**4.9E+01**
Bis2-Chloroethyl Ether		--	--	1.4E+01	--	--	1.4E+03	--	--	--	--	--	--	--	--	**1.4E+03**
Bis2-Chloroisopropyl Ether		--	--	1.7E+05	--	--	1.7E+07	--	--	--	--	--	--	--	--	**1.7E+07**
Bromoform [C]	0	--	--	3.6E+03	--	--	3.6E+05	--	--	--	--	--	--	--	--	**3.6E+05**
Butylbenzylphthalate	0	--	--	5.2E+03	--	--	5.2E+05	--	--	--	--	--	--	--	--	**5.2E+05**
Cadmium	0	4.0E+01	8.8E+00	--	4.0E+03	8.8E+02	--	--	--	--	--	--	--	**4.0E+03**	**8.8E+02**	--
Carbon Tetrachloride [C]	0	--	--	4.4E+01	--	--	4.4E+03	--	--	--	--	--	--	--	--	**4.4E+03**
Chlordane [C]	0	9.0E-02	4.0E-03	2.2E-02	9.0E+00	4.0E-01	2.2E+00	--	--	--	--	--	--	**9.0E+00**	**4.0E-01**	**2.2E+00**
TRC	0			--			--	--	--	--	--	--	--	--	--	--
Chlorine Prod. Oxidant	0	1.3E+01	7.5E+00	--	1.3E+03	7.5E+02	--	--	--	--	--	--	--	**1.3E+03**	**7.5E+02**	--

Parameter	Background	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			**Most Limiting Allocations**		
(ug/l unless noted)	Conc.	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	**Acute**	**Chronic**	**HH**
Chlorobenzene		--	--	2.1E+04	--	--	2.1E+06	--	--	--	--	--	--	**--**	**--**	**2.1E+06**
Chlorodibromomethane[C]	0	--	--	3.4E+02	--	--	3.4E+04	--	--	--	--	--	--	**--**	**--**	**3.4E+04**
Chloroform [C]	0	--	--	2.9E+04	--	--	2.9E+06	--	--	--	--	--	--	**--**	**--**	**2.9E+06**
2-Chloronaphthalene	0	--	--	4.3E+03	--	--	4.3E+05	--	--	--	--	--	--	**--**	**--**	**4.3E+05**
2-Chlorophenol	0	--	--	4.0E+02	--	--	4.0E+04	--	--	--	--	--	--	**--**	**--**	**4.0E+04**
Chlorpyrifos	0	1.1E-02	5.6E-03	--	1.1E+00	5.6E-01	--	--	--	--	--	--	--	**1.1E+00**	**5.6E-01**	**--**
Chromium III	0			--			--	--	--	--	--	--	--	**--**	**--**	**--**
Chromium VI	0	1.1E+03	5.0E+01	--	1.1E+05	5.0E+03	--	--	--	--	--	--	--	**1.1E+05**	**5.0E+03**	**--**
Chrysene [C]	0	--	--	4.9E-01	--	--	4.9E+01	--	--	--	--	--	--	**--**	**--**	**4.9E+01**
Copper	0	9.3E+00	6.0E+00	--	9.3E+02	6.0E+02	--	--	--	--	--	--	--	**9.3E+02**	**6.0E+02**	**--**
Cyanide	0	1.0E+00	1.0E+00	2.2E+05	1.0E+02	1.0E+02	2.2E+07	--	--	--	--	--	--	**1.0E+02**	**1.0E+02**	**2.2E+07**
DDD [C]	0	--	--	8.4E-03	--	--	8.4E-01	--	--	--	--	--	--	**--**	**--**	**8.4E-01**
DDE [C]	0	--	--	5.9E-03	--	--	5.9E-01	--	--	--	--	--	--	**--**	**--**	**5.9E-01**
DDT [C]	0	1.3E-01	1.0E-03	5.9E-03	1.3E+01	1.0E-01	5.9E-01	--	--	--	--	--	--	**1.3E+01**	**1.0E-01**	**5.9E-01**
Demeton	0	--	1.0E-01	--	--	1.0E+01	--	--	--	--	--	--	--	**--**	**1.0E+01**	**--**
Dibenz(a,h)anthracene [C]	0	--	--	4.9E-01	--	--	4.9E+01	--	--	--	--	--	--	**--**	**--**	**4.9E+01**
Dibutyl phthalate	0	--	--	1.2E+04	--	--	1.2E+06	--	--	--	--	--	--	**--**	**--**	**1.2E+06**
Dichloromethane (Methylene Chloride)[C]	0	--	--	1.6E+04	--	--	1.6E+06	--	--	--	--	--	--	**--**	**--**	**1.6E+06**
1,2-Dichlorobenzene	0	--	--	1.7E+04	--	--	1.7E+06	--	--	--	--	--	--	**--**	**--**	**1.7E+06**
1,3-Dichlorobenzene	0	--	--	2.6E+03	--	--	2.6E+05	--	--	--	--	--	--	**--**	**--**	**2.6E+05**
1,4-Dichlorobenzene	0	--	--	2.6E+03	--	--	2.6E+05	--	--	--	--	--	--	**--**	**--**	**2.6E+05**
3,3-Dichlorobenzidine[C]	0	--	--	7.7E-01	--	--	7.7E+01	--	--	--	--	--	--			
Dichlorobromomethane [C]	0	--	--	4.6E+02	--	--	4.6E+04	--	--	--	--	--	--	**--**	**--**	**4.6E+04**
1,2-Dichloroethane [C]	0	--	--	9.9E+02	--	--	9.9E+04	--	--	--	--	--	--	**--**	**--**	**9.9E+04**
1,1-Dichloroethylene	0	--	--	1.7E+04	--	--	1.7E+06	--	--	--	--	--	--	**--**	**--**	**1.7E+06**
1,2-trans-dichloroethylene	0	--	--	1.4E+05	--	--	1.4E+07	--	--	--	--	--	--	**--**	**--**	**1.4E+07**
2,4-Dichlorophenol	0	--	--	7.9E+02	--	--	7.9E+04	--	--	--	--	--	--	**--**	**--**	**7.9E+04**
1,2-Dichloropropane[C]	0	--	--	3.9E+02	--	--	3.9E+04	--	--	--	--	--	--	**--**	**--**	**3.9E+04**
1,3-Dichloropropene	0	--	--	1.7E+03	--	--	1.7E+05	--	--	--	--	--	--	**--**	**--**	**1.7E+05**
Dieldrin [C]	0	7.1E-01	1.9E-03	1.4E-03	7.1E+01	1.9E-01	1.4E-01	--	--	--	--	--	--	**7.1E+01**	**1.9E-01**	**1.4E-01**
Diethyl Phthalate	0	--	--	1.2E+05	--	--	1.2E+07	--	--	--	--	--	--	**--**	**--**	**1.2E+07**
Di-2-Ethylhexyl Phthalate [C]	0	--	--	5.9E+01	--	--	5.9E+03	--	--	--	--	--	--	**--**	**--**	**5.9E+03**
2,4-Dimethylphenol	0	--	--	2.3E+03	--	--	2.3E+05	--	--	--	--	--	--	**--**	**--**	**2.3E+05**
Dimethyl Phthalate	0	--	--	2.9E+06	--	--	2.9E+08	--	--	--	--	--	--	**--**	**--**	**2.9E+08**
Di-n-Butyl Phthalate	0	--	--	1.2E+04	--	--	1.2E+06	--	--	--	--	--	--	**--**	**--**	**1.2E+06**
2,4 Dinitrophenol	0	--	--	1.4E+04	--	--	1.4E+06	--	--	--	--	--	--	**--**	**--**	**1.4E+06**
2-Methyl-4,6-Dinitrophenol	0	--	--	7.65E+02	--	--	7.7E+04	--	--	--	--	--	--	**--**	**--**	**7.7E+04**
2,4-Dinitrotoluene [C]	0	--	--	9.1E+01	--	--	9.1E+03	--	--	--	--	--	--	**--**	**--**	**9.1E+03**
Dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin) (ppq)	0	--	--	1.2E-06	--	--	1.2E-04	--	--	--	--	--	--	**--**	**--**	**1.2E-04**
1,2-Diphenylhydrazine[C]	0	--	--	5.4E+00	--	--	5.4E+02	--	--	--	--	--	--	**--**	**--**	**5.4E+02**
Alpha-Endosulfan	0	3.4E-02	8.7E-03	2.4E+02	3.4E+00	8.7E-01	2.4E+04	--	--	--	--	--	--	**3.4E+00**	**8.7E-01**	**2.4E+04**

Parameter	Background	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			**Most Limiting Allocations**		
(ug/l unless noted)	Conc.	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	**Acute**	**Chronic**	**HH**
Beta-Endosulfan	0	3.4E-02	8.7E-03	2.4E+02	3.4E+00	8.7E-01	2.4E+04	--	--	--	--	--	--	**3.4E+00**	**8.7E-01**	**2.4E+04**
Endosulfan Sulfate	0	--	--	2.4E+02	--	--	2.4E+04	--	--	--	--	--	--	**--**	**--**	**2.4E+04**
Endrin	0	3.7E-02	2.3E-03	8.1E-01	3.7E+00	2.3E-01	8.1E+01	--	--	--	--	--	--	**3.7E+00**	**2.3E-01**	**8.1E+01**
Endrin Aldehyde	0	--	--	8.1E-01	--	--	8.1E+01	--	--	--	--	--	--	**--**	**--**	**8.1E+01**
Ethylbenzene	0	--	--	2.9E+04	--	--	2.9E+06	--	--	--	--	--	--	**--**	**--**	**2.9E+06**
Fluoranthene	0	--	--	3.7E+02	--	--	3.7E+04	--	--	--	--	--	--	**--**	**--**	**3.7E+04**
Fluorene	0	--	--	1.4E+04	--	--	1.4E+06	--	--	--	--	--	--	**--**	**--**	**1.4E+06**
Guthion	0	--	1.0E-02	--	--	1.0E+00	--	--	--	--	--	--	--	**--**	**1.0E+00**	**--**
Heptachlor [C]	0	5.3E-02	3.6E-03	2.1E-03	5.3E+00	3.6E-01	2.1E-01	--	--	--	--	--	--	**5.3E+00**	**3.6E-01**	**2.1E-01**
Heptachlor Epoxide[C]	0	5.3E-02	3.6E-03	1.1E-03	5.3E+00	3.6E-01	1.1E-01	--	--	--	--	--	--	**5.3E+00**	**3.6E-01**	**1.1E-01**
Hexachlorobenzene[C]	0	--	--	7.7E-03	--	--	7.7E-01	--	--	--	--	--	--	**--**	**--**	**7.7E-01**
Hexachlorobutadiene[C]	0	--	--	5.0E+02	--	--	5.0E+04	--	--	--	--	--	--	**--**	**--**	**5.0E+04**
Hexachlorocyclohexane Alpha-BHC[C]	0	--	--	1.3E-01	--	--	1.3E+01	--	--	--	--	--	--	**--**	**--**	**1.3E+01**
Hexachlorocyclohexane Beta-BHC[C]	0	--	--	4.6E-01	--	--	4.6E+01	--	--	--	--	--	--	**--**	**--**	**4.6E+01**
Hexachlorocyclohexane Gamma-BHC[C] (Lindane)	0	1.6E-01	--	6.3E-01	1.6E+01	--	6.3E+01	--	--	--	--	--	--	**1.6E+01**	**--**	**6.3E+01**
Hexachlorocyclopentadiene	0	--	--	1.7E+04	--	--	1.7E+06	--	--	--	--	--	--	**--**	**--**	**1.7E+06**
Hexachloroethane[C]	0	--	--	8.9E+01	--	--	8.9E+03	--	--	--	--	--	--	**--**	**--**	**8.9E+03**
Hydrogen Sulfide	0	--	2.0E+00		--	2.0E+02	--	--	--	--	--	--	--	**--**	**2.0E+02**	**--**
Indeno (1,2,3-cd) pyrene C	0	--	--	4.9E-01	--	--	4.9E+01	--	--	--	--	--	--	**--**	**--**	**4.9E+01**
Isophorone[C]	0	--	--	2.6E+04	--	--	2.6E+06	--	--	--	--	--	--	**--**	**--**	**2.6E+06**
Kepone	0	--	0.0E+00	--	--	0.0E+00	--	--	--	--	--	--	--	**--**	**0.0E+00**	**--**
Lead	0	2.4E+02	9.3E+00	--	2.4E+04	9.3E+02	--	--	--	--	--	--	--	**2.4E+04**	**9.3E+02**	**--**
Malathion	0	--	1.0E-01	--	--	1.0E+01	--	--	--	--	--	--	--	**--**	**1.0E+01**	**--**
Mercury	0	1.8E+00	9.4E-01	5.1E-02	1.8E+02	9.4E+01	5.1E+00	--	--	--	--	--	--	**1.8E+02**	**9.4E+01**	**5.1E+00**
Methyl Bromide	0	--	--	4.0E+03	--	--	4.0E+05	--	--	--	--	--	--	**--**	**--**	**4.0E+05**
Methoxychlor	0	--	3.0E-02	--	--	3.0E+00	--	--	--	--	--	--	--	**--**	**3.0E+00**	**--**
Mirex	0	--	0.0E+00	--	--	0.0E+00	--	--	--	--	--	--	--	**--**	**0.0E+00**	**--**
Monochlorobenzene	0	--	--	2.1E+04	--	--	2.1E+06	--	--	--	--	--	--	**--**	**--**	**2.1E+06**
Nickel	0	7.4E+01	8.2E+00	4.6E+03	7.4E+03	8.2E+02	4.6E+05	--	--	--	--	--	--	**7.4E+03**	**8.2E+02**	**4.6E+05**
Nitrobenzene	0	--	--	1.9E+03	--	--	1.9E+05	--	--	--	--	--	--	**--**	**--**	**1.9E+05**
N-Nitrosodimethylamine[C]	0	--	--	8.1E+01	--	--	8.1E+03	--	--	--	--	--	--	**--**	**--**	**8.1E+03**
N-Nitrosodiphenylamine[C]	0	--	--	1.6E+02	--	--	1.6E+04	--	--	--	--	--	--	**--**	**--**	**1.6E+04**
N-Nitrosodi-n-propylamine[C]	0	--	--	1.4E+01	--	--	1.4E+03	--	--	--	--	--	--	**--**	**--**	**1.4E+03**
Parathion	0			--			--	--	--	--	--	--	--	**--**	**--**	**--**
PCB-1016	0	--	3.0E-02	--	--	3.0E+00	--	--	--	--	--	--	--	**--**	**3.0E+00**	**--**
PCB-1221	0	--	3.0E-02	--	--	3.0E+00	--	--	--	--	--	--	--	**--**	**3.0E+00**	**--**
PCB-1232	0	--	3.0E-02	--	--	3.0E+00	--	--	--	--	--	--	--	**--**	**3.0E+00**	**--**
PCB-1242	0	--	3.0E-02	--	--	3.0E+00	--	--	--	--	--	--	--	**--**	**3.0E+00**	**--**
PCB-1248	0	--	3.0E-02	--	--	3.0E+00	--	--	--	--	--	--	--	**--**	**3.0E+00**	**--**
PCB-1254	0	--	3.0E-02	--	--	3.0E+00	--	--	--	--	--	--	--	**--**	**3.0E+00**	**--**

Parameter	Background	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			**Most Limiting Allocations**		
(ug/l unless noted)	Conc.	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	**Acute**	**Chronic**	**HH**
PCB-1260	0	--	3.0E-02	--	--	3.0E+00	--	--	--	--	--	--	--	**--**	**3.0E+00**	**--**
PCB Total[C]	0	--	--	1.7E-03	--	--	1.7E-01	--	--	--	--	--	--	**--**	**--**	**1.7E-01**
Pentachlorophenol [C]	0	1.3E+01	7.9E+00	8.2E+01	1.3E+03	7.9E+02	8.2E+03	--	--	--	--	--	--	**1.3E+03**	**7.9E+02**	**8.2E+03**
Phenol	0	--	--	4.6E+06	--	--	4.6E+08	--	--	--	--	--	--	**--**	**--**	**4.6E+08**
Phosphorus (Elemental)	0	--	0.1	--	--	1.0E+01	--	--	--	--	--	--	--	**--**	**1.0E+01**	**--**
Pyrene	0	--	--	1.1E+04	--	--	1.1E+06	--	--	--	--	--	--	**--**	**--**	**1.1E+06**
Radionuclides (pCi/l except Beta/Photon)	0	--	--	--	--	--	--	--	--	--	--	--	--	**--**	**--**	**--**
Gross Alpha Activity	0	--	--	1.5E+01	--	--	1.5E+03	--	--	--	--	--	--	**--**	**--**	**1.5E+03**
Beta and Photon Activity (mrem/yr)	0	--	--	4.0E+00	--	--	4.0E+02	--	--	--	--	--	--	**--**	**--**	**4.0E+02**
Strontium-90	0	--	--	8.0E+00	--	--	8.0E+02	--	--	--	--	--	--	**--**	**--**	**8.0E+02**
Tritium	0	--	--	2.0E+04	--	--	2.0E+06	--	--	--	--	--	--	**--**	**--**	**2.0E+06**
Selenium	0	3.0E+02	7.1E+01	1.1E+04	3.0E+04	7.1E+03	1.1E+06	--	--	--	--	--	--	**3.0E+04**	**7.1E+03**	**1.1E+06**
Silver	0	2.0E+00	--	--	2.0E+02	--	--	--	--	--	--	--	--	**2.0E+02**	**--**	**--**
1,1,2,2-Tetrachloroethane[C]	0	--	--	1.1E+02	--	--	1.1E+04	--	--	--	--	--	--	**--**	**--**	**1.1E+04**
Tetrachloroethylene[C]	0	--	--	8.9E+01	--	--	8.9E+03	--	--	--	--	--	--	**--**	**--**	**8.9E+03**
Thallium	0	--	--	6.3E+00	--	--	6.3E+02	--	--	--	--	--	--	**--**	**--**	**6.3E+02**
Toluene	0	--	--	2.0E+05	--	--	2.0E+07	--	--	--	--	--	--	**--**	**--**	**2.0E+07**
Toxaphene [C]	0	2.1E-01	2.0E-04	7.5E-03	2.1E+01	2.0E-02	7.5E-01	--	--	--	--	--	--	**2.1E+01**	**2.0E-02**	**7.5E-01**
Tributyltin	0	3.8E-01	1.0E-03	--	3.8E+01	1.0E-01	--	--	--	--	--	--	--	**3.8E+01**	**1.0E-01**	**--**
1,2,4-Trichlorobenzene	0	--	--	9.4E+02	--	--	9.4E+04	--	--	--	--	--	--	**--**	**--**	**9.4E+04**
1,1,2-Trichloroethane[C]		--	--	4.2E+02	--	--	4.2E+04	--	--	--	--	--	--	**--**	**--**	**4.2E+04**
Trichloroethylene [C]	0	--	--	8.1E+02	--	--	8.1E+04	--	--	--	--	--	--	**--**	**--**	**8.1E+04**
2,4,6-Trichlorophenol [C]	0	--	--	6.5E+01	--	--	6.5E+03	--	--	--	--	--	--	**--**	**--**	**6.5E+03**
Vinyl Chloride[C]	0	--	--	6.1E+01	--	--	6.1E+03	--	--	--	--	--	--	**--**	**--**	**6.1E+03**
Zinc	0	9.0E+01	8.1E+01	6.9E+04	9.0E+03	8.1E+03	6.9E+06	--	--	--	--	--	--	**9.0E+03**	**8.1E+03**	**6.9E+06**

Notes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
2. Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
3. Metals measured as Dissolved, unless specified otherwise
4. "C" indicates a carcinogenic parameter
5. For transition zone waters, spreadsheet prints the lesser of the freshwater and saltwater water quality criteria.
6. Regular WLA = (WQC x WLA multiplier) - (WLA multiplier - 1)(background conc.)
7. Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
   = (0.1(WQC - background conc.) + background conc.) for human health
8. Antideg. WLA = (Antideg. Baseline)(WLA multiplier) - (WLA multiplier - 1)(background conc.)

Metal	Site Specific Target Value (SSTV)
Antimony	4.3E+05
Arsenic III	2.2E+03
Cadmium	5.3E+02
Chromium III	#VALUE!
Chromium VI	3.0E+03
Copper	3.6E+02
Lead	5.6E+02
Mercury	5.1E+00
Nickel	4.9E+02
Selenium	4.3E+03
Silver	8.0E+01
Zinc	3.6E+03

Note: do not use QL's lower than the minimum QL's provided in agency guidance

4/29/04 4:43:26 PM

Facility = Omega 002
Chemical = Ammonia
Chronic averaging period = 30
WLAa = 150
WLAc = 22
Q.L. = 0.2
# samples/mo. = 2
# samples/wk. = 1

Summary of Statistics:

observations = 17
Expected Value = 29.3351
Variance = 586.398
C.V. = 0.825484
97th percentile daily values = 87.7862
97th percentile 4 day average = 57.1783
97th percentile 30 day average= 37.6513
< Q.L. = 0
Model used = lognormal

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 51.2942963409358
Average Weekly limit = 51.2942963409358
Average Monthly LImit = 40.992281746523

The data are:

48.3
45.4
48.2
53.2
48.5
45.9
25.2
13.4
11.8
35.3
29.4
19.6
16.5
8.4
8.4
6.44
14

41 mg/L avg. mo. limit/51 mg/L max daily limit exceeds limits determined from previous permit - revert to 38.0 mg/L mo. avg and 45 mg/L max daily limit.

9/27/04 2:13:34 PM

Facility = Omega 002
Chemical = cyanide
Chronic averaging period = 4
WLAa = 100
WLAc = 100
Q.L. = 10
# samples/mo. = 2
# samples/wk. = 1

Summary of Statistics:

observations = 3
Expected Value = 10
Variance = 36
C.V. = 0.6
97th percentile daily values = 24.3341
97th percentile 4 day average = 16.6379
97th percentile 30 day average= 12.0605
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

10
10
10

9/27/04 8:36:34 AM

Facility = Omega 002
Chemical = copper
Chronic averaging period = 4
WLAa = 930
WLAc = 600
Q.L. = 1
# samples/mo. = 2
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 8
Variance = 23.04
C.V. = 0.6
97th percentile daily values = 19.4673
97th percentile 4 day average = 13.3103
97th percentile 30 day average= 9.64842
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

8

ATTACHMENT 10

Omega Fact Sheet
Attachment 10

): Denise M. Mosca@KLMCK@DEQ
:
:c:
:om: Maynard D. Phillips@WPS@DEQ
ıbject:
ıte: Monday, August 17, 1998 8:42:47 EDT
:tach:
ertify: N
orwarded by:

---

enise:

have read again the mixing report for the AMPRO barge discharge into the ay and believe that the 28:1 mixing is appropriate. The situation is:

The discharge is on a daily basis
The discharge duration is 1 to 3 hours
It is unlikely that the location is exactly the same for each day

n this situation, conventional 48 to 96 hour toxicity testing would be xtremely conservative and I see no reason why the 28:1 should not be used. his can be easily attained according to the table on page 2 of Kenneth ourt's analysis. I would suggest that the permit be written with conditions long the following lines:

The barge discharge shall be accomplished according to the following restrictions:

pump rate	Barge Speed
1000 gpm	> 2 kn
1500 gpm	> 3 kn
2000 gpm	> 4 kn

Pumping rates shall not exceed 2000 gpm under any conditions.

Iote: the pump limit is based on the consideration that the tug is unlikely .o be able to move the barge faster than about 4 kn.

: talked to John Barnes and advised him that I was writting you this note and :hat I saw no problem with maintaining the barge discharge as a outfall in :he permit.

Vill talk to John S. today to see what is the problem with the mixing model.

)ale.

Note: Omega now retains ownership of the Ampro barge. Outfall 003 has not been used in over 15 years, however Omega wishes to retain the outfall in case of emergency

Omega Fact Sheet

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY
Piedmont Regional Office

4900 Cox Road Glen Allen, VA 23060 804/527-5020

SUBJECT: AMPRO Fisheries Company

TO: Technical File via Denise Mosca DMM (by FAX 8-3-95)

FROM: Steven G. Stell SGS

DATE: August 2, 1995

COPIES: J.R. Bell, Ray Jenkins, Mason Harper

RECEIVED AUG 07 1995

We all met on August 1, 1995 to discuss the desired sampling locations for the monitoring being conducted on the barge (discharge 003 and Chesapeake Bay Monitoring). The company currently collects samples for Discharge Monitoring Report (DMR) reporting purposes and to supply additional data submitted with the DMR.

We decided that appropriate sampling locations were as follows:

DMR Reporting - Discharge 003

Parameter	Location	Sample Type
BOD_5, TSS, Ammonia	Auto sampler entering Bay barge	24 HC
Oil & Grease	Wastewater entering Bay barge	Grab
D.O., Temp.	'Blend' at discharge spigot	in situ[1]
pH	'Blend' at discharge spigot	Grab
Bioassay/Toxicity	'Blend' at discharge spigot	Grab

The above data will be used to report values on the DMR for Discharge 003 and used to determine the Summary Discharge 999 DMR values.

Chesapeake Bay Water Quality Monitoring - "Pre-Discharge"

Parameter	Location	Sample Type
BOD_5, Ammonia	Off stern, 10 ft. depth	Grab
D.O., Temp.	Off stern, 10 ft. depth	in situ[1]
pH	Off stern, 10 ft. depth	Grab

Chesapeake Bay Water Quality Monitoring - "After Discharge"

Parameter	Location	Sample Type
BOD_5, Ammonia	'Blend' discharge spigot	Grab
D.O., Temp.	'Blend' discharge spigot	in situ[1,2]
pH	'Blend' discharge spigot	Grab[2]

The Chesapeake Bay Water Quality Monitoring data is submitted with the DMR.

[1] D.O. and temperature readings should be obtained in situ (in place).
[2] D.O., temperature and pH samples taken for Discharge 003 reporting purposes may be used for this reporting.

/sgs

Note: This page is included for information concerning the barge discharge. Omega Protein now retains ownership of the

Table VII

EVALUATION OF EFFLUENT CHARACTERIZATION DATA

Outfall 003
Receiving Stream: Chesapeake Bay Hardness: NA (Saltwater Limits apply)
Flow 0.40 MGD

PARAMETER	EFFLUENT CONCEN-TRATION ug/1	VIRGINIA ACUTE CRITERIA SALT WATER ug/1	VIRGINIA CHRONIC CRITERIA SALT WATER ug/1	Multiplier of 28 determined by Dale Phillips PROJECTED IN STREAM CONCENTRATION AVG FLOW		COMMENTS Data from 2C application/ Attachment D evaluated, all units ug/l, unless otherwise specified * The metals form is the Dissolved form
				Acute (WLA_a)	Chronic (WLA_c)	
Aldrin	believed absent	1.3	0.13			Limit not evaluated
Ammonia mg/l	420	1.6	0.23	45	NA Chronic toxicity does not apply to discharge 3 hr. long)	Avg. Monthly limit of 39.6 mg/l, max daily limit of 49.0 mg/l determined from previous permit action replaced with Avg. Monthly limit of 37 mg/l, max daily limit of 45 mg/l because current analysis is more stringent.
Arsenic-trivalent, inorganic	Believed absent	69*	36*	1900*	1000*	Limit not evaluated
Cadmium	39 measured as Total	40*	8.8*	1100*	250*	No limit indicated after evaluation
Chlordane	believed absent	0.09	0.004 0.022HH	2.5	0.11 0.62HH	Limit not evaluated
Chromium-hexavalent	13 measured as Total Recoverable	1100*	50*	31000*	1400*	Total Chromium value of 13 ug/l used to show no Cr VI limit necessary

003 p. 1

PARAMETER	EFFLUENT CONCEN-TRATION ug/1	VIRGINIA ACUTE CRITERIA SALT WATER ug/1	VIRGINIA CHRONIC CRITERIA SALT WATER ug/1	Multiplier of 28 determined by Dale Phillips PROJECTED IN STREAM CONCENTRATION AVG FLOW		COMMENTS Data from 2C application/ Attachment D evaluated, all units ug/l, unless otherwise specified * The metals form is the Dissolved form
				Acute (WLA_a)	Chronic (WLA_c)	
Chromium-trivalent	13 measured as Total Recoverable		No Saltwater value			Limit not evaluated
Copper	198 measured as Total Recoverable	9.3*	6.0*	260*	170*	No dissolved effluent data available; total recoverable data cannot be used to establish limit per 93-015, but established monitoring, based on indicated need for limit
Cyanide, Total	believed absent	1.0	1.0 220000HH	28	28 6000000 HH	No limit evaluated
DDT	believed absent	0.13	0.001 0.0059HH	3.6	0.028 0.17HH	Limit not evaluated
Demeton	no information available		0.1		2.8	Limit not evaluated
Dieldrin	believed absent	0.71	0.0019 0.0014HH	20	0.053 0.039HH	Limit not evaluated
Endosulfan	believed absent	0.034	0.0087 240HH	0.95	0.24 6700HH	Limit not evaluated
Endrin	believed absent	0.037	0.0023 0.81HH	1.0	0.064 23HH	Limit not evaluated
Guthion	no information available		0.01		0.28	Limit not evaluated
Heptachlor	believed absent	0.053	0.0036 2100HH	1.5	0.1 0.059HH	Limit not evaluated

PARAMETER	EFFLUENT CONCEN-TRATION ug/1	VIRGINIA ACUTE CRITERIA SALT WATER ug/1	VIRGINIA CHRONIC CRITERIA SALT WATER ug/1	Multiplier of 28 determined by Dale Phillips PROJECTED IN STREAM CONCENTRATION AVG FLOW		COMMENTS Data from 2C application/ Attachment D evaluated, all units ug/l, unless otherwise specified * The metals form is the Dissolved form
				Acute (WLA_a)	Chronic (WLA_c)	
	believed absent		2.0		56	Limit not evaluated
Iron	Total Iron believed absent		No Saltwater Value			Limit not evaluated
Kepone	No information available		0			Limit not evaluated
Lead	28 Total recoverable	240*	9.3*	6700*	260*	No limit indicated after evaluation
Lindane	believed absent	0.16	0.63HH	4.5	18HH	Limit not evaluated
Malathion	No information available		0.1		2.8	Limit not evaluated
Manganese	believed absent		100			Limit not evaluated
Mercury	believed absent	1.8*	0.94 * 0.051HH	50*	26* 14HH	All data below QL of 0.2 ug/l; no limit necessary.
Methoxychlor	No information available		0.03		0.84	Limit not evaluated
Mirex	No information available		0			Limit not evaluated

PARAMETER	EFFLUENT CONCEN-TRATION ug/1	VIRGINIA ACUTE CRITERIA SALT WATER ug/1	VIRGINIA CHRONIC CRITERIA SALT WATER ug/1	Multiplier of 28 determined by Dale Phillips PROJECTED IN STREAM CONCENTRATION AVG FLOW		COMMENTS Data from 2C application/ Attachment D evaluated, all units ug/l, unless otherwise specified * The metals form is the Dissolved form
				Acute (WLA_a)	Chronic (WLA_c)	
Nickel	140 Total Recoverable	74*	8.2* 4600HH	2100*	2400* 130,000 HH	No limit indicated after evaluation
Parathion	No information available		0.04			Limit not evaluated
Phenol	believed absent					(Human health standard of 4600000) Limit not evaluated
Phthalate Esters	believed absent		3.0			Limit not evaluated
Polychlorinated Biphenyls	believed absent		0.03		0.84	Limit not evaluated
Selenium	19 Total Selenium	300 *	71 * 11000HH	8400*	2000* 310,000 HH	No limit indicated after evaluation
Silver	0.5 Total Recoverable	2.0*		56*		No limit indicated after evaluation
Toxaphene	believed absent	0.21	0.0002 0.0075HH	5.9	0.0056 0.21HH	Limit not evaluated
Tributyltin	(Total Tin believed absent--no TBT used onsite)	0.38	0.001	11	0.028	Limit not evaluated

PARAMETER	EFFLUENT CONCEN-TRATION ug/1	VIRGINIA ACUTE CRITERIA SALT WATER ug/1	VIRGINIA CHRONIC CRITERIA SALT WATER ug/1	Multiplier of 28 determined by Dale Phillips PROJECTED IN STREAM CONCENTRATION AVG FLOW		COMMENTS Data from 2C application/ Attachment D evaluated, all units ug/l, unless otherwise specified * The metals form is the Dissolved form
				Acute (WLA_a)	Chronic (WLA_c)	
Zinc	111 Total Recoverable	90*	81* 69000HH	2500*	2300* 190,000 HH	No limit indicated after evaluation

SALTWATER AND TRANSITION ZONES
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Omega Protein 003
Receiving Stream: Chesapeake Bay

Permit No.: VA0003867

Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information

Mean Hardness (as CaCO3) =	NA	mg/l
90th % Temperature (Annual) =	25.9	(° C)
90th % Temperature (Winter) =		(° C)
90th % Maximum pH =	8.4	
10th % Maximum pH =		
Tier Designation (1 or 2) =	1	
Early Life Stages Present Y/N =	Y	
Tidal Zone =	1	(1 = saltwater, 2 = transition zone)
Mean Salinity =	19	(g/kg)

Mixing Information

Design Flow (MGD)	0.4
Acute WLA multiplier	28
Chronic WLA multiplier	28
Human health WLA multiplier	28

Effluent Information

Mean Hardness (as CaCO3) =	NA	mg/L
90 % Temperature (Annual) =	30	(° C)
90 % Temperature (Winter) =		(° C)
90 % Maximum pH =	8.9	SU
10 % Maximum pH =		SU
Discharge Flow =	0.4	MGD

Parameter	Background	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			**Most Limiting Allocations**		
(ug/l unless noted)	Conc.	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	**Acute**	**Chronic**	**HH**
Acenapthene	0	--	--	2.7E+03	--	--	7.6E+04	--	--	--	--	--	--	--	--	**7.6E+04**
Acrolein		--	--	7.8E+02	--	--	2.2E+04	--	--	--	--	--	--	--	--	**2.2E+04**
Acrylonitrile[C]		--	--	6.6E+00	--	--	1.8E+02	--	--	--	--	--	--	--	--	**1.8E+02**
Aldrin [C]	0	1.3E+00	--	1.4E-03	3.6E+01	--	3.9E-02	--	--	--	--	--	--	**3.6E+01**	--	**3.9E-02**
Ammonia-N (mg/l) - Annual	0	1.6E+00	2.3E-01	--	4.3E+01	6.5E+00	--	--	--	--	--	--	--	**4.3E+01**	**6.5E+00**	--
Ammonia-N (mg/l) - Winter	0	9.7E+00	1.5E+00	--	2.7E+02	4.1E+01	--	--	--	--	--	--	--	**2.7E+02**	**4.1E+01**	--
Anthracene	0	--	--	1.1E+05	--	--	3.1E+06	--	--	--	--	--	--	--	--	**3.1E+06**
Antimony	0	--	--	4.3E+03	--	--	1.2E+05	--	--	--	--	--	--	--	--	**1.2E+05**
Arsenic	0	6.9E+01	3.6E+01	--	1.9E+03	1.0E+03	--	--	--	--	--	--	--	**1.9E+03**	**1.0E+03**	--
Benzene [C]	0	--	--	7.1E+02	--	--	2.0E+04	--	--	--	--	--	--	--	--	**2.0E+04**
Benzidine[C]		--	--	5.4E-03	--	--	1.5E-01	--	--	--	--	--	--	--	--	**1.5E-01**
Benzo (a) anthracene [C]	0	--	--	4.9E-01	--	--	1.4E+01	--	--	--	--	--	--	--	--	**1.4E+01**
Benzo (b) fluoranthene [C]	0	--	--	4.9E-01	--	--	1.4E+01	--	--	--	--	--	--	--	--	**1.4E+01**
Benzo (k) fluoranthene [C]	0	--	--	4.9E-01	--	--	1.4E+01	--	--	--	--	--	--	--	--	**1.4E+01**
Benzo (a) pyrene [C]	0	--	--	4.9E-01	--	--	1.4E+01	--	--	--	--	--	--	--	--	**1.4E+01**
Bis2-Chloroethyl Ether		--	--	1.4E+01	--	--	3.9E+02	--	--	--	--	--	--	--	--	**3.9E+02**
Bis2-Chloroisopropyl Ether		--	--	1.7E+05	--	--	4.8E+06	--	--	--	--	--	--	--	--	**4.8E+06**
Bromoform [C]	0	--	--	3.6E+03	--	--	1.0E+05	--	--	--	--	--	--	--	--	**1.0E+05**
Butylbenzylphthalate	0	--	--	5.2E+03	--	--	1.5E+05	--	--	--	--	--	--	--	--	**1.5E+05**
Cadmium	0	4.0E+01	8.8E+00	--	1.1E+03	2.5E+02	--	--	--	--	--	--	--	**1.1E+03**	**2.5E+02**	--
Carbon Tetrachloride [C]	0	--	--	4.4E+01	--	--	1.2E+03	--	--	--	--	--	--	--	--	**1.2E+03**
Chlordane [C]	0	9.0E-02	4.0E-03	2.2E-02	2.5E+00	1.1E-01	6.2E-01	--	--	--	--	--	--	**2.5E+00**	**1.1E-01**	**6.2E-01**
TRC	0			--			--	--	--	--	--	--	--	--	--	--
Chlorine Prod. Oxidant	0	1.3E+01	7.5E+00	--	3.6E+02	2.1E+02	--	--	--	--	--	--	--	**3.6E+02**	**2.1E+02**	--

Parameter	Background	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			**Most Limiting Allocations**		
(ug/l unless noted)	Conc.	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	**Acute**	**Chronic**	**HH**
Chlorobenzene		--	--	2.1E+04	--	--	5.9E+05	--	--	--	--	--	--	**--**	**--**	**5.9E+05**
Chlorodibromomethane[C]	0	--	--	3.4E+02	--	--	9.5E+03	--	--	--	--	--	--	**--**	**--**	**9.5E+03**
Chloroform [C]	0	--	--	2.9E+04	--	--	8.1E+05	--	--	--	--	--	--	**--**	**--**	**8.1E+05**
2-Chloronaphthalene	0	--	--	4.3E+03	--	--	1.2E+05	--	--	--	--	--	--	**--**	**--**	**1.2E+05**
2-Chlorophenol	0	--	--	4.0E+02	--	--	1.1E+04	--	--	--	--	--	--	**--**	**--**	**1.1E+04**
Chlorpyrifos	0	1.1E-02	5.6E-03	--	3.1E-01	1.6E-01	--	--	--	--	--	--	--	**3.1E-01**	**1.6E-01**	**--**
Chromium III	0			--			--	--	--	--	--	--	--	**--**	**--**	**--**
Chromium VI	0	1.1E+03	5.0E+01	--	3.1E+04	1.4E+03	--	--	--	--	--	--	--	**3.1E+04**	**1.4E+03**	**--**
Chrysene [C]	0	--	--	4.9E-01	--	--	1.4E+01	--	--	--	--	--	--	**--**	**--**	**1.4E+01**
Copper	0	9.3E+00	6.0E+00	--	2.6E+02	1.7E+02	--	--	--	--	--	--	--	**2.6E+02**	**1.7E+02**	**--**
Cyanide	0	1.0E+00	1.0E+00	2.2E+05	2.8E+01	2.8E+01	6.0E+06	--	--	--	--	--	--	**2.8E+01**	**2.8E+01**	**6.0E+06**
DDD [C]	0	--	--	8.4E-03	--	--	2.4E-01	--	--	--	--	--	--	**--**	**--**	**2.4E-01**
DDE [C]	0	--	--	5.9E-03	--	--	1.7E-01	--	--	--	--	--	--	**--**	**--**	**1.7E-01**
DDT [C]	0	1.3E-01	1.0E-03	5.9E-03	3.6E+00	2.8E-02	1.7E-01	--	--	--	--	--	--	**3.6E+00**	**2.8E-02**	**1.7E-01**
Demeton	0	--	1.0E-01	--	--	2.8E+00	--	--	--	--	--	--	--	**--**	**2.8E+00**	**--**
Dibenz(a,h)anthracene [C]	0	--	--	4.9E-01	--	--	1.4E+01	--	--	--	--	--	--	**--**	**--**	**1.4E+01**
Dibutyl phthalate	0	--	--	1.2E+04	--	--	3.4E+05	--	--	--	--	--	--	**--**	**--**	**3.4E+05**
Dichloromethane (Methylene Chloride)[C]	0	--	--	1.6E+04	--	--	4.5E+05	--	--	--	--	--	--	**--**	**--**	**4.5E+05**
1,2-Dichlorobenzene	0	--	--	1.7E+04	--	--	4.8E+05	--	--	--	--	--	--	**--**	**--**	**4.8E+05**
1,3-Dichlorobenzene	0	--	--	2.6E+03	--	--	7.3E+04	--	--	--	--	--	--	**--**	**--**	**7.3E+04**
1,4-Dichlorobenzene	0	--	--	2.6E+03	--	--	7.3E+04	--	--	--	--	--	--	**--**	**--**	**7.3E+04**
3,3-Dichlorobenzidine[C]	0	--	--	7.7E-01	--	--	2.2E+01	--	--	--	--	--	--			
Dichlorobromomethane [C]	0	--	--	4.6E+02	--	--	1.3E+04	--	--	--	--	--	--	**--**	**--**	**1.3E+04**
1,2-Dichloroethane [C]	0	--	--	9.9E+02	--	--	2.8E+04	--	--	--	--	--	--	**--**	**--**	**2.8E+04**
1,1-Dichloroethylene	0	--	--	1.7E+04	--	--	4.8E+05	--	--	--	--	--	--	**--**	**--**	**4.8E+05**
1,2-trans-dichloroethylene	0	--	--	1.4E+05	--	--	3.9E+06	--	--	--	--	--	--	**--**	**--**	**3.9E+06**
2,4-Dichlorophenol	0	--	--	7.9E+02	--	--	2.2E+04	--	--	--	--	--	--	**--**	**--**	**2.2E+04**
1,2-Dichloropropane[C]	0	--	--	3.9E+02	--	--	1.1E+04	--	--	--	--	--	--	**--**	**--**	**1.1E+04**
1,3-Dichloropropene	0	--	--	1.7E+03	--	--	4.8E+04	--	--	--	--	--	--	**--**	**--**	**4.8E+04**
Dieldrin [C]	0	7.1E-01	1.9E-03	1.4E-03	2.0E+01	5.3E-02	3.9E-02	--	--	--	--	--	--	**2.0E+01**	**5.3E-02**	**3.9E-02**
Diethyl Phthalate	0	--	--	1.2E+05	--	--	3.4E+06	--	--	--	--	--	--	**--**	**--**	**3.4E+06**
Di-2-Ethylhexyl Phthalate [C]	0	--	--	5.9E+01	--	--	1.7E+03	--	--	--	--	--	--	**--**	**--**	**1.7E+03**
2,4-Dimethylphenol	0	--	--	2.3E+03	--	--	6.4E+04	--	--	--	--	--	--	**--**	**--**	**6.4E+04**
Dimethyl Phthalate	0	--	--	2.9E+06	--	--	8.1E+07	--	--	--	--	--	--	**--**	**--**	**8.1E+07**
Di-n-Butyl Phthalate	0	--	--	1.2E+04	--	--	3.4E+05	--	--	--	--	--	--	**--**	**--**	**3.4E+05**
2,4 Dinitrophenol	0	--	--	1.4E+04	--	--	3.9E+05	--	--	--	--	--	--	**--**	**--**	**3.9E+05**
2-Methyl-4,6-Dinitrophenol	0	--	--	7.65E+02	--	--	2.1E+04	--	--	--	--	--	--	**--**	**--**	**2.1E+04**
2,4-Dinitrotoluene [C]	0	--	--	9.1E+01	--	--	2.5E+03	--	--	--	--	--	--	**--**	**--**	**2.5E+03**
Dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin) (ppq)	0	--	--	1.2E-06	--	--	3.4E-05	--	--	--	--	--	--	**--**	**--**	**3.4E-05**
1,2-Diphenylhydrazine[C]	0	--	--	5.4E+00	--	--	1.5E+02	--	--	--	--	--	--	**--**	**--**	**1.5E+02**
Alpha-Endosulfan	0	3.4E-02	8.7E-03	2.4E+02	9.5E-01	2.4E-01	6.7E+03	--	--	--	--	--	--	**9.5E-01**	**2.4E-01**	**6.7E+03**

Parameter	Background	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			**Most Limiting Allocations**		
(ug/l unless noted)	Conc.	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	**Acute**	**Chronic**	**HH**
Beta-Endosulfan	0	3.4E-02	8.7E-03	2.4E+02	9.5E-01	2.4E-01	6.7E+03	--	--	--	--	--	--	**9.5E-01**	**2.4E-01**	**6.7E+03**
Endosulfan Sulfate	0	--	--	2.4E+02	--	--	6.7E+03	--	--	--	--	--	--	**--**	**--**	**6.7E+03**
Endrin	0	3.7E-02	2.3E-03	8.1E-01	1.0E+00	6.4E-02	2.3E+01	--	--	--	--	--	--	**1.0E+00**	**6.4E-02**	**2.3E+01**
Endrin Aldehyde	0	--	--	8.1E-01	--	--	2.3E+01	--	--	--	--	--	--	**--**	**--**	**2.3E+01**
Ethylbenzene	0	--	--	2.9E+04	--	--	8.1E+05	--	--	--	--	--	--	**--**	**--**	**8.1E+05**
Fluoranthene	0	--	--	3.7E+02	--	--	1.0E+04	--	--	--	--	--	--	**--**	**--**	**1.0E+04**
Fluorene	0	--	--	1.4E+04	--	--	3.9E+05	--	--	--	--	--	--	**--**	**--**	**3.9E+05**
Guthion	0	--	1.0E-02	--	--	2.8E-01	--	--	--	--	--	--	--	**--**	**2.8E-01**	**--**
Heptachlor [C]	0	5.3E-02	3.6E-03	2.1E-03	1.5E+00	1.0E-01	5.9E-02	--	--	--	--	--	--	**1.5E+00**	**1.0E-01**	**5.9E-02**
Heptachlor Epoxide[C]	0	5.3E-02	3.6E-03	1.1E-03	1.5E+00	1.0E-01	3.1E-02	--	--	--	--	--	--	**1.5E+00**	**1.0E-01**	**3.1E-02**
Hexachlorobenzene[C]	0	--	--	7.7E-03	--	--	2.2E-01	--	--	--	--	--	--	**--**	**--**	**2.2E-01**
Hexachlorobutadiene[C]	0	--	--	5.0E+02	--	--	1.4E+04	--	--	--	--	--	--	**--**	**--**	**1.4E+04**
Hexachlorocyclohexane Alpha-BHC[C]	0	--	--	1.3E-01	--	--	3.6E+00	--	--	--	--	--	--	**--**	**--**	**3.6E+00**
Hexachlorocyclohexane Beta-BHC[C]	0	--	--	4.6E-01	--	--	1.3E+01	--	--	--	--	--	--	**--**	**--**	**1.3E+01**
Hexachlorocyclohexane Gamma-BHC[C] (Lindane)	0	1.6E-01	--	6.3E-01	4.5E+00	--	1.8E+01	--	--	--	--	--	--	**4.5E+00**	**--**	**1.8E+01**
Hexachlorocyclopentadiene	0	--	--	1.7E+04	--	--	4.8E+05	--	--	--	--	--	--	**--**	**--**	**4.8E+05**
Hexachloroethane[C]	0	--	--	8.9E+01	--	--	2.5E+03	--	--	--	--	--	--	**--**	**--**	**2.5E+03**
Hydrogen Sulfide	0	--	2.0E+00		--	5.6E+01	--	--	--	--	--	--	--	**--**	**5.6E+01**	**--**
Indeno (1,2,3-cd) pyrene C	0	--	--	4.9E-01	--	--	1.4E+01	--	--	--	--	--	--	**--**	**--**	**1.4E+01**
Isophorone[C]	0	--	--	2.6E+04	--	--	7.3E+05	--	--	--	--	--	--	**--**	**--**	**7.3E+05**
Kepone	0	--	0.0E+00	--	--	0.0E+00	--	--	--	--	--	--	--	**--**	**0.0E+00**	**--**
Lead	0	2.4E+02	9.3E+00	--	6.7E+03	2.6E+02	--	--	--	--	--	--	--	**6.7E+03**	**2.6E+02**	**--**
Malathion	0	--	1.0E-01	--	--	2.8E+00	--	--	--	--	--	--	--	**--**	**2.8E+00**	**--**
Mercury	0	1.8E+00	9.4E-01	5.1E-02	5.0E+01	2.6E+01	1.4E+00	--	--	--	--	--	--	**5.0E+01**	**2.6E+01**	**1.4E+00**
Methyl Bromide	0	--	--	4.0E+03	--	--	1.1E+05	--	--	--	--	--	--	**--**	**--**	**1.1E+05**
Methoxychlor	0	--	3.0E-02	--	--	8.4E-01	--	--	--	--	--	--	--	**--**	**8.4E-01**	**--**
Mirex	0	--	0.0E+00	--	--	0.0E+00	--	--	--	--	--	--	--	**--**	**0.0E+00**	**--**
Monochlorobenzene	0	--	--	2.1E+04	--	--	5.9E+05	--	--	--	--	--	--	**--**	**--**	**5.9E+05**
Nickel	0	7.4E+01	8.2E+00	4.6E+03	2.1E+03	2.3E+02	1.3E+05	--	--	--	--	--	--	**2.1E+03**	**2.3E+02**	**1.3E+05**
Nitrobenzene	0	--	--	1.9E+03	--	--	5.3E+04	--	--	--	--	--	--	**--**	**--**	**5.3E+04**
N-Nitrosodimethylamine[C]	0	--	--	8.1E+01	--	--	2.3E+03	--	--	--	--	--	--	**--**	**--**	**2.3E+03**
N-Nitrosodiphenylamine[C]	0	--	--	1.6E+02	--	--	4.5E+03	--	--	--	--	--	--	**--**	**--**	**4.5E+03**
N-Nitrosodi-n-propylamine[C]	0	--	--	1.4E+01	--	--	3.9E+02	--	--	--	--	--	--	**--**	**--**	**3.9E+02**
Parathion	0			--			--	--	--	--	--	--	--	**--**	**--**	**--**
PCB-1016	0	--	3.0E-02	--	--	8.4E-01	--	--	--	--	--	--	--	**--**	**8.4E-01**	**--**
PCB-1221	0	--	3.0E-02	--	--	8.4E-01	--	--	--	--	--	--	--	**--**	**8.4E-01**	**--**
PCB-1232	0	--	3.0E-02	--	--	8.4E-01	--	--	--	--	--	--	--	**--**	**8.4E-01**	**--**
PCB-1242	0	--	3.0E-02	--	--	8.4E-01	--	--	--	--	--	--	--	**--**	**8.4E-01**	**--**
PCB-1248	0	--	3.0E-02	--	--	8.4E-01	--	--	--	--	--	--	--	**--**	**8.4E-01**	**--**
PCB-1254	0	--	3.0E-02	--	--	8.4E-01	--	--	--	--	--	--	--	**--**	**8.4E-01**	**--**

Parameter	Background	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			**Most Limiting Allocations**		
(ug/l unless noted)	Conc.	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	**Acute**	**Chronic**	**HH**
PCB-1260	0	--	3.0E-02	--	--	8.4E-01	--	--	--	--	--	--	--	--	8.4E-01	--
PCB Total[C]	0	--	--	1.7E-03	--	--	4.8E-02	--	--	--	--	--	--	--	--	4.8E-02
Pentachlorophenol [C]	0	1.3E+01	7.9E+00	8.2E+01	3.6E+02	2.2E+02	2.3E+03	--	--	--	--	--	--	3.6E+02	2.2E+02	2.3E+03
Phenol	0	--	--	4.6E+06	--	--	1.3E+08	--	--	--	--	--	--	--	--	1.3E+08
Phosphorus (Elemental)	0	--	0.1	--	--	2.8E+00	--	--	--	--	--	--	--	--	2.8E+00	--
Pyrene	0	--	--	1.1E+04	--	--	3.1E+05	--	--	--	--	--	--	--	--	3.1E+05
Radionuclides (pCi/l except Beta/Photon)	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Gross Alpha Activity	0	--	--	1.5E+01	--	--	4.2E+02	--	--	--	--	--	--	--	--	4.2E+02
Beta and Photon Activity (mrem/yr)	0	--	--	4.0E+00	--	--	1.1E+02	--	--	--	--	--	--	--	--	1.1E+02
Strontium-90	0	--	--	8.0E+00	--	--	2.2E+02	--	--	--	--	--	--	--	--	2.2E+02
Tritium	0	--	--	2.0E+04	--	--	5.6E+05	--	--	--	--	--	--	--	--	5.6E+05
Selenium	0	3.0E+02	7.1E+01	1.1E+04	8.4E+03	2.0E+03	3.1E+05	--	--	--	--	--	--	8.4E+03	2.0E+03	3.1E+05
Silver	0	2.0E+00	--	--	5.6E+01	--	--	--	--	--	--	--	--	5.6E+01	--	--
1,1,2,2-Tetrachloroethane[C]	0	--	--	1.1E+02	--	--	3.1E+03	--	--	--	--	--	--	--	--	3.1E+03
Tetrachloroethylene[C]	0	--	--	8.9E+01	--	--	2.5E+03	--	--	--	--	--	--	--	--	2.5E+03
Thallium	0	--	--	6.3E+00	--	--	1.8E+02	--	--	--	--	--	--	--	--	1.8E+02
Toluene	0	--	--	2.0E+05	--	--	5.6E+06	--	--	--	--	--	--	--	--	5.6E+06
Toxaphene [C]	0	2.1E-01	2.0E-04	7.5E-03	5.9E+00	5.6E-03	2.1E-01	--	--	--	--	--	--	5.9E+00	5.6E-03	2.1E-01
Tributyltin	0	3.8E-01	1.0E-03	--	1.1E+01	2.8E-02	--	--	--	--	--	--	--	1.1E+01	2.8E-02	--
1,2,4-Trichlorobenzene	0	--	--	9.4E+02	--	--	2.6E+04	--	--	--	--	--	--	--	--	2.6E+04
1,1,2-Trichloroethane[C]		--	--	4.2E+02	--	--	1.2E+04	--	--	--	--	--	--	--	--	1.2E+04
Trichloroethylene [C]	0	--	--	8.1E+02	--	--	2.3E+04	--	--	--	--	--	--	--	--	2.3E+04
2,4,6-Trichlorophenol [C]	0	--	--	6.5E+01	--	--	1.8E+03	--	--	--	--	--	--	--	--	1.8E+03
Vinyl Chloride[C]	0	--	--	6.1E+01	--	--	1.7E+03	--	--	--	--	--	--	--	--	1.7E+03
Zinc	0	9.0E+01	8.1E+01	6.9E+04	2.5E+03	2.3E+03	1.9E+06	--	--	--	--	--	--	2.5E+03	2.3E+03	1.9E+06

Notes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
2. Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
3. Metals measured as Dissolved, unless specified otherwise
4. "C" indicates a carcinogenic parameter
5. For transition zone waters, spreadsheet prints the lesser of the freshwater and saltwater water quality criteria.
6. Regular WLA = (WQC x WLA multiplier) - (WLA multiplier - 1)(background conc.)
7. Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
   = (0.1(WQC - background conc.) + background conc.) for human health
8. Antideg. WLA = (Antideg. Baseline)(WLA multiplier) - (WLA multiplier - 1)(background conc.)

Metal	Site Specific Target Value (SSTV)
Antimony	1.2E+05
Arsenic III	6.0E+02
Cadmium	1.5E+02
Chromium III	#VALUE!
Chromium VI	8.4E+02
Copper	1.0E+02
Lead	1.6E+02
Mercury	1.4E+00
Nickel	1.4E+02
Selenium	1.2E+03
Silver	2.2E+01
Zinc	1.0E+03

Note: do not use QL's lower than the minimum QL's provided in agency guidance

9/27/04 2:10:13 PM

Facility = Omega 003
Chemical = copper (Total Recoverable)
Chronic averaging period = 4
WLAa = 260
WLAc = 170
Q.L. = 10
# samples/mo. = 2
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 198
Variance = 14113.4
C.V. = 0.6
97th percentile daily values = 481.816
97th percentile 4 day average = 329.430
97th percentile 30 day average= 238.798
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 248.637713289049
Average Weekly limit = 248.637713289049
Average Monthly LImit = 202.188207364612

The data are:

198

4/29/04 5:07:56 PM

Facility = Omega 003
Chemical = Total Recoverable Silver
Chronic averaging period = 4
WLAa = 58
WLAc =
Q.L. = 0.5
# samples/mo. = 2
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = .5
Variance = .09
C.V. = 0.6
97th percentile daily values = 1.21670
97th percentile 4 day average = .831895
97th percentile 30 day average= .603026
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

0.5

4/29/04 5:08:48 PM

Facility = Omega 003
Chemical = Total Recoverable Zinc
Chronic averaging period = 4
WLAa = 2600
WLAc =
Q.L. = 111
# samples/mo. = 2
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 111
Variance = 4435.56
C.V. = 0.6
97th percentile daily values = 270.109
97th percentile 4 day average = 184.680
97th percentile 30 day average= 133.871
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

111

4/29/04 5:05:39 PM

Facility = Omega 003
Chemical = Total Recoverable Nickel
Chronic averaging period = 4
WLAa = 2100
WLAc =
Q.L. = 140
# samples/mo. = 2
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 140
Variance = 7056
C.V. = 0.6
97th percentile daily values = 340.678
97th percentile 4 day average = 232.930
97th percentile 30 day average= 168.847
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

140

9/27/04 10:22:03 AM

Facility = Omega 003
Chemical = selenium
Chronic averaging period = 4
WLAa = 8400
WLAc = 2000
Q.L. = 10
# samples/mo. = 2
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 19
Variance = 129.96
C.V. = 0.6
97th percentile daily values = 46.2349
97th percentile 4 day average = 31.6120
97th percentile 30 day average= 22.9150
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

19

9/27/04 10:20:09 AM

Facility = Omega 003
Chemical = lead
Chronic averaging period = 4
WLAa = 6700
WLAc = 260
Q.L. = 10
# samples/mo. = 2
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 28
Variance = 282.24
C.V. = 0.6
97th percentile daily values = 68.1356
97th percentile 4 day average = 46.5861
97th percentile 30 day average= 33.7694
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

28

9/27/04 10:18:32 AM

Facility = Omega 003
Chemical = hexavalent chromium
Chronic averaging period = 4
WLAa = 31000
WLAc = 1400
Q.L. = 10
# samples/mo. = 2
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 13
Variance = 60.84
C.V. = 0.6
97th percentile daily values = 31.6344
97th percentile 4 day average = 21.6292
97th percentile 30 day average= 15.6786
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

13

9/27/04 10:17:04 AM

Facility = Omega 003
Chemical = Cadmium
Chronic averaging period = 4
WLAa = 1100
WLAc = 250
Q.L. = 10
# samples/mo. = 2
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 39
Variance = 547.56
C.V. = 0.6
97th percentile daily values = 94.9032
97th percentile 4 day average = 64.8878
97th percentile 30 day average= 47.0360
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

39

ATTACHMENT 11

Table VIII

EVALUATION OF EFFLUENT CHARACTERIZATION DATA 995 (004/005) outfall—Omega called 006 in application
Receiving Stream: Hardness: NA (Saltwater Limits apply) Flow: 7.1 MGD

PARAMETER	EFFLUENT CONCEN-TRATION ug/1	VIRGINIA ACUTE CRITERIA SALT-WATER ug/1	VIRGINIA CHRONIC CRITERIA SALTWATER ug/1	Agency default values are 2:1 acute and 50:1 chronic PROJECTED IN STREAM CONCENTRATION AVG FLOW		COMMENTS
				Acute (WLA_a)	Chronic (WLA_c)	Data from 2C application evaluated and all units ug/l, unless otherwise specified *Measured as Dissolved species
						Acute (WLA_a) and Chronic (WLA_c) are calculated as follows: 26x acute and chronic standards for estuarine, per 93-015) ug/l
Antimony	<5	4300 (Human Health standard)			220000 Human Health WLA	Value is below detection
Aldrin	<0.5,<0.05	0.0014 HH	0.13	2.6	0.07HH	All data below QL of 0.5
Ammonia mg/l	0.309, 0.298, 0.281,0.296,0 .575,0.553, 3.7	0.71	0.21	1.4	10	No limit indicated after analysis.

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PARAMETER	EFFLUENT CONCEN-TRATION ug/1	VIRGINIA ACUTE CRITERIA SALT-WATER ug/1	VIRGINIA CHRONIC CRITERIA SALTWATER ug/1	Agency default values are 2:1 acute and 50:1 chronic PROJECTED IN STREAM CONCENTRATION AVG FLOW		COMMENTS
				Acute (WLA_a)	Chronic (WLA_c)	Data from 2C application evaluated and all units ug/l, unless otherwise specified *Measured as Dissolved species
						Acute (WLA_a) and Chronic (WLA_c) are calculated as follows: 26x acute and chronic standards for estuarine, per 93-015) ug/l
Arsenic-trivalent, inorganic	<50	69*	36*	140	1800	All data below lab QL of 50
Cadmium	8	40*	8.8*	80	440	No limit indicated after evaluation
Chlordane	<1	0.09	0.004 HH 0.022	0.18	0.2	Program indicates all data below QL, though <1 not less than DEQ required QL of 0.2
Chlorpyrifos (Dursban)	<0.1	0.011	0.0056	0.022	0.28	Value below detection
Chromium-hexavalent	<10	1100*	50*	2200*	2500	Data below QL level
Chromium-trivalent	No data required		No Saltwater value			Limit not evaluated
Copper, Dissolved	117, 36	9.3*	6.0*	19	300	Mo. Avg limit of 17 ug/l, Max Daily limit of 19 ug/l determined
Cyanide, Total	<0.01	1.0	1.0 220000HH	2	50 HH 11,000,000	Value is less than detection
DDD	<0.15		0.0084 Human Health Standard		0.42 human health WLA	Value is less than detection—however, specified QL is 0.1
DDE	<0.05		0.0059 Human Health Standard		0.30 human health WLA	Value is less than detection

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PARAMETER	EFFLUENT CONCEN-TRATION ug/1	VIRGINIA ACUTE CRITERIA SALT-WATER ug/1	VIRGINIA CHRONIC CRITERIA SALTWATER ug/1	Agency default values are 2:1 acute and 50:1 chronic PROJECTED IN STREAM CONCENTRATION AVG FLOW		COMMENTS
				Acute (WLA_a)	Chronic (WLA_c)	Data from 2C application evaluated and all units ug/l, unless otherwise specified *Measured as Dissolved species
						Acute (WLA_a) and Chronic (WLA_c) are calculated as follows: 26x acute and chronic standards for estuarine, per 93-015) ug/l
DDT	<0.15	0.13	0.001 0.0059 HH	0.26	0.050 HH 0.3	Value is less than detection—however, specified QL is 0.1
Demeton	<2		0.1		5.0	Value is less than detection
Dieldrin	<0.05	0.71	0.0019 0.0014HH	14	0.095	Value is less than detection
Endosulfan	<0.15, <0.05	0.034	0.0087 240 HH	0.068	0.44 12000 HH	Value is less than detection—however, specified QL is 0.1. Retested 9/02 at QL 0.05.
Endrin	<0.15	0.037	0.0023 0.81HH	0.074	0.12 41HH	Value is less than detection—however, specified DL is 0.1
Guthion	<20 mg/l		0.01		0.5	Value is less than detection
Heptachlor	<0.05, <0.05	0.053	0.0036 0.0021HH	0.11	0.18 0.11HH	Value is less than detection
Hydrogen Sulfide	2.5 mg/l		2.0		100	No limit indicated after evaluation
Iron	Total Iron believed absent		No Saltwater Value			Limit not evaluated
Kepone	<2 ug/l		0			Value is less than detection
Lead	<1	240	9.3	480	470	Value is less than detection
Lindane (Hexa- chlorocyclohexane)	<0.04	0.16	0.63HH	0.32	32HH	Value is less than detection

PARAMETER	EFFLUENT CONCEN-TRATION ug/1	VIRGINIA ACUTE CRITERIA SALT-WATER ug/1	VIRGINIA CHRONIC CRITERIA SALTWATER ug/1	Agency default values are 2:1 acute and 50:1 chronic PROJECTED IN STREAM CONCENTRATION AVG FLOW		COMMENTS Data from 2C application evaluated and all units ug/l, unless otherwise specified *Measured as Dissolved species
				Acute (WLA_a)	Chronic (WLA_c)	
Malathion	<2 ug/l		0.1		5.0	Acute (WLA_a) and Chronic (WLA_c) are calculated as follows: 26x acute and chronic standards for estuarine, per 93-015) ug/l Value is less than detection
Manganese	98		50		2500	No limit indicated after evaluation
Mercury	<0.2	1.8 *	0.94 * 0.051HH	3.6	47 26HH	Value is less than detection
Methoxychlor	<0.4 ug/l		0.03		1.5	Value is less than detection
Mirex	<0.1		0			Value is less than detection
Nickel	14	74* 4600HH	8.3*	150	410 230,000HH	No limit indicated after evaluation
PCB-1016	<1 mg/l		0.03		1.5	Value less than detection however, specified DL is 1 ug/l
PCB-1221	<1 mg/l		0.03		1.5	Value less than detection however, specified DL is 1 ug/l
PCB-1232	<1 mg/l		0.03		1.5	Value less than detection however, specified DL is 1 ug/l
PCB-1242	<1 mg/l		0.03		1.5	Value less than detection however, specified DL is 1ug/l
PCB-1248	<1 mg/l		0.03		1.5	Value less than detection however, specified DL is 1 ug/l
PCB-1254	<1 mg/l		0.03		1.5	Value less than detection however, specified DL is 1 ug/l
PCB-1260	<1 mg/l		0.03		1.5	Value less than detection however, specified DL is 1 ug/l
Phenol	<10		4600000 Human Health Standard		230,000,000	Value less than detection

PARAMETER	EFFLUENT CONCEN-TRATION ug/1	VIRGINIA ACUTE CRITERIA SALT-WATER ug/1	VIRGINIA CHRONIC CRITERIA SALTWATER ug/1	Agency default values are 2:1 acute and 50:1 chronic PROJECTED IN STREAM CONCENTRATION AVG FLOW Acute (WLA_a)	Chronic (WLA_c)	COMMENTS Data from 2C application evaluated and all units ug/l, unless otherwise specified *Measured as Dissolved species
						Acute (WLA_a) and Chronic (WLA_c) are calculated as follows: 26x acute and chronic standards for estuarine, per 93-015) ug/l
Phthalate Esters	believed absent		3.0			Limit not evaluated
Selenium	<5	300*	71* 11000HH	600	3600 550,000HH	Value is less than detection.
Silver	24, 4.72	2.0 *		4.0		Max daily limit of 4.0 ug/l and avg. mo. limit of 3.3 determined
Toxaphene	<1	0.21	0.0002 0.0075HH	0.42	0.001 0.38HH	Value less than detection
2-(2,4,5-Trichlorophenoxy) Propionic Acid (Silvex)	<0.002		50		2500	Value less than detection
Tributyltin	<0.5	0.38	0.001	0.76	0.050	Value less than detection
Zinc	<20	90*	81* 69000HH	180	4100 3500000 HH	Value is less than detection.
Base Neutral Extractables						
Acenapthene	<10		2700 Human Health Std		140,000 Human Health WLA	Value is less than detection
Anthracene	<10		110000 Human Health Std		5,600,000 Human Health WLA	Value is less than detection

PARAMETER	EFFLUENT CONCEN-TRATION ug/1	VIRGINIA ACUTE CRITERIA SALT-WATER ug/1	VIRGINIA CHRONIC CRITERIA SALTWATER ug/1	Agency default values are 2:1 acute and 50:1 chronic PROJECTED IN STREAM CONCENTRATION AVG FLOW		COMMENTS
				Acute (WLA_a)	Chronic (WLA_c)	Data from 2C application evaluated and all units ug/l, unless otherwise specified *Measured as Dissolved species
						Acute (WLA_a) and Chronic (WLA_c) are calculated as follows: 26x acute and chronic standards for estuarine, per 93-015) ug/l
Benzo(a)anthracene	<10		0.49 Human Health Std		25 Human Health WLA	Value is less than detection
Benzo(b)fluoranthene	<10		0.49 Human Health Std		25 Human Health WLA	Value is less than detection
Benzo(k)fluoranthene	<10		0.49 Human Health Std		25 Human Health WLA	Value is less than detection
Benzo(a)pyrene	<10		0.49 Human Health Std		25 Human Health WLA	Value is less than detection
Butyl Benzyl phthalate	<10		5200 Human Health Std		270,000 Human Health WLA	Value is less than detection
Chrysene	<10		0.49 Human Health Std		25 Human Health WLA	Value is less than detection
Dibenz(a,h)anthracene	<10		0.49 Human Health Std		25 Human Health WLA	Value is less than detection

PARAMETER	EFFLUENT CONCEN-TRATION ug/1	VIRGINIA ACUTE CRITERIA SALT-WATER ug/1	VIRGINIA CHRONIC CRITERIA SALTWATER ug/1	Agency default values are 2:1 acute and 50:1 chronic PROJECTED IN STREAM CONCENTRATION AVG FLOW		COMMENTS
				Acute (WLA_a)	Chronic (WLA_c)	Data from 2C application evaluated and all units ug/l, unless otherwise specified *Measured as Dissolved species
						Acute (WLA_a) and Chronic (WLA_c) are calculated as follows: 26x acute and chronic standards for estuarine, per 93-015) ug/l
Dibutyl phthalate	<10		12000 Human Health Std		610,000 Human Health WLA	Value is less than detection
1, 2 Dichlorobenzene	<10		17000 Human Health Std		870,000 Human Health WLA	Value is less than detection
1, 3 Dichlorobenzene	<10		2600 Human Health Std		130,000 Human Health WLA	Value is less than detection
1, 4 Dichlorobenzene	<10		2600 Human Health Std		130,000 Human Health WLA	Value is less than detection
Diethylphthalate	<10		120000 Human Health Std		6,000,000 Human Health WLA	Value is less than detection
Di-2-ethylhexlyphthalate	<10		59 Human Health Std		3000 Human Health WLA	Value is less than detection
2,4-Dinitrotoluene	<10		91 Human Health Std		4600HH WLA	Value is less than detection

PARAMETER	EFFLUENT CONCEN-TRATION ug/1	VIRGINIA ACUTE CRITERIA SALT-WATER ug/1	VIRGINIA CHRONIC CRITERIA SALTWATER ug/1	Agency default values are 2:1 acute and 50:1 chronic PROJECTED IN STREAM CONCENTRATION AVG FLOW		COMMENTS
				Acute (WLA_a)	Chronic (WLA_c)	Data from 2C application evaluated and all units ug/l, unless otherwise specified *Measured as Dissolved species
						Acute (WLA_a) and Chronic (WLA_c) are calculated as follows: 26x acute and chronic standards for estuarine, per 93-015) ug/l
Fluoranthene	<10		370 Human Health Std		19,000 Human Health WLA	Value is less than detection
Fluorene	<10		14000 Human Health Std		700,000 Human Health WLA	Value is less than detection
Ideno(1,2,3-cd)pyrene	<10		0.49 Human Health Std		25 Human Health WLA	Value is less than detection
Isophorone	<10		26000 Human Health Std.		13,000 ,000 Human Health WLA	Value is less than detection
Pyrene	<10		11000 Human Health Std		550,000 Human Health WLA	Value is less than detection
1,2,4-Trichlorobenzene	<10		940 Human Health Std		47,000 Human Health WLA	Value is less than detection
Volatiles						

PARAMETER	EFFLUENT CONCEN-TRATION ug/1	VIRGINIA ACUTE CRITERIA SALT-WATER ug/1	VIRGINIA CHRONIC CRITERIA SALTWATER ug/1	Agency default values are 2:1 acute and 50:1 chronic PROJECTED IN STREAM CONCENTRATION AVG FLOW		COMMENTS
				Acute (WLA_a)	Chronic (WLA_c)	Data from 2C application evaluated and all units ug/l, unless otherwise specified *Measured as Dissolved species
						Acute (WLA_a) and Chronic (WLA_c) are calculated as follows: 26x acute and chronic standards for estuarine, per 93-015) ug/l
Benzene	<5		710 Human Health Std		36,000 Human Health WLA	Value is less than detection
Bromoform	<5		3600 Human Health Std		180,000 Human Health WLA	Value is less than detection
Carbon Tetrachloride	<5		44 Human Health Std		2200 Human Health Std	Value is less than detection
Chlorodibromomethane	<5		340 Human Health Std		17000 Human Health WLA	Value is less than detection
Chloroform	<5		29000 Human Health Std		1500,000 Human Health WLA	Value is less than detection
Dichloromethane	<5		16000 Human Health Std		800,000 Human Health WLA	Value is less than detection
Dichlorobromomethane	<5		460 Human Health Std		23,000 Human Health WLA	Value is less than detection

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PARAMETER	EFFLUENT CONCEN-TRATION ug/1	VIRGINIA ACUTE CRITERIA SALT-WATER ug/1	VIRGINIA CHRONIC CRITERIA SALTWATER ug/1	Agency default values are 2:1 acute and 50:1 chronic PROJECTED IN STREAM CONCENTRATION AVG FLOW		COMMENTS
				Acute (WLA_a)	Chronic (WLA_c)	Data from 2C application evaluated and all units ug/l, unless otherwise specified *Measured as Dissolved species
						Acute (WLA_a) and Chronic (WLA_c) are calculated as follows: 26x acute and chronic standards for estuarine, per 93-015) ug/l
1, 2-Dichloroethane	<5		990 Human Health Std		50,000 Human Health WLA	Value is less than detection
1,1-Dichloroethylene	<5		17000 Human Health Std		850,000 Human Health WLA	Value is less than detection
Ethylbenzene	<5		29000 Human Health Std		1,500,000Human Health WLA	Value is less than detection
Tetrachloroethylene	<5		89 Human Health Std		4500 Human Health Std	Value is less than detection
Vinyl Chloride	<10		61 Human Health Std		3100 Human Health Std	Value is less than detection
Acids Extractables						
2-Chlorophenol	<10		400 Human Health Std		20,000 Human Health WLA	Value is less than detection
2,4-Dichlorophenol	<10		790 Human Health Std		40,000 Human Health WLA	Value is less than detection

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PARAMETER	EFFLUENT CONCEN-TRATION ug/1	VIRGINIA ACUTE CRITERIA SALT-WATER ug/1	VIRGINIA CHRONIC CRITERIA SALTWATER ug/1	Agency default values are 2:1 acute and 50:1 chronic PROJECTED IN STREAM CONCENTRATION AVG FLOW		COMMENTS
				Acute (WLA_a)	Chronic (WLA_c)	Data from 2C application evaluated and all units ug/l, unless otherwise specified *Measured as Dissolved species
						Acute (WLA_a) and Chronic (WLA_c) are calculated as follows: 26x acute and chronic standards for estuarine, per 93-015) ug/l
2,4-Dimethylphenol	<10		2300 Human Health Std		120,000 Human Health WLA	Value is less than detection
Pentachlorophenol	<50	13	7.9 82HH	26	400 4100HH	Value is less than detection
2,4,6-Trichlorophenol	<10		65 Human Health Std		3300 Human Health WLA	Value is less than detection

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SALTWATER AND TRANSITION ZONES
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Omega Protein 004/005 995 Permit No.: VA0003867 Version: OWP Guidance Memo 00-2011 (8/24/00)
Receiving Stream: Cockrell's Creek

Stream Information		
Mean Hardness (as CaCO3) =	NA	mg/l
90th % Temperature (Annual) =	28.41	(° C)
90th % Temperature (Winter) =		(° C)
90th % Maximum pH =	8.37	
10th % Maximum pH =		
Tier Designation (1 or 2) =	1	
Early Life Stages Present Y/N =	Y	
Tidal Zone =	1	(1 = saltwater, 2 = transition zone)
Mean Salinity =	17	(g/kg)

Mixing Information	
Design Flow (MGD)	14.2
Acute WLA multiplier	2
Chronic WLA multiplier	50
Human health WLA multiplier	50

Agency defaults used

Effluent Information		
Mean Hardness (as CaCO3) =	NA	mg/L
90 % Temperature (Annual) =	38	(° C)
90 % Temperature (Winter) =	22	(° C)
90 % Maximum pH =	8.94	SU
10 % Maximum pH =		SU
Discharge Flow =	14.2	MGD

Parameter	Background	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			**Most Limiting Allocations**		
(ug/l unless noted)	Conc.	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	**Acute**	**Chronic**	**HH**
Acenapthene	0	--	--	2.7E+03	--	--	1.4E+05	--	--	--	--	--	--	--	--	**1.4E+05**
Acrolein		--	--	7.8E+02	--	--	3.9E+04	--	--	--	--	--	--	--	--	**3.9E+04**
Acrylonitrile[C]		--	--	6.6E+00	--	--	3.3E+02	--	--	--	--	--	--	--	--	**3.3E+02**
Aldrin [C]	0	1.3E+00	--	1.4E-03	2.6E+00	--	7.0E-02	--	--	--	--	--	--	**2.6E+00**	--	**7.0E-02**
Ammonia-N (mg/l) - Annual	0	7.1E-01	2.1E-01	--	1.4E+00	1.0E+01	--	--	--	--	--	--	--	**1.4E+00**	**1.0E+01**	--
Ammonia-N (mg/l) - Winter	0	2.9E+00	1.5E+00	--	5.9E+00	7.5E+01	--	--	--	--	--	--	--	**5.9E+00**	**7.5E+01**	--
Anthracene	0	--	--	1.1E+05	--	--	5.5E+06	--	--	--	--	--	--	--	--	**5.5E+06**
Antimony	0	--	--	4.3E+03	--	--	2.2E+05	--	--	--	--	--	--	--	--	**2.2E+05**
Arsenic	0	6.9E+01	3.6E+01	--	1.4E+02	1.8E+03	--	--	--	--	--	--	--	**1.4E+02**	**1.8E+03**	--
Benzene [C]	0	--	--	7.1E+02	--	--	3.6E+04	--	--	--	--	--	--	--	--	**3.6E+04**
Benzidine[C]		--	--	5.4E-03	--	--	2.7E-01	--	--	--	--	--	--	--	--	**2.7E-01**
Benzo (a) anthracene [C]	0	--	--	4.9E-01	--	--	2.5E+01	--	--	--	--	--	--	--	--	**2.5E+01**
Benzo (b) fluoranthene [C]	0	--	--	4.9E-01	--	--	2.5E+01	--	--	--	--	--	--	--	--	**2.5E+01**
Benzo (k) fluoranthene [C]	0	--	--	4.9E-01	--	--	2.5E+01	--	--	--	--	--	--	--	--	**2.5E+01**
Benzo (a) pyrene [C]	0	--	--	4.9E-01	--	--	2.5E+01	--	--	--	--	--	--	--	--	**2.5E+01**
Bis2-Chloroethyl Ether		--	--	1.4E+01	--	--	7.0E+02	--	--	--	--	--	--	--	--	**7.0E+02**
Bis2-Chloroisopropyl Ether		--	--	1.7E+05	--	--	8.5E+06	--	--	--	--	--	--	--	--	**8.5E+06**
Bromoform [C]	0	--	--	3.6E+03	--	--	1.8E+05	--	--	--	--	--	--	--	--	**1.8E+05**
Butylbenzylphthalate	0	--	--	5.2E+03	--	--	2.6E+05	--	--	--	--	--	--	--	--	**2.6E+05**
Cadmium	0	4.0E+01	8.8E+00	--	8.0E+01	4.4E+02	--	--	--	--	--	--	--	**8.0E+01**	**4.4E+02**	--
Carbon Tetrachloride [C]	0	--	--	4.4E+01	--	--	2.2E+03	--	--	--	--	--	--	--	--	**2.2E+03**
Chlordane [C]	0	9.0E-02	4.0E-03	2.2E-02	1.8E-01	2.0E-01	1.1E+00	--	--	--	--	--	--	**1.8E-01**	**2.0E-01**	**1.1E+00**
TRC	0			--			--	--	--	--	--	--	--	--	--	--
Chlorine Prod. Oxidant	0	1.3E+01	7.5E+00	--	2.6E+01	3.8E+02	--	--	--	--	--	--	--	**2.6E+01**	**3.8E+02**	--

Parameter	Background	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			Most Limiting Allocations		
(ug/l unless noted)	Conc.	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH
Chlorobenzene		--	--	2.1E+04	--	--	1.1E+06	--	--	--	--	--	--	--	--	1.1E+06
Chlorodibromomethane[C]	0	--	--	3.4E+02	--	--	1.7E+04	--	--	--	--	--	--	--	--	1.7E+04
Chloroform [C]	0	--	--	2.9E+04	--	--	1.5E+06	--	--	--	--	--	--	--	--	1.5E+06
2-Chloronaphthalene	0	--	--	4.3E+03	--	--	2.2E+05	--	--	--	--	--	--	--	--	2.2E+05
2-Chlorophenol	0	--	--	4.0E+02	--	--	2.0E+04	--	--	--	--	--	--	--	--	2.0E+04
Chlorpyrifos	0	1.1E-02	5.6E-03	--	2.2E-02	2.8E-01	--	--	--	--	--	--	--	2.2E-02	2.8E-01	--
Chromium III	0			--			--	--	--	--	--	--	--	--	--	--
Chromium VI	0	1.1E+03	5.0E+01	--	2.2E+03	2.5E+03	--	--	--	--	--	--	--	2.2E+03	2.5E+03	--
Chrysene [C]	0	--	--	4.9E-01	--	--	2.5E+01	--	--	--	--	--	--	--	--	2.5E+01
Copper	0	9.3E+00	6.0E+00	--	1.9E+01	3.0E+02	--	--	--	--	--	--	--	1.9E+01	3.0E+02	--
Cyanide	0	1.0E+00	1.0E+00	2.2E+05	2.0E+00	5.0E+01	1.1E+07	--	--	--	--	--	--	2.0E+00	5.0E+01	1.1E+07
DDD [C]	0	--	--	8.4E-03	--	--	4.2E-01	--	--	--	--	--	--	--	--	4.2E-01
DDE [C]	0	--	--	5.9E-03	--	--	3.0E-01	--	--	--	--	--	--	--	--	3.0E-01
DDT [C]	0	1.3E-01	1.0E-03	5.9E-03	2.6E-01	5.0E-02	3.0E-01	--	--	--	--	--	--	2.6E-01	5.0E-02	3.0E-01
Demeton	0	--	1.0E-01	--	--	5.0E+00	--	--	--	--	--	--	--	--	5.0E+00	--
Dibenz(a,h)anthracene [C]	0	--	--	4.9E-01	--	--	2.5E+01	--	--	--	--	--	--	--	--	2.5E+01
Dibutyl phthalate	0	--	--	1.2E+04	--	--	6.0E+05	--	--	--	--	--	--	--	--	6.0E+05
Dichloromethane (Methylene Chloride)[C]	0	--	--	1.6E+04	--	--	8.0E+05	--	--	--	--	--	--	--	--	8.0E+05
1,2-Dichlorobenzene	0	--	--	1.7E+04	--	--	8.5E+05	--	--	--	--	--	--	--	--	8.5E+05
1,3-Dichlorobenzene	0	--	--	2.6E+03	--	--	1.3E+05	--	--	--	--	--	--	--	--	1.3E+05
1,4-Dichlorobenzene	0	--	--	2.6E+03	--	--	1.3E+05	--	--	--	--	--	--	--	--	1.3E+05
3,3-Dichlorobenzidine[C]	0	--	--	7.7E-01	--	--	3.9E+01	--	--	--	--	--	--			
Dichlorobromomethane [C]	0	--	--	4.6E+02	--	--	2.3E+04	--	--	--	--	--	--	--	--	2.3E+04
1,2-Dichloroethane [C]	0	--	--	9.9E+02	--	--	5.0E+04	--	--	--	--	--	--	--	--	5.0E+04
1,1-Dichloroethylene	0	--	--	1.7E+04	--	--	8.5E+05	--	--	--	--	--	--	--	--	8.5E+05
1,2-trans-dichloroethylene	0	--	--	1.4E+05	--	--	7.0E+06	--	--	--	--	--	--	--	--	7.0E+06
2,4-Dichlorophenol	0	--	--	7.9E+02	--	--	4.0E+04	--	--	--	--	--	--	--	--	4.0E+04
1,2-Dichloropropane[C]	0	--	--	3.9E+02	--	--	2.0E+04	--	--	--	--	--	--	--	--	2.0E+04
1,3-Dichloropropene	0	--	--	1.7E+03	--	--	8.5E+04	--	--	--	--	--	--	--	--	8.5E+04
Dieldrin [C]	0	7.1E-01	1.9E-03	1.4E-03	1.4E+00	9.5E-02	7.0E-02	--	--	--	--	--	--	1.4E+00	9.5E-02	7.0E-02
Diethyl Phthalate	0	--	--	1.2E+05	--	--	6.0E+06	--	--	--	--	--	--	--	--	6.0E+06
Di-2-Ethylhexyl Phthalate [C]	0	--	--	5.9E+01	--	--	3.0E+03	--	--	--	--	--	--	--	--	3.0E+03
2,4-Dimethylphenol	0	--	--	2.3E+03	--	--	1.2E+05	--	--	--	--	--	--	--	--	1.2E+05
Dimethyl Phthalate	0	--	--	2.9E+06	--	--	1.5E+08	--	--	--	--	--	--	--	--	1.5E+08
Di-n-Butyl Phthalate	0	--	--	1.2E+04	--	--	6.0E+05	--	--	--	--	--	--	--	--	6.0E+05
2,4 Dinitrophenol	0	--	--	1.4E+04	--	--	7.0E+05	--	--	--	--	--	--	--	--	7.0E+05
2-Methyl-4,6-Dinitrophenol	0	--	--	7.65E+02	--	--	3.8E+04	--	--	--	--	--	--	--	--	3.8E+04
2,4-Dinitrotoluene [C]	0	--	--	9.2E+01	--	--	4.6E+03	--	--	--	--	--	--	--	--	4.6E+03
Dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin) (ppq)	0	--	--	1.2E-06	--	--	6.0E-05	--	--	--	--	--	--	--	--	6.0E-05
1,2-Diphenylhydrazine[C]	0	--	--	5.4E+00	--	--	2.7E+02	--	--	--	--	--	--	--	--	2.7E+02
Alpha-Endosulfan	0	3.4E-02	8.7E-03	2.4E+02	6.8E-02	4.4E-01	1.2E+04	--	--	--	--	--	--	6.8E-02	4.4E-01	1.2E+04

Parameter	Background	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			**Most Limiting Allocations**		
(ug/l unless noted)	Conc.	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	**Acute**	**Chronic**	**HH**
Beta-Endosulfan	0	3.4E-02	8.7E-03	2.4E+02	6.8E-02	4.4E-01	1.2E+04	--	--	--	--	--	--	**6.8E-02**	**4.4E-01**	**1.2E+04**
Endosulfan Sulfate	0	--	--	2.4E+02	--	--	1.2E+04	--	--	--	--	--	--	**--**	**--**	**1.2E+04**
Endrin	0	3.7E-02	2.3E-03	8.1E-01	7.4E-02	1.2E-01	4.1E+01	--	--	--	--	--	--	**7.4E-02**	**1.2E-01**	**4.1E+01**
Endrin Aldehyde	0	--	--	8.1E-01	--	--	4.1E+01	--	--	--	--	--	--	**--**	**--**	**4.1E+01**
Ethylbenzene	0	--	--	2.9E+04	--	--	1.5E+06	--	--	--	--	--	--	**--**	**--**	**1.5E+06**
Fluoranthene	0	--	--	3.7E+02	--	--	1.9E+04	--	--	--	--	--	--	**--**	**--**	**1.9E+04**
Fluorene	0	--	--	1.4E+04	--	--	7.0E+05	--	--	--	--	--	--	**--**	**--**	**7.0E+05**
Guthion	0	--	1.0E-02	--	--	5.0E-01	--	--	--	--	--	--	--	**--**	**5.0E-01**	**--**
Heptachlor [C]	0	5.3E-02	3.6E-03	2.1E-03	1.1E-01	1.8E-01	1.1E-01	--	--	--	--	--	--	**1.1E-01**	**1.8E-01**	**1.1E-01**
Heptachlor Epoxide[C]	0	5.3E-02	3.6E-03	1.1E-03	1.1E-01	1.8E-01	5.5E-02	--	--	--	--	--	--	**1.1E-01**	**1.8E-01**	**5.5E-02**
Hexachlorobenzene[C]	0	--	--	7.7E-03	--	--	3.9E-01	--	--	--	--	--	--	**--**	**--**	**3.9E-01**
Hexachlorobutadiene[C]	0	--	--	5.0E+02	--	--	2.5E+04	--	--	--	--	--	--	**--**	**--**	**2.5E+04**
Hexachlorocyclohexane Alpha-BHC[C]	0	--	--	1.3E-01	--	--	6.5E+00	--	--	--	--	--	--	**--**	**--**	**6.5E+00**
Hexachlorocyclohexane Beta-BHC[C]	0	--	--	4.6E-01	--	--	2.3E+01	--	--	--	--	--	--	**--**	**--**	**2.3E+01**
Hexachlorocyclohexane Gamma-BHC[C] (Lindane)	0	1.6E-01	--	6.3E-01	3.2E-01	--	3.2E+01	--	--	--	--	--	--	**3.2E-01**	**--**	**3.2E+01**
Hexachlorocyclopentadiene	0	--	--	1.7E+04	--	--	8.5E+05	--	--	--	--	--	--	**--**	**--**	**8.5E+05**
Hexachloroethane[C]	0	--	--	8.9E+01	--	--	4.5E+03	--	--	--	--	--	--	**--**	**--**	**4.5E+03**
Hydrogen Sulfide	0	--	2.0E+00		--	1.0E+02	--	--	--	--	--	--	--	**--**	**1.0E+02**	**--**
Indeno (1,2,3-cd) pyrene C	0	--	--	4.9E-01	--	--	2.5E+01	--	--	--	--	--	--	**--**	**--**	**2.5E+01**
Isophorone[C]	0	--	--	2.6E+04	--	--	1.3E+06	--	--	--	--	--	--	**--**	**--**	**1.3E+06**
Kepone	0	--	0.0E+00	--	--	0.0E+00	--	--	--	--	--	--	--	**--**	**0.0E+00**	**--**
Lead	0	2.4E+02	9.3E+00	--	4.8E+02	4.7E+02	--	--	--	--	--	--	--	**4.8E+02**	**4.7E+02**	**--**
Malathion	0	--	1.0E-01	--	--	5.0E+00	--	--	--	--	--	--	--	**--**	**5.0E+00**	**--**
Mercury	0	1.8E+00	9.4E-01	5.1E-02	3.6E+00	4.7E+01	2.6E+00	--	--	--	--	--	--	**3.6E+00**	**4.7E+01**	**2.6E+00**
Methyl Bromide	0	--	--	4.0E+03	--	--	2.0E+05	--	--	--	--	--	--	**--**	**--**	**2.0E+05**
Methoxychlor	0	--	3.0E-02	--	--	1.5E+00	--	--	--	--	--	--	--	**--**	**1.5E+00**	**--**
Mirex	0	--	0.0E+00	--	--	0.0E+00	--	--	--	--	--	--	--	**--**	**0.0E+00**	**--**
Monochlorobenzene	0	--	--	2.1E+04	--	--	1.1E+06	--	--	--	--	--	--	**--**	**--**	**1.1E+06**
Nickel	0	7.4E+01	8.2E+00	4.6E+03	1.5E+02	4.1E+02	2.3E+05	--	--	--	--	--	--	**1.5E+02**	**4.1E+02**	**2.3E+05**
Nitrobenzene	0	--	--	1.9E+03	--	--	9.5E+04	--	--	--	--	--	--	**--**	**--**	**9.5E+04**
N-Nitrosodimethylamine[C]	0	--	--	8.1E+01	--	--	4.1E+03	--	--	--	--	--	--	**--**	**--**	**4.1E+03**
N-Nitrosodiphenylamine[C]	0	--	--	1.6E+02	--	--	8.0E+03	--	--	--	--	--	--	**--**	**--**	**8.0E+03**
N-Nitrosodi-n-propylamine[C]	0	--	--	1.4E-01	--	--	7.0E+02	--	--	--	--	--	--	**--**	**--**	**7.0E+02**
Parathion	0			--			--	--	--	--	--	--	--	**--**	**--**	**--**
PCB-1016	0	--	3.0E-02	--	--	1.5E+00	--	--	--	--	--	--	--	**--**	**1.5E+00**	**--**
PCB-1221	0	--	3.0E-02	--	--	1.5E+00	--	--	--	--	--	--	--	**--**	**1.5E+00**	**--**
PCB-1232	0	--	3.0E-02	--	--	1.5E+00	--	--	--	--	--	--	--	**--**	**1.5E+00**	**--**
PCB-1242	0	--	3.0E-02	--	--	1.5E+00	--	--	--	--	--	--	--	**--**	**1.5E+00**	**--**
PCB-1248	0	--	3.0E-02	--	--	1.5E+00	--	--	--	--	--	--	--	**--**	**1.5E+00**	**--**
PCB-1254	0	--	3.0E-02	--	--	1.5E+00	--	--	--	--	--	--	--	**--**	**1.5E+00**	**--**

Parameter	Background	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			**Most Limiting Allocations**		
(ug/l unless noted)	Conc.	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	**Acute**	**Chronic**	**HH**
PCB-1260	0	--	3.0E-02	--	--	1.5E+00	--	--	--	--	--	--	--	--	**1.5E+00**	--
PCB Total[C]	0	--	--	1.7E-03	--	--	8.5E-02	--	--	--	--	--	--	--	--	**8.5E-02**
Pentachlorophenol [C]	0	1.3E+01	7.9E+00	8.2E+01	2.6E+01	4.0E+02	4.1E+03	--	--	--	--	--	--	**2.6E+01**	**4.0E+02**	**4.1E+03**
Phenol	0	--	--	4.6E+06	--	--	2.3E+08	--	--	--	--	--	--	--	--	**2.3E+08**
Phosphorus (Elemental)	0	--	0.1	--	--	5.0E+00	--	--	--	--	--	--	--	--	**5.0E+00**	--
Pyrene	0	--	--	1.1E+04	--	--	5.5E+05	--	--	--	--	--	--	--	--	**5.5E+05**
Radionuclides (pCi/l except Beta/Photon)	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Gross Alpha Activity	0	--	--	1.5E+01	--	--	7.5E+02	--	--	--	--	--	--	--	--	**7.5E+02**
Beta and Photon Activity (mrem/yr)	0	--	--	4.0E+00	--	--	2.0E+02	--	--	--	--	--	--	--	--	**2.0E+02**
Strontium-90	0	--	--	8.0E+00	--	--	4.0E+02	--	--	--	--	--	--	--	--	**4.0E+02**
Tritium	0	--	--	2.0E+04	--	--	1.0E+06	--	--	--	--	--	--	--	--	**1.0E+06**
Selenium	0	3.0E+02	7.1E+01	1.1E+04	6.0E+02	3.6E+03	5.5E+05	--	--	--	--	--	--	**6.0E+02**	**3.6E+03**	**5.5E+05**
Silver	0	2.0E+00	--	--	4.0E+00	--	--	--	--	--	--	--	--	**4.0E+00**	--	--
1,1,2,2-Tetrachloroethane[C]	0	--	--	1.1E+02	--	--	5.5E+03	--	--	--	--	--	--	--	--	**5.5E+03**
Tetrachloroethylene[C]	0	--	--	8.9E+01	--	--	4.5E+03	--	--	--	--	--	--	--	--	**4.5E+03**
Thallium	0	--	--	6.3E+00	--	--	3.2E+02	--	--	--	--	--	--	--	--	**3.2E+02**
Toluene	0	--	--	2.0E+05	--	--	1.0E+07	--	--	--	--	--	--	--	--	**1.0E+07**
Toxaphene [C]	0	2.1E-01	2.0E-04	7.5E-03	4.2E-01	1.0E-02	3.8E-01	--	--	--	--	--	--	**4.2E-01**	**1.0E-02**	**3.8E-01**
Tributyltin	0	3.8E-01	1.0E-03	--	7.6E-01	5.0E-02	--	--	--	--	--	--	--	**7.6E-01**	**5.0E-02**	--
1,2,4-Trichlorobenzene	0	--	--	9.4E+02	--	--	4.7E+04	--	--	--	--	--	--	--	--	**4.7E+04**
1,1,2-Trichloroethane[C]		--	--	4.2E+02	--	--	2.1E+04	--	--	--	--	--	--	--	--	**2.1E+04**
Trichloroethylene [C]	0	--	--	8.1E+02	--	--	4.1E+04	--	--	--	--	--	--	--	--	**4.1E+04**
2,4,6-Trichlorophenol [C]	0	--	--	6.6E+01	--	--	3.3E+03	--	--	--	--	--	--	--	--	**3.3E+03**
Vinyl Chloride[C]	0	--	--	6.1E+01	--	--	3.1E+03	--	--	--	--	--	--	--	--	**3.1E+03**
Zinc	0	9.0E+01	8.1E+01	6.9E+04	1.8E+02	4.1E+03	3.5E+06	--	--	--	--	--	--	**1.8E+02**	**4.1E+03**	**3.5E+06**

Notes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
2. Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
3. Metals measured as Dissolved, unless specified otherwise
4. "C" indicates a carcinogenic parameter
5. For transition zone waters, spreadsheet prints the lesser of the fresh water and saltwater water quality criteria.
6. Regular WLA = (WQC x WLA multiplier) - (WLA multiplier - 1)(background conc.)
7. Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
   = (0.1(WQC - background conc.) + background conc.) for human health
8. Antideg. WLA = (Antideg. Baseline)(WLA multiplier) - (WLA multiplier - 1)(background conc.)

Metal	Site Specific Target Value (SSTV)
Antimony	2.2E+05
Arsenic III	5.5E+01
Cadmium	3.2E+01
Chromium III	#VALUE!
Chromium VI	8.8E+02
Copper	7.4E+00
Lead	1.9E+02
Mercury	1.4E+00
Nickel	5.9E+01
Selenium	2.4E+02
Silver	1.6E+00
Zinc	7.2E+01

Note: do not use QL's lower than the minimum QL's provided in agency guidance

9/27/04 8:39:50 AM

Facility = Omega 995 (004+005)
Chemical = ammonia
Chronic averaging period = 30
WLAa = 1.4
WLAc = 10
Q.L. = 0.2
# samples/mo. = 2
# samples/wk. = 1

Summary of Statistics:

observations = 8
Expected Value = .447471
Variance = .072083
C.V. = 0.6
97th percentile daily values = 1.08888
97th percentile 4 day average = .744498
97th percentile 30 day average= .539674
< Q.L. = 1
Model used = BPJ Assumptions, Type 1 data

No Limit is required for this material

The data are:

0.309
0.298
0.281
0.296
0
0.575
0.553
3.7

9/27/04 8:42:21 AM

Facility = Omega 995 (004+005)
Chemical = Cadmium
Chronic averaging period = 4
WLAa = 80
WLAc = 440
Q.L. = 5
# samples/mo. = 2
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 8
Variance = 23.04
C.V. = 0.6
97th percentile daily values = 19.4673
97th percentile 4 day average = 13.3103
97th percentile 30 day average= 9.64842
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

8

6/30/04 8:48:12 PM

995

Facility = Omega (004-005)

Chemical = Copper

Chronic averaging period = 4

WLAa = 19

WLAc = 300

Q.L. = 4.7

samples/mo. = 2

samples/wk. = 1

Summary of Statistics:

observations = 12

Expected Value = 71.4509

Variance = 458.150

C.V. = 0.299568

97th percentile daily values = 118.803

97th percentile 4 day average = 93.5130

97th percentile 30 day average= 78.8017

< Q.L. = 0

Model used = lognormal

A limit is needed based on Acute Toxicity

Maximum Daily Limit = 19

Average Weekly limit = 19

Average Monthly LImit = 16.5787015065066

The data are:

66

72

73

75

74

73

72

90

53

52

36

117

6/25/04 9:24:08 AM

995

Facility = Omega (004/005)
Chemical = Nickel
Chronic averaging period = 4
WLAa = 150
WLAc = 410
Q.L. = 8
# samples/mo. = 2
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 14
Variance = 70.56
C.V. = 0.6
97th percentile daily values = 34.0678
97th percentile 4 day average = 23.2930
97th percentile 30 day average= 16.8847
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

14

6/25/04 9:35:39 AM

995

Facility = Omega (004/005)
Chemical = Silver
Chronic averaging period = 4
WLAa = 4
WLAc =
Q.L. = 1
# samples/mo. = 2
# samples/wk. = 1

Summary of Statistics:

observations = 8
Expected Value = 4.60375
Variance = 7.63002
C.V. = 0.6
97th percentile daily values = 11.2028
97th percentile 4 day average = 7.65967
97th percentile 30 day average= 5.55236
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 4
Average Weekly limit = 4
Average Monthly LImit = 3.25273595368957

The data are:

1.62
1.07
1.51
1.43
1.16
1.32
4.72
24

ATTACHMENT 12

PERMITTEE NAME/ADDRESS(INCLUDE FACILITY NAME/LOCATION IF DIFFERENT)

NAME Omega Protein - Reedville
ADDRESS PO Box 175
Reedville VA 22539
FACILITY LOCATION 610 Menhaden Rd

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF ENVIRONMENTAL QUALITY
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM(NPDES)
DISCHARGE MONITORING REPORT(DMR)

VA0003867	001
PERMIT NUMBER	DISCHARGE NUMBER

MONITORING PERIOD						
	YEAR	MO	DAY		YEAR	MO	DAY
FROM				TO			

Industrial Major 10/12/2005

DEPT. OF ENVIRONMENTAL QUALITY
(REGIONAL OFFICE)

Piedmont Regional Office
4949-A Cox Road

Glen Allen VA 23060

NOTE: **READ PERMIT AND GENERAL INSTRUCTIONS BEFORE COMPLETING THIS FORM.**

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX.	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
001 FLOW	REPORTD				*********	*********	*********				
	REQRMNT	NL	NL	MGD	*********	*********	*********			CONT	EST
002 PH	REPORTD	*********	*********			*********					
	REQRMNT	*********	*********		6.0	*********	9.0	SU		3D/W	GRAB
003 BOD5	REPORTD				*********	*********	*********				
	REQRMNT	1700	3100	KG/D	*********	*********	*********			3D/W	24HC
004 TSS	REPORTD				*********	*********	*********				
	REQRMNT	650	1600	KG/D	*********	*********	*********			3D/W	24HC
005 CL2, TOTAL	REPORTD	*********	*********		*********						
	REQRMNT	*********	*********		*********	580	1200	UG/L		1/DAY	GRAB
012 PHOSPHORUS, TOTAL (AS P)	REPORTD		*********		*********		*********				
	REQRMNT	23	*********	KG/D	*********	2.0	*********	MG/L		1/W	24HC
013 NITROGEN, TOTAL (AS N)	REPORTD		*********		*********		*********				
	REQRMNT	NL	*********	KG/D	*********	NL	*********	MG/L		1/W	CALC
018 CYANIDE, TOTAL (AS CN)	REPORTD	*********	*********		*********						
	REQRMNT	*********	*********		*********	96	110	UG/L		2/M	GRAB

ADDITIONAL PERMIT REQUIREMENTS OR COMMENTS

BYPASSES AND OVERFLOWS	TOTAL OCCURRENCES	TOTAL FLOW(M.G.)	TOTAL BOD5(K.G.)

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OPERATOR IN RESPONSIBLE CHARGE			DATE		
TYPED OR PRINTED NAME	SIGNATURE	CERTIFICATE NO.	YEAR	MO.	DAY
PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT		TELEPHONE			
TYPED OR PRINTED NAME	SIGNATURE		YEAR	MO.	DAY

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF ENVIRONMENTAL QUALITY
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM(NPDES)
DISCHARGE MONITORING REPORT(DMR)

Industrial Major 10/12/2005

PERMITTEE NAME/ADDRESS(INCLUDE FACILITY NAME/LOCATION IF DIFFERENT)

NAME Omega Protein - Reedville
ADDRESS PO Box 175
Reedville VA 22539
FACILITY LOCATION 610 Menhaden Rd

VA0003867	001
PERMIT NUMBER	DISCHARGE NUMBER

MONITORING PERIOD						
	YEAR	MO	DAY		YEAR	MO	DAY
FROM				TO			

DEPT. OF ENVIRONMENTAL QUALITY (REGIONAL OFFICE)
Piedmont Regional Office
4949-A Cox Road
Glen Allen VA 23060

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PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX.	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
039 AMMONIA, AS N	REPORTD	*********	*********		*********						
	REQRMNT	*********	*********		*********	NL	NL	MG/L		2/M	24HC
068 TKN (N-KJEL)	REPORTD		*********		*********		*********				
	REQRMNT	NL	*********		*********	NL	*********	MG/L		1/W	24HC
080 TEMPERATURE, WATER (DEG. C)	REPORTD	*********	*********		*********	*********					
	REQRMNT	*********	*********		*********	*********	50	C		1/DAY	IS
389 NITRITE+NITRATE-N,TOTAL	REPORTD		*********		*********		*********				
	REQRMNT	NL	*********	KG/D	*********	NL	*********	MG/L		1/W	24HC
500 OIL & GREASE	REPORTD				*********	*********	*********				
	REQRMNT	370	680	KG/D	*********	*********	*********			3D/W	GRAB
791 NITROGEN, TOTAL (AS N) (MONTHLY LOAD)	REPORTD	*********			*********	*********	*********				
	REQRMNT	*********	NL	KG/MO	*********	*********	*********			1/M	CALC
792 NITROGEN, TOTAL (AS N) (CALENDAR YEAR)	REPORTD	*********			*********	*********	*********				
	REQRMNT	*********	NL	KG/YR	*********	*********	*********			1/YR	CALC
793 PHOSPHORUS, TOTAL (AS P) (MONTHLY LOAD)	REPORTD	*********			*********	*********	*********				
	REQRMNT	*********	NL	KG/MO	*********	*********	*********			1/M	CALC

ADDITIONAL PERMIT REQUIREMENTS OR COMMENTS

BYPASSES AND OVERFLOWS	TOTAL OCCURRENCES	TOTAL FLOW(M.G.)	TOTAL BOD5(K.G.)

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TYPED OR PRINTED NAME	SIGNATURE		YEAR	MO.	DAY

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF ENVIRONMENTAL QUALITY
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM(NPDES)
DISCHARGE MONITORING REPORT(DMR)

Industrial Major 10/19/2005

PERMITTEE NAME/ADDRESS(INCLUDE FACILITY NAME/LOCATION IF DIFFERENT)

NAME Omega Protein - Reedville
ADDRESS PO Box 175
Reedville VA 22539
FACILITY LOCATION 610 Menhaden Rd

VA0003867	001
PERMIT NUMBER	DISCHARGE NUMBER

MONITORING PERIOD						
	YEAR	MO	DAY		YEAR	MO	DAY
FROM				TO			

DEPT. OF ENVIRONMENTAL QUALITY
(REGIONAL OFFICE)

Piedmont Regional Office
4949-A Cox Road

Glen Allen VA 23060

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PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX.	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
794 PHOSPHORUS, TOTAL (AS P) (CALENDAR YEAR)	REPORTD	*********			*********	*********	*********				
	REQRMNT	*********	NL	KG/YR	*********	*********	*********			1/YR	CALC
795 ORTHOPHOSPHATE (AS P)	REPORTD		*********		*********		*********				
	REQRMNT	NL	*********	KG/D	*********	NL	*********	MG/L		1/W	24HC
805 NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	REPORTD	*********			*********	*********	*********				
	REQRMNT	*********	NL	KG/YR	*********	*********	*********			1/M	CALC
806 PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	REPORTD	*********			*********	*********	*********				
	REQRMNT	*********	NL	KG/YR	*********	*********	*********			1/M	CALC
	REPORTD										
	REQRMNT									*******	
	REPORTD										
	REQRMNT									*******	
	REPORTD										
	REQRMNT									*******	
	REPORTD										
	REQRMNT									*******	

ADDITIONAL PERMIT REQUIREMENTS OR COMMENTS

BYPASSES AND OVERFLOWS	TOTAL OCCURRENCES	TOTAL FLOW(M.G.)	TOTAL BOD5(K.G.)

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FACILITY LOCATION 610 Menhaden Rd

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF ENVIRONMENTAL QUALITY
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM(NPDES)
DISCHARGE MONITORING REPORT(DMR)

VA0003867	002
PERMIT NUMBER	DISCHARGE NUMBER

MONITORING PERIOD						
	YEAR	MO	DAY		YEAR	MO	DAY
FROM				TO			

Industrial Major 10/12/2005

DEPT. OF ENVIRONMENTAL QUALITY
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		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
001 FLOW	REPORTD				*********	*********	*********				
	REQRMNT	NL	NL	MGD	*********	*********	*********			CONT	MEAS
002 PH	REPORTD	*********	*********			*********					
	REQRMNT	*********	*********		6.0	*********	9.0	SU		2D/W	GRAB
003 BOD5	REPORTD				*********	*********	*********				
	REQRMNT	470	840	KG/D	*********	*********	*********			2/M	24HC
004 TSS	REPORTD				*********	*********	*********				
	REQRMNT	160	410	KG/D	*********	*********	*********			2/M	24HC
006 COLIFORM, FECAL	REPORTD	*********	*********		*********		*********				
	REQRMNT	*********	*********		*********	200	*********	N/CML		1/W	GRAB
012 PHOSPHORUS, TOTAL (AS P)	REPORTD		*********		*********		*********				
	REQRMNT	NL	*********	KG/D	*********	NL	*********	MG/L		1/W	24HC
013 NITROGEN, TOTAL (AS N)	REPORTD		*********		*********		*********				
	REQRMNT	NL	*********	KG/D	*********	NL	*********	MG/L		2/M	CALC
039 AMMONIA, AS N	REPORTD	*********	*********		*********						
	REQRMNT	*********	*********		*********	38	45	MG/L		2/M	24HC

ADDITIONAL PERMIT REQUIREMENTS OR COMMENTS

BYPASSES AND OVERFLOWS	TOTAL OCCURRENCES	TOTAL FLOW(M.G.)	TOTAL BOD5(K.G.)

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OPERATOR IN RESPONSIBLE CHARGE			DATE		
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PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT		TELEPHONE			
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COMMONWEALTH OF VIRGINIA
DEPARTMENT OF ENVIRONMENTAL QUALITY
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM(NPDES)
DISCHARGE MONITORING REPORT(DMR)

Industrial Major 10/19/2005

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VA0003867	002
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		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
068 TKN (N-KJEL)	REPORTD		*********		*********		*********				
	REQRMNT	NL	*********	KG/D	*********	NL	*********	MG/L		1/W	24HC
080 TEMPERATURE, WATER (DEG. C)	REPORTD	*********	*********		*********						
	REQRMNT	*********	*********		*********	NL	NL	C		2D/W	IS
140 ENTEROCOCCI	REPORTD	*********	*********		*********		*********				
	REQRMNT	*********	*********		*********	35	*********	N/CML		1/W	GRAB
379 TOXICITY, FINAL, ACUTE	REPORTD	*********	*********		*********	*********					
	REQRMNT	*********	*********		*********	*********	14	TU-A		1/3M	24HC
389 NITRITE+NITRATE-N,TOTAL	REPORTD		*********		*********		*********				
	REQRMNT	NL	*********	KG/D	*********	NL	*********	MG/L		1/W	24HC
500 OIL & GREASE	REPORTD				*********	*********	*********				
	REQRMNT	25	46	KG/D	*********	*********	*********			2/M	GRAB
791 NITROGEN, TOTAL (AS N) (MONTHLY LOAD)	REPORTD	*********			*********	*********	*********				
	REQRMNT	*********	NL	KG/MO	*********	*********	*********			1/M	CALC
792 NITROGEN, TOTAL (AS N) (CALENDAR YEAR)	REPORTD	*********			*********	*********	*********				
	REQRMNT	*********	NL	KG/YR	*********	*********	*********			1/YR	CALC

ADDITIONAL PERMIT REQUIREMENTS OR COMMENTS

BYPASSES AND OVERFLOWS	TOTAL OCCURRENCES	TOTAL FLOW(M.G.)	TOTAL BOD5(K.G.)

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TYPED OR PRINTED NAME	SIGNATURE	CERTIFICATE NO.	YEAR	MO.	DAY
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DEPARTMENT OF ENVIRONMENTAL QUALITY
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VA0003867	002
PERMIT NUMBER	DISCHARGE NUMBER

MONITORING PERIOD						
	YEAR	MO	DAY		YEAR	MO	DAY
FROM				TO			

Industrial Major 10/12/2005

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		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
793 PHOSPHORUS, TOTAL (AS P) (MONTHLY LOAD)	REPORTD	*********			*********	*********	*********				
	REQRMNT	*********	NL	KG/MO	*********	*********	*********			1/M	CALC
794 PHOSPHORUS, TOTAL (AS P) (CALENDAR YEAR)	REPORTD	*********			*********	*********	*********				
	REQRMNT	*********	NL	KG/YR	*********	*********	*********			1/YR	CALC
795 ORTHOPHOSPHATE (AS P)	REPORTD		*********		*********		*********				
	REQRMNT	NL	*********	KG/D	*********	NL	*********	MG/L		1/W	24HC
805 NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	REPORTD	*********			*********	*********	*********				
	REQRMNT	*********	NL	KG/YR	*********	*********	*********			1/M	CALC
806 PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	REPORTD	*********			*********	*********	*********				
	REQRMNT	*********	NL	KG/YR	*********	*********	*********			1/M	CALC
	REPORTD										
	REQRMNT									*******	
	REPORTD										
	REQRMNT									*******	
	REPORTD										
	REQRMNT									*******	

ADDITIONAL PERMIT REQUIREMENTS OR COMMENTS

BYPASSES AND OVERFLOWS	TOTAL OCCURRENCES	TOTAL FLOW(M.G.)	TOTAL BOD5(K.G.)

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. SEE 18 U.S.C. & 1001 AND 33 U.S.C. & 1319. (Penalties under these statutes may include fines up to $10,000 and/or maximum imprisonment of between 6 months and 5 years.)

OPERATOR IN RESPONSIBLE CHARGE			DATE		
TYPED OR PRINTED NAME	SIGNATURE	CERTIFICATE NO.	YEAR	MO.	DAY
PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT		TELEPHONE			
TYPED OR PRINTED NAME	SIGNATURE		YEAR	MO.	DAY

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF ENVIRONMENTAL QUALITY
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM(NPDES)
DISCHARGE MONITORING REPORT(DMR)

Industrial Major 10/19/2005

PERMITTEE NAME/ADDRESS(INCLUDE FACILITY NAME/LOCATION IF DIFFERENT)

NAME Omega Protein - Reedville
ADDRESS PO Box 175
Reedville VA 22539
FACILITY LOCATION 610 Menhaden Rd

VA0003867	003
PERMIT NUMBER	DISCHARGE NUMBER

MONITORING PERIOD						
	YEAR	MO	DAY		YEAR	MO	DAY
FROM				TO			

DEPT. OF ENVIRONMENTAL QUALITY (REGIONAL OFFICE)
Piedmont Regional Office
4949-A Cox Road
Glen Allen VA 23060

NOTE: READ PERMIT AND GENERAL INSTRUCTIONS BEFORE COMPLETING THIS FORM.

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX.	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
001 FLOW	REPORTD				*********	*********	*********				
	REQRMNT	NL	NL	MGD	*********	*********	*********			CONT	EST
002 PH	REPORTD	*********	*********			*********					
	REQRMNT	*********	*********		6.0	*********	9.0	SU		2/M	GRAB
003 BOD5	REPORTD				*********	*********	*********				
	REQRMNT	4300	7700	KG/D	*********	*********	*********			2/M	24HC
004 TSS	REPORTD				*********	*********	*********				
	REQRMNT	110	280	KG/D	*********	*********	*********			2/M	24HC
007 DO	REPORTD	*********	*********				*********				
	REQRMNT	*********	*********		NL	NL	*********	MG/L		1/DAY	GRAB
012 PHOSPHORUS, TOTAL (AS P)	REPORTD		*********		*********		*********				
	REQRMNT	3.0	*********	KG/D	*********	2.0	*********	MG/L		1/W	24HC
013 NITROGEN, TOTAL (AS N)	REPORTD		*********		*********		*********				
	REQRMNT	NL	*********	KG/D	*********	NL	*********	MG/L		1/W	CALC
039 AMMONIA, AS N	REPORTD	*********	*********		*********						
	REQRMNT	*********	*********		*********	37	45	MG/L		2/M	24HC

ADDITIONAL PERMIT REQUIREMENTS OR COMMENTS

BYPASSES AND OVERFLOWS	TOTAL OCCURRENCES	TOTAL FLOW(M.G.)	TOTAL BOD5(K.G.)

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		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
068 TKN (N-KJEL)	REPORTD		*********		*********		*********				
	REQRMNT	NL	*********	KG/D	*********	NL	*********	MG/L		1/W	24HC
080 TEMPERATURE, WATER (DEG. C)	REPORTD	*********	*********		*********						
	REQRMNT	*********	*********		*********	NL	NL	C		1/DAY	IS
389 NITRITE+NITRATE-N,TOTAL	REPORTD		*********		*********		*********				
	REQRMNT	NL	*********	KG/D	*********	NL	*********	MG/L		1/W	24HC
442 COPPER, DISSOLVED (UG/L AS CU)	REPORTD	*********	*********		*********						
	REQRMNT	*********	*********		*********	NL	NL	UG/L		1/M	GRAB
500 OIL & GREASE	REPORTD				*********	*********	*********				
	REQRMNT	430	780	KG/D	*********	*********	*********			2/M	GRAB
791 NITROGEN, TOTAL (AS N) (MONTHLY LOAD)	REPORTD	*********			*********	*********	*********				
	REQRMNT	*********	NL	KG/MO	*********	*********	*********			1/M	CALC
792 NITROGEN, TOTAL (AS N) (CALENDAR YEAR)	REPORTD	*********			*********	*********	*********				
	REQRMNT	*********	NL	KG/YR	*********	*********	*********			1/YR	CALC
793 PHOSPHORUS, TOTAL (AS P) (MONTHLY LOAD)	REPORTD	*********			*********	*********	*********				
	REQRMNT	*********	NL	KG/MO	*********	*********	*********			1/M	CALC

ADDITIONAL PERMIT REQUIREMENTS OR COMMENTS

BYPASSES AND OVERFLOWS	TOTAL OCCURRENCES	TOTAL FLOW(M.G.)	TOTAL BOD5(K.G.)

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PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX.	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
794 PHOSPHORUS, TOTAL (AS P) (CALENDAR YEAR)	REPORTD	*********			*********	*********	*********				
	REQRMNT	*********	NL	KG/YR	*********	*********	*********			1/YR	CALC
795 ORTHOPHOSPHATE (AS P)	REPORTD		*********		*********		*********				
	REQRMNT	NL	*********	KG/D	*********	NL	*********	MG/L		1/W	24HC
805 NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	REPORTD	*********			*********	*********	*********				
	REQRMNT	*********	NL	KG/YR	*********	*********	*********			1/M	CALC
806 PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	REPORTD	*********			*********	*********	*********				
	REQRMNT	*********	NL	KG/YR	*********	*********	*********			1/M	CALC
	REPORTD										
	REQRMNT									*******	
	REPORTD										
	REQRMNT									*******	
	REPORTD										
	REQRMNT									*******	
	REPORTD										
	REQRMNT									*******	

ADDITIONAL PERMIT REQUIREMENTS OR COMMENTS

BYPASSES AND OVERFLOWS	TOTAL OCCURRENCES	TOTAL FLOW(M.G.)	TOTAL BOD5(K.G.)

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COMMONWEALTH OF VIRGINIA
DEPARTMENT OF ENVIRONMENTAL QUALITY
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM(NPDES)
DISCHARGE MONITORING REPORT(DMR)

Industrial Major 10/19/2005

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NAME Omega Protein - Reedville
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Reedville VA 22539

FACILITY LOCATION 610 Menhaden Rd

VA0003867	995
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MONITORING PERIOD						
	YEAR	MO	DAY		YEAR	MO	DAY
FROM				TO			

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Glen Allen VA 23060

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		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
001 FLOW	REPORTD				*********	*********	*********				
	REQRMNT	NL	NL	MGD	*********	*********	*********			CONT	EST
002 PH	REPORTD	*********	*********			*********					
	REQRMNT	*********	*********		6.0	*********	9.0	SU		5D/W	GRAB
019 COPPER, TOTAL (AS CU)	REPORTD	*********	*********		*********						
	REQRMNT	*********	*********		*********	NL	NL	UG/L		1/M	24HC
080 TEMPERATURE, WATER (DEG. C)	REPORTD	*********	*********		*********						
	REQRMNT	*********	*********		*********	NL	45	C		1/DAY	IS
186 SILVER, TOTAL RECOVERABLE	REPORTD	*********	*********		*********						
	REQRMNT	*********	*********		*********	NL	NL	UG/L		1/M	24HC
448 ZINC, DISSOLVED (AS ZN) (UG/L)	REPORTD	*********	*********		*********						
	REQRMNT	*********	*********		*********	NL	NL	UG/L		1/M	GRAB
	REPORTD										
	REQRMNT									*******	
	REPORTD										
	REQRMNT									*******	

ADDITIONAL PERMIT REQUIREMENTS OR COMMENTS

BYPASSES AND OVERFLOWS	TOTAL OCCURRENCES	TOTAL FLOW(M.G.)	TOTAL BOD5(K.G.)

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Industrial Major 10/19/2005

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF ENVIRONMENTAL QUALITY
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM(NPDES)
DISCHARGE MONITORING REPORT(DMR)

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Reedville VA 22539
FACILITY LOCATION 610 Menhaden Rd

VA0003867	996
PERMIT NUMBER	DISCHARGE NUMBER

MONITORING PERIOD						
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FROM				TO			

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		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
791 NITROGEN, TOTAL (AS N) (MONTHLY LOAD)	REPORTD	*********			*********	*********	*********				
	REQRMNT	*********	NL	KG/MO	*********	*********	*********			1/M	CALC
792 NITROGEN, TOTAL (AS N) (CALENDAR YEAR)	REPORTD	*********			*********	*********	*********				
	REQRMNT	*********	7076	KG/YR	*********	*********	*********			1/YR	CALC
793 PHOSPHORUS, TOTAL (AS P) (MONTHLY LOAD)	REPORTD	*********			*********	*********	*********				
	REQRMNT	*********	NL	KG/MO	*********	*********	*********			1/M	CALC
794 PHOSPHORUS, TOTAL (AS P) (CALENDAR YEAR)	REPORTD	*********			*********	*********	*********				
	REQRMNT	*********	530	KG/YR	*********	*********	*********			1/YR	CALC
805 NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	REPORTD	*********			*********	*********	*********				
	REQRMNT	*********	NL	KG/YR	*********	*********	*********			1/M	CALC
806 PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	REPORTD	*********			*********	*********	*********				
	REQRMNT	*********	NL	KG/YR	*********	*********	*********			1/M	CALC
	REPORTD										
	REQRMNT									*******	
	REPORTD										
	REQRMNT									*******	

ADDITIONAL PERMIT REQUIREMENTS OR COMMENTS

BYPASSES AND OVERFLOWS	TOTAL OCCURRENCES	TOTAL FLOW(M.G.)	TOTAL BOD5(K.G.)

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PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT		TELEPHONE			
TYPED OR PRINTED NAME	SIGNATURE		YEAR	MO.	DAY

THIS REPORT IS REQUIRED BY LAW (33 U. S. C. § 1318 40 CFR 122.60). FAILURE TO REPORT OR FAILURE TO REPORT TRUTHFULLY CAN RESULT IN CIVIL PENALTIES NOT TO EXCEED $10,000 PER DAY OF VIOLATION: OR IN CRIMINAL PENALTIES NOT TO EXCEED $25,000 PER DAY OF VIOLATION OR BY IMPRISONMENT FOR NOT MORE THAN FIVE YEARS, OR BOTH.

GENERAL INSTRUCTIONS

1. Complete this form in permanent ink or indelible pencil.
2. Be sure to enter the dates for the first and last day of the period covered by the report on the form in the space marked "Monitoring Period".
3. For those parameters where the "permit requirement" spaces are blank or a limitation appears, provide data in the "reported" spaces in accordance with your permit.
4. Enter the average and, if appropriate, maximum quantities and units in the "reported" spaces in the columns marked "Quantity or Loading". KG/DAY = Concentration(mg/l) x Flow(MGD) x 3.785.
5. Enter maximum, minimum, and/or average concentrations and units in the "reported" spaces in the columns marked "Quality or Concentration".
6. Enter the number of samples which do not comply with the maximum and /or minimum permit requirements in the "reported" space in the column marked "No. Ex.".
7. Enter the actual frequency of analysis for each parameter (number of times per day, week, month) in the "reported" space in the column marked "Frequency of Analysis".
8. Enter the actual type of sample collected for each parameter in the "reported" space in the column marked "Sample Type".
9. Enter additional required data or comments in the space marked "additional permit requirements or comments".
10. Record the number of bypasses during the month, the total flow in million gallons and BOD5 in kilograms in the proper columns in the section marked "Bypasses and Overflows".
11. The operator in responsible charge of the facility should review the form and sign in the space provided. If the plant is required to have a licensed operator, the operator's certificate number should be reported in the space provided.
12. The principal executive officer should then review the form and sign in the space provided and provide a telephone number where he/she can be reached.
13. You are required to sample at the frequency and type indicated in your permit.
14. Send the completed form to your Dept. of Environmental Quality Regional Office by the 10th of each month.
15. You are required to retain a copy of the report for your records.
16. Where violations of permit requirements are reported, attach a brief explanation in accordance with the permit requirements describing causes and corrective actions taken. Reference each violation by date.
17. If you have any questions, contact the Dept. of Environmental Quality Regional Office.

ATTACHMENT 13

Omega Fact Sheet
Attachment 13

o: James R. Bell@rchmd@deq
c:
cc:
rom: Maynard D. Phillips@WPS@DEQ
ubject:
ate: Monday, May 4, 1998 8:55:36 EDT
ttach:
ertify: N
orwarded by: James R. Bell@RCHMD@DEQ

---

orwarded to: Denise M. Mosca@KLMCK@DEQ
cc: Ray R. Jenkins@RCHMD@DEQ

orwarded date: Monday, May 4, 1998 9:25:57 EDT
omments by: James R. Bell@RCHMD@DEQ

---------- [Original Message] ----------

R

elative to Zappata antibacksliding:

: believe that the current permit limits result in attainment of all pplicable standards in the receiving stream. Further, I believe that the tream is a tier 1 stream. In this case section 302(d)(4)(B) of the clean ater act allows modification of the permit limits and antibacksliding does ot apply.

or example, the standards are attained, they will be attained after the odification, antidegradation for this stream consists of the finding that it s a tier 1 stream requiring maintenance of all standards. Bottom line is, he change will comply with 303(d)(4)(B) and in that case section 402(o) does ot apply. See section 402(o)(1) of the act.

ale.

load not later than thirty days after the date of submission. If the Administrator approves such identification and load, such State shall incorporate them into its current plan under subsection (e) of this section. If the Administrator disapproves such identification and load, he shall not later than thirty days after the date of such disapproval identify such waters in such State and establish such loads for such waters as he determines necessary to implement the water quality standards applicable to such waters and upon such identification and establishment the State shall incorporate them into its current plan under subsection (e) of this section.

(3) For the specific purpose of developing information, each State shall identify all waters within its boundaries which it has not identified under paragraph (1)(A) and (1)(B) of this subsection and estimate for such waters the total maximum daily load with seasonal variations and margins of safety, for those pollutants which the Administrator identifies under section 304(a)(2) as suitable for such calculation and for thermal discharges, at a level that would assure protection and propagation of a balanced indigenous population of fish, shellfish and wildlife.

(4) LIMITATIONS ON REVISION OF CERTAIN EFFLUENT LIMITATIONS.—

(A) STANDARD NOT ATTAINED.—For waters identified under paragraph (1)(A) where the applicable water quality standard has not yet been attained, any effluent limitation based on a total maximum daily load or other waste load allocation established under this section may be revised only if (i) the cumulative effect of all such revised effluent limitations based on such total maximum daily load or waste load allocation will assure the attainment of such water quality standard, or (ii) the designated use which is not being attained is removed in accordance with regulations established under this section.

(B) STANDARD ATTAINED.—For waters identified under paragraph (1)(A) where the quality of such waters equals or exceeds levels necessary to protect the designated use for such waters or otherwise required by applicable water quality standard, any effluent limitation based on a total maximum daily load or other waste load allocation established under this section, or any water quality standard established under this section, or any other permitting standard may be revised only if such revision is subject to and consistent with the antidegradation policy established under this section.

(e)(1) Each State shall have a continuing planning process approved under paragraph (2) of this subsection which is consistent with this Act.

(2) Each State shall submit not later than 120 days after the date of the enactment of the Water Pollution Control Amendments of 1972 to the Administrator for his approval a proposed continuing planning process which is consistent with this Act. Not later than thirty days after the date of submission of such a process the Administrator shall either approve or disapprove such process. The Administrator shall from time to time review each State's approved planning process for the purpose of insuring that such planning process is at all times consistent with this Act. The Administrator

ATTACHMENT 14

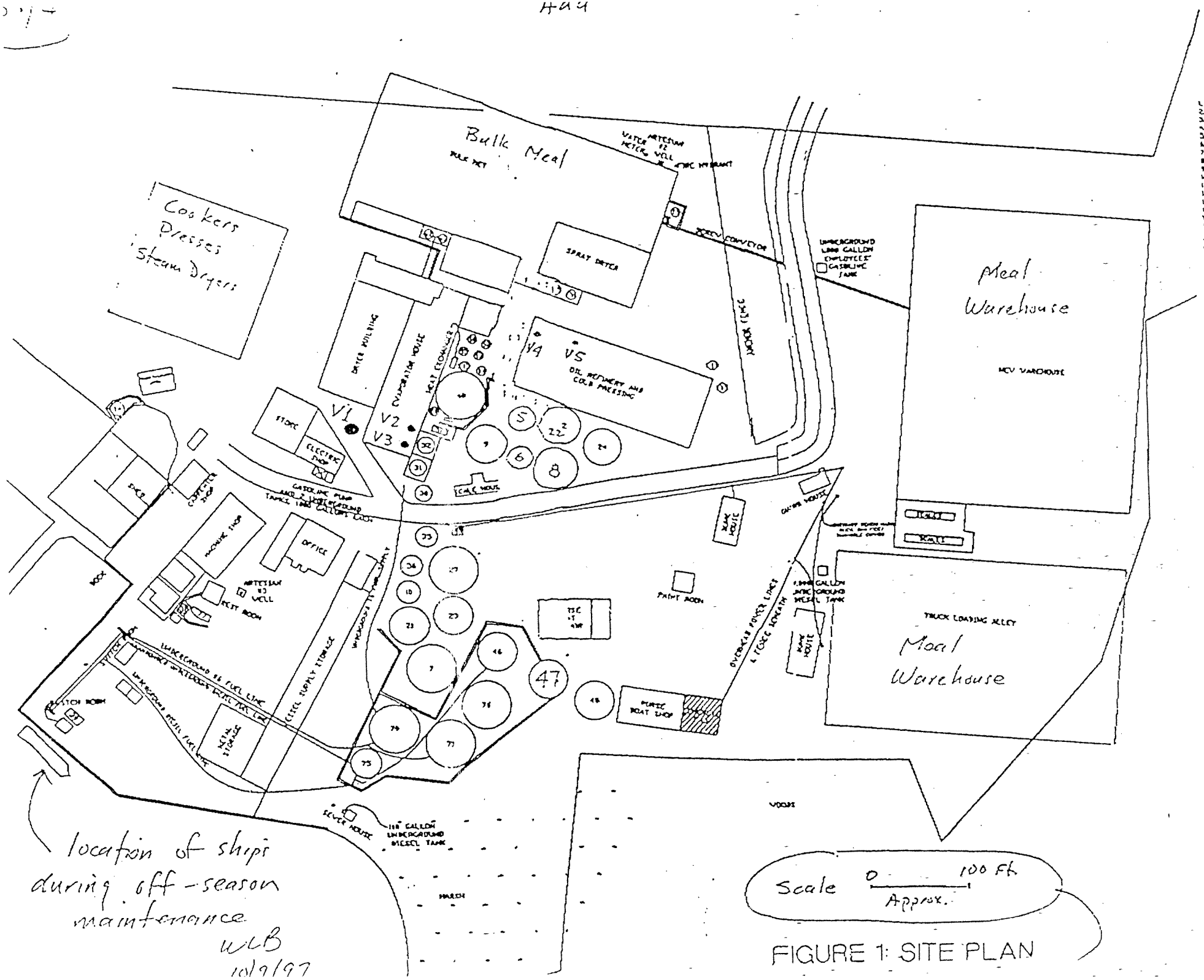
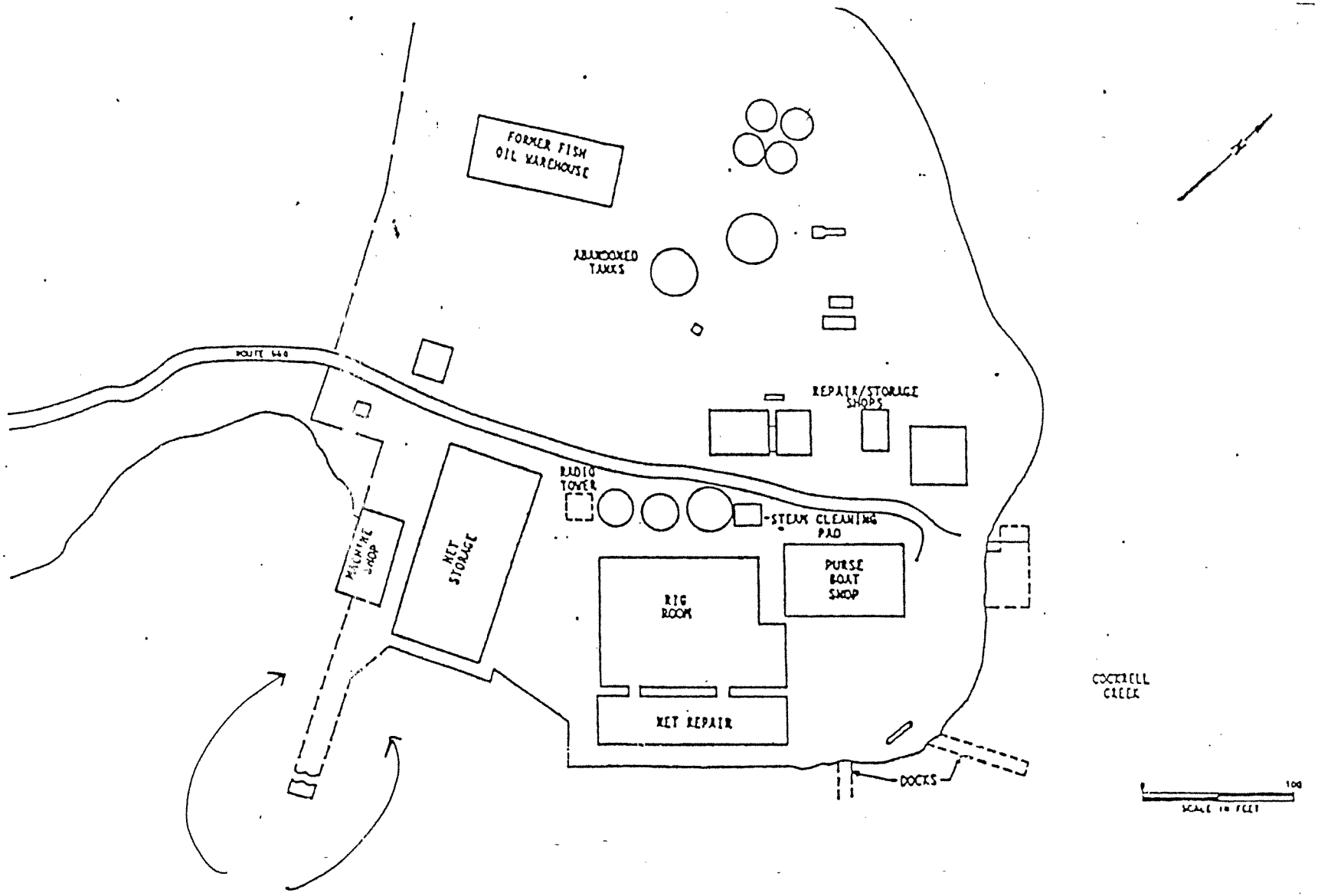


FIGURE 1: SITE PLAN

location of ships during off-season maintenance
WLB
10/9/97

Attachment 14



Ship Repair (BMPs)

Fairport-Boatyard

Omega Protein, Inc.
Reedville, VA February

Attachment 14

ATTACHMENT 15

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY

PIEDMONT REGIONAL OFFICE – KILMARNOCK SATTELITE OFFICE

P.O. Box 699 Kilmarnock, VA 22482

SUBJECT: TMP Data Review for Omega Protein (VA0003867)

TO: PRO TMP file

FROM: Denise Mosca

DATE: January 23, 2003, rev. September 30, 2004

COPIES: OWPS-TMP

INTRODUCTION

This testing was performed under a permit with an effective date of December 17, 1997 for Omega Protein, the menhaden fish processing plant in Reedville, Va. The TMP requires annual acute and chronic testing at 001 (contact cooling water) using *Cyprinodon variegatus*. During this permit cycle, in 2000, 001 plus the two non-contact cooling water outfalls, 004 and 005, were combined into 006. Outfall 006 was to meet the same TMP requirements as 001. The TMP requirement at 002 (evaporator condensate lagoon) is a WET limit for which quarterly acute static tests are performed using *Mysidopsis bahia*. The WET limit is the result of a Toxic Reduction Evaluation performed during the previous permit cycle. Outfall 003 (emergency barge discharge for evaporator condensate to the Chesapeake Bay) has a TMP requirement of 4 sets of static acute tests during discharge events, using *Cyprinodon variegatus* and *Mysidopsis bahia.* The acute tests at these outfalls must be 48-hour static tests; the chronic tests must be 7-day larval survival and growth tests. During the previous permit cycle, a TMP requirement was imposed upon 004, non-contact cooling water, that was satisfactorily met, and the requirement was not continued in the current permit cycle. IWC for outfall 002 is 1%, 2% for 001 (the IWC decreased to 0.9% with the installation of the diffuser). The testing lab was BMI, Inc.

DISCUSSION

The results of these toxicity tests for outfalls 001/006, 002 and 003 are summarized in Table 1, attached.

For outfall 001/006, all acute tests met the acute toxicity criterion of 100% effluent, and all chronic tests met the chronic criterion of at least 2%. However, four of six chronic tests had samples that were used inappropriately in regard to holding times, which invalidate the tests. In addition, four of six acute tests used the wrong organism.

For outfall 002, 4 of 13 tests did not meet the passing criterion of an NOEC greater than 100%. These tests are unacceptable. However, these were performed before the installation of the diffuser at 002 in 2000, and subsequent tests passed the criteria.

Outfall 003 did not have any discharge during the last permit cycle, so no tests were performed.

RECOMMENDATIONS

The lab should pay close attention to sample use times and sample holding times. 001 is now split from the non-contact cooling water outfalls, which are combined into the 004/005 outfall. 001 now has a diffuser. Because 001 is a process water outfall with a new configurations, it is recommended that quarterly testing be applied until the potential for toxicity is demonstrated to be not present. In addition, the increased testing is recommended at 001 because of the use of inappropriate sample holding times during the previous permit cycle, which invalidates the test. Because the non-contact cooling water has not demonstrated any toxicity in a previous permit cycle, no monitoring is being recommended at this time.

FACILITY INFORMATION

FACILITY: Omega Protein

LOCATION: Reedville, Northumberland County, Virginia

VPDES#: VA0003867 Expiration Date: 12/27/02

SIC CODE/DESCRIPTION: 2077

OUTFALLS/FLOWS (MGD): 001 3.5 MGD, 002 0.25 MGD, 003 (to Chesapeake Bay) 0.4 MGD, 004/005 7.5 MGD

RECEIVING STREAMS (S)/CRITICAL FLOWS/IWC/HARDNESS:

Receiving Stream: Cockrell Creek
No freshwater input, so 1Q10 = 0 MGD, 7Q10 = 0 MGD
Hardness = 001: 5340 mg/L as $CaCO_3$, 002: 10 mg/L as $CaCO_3$, 004/005: 5000 mg/L as $CaCO_3$
IWC = 001: 0.9%, 002: 1.0%, 003: 3.6 %, 004/005: 2%

TMP REQUIREMENTS:

Biological Monitoring:

Outfall 001: Annual acute and chronic testing, using *Cyprinodon variegatus.* Acute is 48-hour static test; chronic is 7-day static renewal larval survival and growth test.

Outfall 002: Quarterly acute testing, using *Mysidopsis bahia.* Acute is 48-hour static test.

Outfall 003: 4 sets each of static acute tests during discharge events, using *Cyprinodon variegatus* and *Mysidopsis bahia.* Acute is 48-hour static test.

NOTE: The permit was modified in March, 2000 to add the wasteload allocation of Ampro Fisheries, the other menhaden fishery on the creek that was bought out by Omega. Quarterly testing at 004 (non-contact cooling water) was dropped in 1997 because no toxicity was found over the previous permit cycle. This was before the addition of the other non-contact cooling water outfall, 005. Presently they are combined into one outfall.

The following special conditions are recommended for insertion into the draft permit for Omega Protein VA0003867:

C. OTHER REQUIREMENTS AND SPECIAL CONDITIONS

1. Toxics Management Program

a. Biological Monitoring (Outfall 001):

(1) The permittee shall conduct quarterly acute and chronic toxicity tests for a period of one year using 24-hour flow-proportioned samples of final effluent from outfall 001. The quarters shall be defined by the seasonal operation of the facility: First Quarter: May-July; Second Quarter: August-October; Third Quarter: November-January; Fourth Quarter: February-April. The acute tests shall be 48-hour static tests using Mysidopsis bahia and Cyprinodon variegatus, both conducted in such a manner and at sufficient dilutions for calculation of a valid LC_{50}. The chronic tests shall be static renewal tests using M. bahia and C. variegatus. The M. bahia test shall be a 7-day larval survival, growth and/or fecundity test, and the C. variegatus test shall be a 7-day larval survival and growth test. These chronic tests shall be conducted in such a manner and at sufficient dilutions to determine the "No Observed Effect Concentration" (NOEC) for survival and reproduction or growth. The permittee may provide additional samples to address data variability. These data may be included in the evaluation of effluent toxicity. The results of all such additional analyses shall be reported. Technical assistance in developing the procedures for these tests shall be provided by the Department of Environmental Quality staff, if requested by the permittee. Test protocols and reporting shall be in accordance with the WET testing methods cited in 40 CFR 136.3.

(2) The following criteria shall be used in evaluating the toxicity test data generated in I.C.1.b. (1) above:

(a) LC_{50} greater than or equal to 7% effluent in six of the total of eight acute toxicity tests, or in at least 75% of the tests conducted, if more than eight tests are conducted.

(b) No Observed Effect Concentration (NOEC) greater than or equal to the Instream Waste Concentration (IWC) of 0.9%, in six of the total of eight toxicity tests, or in at least 75% of the tests if more than eight tests are conducted.

Any effluent failing either of the above criteria shall be considered to have demonstrated actual or potential toxicity and a WET limit will be required. In the event the plant is not operating during one of the reporting quarters, the permittee shall submit a statement along with the DMR for the following month, and continue testing as in I. C.1.b. (2) (a) and (b) above until the required number of tests have been completed.

(3) If, prior to completing the monitoring requirements specified in I. C.1.b. (1) above, it is determined that the effluent fails the decision criteria outlined in I. C.1.b. (2), the effluent shall be considered to have demonstrated actual potential toxicity and a Whole Effluent Toxicity (WET) limit and a compliance period will be required.

(4) Following successful completion of the testing of outfall 001 as in I. C.1.b. (1) above, the permittee shall resume annual acute and chronic toxicity testing of the outfall. The first annual tests shall be conducted within 30 days of initial annual discharge from the outfall following completion of the last quarterly tests. The test organisms shall be those identified as the most sensitive species from the quarterly acute and chronic tests, or alternative species approved by the Department of Environmental Quality staff. Annual testing of the outfall is not required in cases where the need for a WET limit of the outfall has been established.

(5) If, in the testing according to I.C.1.b. (4) above, any of the annual acute toxicity tests yields an LC_{50} of less than 7% effluent, or any of the annual chronic tests yields an NOEC less than the IWC of 0.9%, the test shall be repeated within three months.

(a) If the retest also indicates an LC_{50} of less than 7% effluent or an NOEC less than the IWC, quarterly toxicity testing as in I. C.1.b. (1) above shall commence within three months. The results of these tests will be included in the evaluation of the need for toxicity reduction and a WET limit.

(b) If the retest does not confirm the results of the first test, then annual testing in accordance with the annual compliance schedule shall resume.

Biological Monitoring (Outfall 003):

(1) If the permittee elects to discharge process wastewater (evaporator condensate only) via outfall 003, then the following testing will be required for each discharge event until the first four discharge events have occurred:

Two acute toxicity tests using grab samples of final effluent from outfall 003. The acute tests shall be 48-hour static tests using Cyprinodon variegatus and Mysidopsis bahia, both conducted in such a manner and at sufficient dilutions for calculation of a valid LC_{50}.

(2) The following criterion shall be used in evaluating the toxicity test data generated in (1) above:

LC_{50} greater than or equal to 25% effluent concentration in six of the total of eight acute toxicity tests

(3) If effluent from outfall 003 fails the above criterion it shall be considered to have demonstrated actual or potential toxicity. Accordingly, continued discharge of this effluent via outfall 003 shall be prohibited. In order to resume discharging from this outfall the permittee must:

(a) assure the absence of actual or potential toxicity, or

(b) demonstrate that there is, or would be, no adverse impact from the discharge on all reasonable and beneficial uses of the state's waters.

Whole Effluent Toxicity Effluent Limitation and Monitoring Requirements for Outfall 002 (Acute WET Limit)

a. **The Whole Effluent Toxicity limit for outfall 002 shall be an LC_{50} greater than or equal to 7% or TU_a = 14.58 (acute toxic units).**

b. **Commencing with the effective date of this permit, the permittee shall conduct quarterly acute toxicity tests using 24 hour flow-proportioned composite samples of final effluent from outfall 002.** The quarters shall be defined by the seasonal operation of the facility: First Quarter: May-July; Second Quarter: August-October; Third Quarter: November-January; Fourth Quarter: February-April. The acute toxicity tests shall be 48-hour static tests using Mysidopsis bahia. **The LC_{50} or TU_a shall be reported on the DMR for the month following the quarter in which the test is performed. Two copies of a detailed report concerning the conduct of the test shall accompany the results.** Technical assistance in developing the procedures for these tests shall be provided by the Department of Environmental Quality, if requested by the permittee. **Test protocols shall be submitted for approval no later than two months before the effective date of the limit.**

c. In the event that quarterly WET testing as in b. above is not possible due to lack of operations at the facility, the permittee shall submit a written notifce to the Department of Environmental Quality's Kilmarnock Regional Office with the DMR submitted for the month following the quarter in which the test was to have been performed.

d. This permit may be modified or revoked and reissued to include pollutant specific limits in lieu of a WET limit should it be demonstrated that toxicity is due to specific parameters. The pollutant specific limits must control the toxicity of the effluent.

Table 1 Omega Protein Toxic Management Program

Outfall 002 – WET Limit – NOAEC=100% - eff 1/15/98 – QT – M. bahia

DUE	COMPLETED	M bahia NOAEC Result	Survival in 100% Effluent	LAB	Is test acceptable	Comments
Q1 – May-Jul 98	No discharge			All BMI, Inc.		
Q2 – Aug-Oct 98	8/5-7/98	NOAEC 100%	98		Y	2,3,4,5,17
Q3 – Nov-Jan 99	11/10-12/99	NOAEC <100%	0		N	17
Q4 – Feb-Apr 99	No discharge					
Q1 – May-Jul 99	?					
Q2 – Aug-Oct 99	9/22-24/99	NOAEC <100%	0		N	1,2,3,4,17
Q3 – Nov-Jan 00	11/10-12/99	NOAEC <100%	0		N	1,2,3,4,5,17
Q4 – Feb-Apr 00	No discharge					
Q1 – May-Jul 00	7/11-13/00	NOAEC< 100%	0		N	2, 17
Q2 – Aug-Oct 00	8/29-31/00	NOAEC 100%	95		Y	2,4,17
Q3 – Nov-Jan 01	11/7-9/00	NOAEC 100%	95		Y	1,2,3,4,6,7
Q4 – Feb-Apr 01	No discharge					
Q1 – May-Jul 01	7/20-22/01	NOAEC 100%	100		Y	2
Q2 – Aug-Oct 01	9/13-15/01	NOAEC 100%	100		Y	2,13
Q3 – Nov-Jan 02	11/14-16/01	NOAEC 100%	95		Y	3
Q4 – Feb-Apr 02	No discharge					
Q1 – May-Jul 02	7/24-26/02	NOAEC 100%	95		Y	2
Q2 – Aug-Oct 02	9/25-27/02	NOAEC 100%	100		Y	2,3
Q3 – Nov-Jan 03	1/13-15/02	NOAEC 100%	95		Y	2

Outfall 003 – Monitoring – Acute LC50 ≥ 100% - M. Bahia and C. variegatus – 4 sets of tests during discharge events.

TEST DATES	M. bahia LC_{50} result	C. variegatus LC_{50} result	Survival in 100% Eff	LAB	Comments
No Discharge, no samples					

Attachment 15

Outfall 001 or 006 – Monitoring – Annual - Acute (LC50 ≥ 100%) and Chronic (NOEC ≥ 2%) with C. variegatus

DUE Dates	Outfall	TEST DATES	C. variegatus Acute Result	C. variegatus Chronic Result	% Survival in 100% Eff	LAB	Is test acceptable	Acute test Comments	Chronic test Com-ments
1997	001	8/28-30/97 acute 9/10-17/97 chronic	LC50 =>100%	NOEC = 2%	100 acute 75 chronic	BMI, Inc.	Acute: Y Chronic: N	2, 17,18	2,8,9
By Mar 17, 1998	001	6/24-26/98 acute 6/24/98-7/1/98 chronic	LC50 = >100	NOEC = 100%	65 acute 98 chronic	BMI, Inc.	Acute: Y Chronic: N	2,17,18	2,10
By Mar 17, 1999	001	9/25-27/99 acute 9/22-29/99 chronic	LC50 = >100	NOEC = 51%	98 acute 0 chronic	BMI, Inc.	Acute: Y Chronic: N	2,17,18	2, 11
By Mar 17, 2000	006	8/31/00-9/2/00 acute 8/29/00-9/5/00 chronic	LC50 = >100	NOEC = 100%	100 acute 97.5 chronic	BMI, Inc.	Acute: Y Chronic: Y	2, 17	2, 12
By Mar 17, 2001	006	9/13-15/01 acute 9/11-18/01 chronic	LC50 =>100	NOEC = 100%	90 Acute 93 Chronic	BMI, Inc.	Acute: Y Chronic: Y	2	2, 13
By Mar 17, 2002	006	6/26-27/02 acute 6/26/02-7/3/02 chronic	LC50 = >100	NOEC = 100%	90 Acute 100 Chronic	BMI, Inc.	Acute: Y Chronic: N	14	15, 16

Comments

1. Used 2 replicates—need 4 replicates of 5 organisms
2. Bring Salinity to 20 ppt plus or minus 2
3. Sample lacked alkalinity and hardness test
4. Replicates should contain only 5 organisms
5. Results should be reported as NOAEC = 100%, not LC 50
6. Typo error on test end date
7. No result reported
8. Third use of sample at 77 hours—exceeds 72 hr. holding time
9. Chain of custody form for sample date 9/15-16/97 does not seem feasible. Sample was shipped at 2:30 PM 9/16/97 from Reedville and received 4:30 PM the same day in Blacksburg.
10. Third use of sample noted as before sample even composited.
11. Day 9/24/99, sample was 74.5 hr. old, 2.5 hours over 72 hr. limit for last use.
12. Two samples lack hardness data.
13. None of the samples have hardness data
14. DO of 4.2 on 100% effluent should have prompted all containers to be aerated at test onset.
15. Last use of sample exceeded 72 hr.
16. No alkalinity and hardness data for one sample.
17. Test run at 20 degrees C plus or minus 1 degree; this was ok prior to October, 2000
18. Test organism used were Mysids, not Cyprinodons

Attachment 15

Spreadsheet for determination of WET test endpoints or WET limits

1															
2		**Spreadsheet for determination of WET test endpoints or WET limits**													
3															
4		**Excel 97**			**Acute Endpoint/Permit Limit**			**Use as LC_{50} in Special Condition, as TUa on DMR**							
5		**Revision Date: 12/05/01**													
6		**File: WETLIM10.xls**			ACUTE	15.50329165	TUa	LC_{50} =	7	% Use as	14.28	TUa			
7		**(MIX.EXE required also)**													
8					ACUTE WLAa		31.8	Note: Inform the permittee that if the mean of the data exceeds							
9								this TUa:	4.35601216	a limit may result using WLA.EXE					
10															
11					**Chronic Endpoint/Permit Limit**			**Use as NOEC in Special Condition, as TUc on DMR**							
12															
13					CHRONIC	155.0329165	TU_c	NOEC =	1	% Use as	100.00	TU_c			
14					BOTH*	318.0000078	TU_c	NOEC =	1	% Use as	100.00	TU_c			
15	**Enter data in the cells with blue type:**				AML	155.0329165	TU_c	NOEC =	1	% Use as	100.00	TU_c			
16															
17	Entry Date:		01/14/03		ACUTE WLAa,c		318		Note: Inform the permittee that if the mean						
18	Facility Name:		Omega 001		CHRONIC WLAc		106		of the data exceeds this TUc:			63.7099508			
19	VPDES Number:		VA0003867		* Both means acute expressed as chronic				a limit may result using WLA.EXE						
20	Outfall Number:		1												
21					**% Flow to be used from MIX.EXE**				**Difuser /modeling study?**						
22	Plant Flow:		3.5	MGD					Enter Y/N	Y					
23	Acute 1Q10:		0	MGD	100	%			Acute	106	:1				
24	Chronic 7Q10:		0	MGD	100	%			Chronic	106	:1				
25															
26	Are data available to calculate CV? (Y/N)				N	(Minimum of 10 data points, same species, needed)					Go to Page 2				
27	Are data available to calculate ACR? (Y/N)				N	(NOEC<LC50, do not use greater/less than data)					Go to Page 3				
28															
29															
30	IWC_a		0.94339623	%	Plant flow/plant flow + 1Q10			**NOTE: If the IWCa is >33%, specify the**							
31	IWC_c		0.94339623	%	Plant flow/plant flow + 7Q10			**NOAEC = 100% test/endpoint for use**							
32															
33	Dilution, acute		106		100/IWCa										
34	Dilution, chronic		106		100/IWCc										
35															
36	WLA_a		31.8		Instream criterion (0.3 TUa) X's Dilution, acute										
37	WLA_c		106		Instream criterion (1.0 TUc) X's Dilution, chronic										
38	$WLA_{a,c}$		318		ACR X's WLA_a - converts acute WLA to chronic units										
39															
40	ACR -acute/chronic ratio		10		LC50/NOEC (Default is 10 - if data are available, use tables Page 3)										
41	CV-Coefficient of variation		0.6		Default of 0.6 - if data are available, use tables Page 2)										
42	Constants	eA	0.4109447		Default = 0.4										
43		eB	0.6010373		Default = 0.60										
44		eC	2.4334175		Default = 2.43										
45		eD	2.4334175		Default = 2.43 (1 samp)			****The Maximum Daily Limit is calculated from the lowest**							
46								**LTA, X's eC. The LTAa,c and MDL using it are driven by the ACR.**							
47	$LTA_{a,c}$		130.680415		WLAa,c X's eA										
48	LTA_c		63.7099538		WLAc X's eD						Rounded NOEC's		%		
49	MDL** with $LTA_{a,c}$		318.000008	TU_c	NOEC =	0.314465	(Protects from acute/chronic toxicity)				NOEC =	1	%		
50	MDL** with LTA_c		155.032917	TU_c	NOEC =	0.645024	(Protects from chronic toxicity)				NOEC =	1	%		
51	AML with lowest LTA		155.032917	TU_c	NOEC =	0.645024	Lowest LTA X's eD				NOEC =	1			
52															
53	IF ONLY ACUTE ENDPOINT/LIMIT IS NEEDED, CONVERT MDL FROM TU_c to TU_a														
54											Rounded LC50's		%		
55	MDL with $LTA_{a,c}$		31.8000008	TU_a	LC50 =	3.144654	%				LC50 =	4	%		
56	MDL with LTA_c		15.5032917	TU_a	LC50 =	6.450243	%				LC50 =	7			
57															
58															

Attachment 15

Page 2 - Follow the directions to develop a site specific CV (coefficient of variation)

IF YOU HAVE AT LEAST 10 DATA POINTS THAT ARE QUANTIFIABLE (NOT "<" OR ">") FOR A SPECIES, ENTER THE DATA IN EITHER COLUMN "G" (VERTEBRATE) OR COLUMN "J" (INVERTEBRATE). THE 'CV' WILL BE PICKED UP FOR THE CALCULATIONS BELOW. THE DEFAULT VALUES FOR eA, eB, AND eC WILL CHANGE IF THE 'CV' IS ANYTHING OTHER THAN 0.6.

	Vertebrate IC_{25} Data or LC_{50} Data	LN of data	Invertebrate IC_{25} Data or LC_{50} Data	LN of data
	**********		**********	
1	0		0	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

Coefficient of Variation for effluent tests

CV = 0.6 (Default 0.6)

δ^2 = 0.3074847

δ = 0.55451303

Using the log variance to develop eA

(P. 100, step 2a of TSD)

Z = 1.881 (97% probability stat from table)

A = -0.8892967

eA = 0.41094469

Using the log variance to develop eB

(P. 100, step 2b of TSD)

δ_4^2 = 0.0861777

δ_4 = 0.29356038

B = -0.5090982

eB = 0.60103733

St Dev	NEED DATA	NEED DATA	St Dev	NEED DATA	NEED DATA
Mean	0	0	Mean	0	0
Variance	0	0.000000	Variance	0	0.000000
CV	0		CV	0	

Using the log variance to develop eC

(P. 100, step 4a of TSD)

δ^2 = 0.3074847

δ = 0.55451303

C = 0.88929666

eC = 2.43341753

Using the log variance to develop eD

(P. 100, step 4b of TSD)

n = 1 This number will most likely stay as "1", for 1 sample/month.

δ_n^2 = 0.3074847

δ_n = 0.55451303

D = 0.88929666

eD = 2.43341753

Attachment 15

Page 3 - Follow directions to develop a site specific ACR (Acute to Chronic Ratio)

To determine Acute/Chronic Ratio (ACR), insert usable data below. Usable data is defined as valid paired test results, acute and chronic, tested at the same temperature, same species. The chronic NOEC must be less than the acute LC_{50}, since the ACR divides the LC_{50} by the NOEC. LC_{50}'s >100% should not be used.

Table 1. ACR using Vertebrate data

Set #	LC_{50}	NOEC	Test ACR	Logarithm	Geomean	Antilog	ACR to Use
1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
2	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
3	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
4	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
5	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
6	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
7	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
8	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
9	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
10	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA

ACR for vertebrate data: 0

Table 1. Result:	Vertebrate ACR	0
Table 2. Result:	Invertebrate ACR	0
	Lowest ACR	Default to 10

Table 2. ACR using Invertebrate data

Set #	LC_{50}	NOEC	Test ACR	Logarithm	Geomean	Antilog	ACR to Use
1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
2	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
3	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
4	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
5	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
6	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
7	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
8	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
9	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
10	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA

ACR for vertebrate data: 0

Table 4. DILUTION SERIES TO RECOMMEND

	Monitoring		Limit	
	% Effluent	TUc	% Effluent	TUc
Dilution series based on data mean	1.6	63.709951		
Dilution series to use for limit			1	100
Dilution factor to recommend:	0.1252842		0.1	
Dilution series to recommend:	100.0	1.00	100.0	1.00
	12.5	7.98	10.0	10.00
	1.6	63.71	1.0	100.00
	0.2	508.52	0.1	1000.00
	0.02	4058.96	0.0	10000.00
Extra dilutions if needed	0.00	32398.00	0.0	100000.00
	0.00	258596.00	0.0	#########

Table 3. Convert LC_{50}'s and NOEC's to Chronic TU's for use in WLA.EXE

ACR used: 10

	Enter LC_{50}	TUc	Enter NOEC	TUc
1		NO DATA		NO DATA
2		NO DATA		NO DATA
3		NO DATA		NO DATA
4		NO DATA		NO DATA
5		NO DATA		NO DATA
6		NO DATA		NO DATA
7		NO DATA		NO DATA
8		NO DATA		NO DATA
9		NO DATA		NO DATA
10		NO DATA		NO DATA
11		NO DATA		NO DATA
12		NO DATA		NO DATA
13		NO DATA		NO DATA
14		NO DATA		NO DATA
15		NO DATA		NO DATA
16		NO DATA		NO DATA
17		NO DATA		NO DATA
18		NO DATA		NO DATA
19		NO DATA		NO DATA
20		NO DATA		NO DATA

If WLA.EXE determines that an acute limit is needed, you need to convert the TUc answer you get to TUa and then an LC50, enter it here:

NO DATA	$\%LC_{50}$
NO DATA	TUa

Attachment 5

Cell: I9
Comment:

Cell: K18
Comment: This is assuming that the data are Type 2 data (none of the data in the data set are censored - "<" or ">").

Cell: J22
Comment: Remember to change the "N" to "Y" if you have ratios entered, otherwise, they won't be used in the calculations.

Cell: C40
Comment:
If you have entered data to calculate an ACR on page 3, and this is still defaulted to "10", make sure you have selected "Y" in cell E21

Cell: C41
Comment: If you have entered data to calculate an effluent specific CV on page 2, and this is still defaulted to "0.6", make sure you have selected "Y" in cell E20

Cell: L48
Comment:
See Row 151 for the appropriate dilution series to use for these NOEC's

Cell: G62
Comment:
Vertebrates are:
Pimephales promelas
Oncorhynchus mykiss
Cyprinodon variegatus

Cell: J62
Comment:
Invertebrates are:
Ceriodaphnia dubia
Mysidopsis bahia

Cell: C117
Comment: Vertebrates are:

Pimephales promelas
Cyprinodon variegatus

Cell: M119
Comment: The ACR has been picked up from cell C34 on Page 1. If you have paired data to calculate an ACR, enter it in the tables to the left, and make sure you have a "Y" in cell E21 on Page 1. Otherwise, the default of 10 will be used to convert your acute data.

Cell: M121
Comment: If you are only concerned with acute data, you can enter it in the NOEC column for conversion and the number calculated will be equivalent to the TUa. The calculation is the same: 100/NOEC = TUc or 100/LC50 = TUa.

Cell: C138
Comment: Invertebrates are:

Ceriodaphnia dubia
Mysidopsis bahia

Attachment 15

Spreadsheet for determination of WET test endpoints or WET limits

Excel 97
Revision Date: 12/05/01
File: WETLIM10.xls
(MIX.EXE required also)

Acute Endpoint/Permit Limit			**Use as LC_{50} in Special Condition, as TUa on DMR**				
ACUTE	14.62574684	TUa	LC_{50} =	8	% Use as	~~42.50~~ 14.6 rounded to 14	TUa
ACUTE WLAa		30	Note: Inform the permittee that if the mean of the data exceeds this TUa:	4.10944543	a limit may result using WLA.EXE		

Chronic Endpoint/Permit Limit			**Use as NOEC in Special Condition, as TUc on DMR**				
CHRONIC	146.2574684	TU_c	NOEC =	1	% Use as	100.00	TU_c
BOTH*	300.0000074	TU_c	NOEC =	1	% Use as	100.00	TU_c
AML	146.2574684	TU_c	NOEC =	1	% Use as	100.00	TU_c
ACUTE WLAa,c		300	Note: Inform the permittee that if the mean of the data exceeds this TUc:			60.1037272	
CHRONIC WLAc		100	a limit may result using WLA.EXE				

* Both means acute expressed as chronic

Enter data in the cells with blue type:

Entry Date:	01/14/03		
Facility Name:	Omega Protein 002		
VPDES Number:	VA0003867		
Outfall Number:	2		
Plant Flow:	0.25	MGD	
Acute 1Q10:	NA	MGD	
Chronic 7Q10:	NA	MGD	

% Flow to be used from MIX.EXE

Acute	100	%
Chronic	100	%

Difuser /modeling study?

Enter Y/N	Y	
Acute	100	:1
Chronic	100	:1

Are data available to calculate CV? (Y/N)	N	(Minimum of 10 data points, same species, needed)	Go to Page 2
Are data available to calculate ACR? (Y/N)	N	(NOEC<LC50, do not use greater/less than data)	Go to Page 3

IWC_a	1	%	Plant flow/plant flow + 1Q10
IWC_c	1	%	Plant flow/plant flow + 7Q10

NOTE: If the IWCa is >33%, specify the NOAEC = 100% test/endpoint for use

Dilution, acute	100	100/IWCa
Dilution, chronic	100	100/IWCc
WLA_a	30	Instream criterion (0.3 TUa) X's Dilution, acute
WLA_c	100	Instream criterion (1.0 TUc) X's Dilution, chronic
$WLA_{a,c}$	300	ACR X's WLA_a - converts acute WLA to chronic units
ACR -acute/chronic ratio	10	LC50/NOEC (Default is 10 - if data are available, use tables Page 3)
CV-Coefficient of variation	0.6	Default of 0.6 - if data are available, use tables Page 2)
Constants eA	0.4109447	Default = 0.41
eB	0.6010373	Default = 0.60
eC	2.4334175	Default = 2.43
eD	2.4334175	Default = 2.43 (1 samp)

****The Maximum Daily Limit is calculated from the lowest LTA, X's eC. The LTAa,c and MDL using it are driven by the ACR.**

$LTA_{a,c}$	123.28341	WLAa,c X's eA					
LTA_c	60.10373	WLAc X's eB				Rounded NOEC's	%
MDL** with $LTA_{a,c}$	300.000007	TU_c	NOEC =	0.333333	(Protects from acute/chronic toxicity)	NOEC = 1	%
MDL** with LTA_c	146.257468	TU_c	NOEC =	0.683726	(Protects from chronic toxicity)	NOEC = 1	%
AML with lowest LTA	146.257468	TU_c	NOEC =	0.683726	Lowest LTA X's eD	NOEC = 1	

IF ONLY ACUTE ENDPOINT/LIMIT IS NEEDED, CONVERT MDL FROM TU_c to TU_a

						Rounded LC50's	%
MDL with $LTA_{a,c}$	30.0000007	TU_a	LC50 =	3.333333	%	LC50 = 4	%
MDL with LTA_c	14.6257468	TU_a	LC50 =	6.837258	%	LC50 = 7	

ATTACHMENT 19

Page 2 - Follow the directions to develop a site specific CV (coefficient of variation)

IF YOU HAVE AT LEAST 10 DATA POINTS THAT ARE QUANTIFIABLE (NOT "<" OR ">") FOR A SPECIES, ENTER THE DATA IN EITHER COLUMN "G" (VERTEBRATE) OR COLUMN "J" (INVERTEBRATE). THE 'CV' WILL BE PICKED UP FOR THE CALCULATIONS BELOW. THE DEFAULT VALUES FOR eA, eB, AND eC WILL CHANGE IF THE 'CV' IS ANYTHING OTHER THAN 0.6.

	Vertebrate IC_{25} Data or LC_{50} Data	LN of data		Invertebrate IC_{25} Data or LC_{50} Data	LN of data
	**********			**********	
1	0		1	0	
2			2		
3			3		
4			4		
5			5		
6			6		
7			7		
8			8		
9			9		
10			10		
11			11		
12			12		
13			13		
14			14		
15			15		
16			16		
17			17		
18			18		
19			19		
20			20		
St Dev	NEED DATA	NEED DATA	St Dev	NEED DATA	NEED DATA
Mean	0	0	Mean	0	0
Variance	0	0.000000	Variance	0	0.000000
CV	0		CV	0	

Coefficient of Variation for effluent tests

CV = 0.6 (Default 0.6)

δ^2 = 0.3074847

δ = 0.55451303

Using the log variance to develop eA

(P. 100, step 2a of TSD)

Z = 1.881 (97% probability stat from table

A = -0.8892967

eA = 0.41094469

Using the log variance to develop eB

(P. 100, step 2b of TSD)

δ_4^2 = 0.0861777

δ_4 = 0.29356038

B = -0.5090982

eB = 0.60103733

Using the log variance to develop eC

(P. 100, step 4a of TSD)

δ^2 = 0.3074847

δ = 0.55451303

C = 0.88929666

eC = 2.43341753

Using the log variance to develop eD

(P. 100, step 4b of TSD)

n = 1 This number will most likely stay as "1", for 1 sample/month.

δ_n^2 = 0.3074847

δ_n = 0.55451303

D = 0.88929666

eD = 2.43341753

Attachment 15

Page 3 - Follow directions to develop a site specific ACR (Acute to Chronic Ratio)

To determine Acute/Chronic Ratio (ACR), insert usable data below. Usable data is defined as valid paired test results, acute and chronic, tested at the same temperature, same species. The chronic NOEC must be less than the acute LC_{50}, since the ACR divides the LC_{50} by the NOEC. LC_{50}'s >100% should not be used.

Table 1. ACR using Vertebrate data

Set #	LC_{50}	NOEC	Test ACR	Logarithm	Geomean	Antilog	ACR to Use
1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
2	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
3	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
4	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
5	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
6	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
7	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
8	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
9	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
10	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
				ACR for vertebrate data:			0

Table 1. Result:	Vertebrate ACR	0
Table 2. Result:	Invertebrate ACR	0
	Lowest ACR	Default to 10

Table 2. ACR using Invertebrate data

Set #	LC_{50}	NOEC	Test ACR	Logarithm	Geomean	Antilog	ACR to Use
1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
2	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
3	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
4	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
5	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
6	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
7	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
8	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
9	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
10	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
				ACR for vertebrate data:			0

Table 4. DILUTION SERIES TO RECOMMEND

	Monitoring % Effluent	Monitoring TUc	Limit % Effluent	Limit TUc
Dilution series based on data mean	1.7	60.103727		
Dilution series to use for limit			1	100
Dilution factor to recommend:	0.128988		0.1	
Dilution series to recommend:	100.0	1.00	100.0	1.00
	12.9	7.75	10.0	10.00
	1.7	60.10	1.0	100.00
	0.2	465.96	0.1	1000.00
	0.03	3612.46	0.0	10000.00
Extra dilutions if needed	0.00	28006.16	0.0	100000.00
	0.00	217122.19	0.0	#########

Convert LC_{50}'s and NOEC's to Chronic TU's for use in WLA.EXE

Table 3. ACR used: 10

	Enter LC_{50}	TUc	Enter NOEC	TUc
1		NO DATA		NO DATA
2		NO DATA		NO DATA
3		NO DATA		NO DATA
4		NO DATA		NO DATA
5		NO DATA		NO DATA
6		NO DATA		NO DATA
7		NO DATA		NO DATA
8		NO DATA		NO DATA
9		NO DATA		NO DATA
10		NO DATA		NO DATA
11		NO DATA		NO DATA
12		NO DATA		NO DATA
13		NO DATA		NO DATA
14		NO DATA		NO DATA
15		NO DATA		NO DATA
16		NO DATA		NO DATA
17		NO DATA		NO DATA
18		NO DATA		NO DATA
19		NO DATA		NO DATA
20		NO DATA		NO DATA

If WLA.EXE determines that an acute limit is needed, you need to convert the TUc answer you get to TUa and then an LC50, enter it here:

NO DATA	$\%LC_{50}$	
NO DATA	TUa	

Attachment 15

Cell: I9
Comment:

Cell: K18
Comment: This is assuming that the data are Type 2 data (none of the data in the dala set are censored - "<" or ">").

Cell: J22
Comment: Remember to change the "N" to "Y" if you have ratios entered, otherwise, they won't be used in the calculations.

Cell: C40
Comment:
If you have entered data to calculate an ACR on page 3, and this is still defaulted to "10", make sure you have selected "Y" in cell E21

Cell: C41
Comment: If you have entered data to calculate an effluent specific CV on page 2, and this is still defaulted to "0.6", make sure you have selected "Y" in cell E20

Cell: L48
Comment:
See Row 151 for the appropriate dilution series to use for these NOEC's

Cell: G62
Comment:
Vertebrates are:
Pimephales promelas
Oncorhynchus mykiss
Cyprinodon variegatus

Cell: J62
Comment:
Invertebrates are:
Ceriodaphnia dubia
Mysidopsis bahia

Cell: C117
Comment: Vertebrates are:

Pimephales promelas
Cyprinodon variegatus

Cell: M119
Comment: The ACR has been picked up from cell C34 on Page 1. If you have paired data to calculate an ACR, enter it in the tables to the left, and make sure you have a "Y" in cell E21 on Page 1. Otherwise, the default of 10 will be used to convert your acute data.

Cell: M121
Comment: If you are only concerned with acute data, you can enter it in the NOEC column for conversion and the number calculated will be equivalent to the TUa. The calculation is the same: 100/NOEC = TUc or 100/LC50 = TUa.

Cell: C138
Comment: Invertebrates are:

Ceriodaphnia dubia
Mysidopsis bahia

Attachment 15

Spreadsheet for determination of WET test endpoints or WET limits

Excel 97
Revision Date: 12/05/01
File: WETLIM10.xls
(MIX.EXE required also)

Acute Endpoint/Permit Limit — **Use as LC_{50} In Special Condition, as TUa on DMR**

ACUTE	100% =	NOAEC	LC_{50} =	NA	% Use as	NA	TUa
ACUTE WLAa		0.6	Note: Inform the permittee that if the mean of the data exceeds this TUa:	1.0	a limit may result using WLA.EXE		

Chronic Endpoint/Permit Limit — **Use as NOEC In Special Condition, as TUc on DMR**

CHRONIC	6.000000147	TU_c	NOEC =	17	% Use as	5.88	TU_c
BOTH*	6.000000147	TU_c	NOEC =	17	% Use as	5.88	TU_c
AML	6.000000147	TU_c	NOEC =	17	% Use as	5.88	TU_c

ACUTE WLAa,c	6	Note: Inform the permittee that if the mean of the data exceeds this TUc:	2.46566808
CHRONIC WLAc	50	a limit may result using WLA.EXE	

* Both means acute expressed as chronic

Enter data in the cells with blue type:

Entry Date:	01/14/03				
Facility Name:	Omega 004/005				
VPDES Number:	VA0003867				
Outfall Number:	4/5				
			% Flow to be used from MIX.EXE		
Plant Flow:	7.5	MGD			
Acute 1Q10:	0	MGD	100	%	
Chronic 7Q10:	0	MGD	100	%	

Difuser /modeling study?

Enter Y/N	Y	
Acute	2	:1
Chronic	50	:1

Are data available to calculate CV? (Y/N)	N	(Minimum of 10 data points, same species, needed)	Go to Page 2
Are data available to calculate ACR? (Y/N)	N	(NOEC<LC50, do not use greater/less than data)	Go to Page 3

IWC_a	50	%	Plant flow/plant flow + 1Q10
IWC_c	2	%	Plant flow/plant flow + 7Q10

NOTE: If the IWCa is >33%, specify the NOAEC = 100% test/endpoint for use

Dilution, acute	2	100/IWCa
Dilution, chronic	50	100/IWCc
WLA_a	0.6	Instream criterion (0.3 TUa) X's Dilution, acute
WLA_c	50	Instream criterion (1.0 TUc) X's Dilution, chronic
$WLA_{a,c}$	6	ACR X's WLA_a - converts acute WLA to chronic units
ACR -acute/chronic ratio	10	LC50/NOEC (Default is 10 - if data are available, use tables Page 3)
CV-Coefficient of variation	0.6	Default of 0.6 - if data are available, use tables Page 2)
Constants eA	0.4109447	Default = 0.41
eB	0.6010373	Default = 0.60
eC	2.4334175	Default = 2.43
eD	2.4334175	Default = 2.43 (1 samp)

****The Maximum Daily Limit is calculated from the lowest LTA, X's eC. The LTAa,c and MDL using it are driven by the ACR.**

$LTA_{a,c}$	2.4656682	WLAa,c X's eA				
LTA_c	30.051865	WLAc X's eB				
MDL** with $LTA_{a,c}$	6.00000015	TU_c	NOEC =	16.666666	(Protects from acute/chronic toxicity)	
MDL** with LTA_c	73.1287342	TU_c	NOEC =	1.367452	(Protects from chronic toxicity)	
AML with lowest LTA	6.00000015	TU_c	NOEC =	16.666666	Lowest LTA X's eD	

Rounded NOEC's		%
NOEC =	17	%
NOEC =	2	%
NOEC =	17	

IF ONLY ACUTE ENDPOINT/LIMIT IS NEEDED, CONVERT MDL FROM TU_c to TU_a

MDL with $LTA_{a,c}$	0.60000001	TU_a	LC50 =	166.666663	%	Use NOAEC=100%
MDL with LTA_c	7.31287342	TU_a	LC50 =	13.674515	%	

Rounded LC50's		%
LC50 =	NA	%
LC50 =	14	

Attachment 15

Page 2 - Follow the directions to develop a site specific CV (coefficient of variation)

IF YOU HAVE AT LEAST 10 DATA POINTS THAT ARE QUANTIFIABLE (NOT "<" OR ">") FOR A SPECIES, ENTER THE DATA IN EITHER COLUMN "G" (VERTEBRATE) OR COLUMN "J" (INVERTEBRATE). THE 'CV' WILL BE PICKED UP FOR THE CALCULATIONS BELOW. THE DEFAULT VALUES FOR eA, eB, AND eC WILL CHANGE IF THE 'CV' IS ANYTHING OTHER THAN 0.6.

	Vertebrate IC_{25} Data or LC_{50} Data	LN of data		Invertebrate IC_{25} Data or LC_{50} Data	LN of data
	**********			**********	
1	0		1	0	
2			2		
3			3		
4			4		
5			5		
6			6		
7			7		
8			8		
9			9		
10			10		
11			11		
12			12		
13			13		
14			14		
15			15		
16			16		
17			17		
18			18		
19			19		
20			20		
St Dev	NEED DATA	NEED DATA	St Dev	NEED DATA	NEED DATA
Mean	0	0	Mean	0	0
Variance	0	0.000000	Variance	0	0.000000
CV	0		CV	0	

Coefficient of Variation for effluent tests

CV = 0.6 (Default 0.6)

δ^2 = 0.3074847

δ = 0.55451303

Using the log variance to develop eA (P. 100, step 2a of TSD)

Z = 1.881 (97% probability stat from table)

A = -0.8892967

eA = 0.41094469

Using the log variance to develop eB (P. 100, step 2b of TSD)

δ_4^2 = 0.0861777

δ_4 = 0.29356038

B = -0.5090982

eB = 0.60103733

Using the log variance to develop eC (P. 100, step 4a of TSD)

δ^2 = 0.3074847

δ = 0.55451303

C = 0.88929666

eC = 2.43341753

Using the log variance to develop eD (P. 100, step 4b of TSD)

n = 1 This number will most likely stay as "1", for 1 sample/month.

δ_n^2 = 0.3074847

δ_n = 0.55451303

D = 0.88929666

eD = 2.43341753

Attachment 15

Page 3 - Follow directions to develop a site specific ACR (Acute to Chronic Ratio)

To determine Acute/Chronic Ratio (ACR), insert usable data below. Usable data is defined as valid paired test results, acute and chronic, tested at the same temperature, same species. The chronic NOEC must be less than the acute LC_{50}, since the ACR divides the LC_{50} by the NOEC. LC_{50}'s >100% should not be used.

Table 1. ACR using Vertebrate data

Set #	LC_{50}	NOEC	Test ACR	Logarithm	Geomean	Antilog	ACR to Use
1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
2	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
3	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
4	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
5	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
6	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
7	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
8	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
9	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
10	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
				ACR for vertebrate data:			0

Table 1. Result:	Vertebrate ACR	0
Table 2. Result:	Invertebrate ACR	0
	Lowest ACR	Default to 10

Table 2. ACR using Invertebrate data

Set #	LC_{50}	NOEC	Test ACR	Logarithm	Geomean	Antilog	ACR to Use
1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
2	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
3	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
4	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
5	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
6	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
7	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
8	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
9	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
10	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
				ACR for vertebrate data:			0

Table 3. Convert LC_{50}'s and NOEC's to Chronic TU's for use in WLA.EXE

ACR used: 10

	Enter LC_{50}	TUc	Enter NOEC	TUc
1		NO DATA		NO DATA
2		NO DATA		NO DATA
3		NO DATA		NO DATA
4		NO DATA		NO DATA
5		NO DATA		NO DATA
6		NO DATA		NO DATA
7		NO DATA		NO DATA
8		NO DATA		NO DATA
9		NO DATA		NO DATA
10		NO DATA		NO DATA
11		NO DATA		NO DATA
12		NO DATA		NO DATA
13		NO DATA		NO DATA
14		NO DATA		NO DATA
15		NO DATA		NO DATA
16		NO DATA		NO DATA
17		NO DATA		NO DATA
18		NO DATA		NO DATA
19		NO DATA		NO DATA
20		NO DATA		NO DATA

If WLA.EXE determines that an acute limit is needed, you need to convert the TUc answer you get to TUa and then an LC50, enter it here:

NO DATA	%LC_{50}
NO DATA	TUa

DILUTION SERIES TO RECOMMEND

Table 4.

	Monitoring % Effluent	Monitoring TUc	Limit % Effluent	Limit TUc
Dilution series based on data mean	40.6	2.4656681		
Dilution series to use for limit			17	5.8823529
Dilution factor to recommend:	0.6368435		0.4123106	
Dilution series to recommend:	100.0	1.00	100.0	1.00
	63.7	1.57	41.2	2.43
	40.6	2.47	17.0	5.88
	25.8	3.87	7.0	14.27
	16.45	6.08	2.9	34.60
Extra dilutions if needed	10.48	9.55	1.2	83.92
	6.67	14.99	0.5	203.54

Attachment 15

Cell: I9
Comment:

Cell: K18
Comment: This is assuming that the data are Type 2 data (none of the data in the data set are censored - "<" or ">").

Cell: J22
Comment: Remember to change the "N" to "Y" if you have ratios entered, otherwise, they won't be used in the calculations.

Cell: C40
Comment:
If you have entered data to calculate an ACR on page 3, and this is still defaulted to "10", make sure you have selected "Y" in cell E21

Cell: C41
Comment: If you have entered data to catculate an effluent specific CV on page 2, and this is still defaulted to "0.6", make sure you have selected "Y" in cell E20

Cell: L48
Comment:
See Row 151 for the appropriate dilution series to use for these NOEC's

Cell: G62
Comment:
Vertebrates are:
Pimephales promelas
Oncorhynchus mykiss
Cyprinodon variegatus

Cell: J62
Comment:
Invertebrates are:
Ceriodaphnia dubia
Mysidopsis bahia

Cell: C117
Comment: Vertebrates are:

Pimephates promelas
Cyprinodon variegatus

Cell: M119
Comment: The ACR has been picked up from cell C34 on Page 1. If you have paired data to calculate an ACR, enter it in the tables to the left, and make sure you have a "Y" in cell E21 on Page 1. Otherwise, the default of 10 will be used to convert your acute data.

Cell: M121
Comment: If you are only concerned with acute data, you can enter it in the NOEC column for conversion and the number calculated will be equivalent to the TUa. The calculation is the same: 100/NOEC = TUc or 100/LC50 = TUa.

Cell: C138
Comment: Invertebrates are:

Ceriodaphnia dubia
Mysidopsis bahia

Attachment 15

Spreadsheet for determination of WET test endpoints or WET limits

Excel 97
Revision Date: 12/05/01
File: WETLIM10.xls
(MIX.EXE required also)

Acute Endpoint/Permit Limit — Use as LC_{50} in Special Condition, as TUa on DMR

ACUTE	4.095209115	TUa	LC_{50} =	25	% Use as	4.00	TUa
ACUTE WLAa	8.4						

Note: Inform the permittee that if the mean of the data exceeds this TUa: 1.15064472 a limit may result using WLA.EXE

Chronic Endpoint/Permit Limit — Use as NOEC in Special Condition, as TUc on DMR

CHRONIC	40.95209115	TU_c	NOEC =	3	% Use as	33.33	TU_c
BOTH*	84.00000206	TU_c	NOEC =	2	% Use as	50.00	TU_c
AML	40.95209115	TU_c	NOEC =	3	% Use as	33.33	TU_c
ACUTE WLAa,c	84						
CHRONIC WLAc	28						

* Both means acute expressed as chronic

Note: Inform the permittee that if the mean of the data exceeds this TUc: 16.8290436 a limit may result using WLA.EXE

Enter data in the cells with blue type:

Entry Date:	02/21/03		
Facility Name:	Omega 003		
VPDES Number:	VA0003867		
Outfall Number:	3		
Plant Flow:	4	MGD	
Acute 1Q10:	0	MGD	100 %
Chronic 7Q10:	0	MGD	100 %

% Flow to be used from MIX.EXE

Difuser /modeling study?

Enter Y/N	y
Acute	28 :1
Chronic	28 :1

Are data available to calculate CV? (Y/N)	N	(Minimum of 10 data points, same species, needed)
Are data available to calculate ACR? (Y/N)	N	(NOEC<LC50, do not use greater/less than data)

Go to Page 2
Go to Page 3

IWC_a	3.57142857	%	Plant flow/plant flow + 1Q10
IWC_c	3.57142857	%	Plant flow/plant flow + 7Q10

NOTE: If the IWCa is >33%, specify the NOAEC = 100% test/endpoint for use

Dilution, acute	28	100/IWCa
Dilution, chronic	28	100/IWCc
WLA_a	8.4	Instream criterion (0.3 TUa) X's Dilution, acute
WLA_c	28	Instream criterion (1.0 TUc) X's Dilution, chronic
$WLA_{a,c}$	84	ACR X's WLA_a - converts acute WLA to chronic units
ACR -acute/chronic ratio	10	LC50/NOEC (Default is 10 - if data are available, use tables Page 3)
CV-Coefficient of variation	0.6	Default of 0.6 - if data are available, use tables Page 2)
Constants eA	0.4109447	Default = 0.41
eB	0.6010373	Default = 0.60
eC	2.4334175	Default = 2.43
eD	2.4334175	Default = 2.43 (1 samp)

**The Maximum Daily Limit is calculated from the lowest LTA, X's eC. The LTAa,c and MDL using it are driven by the ACR.

$LTA_{a,c}$	34.5193548	WLAa,c X's eA			
LTA_c	16.8290444	WLAc X's eB			
MDL** with $LTA_{a,c}$	84.0000021	TU_c	NOEC =	1.190476	(Protects from acute/chronic toxicity)
MDL** with LTA_c	40.9520912	TU_c	NOEC =	2.441878	(Protects from chronic toxicity)
AML with lowest LTA	40.9520912	TU_c	NOEC =	2.441878	Lowest LTA X's eD

Rounded NOEC's		
NOEC =	2	%
NOEC =	3	%
NOEC =	3	

IF ONLY ACUTE ENDPOINT/LIMIT IS NEEDED, CONVERT MDL FROM TU_c to TU_a

MDL with $LTA_{a,c}$	8.4000021	TU_a	LC50 =	11.904762	%
MDL with LTA_c	4.09520912	TU_a	LC50 =	24.418777	%

Rounded LC50's		
LC50 =	12	%
LC50 =	25	

Attachment 15

Page 2 - Follow the directions to develop a site specific CV (coefficient of variation)

IF YOU HAVE AT LEAST 10 DATA POINTS THAT ARE QUANTIFIABLE (NOT "<" OR ">") FOR A SPECIES, ENTER THE DATA IN EITHER COLUMN "G" (VERTEBRATE) OR COLUMN "J" (INVERTEBRATE). THE 'CV' WILL BE PICKED UP FOR THE CALCULATIONS BELOW. THE DEFAULT VALUES FOR eA, eB, AND eC WILL CHANGE IF THE 'CV' IS ANYTHING OTHER THAN 0.6.

	Vertebrate IC_{25} Data or LC_{50} Data **********	LN of data		Invertebrate IC_{25} Data or LC_{50} Data **********	LN of data
1	0		1	0	
2			2		
3			3		
4			4		
5			5		
6			6		
7			7		
8			8		
9			9		
10			10		
11			11		
12			12		
13			13		
14			14		
15			15		
16			16		
17			17		
18			18		
19			19		
20			20		
St Dev	NEED DATA	NEED DATA	St Dev	NEED DATA	NEED DATA
Mean	0	0	Mean	0	0
Variance	0	0.000000	Variance	0	0.000000
CV	0		CV	0	

Coefficient of Variation for effluent test

CV = 0.6 (Default 0.6)

δ^2 = 0.3074847

δ = 0.55451303

Using the log variance to develop eA

(P. 100, step 2a of TSD)

Z = 1.881 (97% probability stat from table

A = -0.8892967

eA = 0.41094469

Using the log variance to develop eB

(P. 100, step 2b of TSD)

δ_4^2 = 0.0861777

δ_4 = 0.29356038

B = -0.5090982

eB = 0.60103733

Using the log variance to develop eC

(P. 100, step 4a of TSD)

δ^2 = 0.3074847

δ = 0.55451303

C = 0.88929666

eC = 2.43341753

Using the log variance to develop eD

(P. 100, step 4b of TSD)

n = 1 This number will most likely stay as "1", for 1 sample/month.

δ_n^2 = 0.3074847

δ_n = 0.55451303

D = 0.88929666

eD = 2.43341753

Attachment 15

Page 3 - Follow directions to develop a site specific ACR (Acute to Chronic Ratio)

To determine Acute/Chronic Ratio (ACR), insert usable data below. Usable data is defined as valid paired test results, acute and chronic, tested at the same temperature, same species. The chronic NOEC must be less than the acute LC_{50}, since the ACR divides the LC_{50} by the NOEC. LC_{50}'s >100% should not be used.

Table 1. ACR using Vertebrate data

Set #	LC_{50}	NOEC	Test ACR	Logarithm	Geomean	Antilog	ACR to Use
1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
2	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
3	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
4	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
5	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
6	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
7	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
8	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
9	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
10	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
				ACR for vertebrate data:			0

Table 1. Result:	Vertebrate ACR	0
Table 2. Result:	Invertebrate ACR	0
	Lowest ACR	Default to 10

Table 2. ACR using Invertebrate data

Set #	LC_{50}	NOEC	Test ACR	Logarithm	Geomean	Antilog	ACR to Use
1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
2	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
3	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
4	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
5	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
6	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
7	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
8	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
9	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
10	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
				ACR for vertebrate data:			0

DILUTION SERIES TO RECOMMEND

Table 4.

	Monitoring % Effluent	Monitoring TUc	Limit % Effluent	Limit TUc
Dilution series based on data mean	5.9	16.829044		
Dilution series to use for limit			3	33.333333
Dilution factor to recommend:	0.2437644		0.1732051	
Dilution series to recommend:	100.0	1.00	100.0	1.00
	24.4	4.10	17.3	5.77
	5.9	16.83	3.0	33.33
	1.4	69.04	0.5	192.45
	0.35	283.22	0.1	1111.11
Extra dilutions if needed	0.09	1161.85	0.0	6415.00
	0.02	4766.27	0.0	37037.04

Convert LC_{50}'s and NOEC's to Chronic TU's for use in WLA.EXE

Table 3. ACR used: 10

	Enter LC_{50}	TUc	Enter NOEC	TUc
1		NO DATA		NO DATA
2		NO DATA		NO DATA
3		NO DATA		NO DATA
4		NO DATA		NO DATA
5		NO DATA		NO DATA
6		NO DATA		NO DATA
7		NO DATA		NO DATA
8		NO DATA		NO DATA
9		NO DATA		NO DATA
10		NO DATA		NO DATA
11		NO DATA		NO DATA
12		NO DATA		NO DATA
13		NO DATA		NO DATA
14		NO DATA		NO DATA
15		NO DATA		NO DATA
16		NO DATA		NO DATA
17		NO DATA		NO DATA
18		NO DATA		NO DATA
19		NO DATA		NO DATA
20		NO DATA		NO DATA

If WLA.EXE determines that an acute limit is needed, you need to convert the TUc answer you get to TUa and then an LC50, enter it here:

NO DATA	$\%LC_{50}$
NO DATA	TUa

Attachment 15

Cell: I9
Comment:

Cell: K18
Comment: This is assuming that the data are Type 2 data (none of the data in the data set are censored - ">").

Cell: J22
Comment: Remember to change the "N" to "Y" if you have ratios entered, otherwise, they won't be used in the calculations.

Cell: C40
Comment:
If you have entered data to calculate an ACR on page 3, and this is still defaulted to "10", make sure you have selected "Y" in cell E21

Cell: C41
Comment: If you have entered data to calculate an effluent specific CV on page 2, and this is still defaulted to "0.6", make sure you have selected "Y" in cell E20

Cell: L48
Comment:
See Row 151 for the appropriate dilution series to use for these NOEC's

Cell: G62
Comment:
Vertebrates are:
Pimephales promelas
Oncorhynchus mykiss
Cyprinodon variegatus

Cell: J62
Comment:
Invertebrates are:
Ceriodaphnia dubia
Mysidopsis bahia

Cell: C117
Comment: Vertebrates are:

Pimephales promelas
Cyprinodon variegatus

Cell: M119
Comment: The ACR has been picked up from cell C34 on Page 1. If you have paired data to calculate an ACR, enter it in the tables to the left, and make sure you have a "Y" in cell E21 on Page 1. Otherwise, the default of 10 will be used to convert your acute data.

Cell: M121
Comment: If you are only concerned with acute data, you can enter it in the NOEC column for conversion and the number calculated will be equivalent to the TUa. The calculation is the same: 100/NOEC = TUc or 100/LC50 = TUa.

Cell: C138
Comment: Invertebrates are:

Ceriodaphnia dubia
Mysidopsis bahia

Attachment 15

ATTACHMENT 16

NPDES Permit Rating Work Sheet

- ☐ Regular Addition
- ☐ Discretionary Addition
- ☐ Score change, but no status change
- ☐ Deletion

Omega Protein Attachment 16

NPDES No.: VA0038617

Facility Name: OMEGA PROTEIN

City: REEDVILLE

Receiving Water: COCKRELL'S CREEK

Reach Number:

Is this facility a steam electric power plant (SIC=4911) with one or more of the following characteristics?
1. Power output 500 MW or greater (not using a cooling pond/lake)
2. A nuclear power plant
3. Cooling water discharge greater than 25% of the receiving stream's 7Q10 flow rate

☐ YES; score is 600 (stop here) ☒ NO (continue)

Is this permit for a municipal separate storm sewer serving a population greater than 100,000?

☐ YES; score is 700 (stop here)
☒ NO (continue)

FACTOR 1: Toxic Pollutant Potential

PCS SIC Code: ____ Primary SIC Code: 2077

Other SIC Codes: ____ ____ ____ ____

Industrial Subcategory Code: 0 (Code 000 if no subcategory)

Determine the Toxicity potential from Appendix A. Be sure to use the TOTAL toxicity potential column and check one)

Toxicity Group	Code	Points	Toxicity Group	Code	Points	Toxicity Group	Code	Points
☐ No process waste streams	0	0	☐ 3.	3	15	☐ 7.	7	35
☒ 1.	1	5	☐ 4.	4	20	☐ 8.	8	40
☐ 2.	2	10	☐ 5.	5	25	☐ 9.	9	45
			☐ 6.	6	30	☐ 10.	10	50

Code Number Checked: 01

Total Points Factor 1: 5

FACTOR 2: Flow/Stream Flow Volume *(Complete either Section A or Section B; check only one)*

Section A—Wastewater Flow Only Considered

Wastewater Type (See Instructions)			Code	Points
Type I:	Flow < 5 MGD	☐	11	0
	Flow 5 to 10 MGD	☐	12	10
	Flow >10 to 50 MGD	☐	13	20
	Flow > 50 MGD	☐	14	30
Type II:	Flow <1 MGD	☐	21	10
	Flow 1 to 5 MGD	☐	22	20
	Flow >5 to 10 MGD	☐	23	30
	Flow >10 MGD	☐	24	50
Type III:	Flow <1 MGD	☐	31	0
	Flow 1 to 5 MGD	☐	32	10
	Flow >5 to 10 MGD	☐	33	20
	Flow >10 MGD	☐	34	30

Section B—Wastewater and Stream Flow Considered

Wastewater Type (See Instructions)	Percent of Instream Wastewater Concentration at Receiving Stream Low Flow		Code	Points
TYPE I/III:	< 10%	☐	41	0
	≥ 10% to <50%	☐	42	10
	≥ 50%	☐	43	20
Type II:	< 10%	☐	51	0
	≥ 10% to <50%	☐	52	20
	≥ 50%	☐	53	30

Max 30 day avg flows
001 3.821 MGD
002 0.249
003 0.4
004/005 7.1
11.569 total MGD
4.469 MGD process WW → Type II since 61%

Code Checked from Section A or B: 24

Total Points Factor 2: 50

NPDES No.: VA0010318617

FACTOR 3: Conventional Pollutants
(only when limited by the permit)

A. Oxygen Demanding Pollutant: (check one) ☒ BOD ☐ COD ☐ Other:

Permit Limits: (check one)		Code	Points
	☐ <100 lbs/day	1	0
	☐ 100 to 1000 lbs/day	2	5
	☐ >1000 to 3000 lbs/day	3	15
	☒ >3000 lbs/day	4	20

001 1755 kg/d x 2.2 = 3861
002 271 = 596.2
003 4296 = 9451.2
13,908.4 lb/day

Code Checked: 4
Points Scored: 20

B. Total Suspended Solids (TSS)

Permit Limits: (check one)		Code	Points
	☐ <100 lbs/day	1	0
	☐ 100 to 1000 lbs/day	2	5
	☒ >1000 to 5000 lbs/day	3	15
	☐ >5000 lbs/day	4	20

001 655 kg/d x 2.2 = 1441
002 168 x 2.2 = 369.6
003 114 x 2.2 = 250.8
2061.4 lb/day total

Code Checked: 3
Points Scored: 15

C. Nitrogen Pollutant: (check one) ☒ Ammonia ☐ Other:

Permit Limits: (check one)		Nitrogen Equivalent	Code	Points
	☐	<300 lbs/day	1	0
	☒	300 to 1000 lbs/day	2	5
	☐	>1000 to 3000 lbs/day	3	15
	☐	>3000 lbs/day	4	20

001 NL
002 38.0 mg/L
003 35.8 mg/L
004/005 NL

38.8 mg/L x 3.785
279.33 x 2.2 = 614.53 lb/day
kg/d

Code Checked: 2
Points Scored: 05
Total Points Factor 3: 40

FACTOR 4: Public Health Impact
Is there a public drinking water supply located within 50 miles downstream of the effluent discharge (this includes any body of water to which the receiving water is a tributary)? A public drinking water supply may include infiltration galleries, or other methods of conveyance that ultimately get water from the above referenced supply.

☐ YES (If yes, check toxicity potential number below)
☒ NO (If no, go to Factor 5)

Determine the *human health* toxicity potential from Appendix A. Use the same SIC code and subcategory reference as in Factor 1. (Be sure to use the human health toxicity group column — check one below)

Toxicity Group	Code	Points	Toxicity Group	Code	Points	Toxicity Group	Code	Points
☐ No process waste streams	0	0	☐ 3.	3	0	☐ 7.	7	15
☐ 1.	1	0	☐ 4.	4	0	☐ 8.	8	20
☐ 2.	2	0	☐ 5.	5	5	☐ 9.	9	25
			☐ 6.	6	10	☐ 10.	10	30

Code Number Checked:
Total Points Factor 4: 0

Attachment 10

FACTOR 5: Water Quality Factors

NPDES No.: VA0010381

A. *Is (or will) one or more of the effluent discharge limits based on water quality factors of the receiving stream (rather than technology-based federal effluent guidelines, or technology-based state effluent guidelines), or has a wasteload allocation been assigned to the discharge?*

	Code	Points
☒ Yes	1	10
☐ No	2	0

B. *Is the receiving water in compliance with applicable water quality standards for pollutants that are water quality limited in the permit?*

	Code	Points
☐ Yes	1	0
☒ No	2	5

C. *Does the effluent discharged from this facility exhibit the reasonable potential to violate water quality standards due to whole effluent toxicity?*

	Code	Points
☒ Yes	1	10
No	2	0

facility has not exhibited toxicity in tests during the past 2 years (July 00)

Code Number Checked: A 1 B 2 C 1

Points Factor 5: A 10 + B 5 + C 10 = 25 TOTAL

FACTOR 6: Proximity to Near Coastal Waters

A. *Base Score: Enter flow code here (from Factor 2):* 24

Enter the multiplication factor that corresponds to the flow code: 1

Check appropriate facility HPRI Code (from PCS):

	HPRI #	Code	HPRI Score
☐	1	1	20
☐	2	2	0
☒	3	3	30
☐	4	4	0
☐	5	5	20

HPRI code checked: 3

Flow Code	Multiplication Factor
11, 31, or 41	0.00
12, 32, or 42	0.05
13, 33, or 43	0.10
14 or 34	0.15
21 or 51	0.10
22 or 52	0.30
23 or 53	0.60
24	1.00

Base Score: (HPRI Score) 30 x (Multiplication Factor) 1 = 30 (TOTAL POINTS)

B. *Additional Points — NEP Program*
For a facility that has an HPRI code of 3, does the facility discharge to one of the estuaries enrolled in the National Estuary Protection (NEP) program (see instructions) or the Chesapeake Bay?

	Code	Points
☒ Yes	1	10
☐ No	2	0

C. *Additional Points — Great Lakes Area of Concern*
For a facility that has an HPRI code of 5, does the facility discharge any of the pollutants of concern into one of the Great Lakes' 31 areas of concern (see instructions)

NA

	Code	Points
☐ Yes	1	10
☐ No	2	0

Code Number Checked: A 3 B 1 C 2

Points Factor 6: A 30 + B 10 + C 0 = 40 TOTAL

SCORE SUMMARY

NPDES No.: VA C 0 0 3 8 6 7

Factor	Description	Total Points
1	Toxic Pollutant Potential	5
2	Flow/Streamflow Volume	50
3	Conventional Pollutants	40
4	Public Health Impacts	0
5	Water Quality Factors	25
6	Proximity to Near Coastal Waters	40
	TOTAL (Factors 1 through 6)	160

S1. Is the total score equal to or greater than 80? ☒ Yes (Facility is a major) ☐ No

S2. If the answer to the above question is no, would you like this facility to be discretionary major?

☐ No

☐ Yes (Add 500 points to the above score and provide reason below:

Reason: _____

NEW SCORE: 160

OLD SCORE: 109.5

the big difference was a change to Factor 2, from category III to category II. I did not include contact cooling water as process waste water previously.

D M Mosca
Permit Reviewer's Name

(804) 435-3181
Phone Number

2-10-03
Date

ATTACHMENT 17

Proposed Barge Loading Facility at Reedville
October 6, 2003

The proposed barge loading facility will be located near the old, tall brick stack that is a landmark in the Cockrell Creek/Reedville area. The stack can be seen from great distances as it is located on the end of a thin peninsula into Cockrell Creek. The peninsula separates the Omega Plant area from the Main Street of Reedville and marks the location of a former fish factory.

The peninsula is oriented in an east-west direction, extending out from the east bank of Cockrell Creek. The location of the proposed barge loading facility is on the south side of the peninsula, near the tall brick stack. There is an existing dock structure at a small "house like" building. The proposed barge loading facility will utilize the existing dock structure. The small building is located at the western end of an existing long warehouse that also is a remnant of the former fish factory.

The barge loading facility will consist of a hopper, a conveyor and a gravity drop for loading the barge. The hopper will be located on land to receive meal from end dumping trucks. The overhead enclosed conveyor will extend from the hopper, over water to the barge. The conveyed meal will be dropped through chutes or socks to control the fall of meal into the barge.

Omega Protein expects to load approximately 5000 to 6000 tons of meal per year into barges. The loading rate for barges will be about 50 tons per hour. The receiving rate will be about two trucks per hour—each trucks holds 23.5 tons. Therefore,assuming 6000 tons per year at a load rate of 50 tons per hour, the loading facility will only operate about 120 hours per year.

EPA's manual AP-42, labeled "Compilation of Air Pollutant Emission Factors" provides emission factors for total particulates, PM, and particulates of airborne diameters of 10 or less microns, PM10. The relevant factors of pounds emission per ton are as follows:

	PM	PM10
Meal Receiving, Straight Truck	0.18	0.059
Grain Shipping, Barge	0.016	0.004

Regarding the potential impact of particulates with respect to water issues, we should use the PM factors. The PM10 particulates will become airborne but will eventually fall. Therefore, the worst case would assume that particulates from the truck operations would fall to the ground and the barge operations would fall into the water.

The quantity of meal released becomes a simple calculation:

Total meal released per year over land is 6000 x 0.18 = 1080 pounds

Total meal released per year over water is 6000 x 0.016 = 96 pounds

This meal is sold commercially for feeding aquaculture, cattle, poultry, pets, etc. Therefore, the larger partiulates are readily consumed by fish when they fall into the water. As to the amounts of particulates that would contribute to a biological oxygen demand (BOD), perhaps the PM10 particulates and some of the larger particulates, say a worst case of 48 pounds per year, a negligible amount it would appear.

The particulates that fall to the land would be subject to storm water runoff into the Cockrell Creek. We propose that Best Management Practices be implemented to minimize their exposure to storm water runoff.