WILLIAM & MARY
VIMS

Virginia Institute of Marine Science
School of Marine Science

Mr. Brian Wrenn
Water Permit Writer
Department of Environmental Quality
Piedmont Regional Office
4949-A Cox Road
Glen Allen, Virginia 23060
brian.wrenn@deq.virginia.gov

February 9, 2016

RE: VPDES Permit 0071528

Dear Mr. Wrenn,

Please find the attached permit forms for the renewal of permit VPDES VA0071528. As requested, the originals plus an electronic pdf of: EPA Form 1, EPA Form 2B, EPA Form 2C, VPDES Permit Application Addendum, and DEQ Attachment A. Please feel free to contact me via the contact information below if you require any other documentation or information.

Respectfully,

James E. Brister
Director
VIMS Seawater Research Laboratory
Virginia Institute of Marine Science
PO Box 1346
Gloucester Point, Virginia 23062
804-684-7255
jebrister@vims.edu

Please print or type in the unshaded areas only.

Form Approved. OMB No. 2040-0086.

FORM 1 GENERAL

EPA

U.S. ENVIRONMENTAL PROTECTION AGENCY

GENERAL INFORMATION

Consolidated Permits Program

(Read the "General Instructions" before starting.)

I. EPA I.D. NUMBER

S		T/A	C
F	VA0071528		D
1	2 — 13	14	15

LABEL ITEMS	PLEASE PLACE LABEL IN THIS SPACE
I. EPA I.D. NUMBER	
III. FACILITY NAME	
V. FACILITY MAILING ADDRESS	
VI. FACILITY LOCATION	

GENERAL INSTRUCTIONS

If a preprinted label has been provided, affix it in the designated space. Review the information carefully; if any of it is incorrect, cross through it and enter the correct data in the appropriate fill-in area below. Also, if any of the preprinted data is absent *(the area to the left of the label space lists the information that should appear)*, please provide it in the proper fill-in area(s) below. If the label is complete and correct, you need not complete Items I, III, V, and VI *(except VI-B which must be completed regardless)*. Complete all items if no label has been provided. Refer to the instructions for detailed item descriptions and for the legal authorizations under which this data is collected.

II. POLLUTANT CHARACTERISTICS

INSTRUCTIONS: Complete A through J to determine whether you need to submit any permit application forms to the EPA. If you answer "yes" to any questions, you must submit this form and the supplemental form listed in the parenthesis following the question. Mark "X" in the box in the third column if the supplemental form is attached. If you answer "no" to each question, you need not submit any of these forms. You may answer "no" if your activity is excluded from permit requirements; see Section C of the instructions. See also, Section D of the instructions for definitions of **bold-faced terms**.

SPECIFIC QUESTIONS	Mark "X" YES	NO	FORM ATTACHED	SPECIFIC QUESTIONS	Mark "X" YES	NO	FORM ATTACHED
A. Is this facility a **publicly owned treatment works** which results in a **discharge** to **waters of the U.S.**? (FORM 2A)		X		B. Does or will this facility *(either existing or proposed)* include a **concentrated animal feeding operation** or **aquatic animal production facility** which results in a **discharge** to **waters of the U.S.**? (FORM 2B)	X		X
	16	17	18		19	20	21
C. Is this a facility which currently results in **discharges** to **waters of the U.S.** other than those described in A or B above? (FORM 2C)	X		X	D. Is this a proposed facility *(other than those described in A or B above)* which will result in a **discharge** to **waters of the U.S.**? (FORM 2D)		X	
	22	23	24		25	26	27
E. Does or will this facility treat, store, or dispose of **hazardous wastes**? (FORM 3)		X		F. Do you or will you inject at this facility industrial or municipal effluent below the lowermost stratum containing, within one quarter mile of the well bore, underground sources of drinking water? (FORM 4)		X	
	28	29	30		31	32	33
G. Do you or will you inject at this facility any produced water or other fluids which are brought to the surface in connection with conventional oil or natural gas production, inject fluids used for enhanced recovery of oil or natural gas, or inject fluids for storage of liquid hydrocarbons? (FORM 4)		X		H. Do you or will you inject at this facility fluids for special processes such as mining of sulfur by the Frasch process, solution mining of minerals, in situ combustion of fossil fuel, or recovery of geothermal energy? (FORM 4)		X	
	34	35	36		37	38	39
I. Is this facility a proposed **stationary source** which is one of the 28 industrial categories listed in the instructions and which will potentially emit 100 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)		X		J. Is this facility a proposed **stationary source** which is NOT one of the 28 industrial categories listed in the instructions and which will potentially emit 250 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an **attainment area**? (FORM 5)		X	
	40	41	42		43	44	45

III. NAME OF FACILITY

C 1 SKIP SEAWATER RESEARCH LABORATORY, VIRGINIA INSTITUTE OF MARINE SCIENCE

15 16 – 29 30 — 69

IV. FACILITY CONTACT

A. NAME & TITLE *(last, first, & title)*	B. PHONE *(area code & no.)*
C 2 WELLS, JOHN, DEAN AND DIRECTOR VIMS	(804) 684-7102
15 16 — 45	46 48 49 51 52- 55

V. FACILTY MAILING ADDRESS

A. STREET OR P.O. BOX

C 3 PO BOX 1346

15 16 — 45

B. CITY OR TOWN	C. STATE	D. ZIP CODE
C 4 GLOUCESTER POINT	VA	23062
15 16 — 40	41 42	47 51

VI. FACILITY LOCATION

A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER

C 5 1443 GREATE ROAD

15 16 — 45

B. COUNTY NAME

GLOUCESTER

46 — 70

C. CITY OR TOWN	D. STATE	E. ZIP CODE	F. COUNTY CODE *(if known)*
C 6 GLOUCESTER POINT	VA	23062	
15 16 — 40	41 42	47 51	52 -54

CONTINUED FROM THE FRONT

VII. SIC CODES *(4-digit, in order of priority)*

A. FIRST	B. SECOND
7 0273 *(specify)* ANIMAL AQUACULTURE	7 0921 *(specify)* FISH HATCHERY
C. THIRD	**D. FOURTH**
7 8221 *(specify)* COLLEGES, UNIVERSITIES, AND PROFESSIONAL SCHOOLS	7 8733 *(specify)* NONCOMMERCIAL RESEARCH ORGANIZATIONS

VIII. OPERATOR INFORMATION

A. NAME: VIRGINIA INSTITUTE OF MARINE SCIENCE, COLLEGE OF WILLIAM & MARY

B. Is the name listed in Item VIII-A also the owner? ☑ YES ☐ NO

C. STATUS OF OPERATOR *(Enter the appropriate letter into the answer box: if "Other," specify.)*

F = FEDERAL
S = STATE
P = PRIVATE
M = PUBLIC *(other than federal or state)*
O = OTHER *(specify)*

S *(specify)*

D. PHONE *(area code & no.)*: A (804) 684-7102

E. STREET OR P.O. BOX: PO BOX 1346

F. CITY OR TOWN: B GLOUCESTER POINT

G. STATE: VA

H. ZIP CODE: 23062

IX. INDIAN LAND

Is the facility located on Indian lands? ☐ YES ☑ NO

X. EXISTING ENVIRONMENTAL PERMITS

A. NPDES *(Discharges to Surface Water)*	9 N VA0071528	D. PSD *(Air Emissions from Proposed Sources)*	9 P
B. UIC *(Underground Injection of Fluids)*	9 U	E. OTHER *(specify)*	9 *(specify)*
C. RCRA *(Hazardous Wastes)*	9 R	E. OTHER *(specify)*	9 *(specify)*

XI. MAP

Attach to this application a topographic map of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers, and other surface water bodies in the map area. See instructions for precise requirements.

XII. NATURE OF BUSINESS *(provide a brief description)*

Applied marine research. Specifically, the holding of marine organisms (i.e., fishes, mollusks, crustaceans, and plants) for the purpose of physiological and ecological research. Facility provides pre-treatment of incoming York River water to optimize parameters necessary for the culture and maintainance of living marine organisms. Facility also provides post-treatment of culture water to remove solids, reduce the amount of dissolved organics, and disinfect the water before returning to the York River.

XIII. CERTIFICATION *(see instructions)*

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

A. NAME & OFFICIAL TITLE *(type or print)*	B. SIGNATURE	C. DATE SIGNED
Dr. John Wells PhD, Dean and Director, VIMS/SMS	John T. Wells	2/10/16

COMMENTS FOR OFFICIAL USE ONLY

C

VPDES Permit Application Addendum

1. **Entity to whom the permit is to be issued:** Virginia Institute of Marine Science

Who will be legally responsible for the wastewater treatment facilities and compliance with the permit? This may or may not be the facility or property owner.

2. **Is this facility located within city or town boundaries?** Yes ☑ No ☐

3. **Provide the tax map parcel number for the land where the discharge is located.** 51A(8)-5

4. **For the facility to be covered by this permit, how many acres will be disturbed during the next five years due to new construction activities?** N/A

5. **What is the design average effluent flow of this facility?** 1.296 MGD

   For industrial facilities, provide the max. 30-day average production level, include units:
   Not applicable

   In addition to the design flow or production level, should the permit be written with limits for any other discharge flow tiers or production levels? Yes ☐ No ☑
   If "Yes", please identify the other flow tiers (in MGD) or production levels:

Please consider the following questions for both the flow tiers and the production levels (if applicable): Do you plan to expand operations during the next five years? Is your facility's design flow considerably greater than your current flow?

6. **Nature of operations generating wastewater:**
   Rearing of aquatic organisms, applied aquatic animal research (e.g, pathology, physiology, & toxicology)

   0 % of flow from domestic connections/sources

   Number of private residences to be served by the treatment works: 0

   ____ % of flow from non-domestic connections/sources

7. **Mode of discharge:** ☑ Continuous ☐ Intermittent ☐ Seasonal

   Describe frequency and duration of intermittent or seasonal discharges:

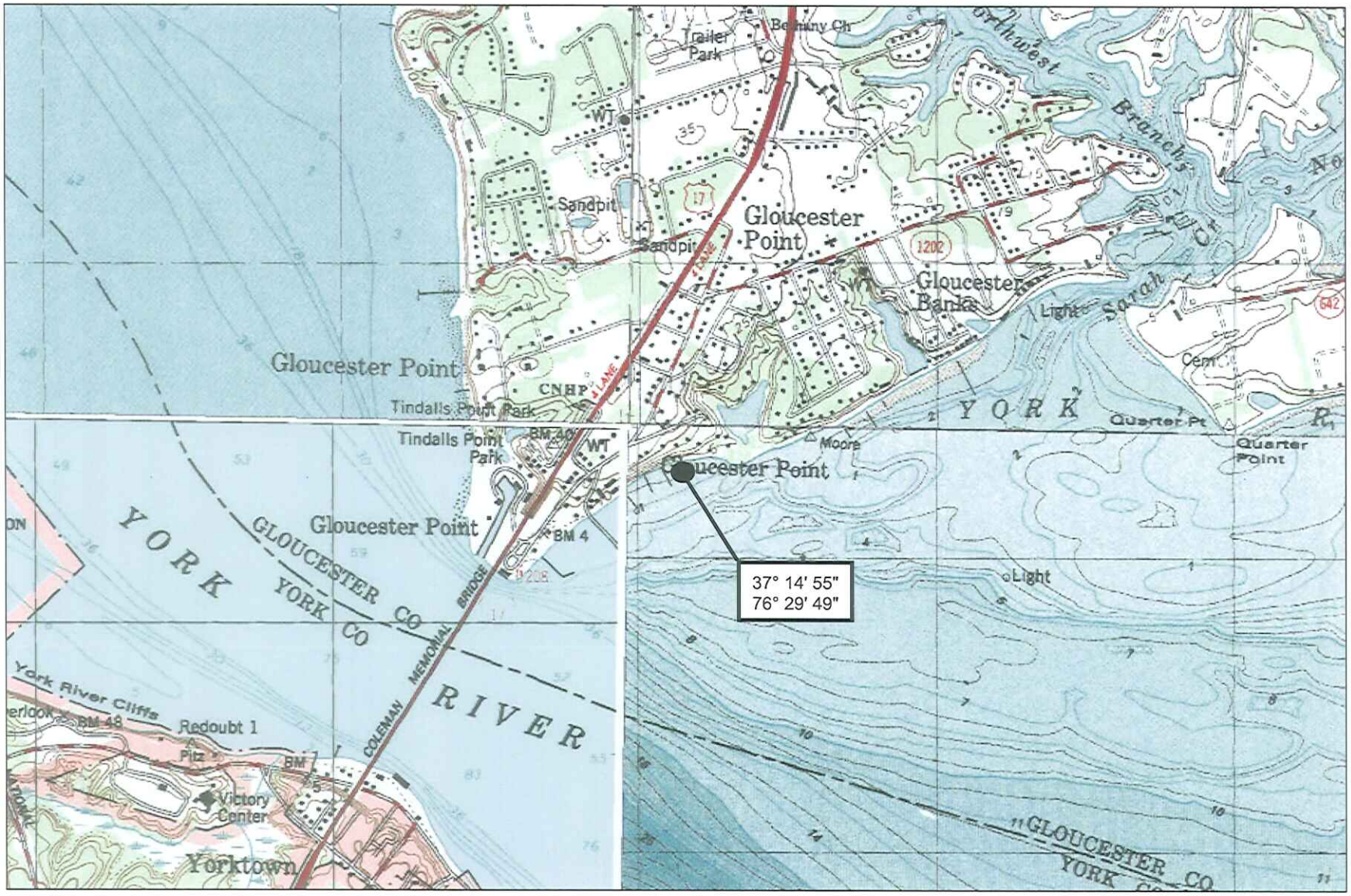
8. **Identify the characteristics of the receiving stream at the point just above the facility's discharge point:**

   ____ Permanent stream, never dry
   ____ Intermittent stream, usually flowing, sometimes dry
   ____ Ephemeral stream, wet-weather flow, often dry
   ____ Effluent-dependent stream, usually or always dry without effluent flow
   ____ Lake or pond at or below the discharge point
   X Other: Surface waters, York River

9. **Approval Date(s):**

   O & M Manual April 16, 2014 **Sludge/Solids Management Plan** ____

   Have there been any changes in your operations or procedures since the above approval dates? Yes ☐ No ☑



N

0 0.5 Mi

0 2000 Ft

Map provided by MyTopo.com

Duke Rd
Sherwood Dr
State Route 1242 Walton St
Ty
dall Dr
17
Laurie Ln
Terrapin Cove Rd
Banks Cir
Gloucester Point
Ohara Rd
SRL Sample Outfall 004 at B004
SRL Sample Outfall 004 at B003
Outfall 004
Intake Pier
George Washington Memorial Hwy
Yorktown
N
W
E
S
© 2011 Google
© 2011 Europa Technologies
Image © 2011 TerraMetrics
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Google
Pointer 37°14'56.56" N 76°29'51.45" W elev 2 ft
Streaming 100%
Eye alt 11772 ft

Route 1239
17
Vernon St
SRL Sample Outfall 004 at B004
SRL Sample Outfall 004 at B003
Outfall 004
Old Ferry Rd
Intake Pier
N
NE
E
SE
S
SW
W
© 2011 Google
© 2011 Europa Technologies
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Google
Pointer 37°14'56.56" N 76°29'51.45" W elev 1 ft
Streaming 100%
Eye alt 2080 ft

Form Approved
OMB No. 2040-0250
Approval expires 12-15-05

EPA I.D. NUMBER *(copy from Item 1 of Form 1)*
VA0071528

FORM 2B NPDES	EPA	U.S. ENVIRONMENTAL PROTECTION AGENCY APPLICATIONS FOR PERMIT TO DISCHARGE WASTEWATER CONCENTRATED ANIMAL FEEDING OPERATIONS AND AQUATIC ANIMAL PRODUCTION FACILITIES

I. GENERAL INFORMATION

Applying for: Individual Permit ☒ Coverage Under General Permit ☐

A. TYPE OF BUSINESS	B. CONTACT INFORMATION	C. FACILITY OPERATION STATUS
☐ 1. Concentrated Animal Feeding Operation (complete items B, C, D, and Section II) ☒ 2. Concentrated Aquatic Animal Production Facility (complete items B, C, and section III)	Owner/or Operator Name: Dr. John Wells Telephone: (804) 684-7102 Address: 1208 Greate Road Facsimile: (804) 684-7450 City: Gloucester Point State: VA Zip Code: 23062	☒ 1. Existing Facility ☐ 2. Proposed Facility

D. FACILITY INFORMATION

Name: Virginia Institute of Marine Science, Seawater Research Laboratory Telephone: (804) 684-7102
Address: 1443 Greate Road Facsimile: (804) 684-7450
City: Gloucester Point State: VA Zip Code: 23062
County: Gloucester Latitude: 37 degrees 15' 01" Longitude: 76 degrees 29' 54"

If contract operation: Name of Integrator: _____
Address of Integrator: _____

II. CONCENTRATED ANIMAL FEEDING OPERATION CHARACTERISTICS

A. TYPE AND NUMBER OF ANIMALS

1. TYPE	2. ANIMALS: NO. IN OPEN CONFINEMENT	2. ANIMALS: NO. HOUSED UNDER ROOF
☐ Mature Dairy Cows		
☐ Dairy Heifers		
☐ Veal Calves		
☐ Cattle (not dairy or veal)		
☐ Swine (55 lbs. or over)		
☐ Swine (under 55 lbs.)		
☐ Horses		
☐ Sheep or Lambs		
☐ Turkeys		

B. Manure, Litter and/or Wastewater Production and Use

a) How much manure, litter and wastewater is generated annually by the facility? _____ tons _____ gallons

b) If land applied how many acres of land under the control of the applicant are available for applying the CAFOs manure/litter/wastewater? _____ acres

c) How many tons of manure or litter, or gallons of waste-water produced by the CAFO will be transferred annually to other persons? tons/gallons *(circle one)* tons

❑ Chickens (Broilers)			
❑ Chickens (Layers)			
❑ Ducks			
❑ Other Specify _____			
3. TOTAL ANIMALS			

C. ❑ TOPOGRAPHIC MAP

D. TYPE OF CONTAINMENT, STORAGE AND CAPACITY

1. Type of Containment	Total Capacity (in gallons)
❑ Lagoon	
❑ Holding Pond	
❑ Evaporation Pond	
❑ Other: Specify _____	

2. Report the total number of acres contributing drainage: _____ acres

3. Type of Storage	Total Number of Days	Total Capacity (gallons/tons)
❑ Anaerobic Lagoon		
❑ Storage Lagoon		
❑ Evaporation Pond		
❑ Aboveground Storage Tanks		
❑ Belowground Storage Tanks		
❑ Roofed Storage Shed		
❑ Concrete Pad		
❑ Impervious Soil Pad		
❑ Other: Specify _____		

E. NUTRIENT MANAGEMENT PLAN

A. Has a nutrient management plan been developed? ☐ Yes ☐ No

B. Is a nutrient management plan being implemented for the facility? ☐ Yes ☐ No

C. If no, when will the nutrient management plan be developed? Date: _____

D. The date of the last review or revision of the nutrient management plan. Date: _____

E. If not land applying, describe alternative use(s) of manure, litter and or wastewater:

Form Approved
OMB No. 2040-0250
Approval expires 12-15-05

F. LAND APPLICATION BEST MANAGEMENT PRACTICES
Please check any of the following best management practices that are being implemented at the facility to control runoff and protect water quality:

❑ Buffers ❑ Setbacks ❑ Conservation tillage ❑ Constructed wetlands ❑ Infiltration field ❑ Grass filter ❑ Terrace

III. CONCENTRATED AQUATIC ANIMAL PRODUCTION FACILITY CHARACTERISTICS

A. For each outfall give the maximum daily flow, maximum 30-day flow, and the long-term average flow.

1. Outfall No.	2. Flow (*gallons per day*)		
	a. Maximum Daily	b. Maximum 30 Day	c. Long Term Average
4.00	1.296 million	1.296 million	1.008 million

B. Indicate the total number of ponds, raceways, and similar structures in your facility.

1. Ponds	2. Raceways	3. Other
	25	

C. Provide the name of the receiving water and the source of water used by your facility.

1. Receiving Water	2. Water Source
York River	York River

D. List the species of fish or aquatic animals held and fed at your facility. For each species, give the total weight produced by your facility per year in pounds of harvestable weight, and also give the maximum weight present at any one time.

1. Cold Water Species			2. Warm Water Species		
a. Species	b. Harvestable Weight (*pounds*)		a. Species	b. Harvestable Weight (*pounds*)	
	(1) Total Yearly	(2) Maximum		(1) Total Yearly	(2) Maximum
Oncorhyncus mykiss	200	1,000	Crassostrea virginica Rapana venosa Callinectes sapidus Fundulus heteroclitus Danio rerio Morone saxatilis Paralichthys dentatus Homarus americanus Uca pugilator	100 50 200 10 2 200 150 100 20	<15,000 across all species

E. Report the total pounds of food during the calendar month of maximum feeding.

1. Month	2. Pounds of Food
August	50 lbs

IV. CERTIFICATION

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

A. Name and Official Title (*print or type*)	B. Phone No. (804) 684-7102
Dr. John Wells, Dean & Director	
C. Signature John S. Wells	D. Date Signed 2/10/16

Form Approved
OMB No. 2040-0250
Approval expires 12-15-05

INSTRUCTIONS

GENERAL

This form must be completed by all applicants who check "yes" to Item II-B in Form 1. Not all animal feeding operations or fish farms are required to obtain NPDES permits. Exclusions are based on size. See the description of these statutory and regulatory exclusions in the General Instructions that accompany Form 1.

For aquatic animal production facilities, the size cutoffs are based on whether the species are warm water or cold water, on the production weight per year in harvestable pounds, and on the amount of feeding in pounds of food (*for cold water species*). Also, facilities which discharge less than 30 days per year, or only during periods of excess runoff (*for warm water fish*) are not required to have a permit.

Refer to the Form 1 instructions to determine where to file this form.

Item I-A

See the note above and the General Instructions which accompany Form 1 to be sure that your facility is a "concentrated animal feeding operation" (CAFO).

Item I-B

Use this space to give owner/operator contact information.

Item I-C

Check "proposed" if your facility is not now in operation or is expanding to meet the definition of a CAFO in accordance with the information found in the General Instructions that accompany Form 1.

Item I-D

Use this space to give a complete legal description of your facility's location including name, address, and latitude/longitude. Also, the if a contract grower, the name and address of the integrator.

Item II

Supply all information in item II if you checked (1) in item I-A.

Item II-A

Give the maximum number of each type of animal in open confinement or housed under roof (either partially or totally) which are held at your facility for a total of 45 days or more in any 12 month period. Provide the total number of animals confined at the facility.

Item II-B

Provide the total amount of manure, litter and wastewater generated annually by the facility. Identify if manure, litter and wastewater generated by the facility is to be land applied and the number of acres, under the control of the CAFO operator, suitable for land application. If the answer to question 3 is yes, provide the estimated annual quantity of manure, litter and wastewater that the applicant plans to transfer off-site.

Item II-C

Check this box if you have submitted a topographic map of the geographic area in which the CAFO is located showing the specific location of the production area.

Item II-D

1. Provide information on the type of containment and the capacity of the containment structure (s).
2. The number of acres that are drained and collected in the containment structure (s).
3. Identify the type of storage for the manure, litter and/or wastewater. Give the capacity of this storage in days and gallons or tons.

Item II-E

Provide information concerning the status of the development and implementation of a nutrient management plan for the facility. In those cases where the nutrient management plan has not been completed, provide an estimated date of development and implementation. If not land applying, describe the alternative uses of the manure, litter and wastewater (e.g., composting, pelletizing, energy generation, etc.).

Item II-F

Check any of the identified conservation practices that are being implemented at the facility to control runoff and protect water quality.

Item III

Supply all information in Item III if you checked (2) in Item I-A.

Item III-A

Outfalls should be numbered to correspond with the map submitted in Item XI of Form 1. Values given for flow should be representative of your normal operation. The maximum daily flow is the maximum measured flow occurring over a calendar day. The maximum 30-day flow is the average of measured daily flow over the calendar month of highest flow. The long-term average flow is the average of measure daily flows over a calendar year.

Item III-B

Give the total number of discrete ponds or raceways in your facility. Under "other," give a descriptive name of any structure which is not a pond or a raceway but which results in discharge to waters of the United States.

Item III-C

Use names for receiving water and source of water which correspond to the map submitted in Item XI of Form 1.

Item III-D

The names of fish species should be proper, common, or scientific names as given in special Publication No. 6 of the American Fisheries Society. "A List of Common and Scientific Names of Fishes from the United States and Canada." The values given for total weight produced by your facility per year and the maximum weight present at any one time should be representative of your normal operation.

Item III-E

The value given for maximum monthly pounds of food should be representative of your normal operation.

Item IV

The Clean Water Act provides for severe penalties for submitting false information on this application form.

Section 309(C)(2) of the Clean Water Act provides that "Any person who knowingly makes any false statement, representation, or certification in any application...shall upon conviction, be punished by a fine of no more than $10,000 or by imprisonment for not more than six months, or both."

Federal regulations require the certification to be signed as follows:

A. For corporation, by a principal executive officer of at least the level of vice president.

B. For a partnership or sole proprietorship, by a general partner or the proprietor, respectively; or

C. For a municipality, State, Federal, or other public facility, by either a principal executive officer or ranking elected official.

Paper Reduction Act Notice

The Public reporting burden for this collection of information estimated to average 4 hours per response. The estimate includes time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information to the chief, Information Policy Branch (PM-223), U.S. Environmental Protection Agency, 1200 Pennsylvania Avenue, N.W., Washington, D.C. 20460, and the Office of Information and Regulatory Afairs, Office of Management and Budget, Washington, D.C. 20503, marked Attention: Desk Officer for EPA.

Please print or type in the unshaded areas only.

EPA I.D. NUMBER (*copy from Item 1 of Form 1*)
VA0071528

Form Approved.
OMB No. 2040-0086.
Approval expires 3-31-98.

FORM 2C NPDES

EPA

U.S. ENVIRONMENTAL PROTECTION AGENCY
APPLICATION FOR PERMIT TO DISCHARGE WASTEWATER

EXISTING MANUFACTURING, COMMERCIAL, MINING AND SILVICULTURE OPERATIONS

Consolidated Permits Program

I. OUTFALL LOCATION

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

A. OUTFALL NUMBER (*list*)	B. LATITUDE			C. LONGITUDE			D. RECEIVING WATER (*name*)
	1. DEG.	2. MIN.	3. SEC.	1. DEG.	2. MIN.	3. SEC.	
004 Sample	37.00	14.00	57.00	76.00	29.00	50.00	YORK RIVER
004 Terminus	37.00	14.00	55.00	76.00	29.00	49.00	YORK RIVER

II. FLOWS, SOURCES OF POLLUTION, AND TREATMENT TECHNOLOGIES

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

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

1. OUTFALL NO. (*list*)	2. OPERATION(S) CONTRIBUTING FLOW		3. TREATMENT		
	a. OPERATION (*list*)	b. AVERAGE FLOW (*include units*)	a. DESCRIPTION	b. LIST CODES FROM TABLE 2C-1	
004	Prep Lab	10 gpm	Sanitary Sewer, intermittently to surface waters	X-X	
004	Intake RW Treatment (ConicalSettler)	500 gpd	Sedimentation, backwasah discharged to surface waters	1-U	4-A
004	Intake RW Treatment (MDF Filtration)	9,600 gpd	Microscreen particulate filtration 940 microns) backwash discharged to surface waters	1-N	4-A
004	Intake RW Treatment	4,320 gpd	Foam fractionation (Protein Skimming), Ozonation	1-I	2-G
	(FOAM Fractionation)		Backwash to sanitary sewer	X-X	
			Process water eventually discharged to surface waters after use		
004	Storm Water (10 year event)	2.51 cfs	Stormceptor, Discharge to surface waters	1-U	4-A
	Calculations per Virginia		(80 % TSS removal, 95% Oil removal)		
	Storm Water Handbook		Clean-out to Landfill Disposal	5-Q	
004	Aquaculture Process Flow	300 gpm	Untreated outfall from multi-purpose lab to surface waters	4-A	

OFFICIAL USE ONLY (*effluent guidelines sub-categories*)

CONTINUED FROM THE FRONT

C. Except for storm runoff, leaks, or spills, are any of the discharges described in Items II-A or B intermittent or seasonal?

☐ YES (*complete the following table*) ☐ NO (*go to Section III*)

1. OUTFALL NUMBER (*list*)	2. OPERATION(s) CONTRIBUTING FLOW (*list*)	3. FREQUENCY		4. FLOW				
		a. DAYS PER WEEK (*specify average*)	b. MONTHS PER YEAR (*specify average*)	a. FLOW RATE (*in mgd*)		B. TOTAL VOLUME (*specify with units*)		C. DURATION (*in days*)
				1. LONG TERM AVERAGE	2. MAXIMUM DAILY	1. LONG TERM AVERAGE	2. MAXIMUM DAILY	
004	Microscreen Drum Filter Backwash Intake Water	7	12	.0096	.0192	.0096 mgd	.0192 mgd	365
004	Microscreen Drum Filter Backwash Effluent Water	7	12	.0096	.0096	.0096 mgd	.0192 mgd	365
004	Settler Washout Intake Water	7	12	.0005	.0010	.0005 mgd	.0010 mgd	365

III. PRODUCTION

A. Does an effluent guideline limitation promulgated by EPA under Section 304 of the Clean Water Act apply to your facility?

☐ YES (*complete Item III-B*) ☑ NO (*go to Section IV*)

B. Are the limitations in the applicable effluent guideline expressed in terms of production (*or other measure of operation*)?

☐ YES (*complete Item III-C*) ☑ NO (*go to Section IV*)

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

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

IV. IMPROVEMENTS

A. Are you now required by any Federal, State or local authority to meet any implementation schedule for the construction, upgrading or operations of wastewater treatment equipment or practices or any other environmental programs which may affect the discharges described in this application? This includes, but is not limited to, permit conditions, administrative or enforcement orders, enforcement compliance schedule letters, stipulations, court orders, and grant or loan conditions.

☐ YES (*complete the following table*) ☑ NO (*go to Item IV-B*)

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

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

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

 CONTINUE ON PAGE 3

EPA I.D. NUMBER (*copy from Item 1 of Form 1*)
VA0071528

CONTINUED FROM PAGE 2

V. INTAKE AND EFFLUENT CHARACTERISTICS

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

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

1. POLLUTANT	2. SOURCE	1. POLLUTANT	2. SOURCE
N/A (see below)	N/A (see below)		

VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS

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

☐ YES (*list all such pollutants below*) ☑ NO (*go to Item VI-B*)

Not applicable. None of the pollutants listed in table 2c-3 are used or generated in this facility.

CONTINUED FROM THE FRONT

VII. BIOLOGICAL TOXICITY TESTING DATA

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

☑ YES (*identify the test(s) and describe their purposes below*) ☐ NO (*go to Section VIII*)

Cyprinodon variegatus, Larval Survival and Growth Test (EPA Met 1004.0); Renewal 7-d Survival (NOEC), Biomass (NOEC); Test method specified in 40 CFR 136. DEQ permit requirement based on guidance in EPA 1991.

Mysidopsis (Americamysis) bahia, Survival, Growth and Fecundity Test (EPA Met 1007.0); Renewal 7-d Survival (NOEC), Biomass (NOEC), Fecundity (NOEC); Test method specified in 40 CFR 136. DEQ permit requirement based on guidance in EPA 1991.

VIII. CONTRACT ANALYSIS INFORMATION

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

☑ YES (*list the name, address, and telephone number of, and pollutants analyzed by, each such laboratory or firm below*) ☐ NO (*go to Section IX*)

A. NAME	B. ADDRESS	C. TELEPHONE (*area code & no.*)	D. POLLUTANTS ANALYZED (*list*)
Coastal Bioanalysts, Inc. (WET)	6400 Enterprise Court Gloucester, VA 23061	(804) 694-8285	See attachment C1
Universal Laboratories, Inc. (Pesticides and Metals)	20 Research Drive Hampton, VA 23666	(757) 965-0880	See attachment C2

IX. CERTIFICATION

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

A. NAME & OFFICIAL TITLE (*type or print*)	B. PHONE NO. (*area code & no.*)
Dr. John Wells, Dean & Director, VIMS/SMS	(804) 684-7102
C. SIGNATURE John V. Wells	D. DATE SIGNED 2/10/16

PLEASE PRINT OR TYPE IN THE UNSHADED AREAS ONLY. You may report some or all of this information on separate sheets (*use the same format*) instead of completing these pages.
SEE INSTRUCTIONS.

EPA I.D. NUMBER (*copy from Item 1 of Form 1*): VA0071528

V. INTAKE AND EFFLUENT CHARACTERISTICS *(continued from page 3 of Form 2-C)*

OUTFALL NO. 004

PART A –You must provide the results of at least one analysis for every pollutant in this table. Complete one table for each outfall. See instructions for additional details.

1. POLLUTANT	2. EFFLUENT a. MAXIMUM DAILY VALUE (1) CONCENTRATION	2. EFFLUENT a. MAXIMUM DAILY VALUE (2) MASS	2. EFFLUENT b. MAXIMUM 30 DAY VALUE (*if available*) (1) CONCENTRATION	2. EFFLUENT b. MAXIMUM 30 DAY VALUE (*if available*) (2) MASS	2. EFFLUENT c. LONG TERM AVRG. VALUE (*if available*) (1) CONCENTRATION	2. EFFLUENT c. LONG TERM AVRG. VALUE (*if available*) (2) MASS	2. EFFLUENT d. NO. OF ANALYSES	3. UNITS (*specify if blank*) a. CONCEN-TRATION	3. UNITS (*specify if blank*) b. MASS	4. INTAKE (*optional*) a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	4. INTAKE (*optional*) a. LONG TERM AVERAGE VALUE (2) MASS	4. INTAKE (*optional*) b. NO. OF ANALYSES
a. Biochemical Oxygen Demand (*BOD*)	<QL						1	mg/L	lbs			
b. Chemical Oxygen Demand (*COD*)	435.0	3655.61					1	mg/L	lbs			
c. Total Organic Carbon (*TOC*)	43.7	469.982	21.8	7033.59	4.67	46938.41	36	mg/L	lbs	5.389	54165	36
d. Total Suspended Solids (*TSS*)	25.8	277.472	20.8	6710.96	12.21	122723	36	mg/L	lbs	13.78	138503	36
e. Ammonia (*as N*)	<QL						1	mg/L	lbs			
f. Flow	VALUE 1.29		VALUE 1.29		VALUE 1.101		36	MGD		VALUE		
g. Temperature (*winter*)	VALUE 0.22		VALUE 8.85		VALUE 6.89		270	°C		VALUE		
h. Temperature (*summer*)	VALUE 29.66		VALUE 27.29		VALUE 26.48		276	°C		VALUE		
i. pH	MINIMUM 7.23	MAXIMUM 8.7	MINIMUM 7.695	MAXIMUM 8.042			1095	STANDARD UNITS				

PART B – Mark "X" in column 2-a for each pollutant you know or have reason to believe is present. Mark "X" in column 2-b for each pollutant you believe to be absent. If you mark column 2a for any pollutant which is limited either directly, or indirectly but expressly, in an effluent limitations guideline, you must provide the results of at least one analysis for that pollutant. For other pollutants for which you mark column 2a, you must provide quantitative data or an explanation of their presence in your discharge. Complete one table for each outfall. See the instructions for additional details and requirements.

	1. POLLUTANT AND CAS NO. (*if available*)	2. MARK "X" a. BELIEVED PRESENT	2. MARK "X" b. BELIEVED ABSENT	3. EFFLUENT a. MAXIMUM DAILY VALUE (1) CONCENTRATION	3. EFFLUENT a. MAXIMUM DAILY VALUE (2) MASS	3. EFFLUENT b. MAXIMUM 30 DAY VALUE (*if available*) (1) CONCENTRATION	3. EFFLUENT b. MAXIMUM 30 DAY VALUE (*if available*) (2) MASS	3. EFFLUENT c. LONG TERM AVRG. VALUE (*if available*) (1) CONCENTRATION	3. EFFLUENT c. LONG TERM AVRG. VALUE (*if available*) (2) MASS	3. EFFLUENT d. NO. OF ANALYSES	4. UNITS a. CONCEN-TRATION	4. UNITS b. MASS	5. INTAKE (*optional*) a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	5. INTAKE (*optional*) a. LONG TERM AVERAGE VALUE (2) MASS	5. INTAKE (*optional*) b. NO. OF ANALYSES
*	a. Bromide (24959-67-9)	X		45.0	483.96					1	mg/L	lbs			
	b. Chlorine, Total Residual		X	<QL						1					
	c. Color		X	5						1	PCU				
	d. Fecal Coliform		X	<2 cfu						1	mpn/100				
	e. Fluoride (16984-48-8)		X	0.7	7.528					1	mg/L	lbs			
*	f. Nitrate-Nitrite (*as N*)	X		.09	0.968	0.9	29.038	0.042	422.144	36	mg/L	lbs	0.049	492.5	36

CONTINUE ON REVERSE

ITEM V-B CONTINUED FROM FRONT

1. POLLUTANT AND CAS NO. (*if available*)	2. MARK "X"		3. EFFLUENT							4. UNITS		5. INTAKE (*optional*)		
	a. BELIEVED PRESENT	b. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (*if available*)		c. LONG TERM AVRG. VALUE (*if available*)		d. NO. OF ANALYSES	a. CONCEN-TRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
			(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
g. Nitrogen, Total Organic (*as N*)	X		1.6	17.208	1.6	516.227	0.777	7809.67	36	mg/L	lbs	0.836	8402.	36
h. Oil and Grease		X	<QL						1					
i. Phosphorus (as P), Total (7723-14-0)	X		0.18	1.936	0.18	58.076	0.056	562.859	36	mg/L	lbs	0.049	492.5	36
j. Radioactivity														
(1) Alpha, Total		X	<QL						1					
(2) Beta, Total		X	<QL						1					
(3) Radium, Total		X	<QL						1					
(4) Radium 226, Total		X	<QL						1					
k. Sulfate (*as* SO_4) (14808-79-8)	X		1840	19788.7					1	mg/L	lbs			
l. Sulfide (*as S*)		X	0.6	6.453					1	mg/L	lbs			
m. Sulfite (*as* SO_3) (14265-45-3)		X	<QL						1	mg/L	lbs			
n. Surfactants		X	<QL						1	mg/L	lbs			
o. Aluminum, Total (7429-90-5)	X		0.033	0.355					1	mg/L	lbs			
p. Barium, Total (7440-39-3)		X	0.017	.183					1	mg/L	lbs			
q. Boron, Total (7440-42-8)	X		2.793	30.08					1	mg/L	lbs			
r. Cobalt, Total (7440-48-4)	X		<QL						1	mg/L	lbs			
s. Iron, Total (7439-89-6)	X		0.05	0.538					1	mg/L	lbs			
t. Magnesium, Total (7439-95-4)	X		871.5	9372.75					1	mg/L	lbs			
u. Molybdenum, Total (7439-98-7)	X		0.008	.086					1	mg/L	lbs			
v. Manganese, Total (7439-96-5)	X		0.020	.215					1	mg/L	lbs			
w. Tin, Total (7440-31-5)		X	0.010	.108					1	mg/L	lbs			
x. Titanium, Total (7440-32-6)		X	<QL						1	mg/L	lbs			

 CONTINUE ON PAGE V-3

EPA I.D. NUMBER (*copy from Item 1 of Form 1*)	OUTFALL NUMBER
VA0071528	004

CONTINUED FROM PAGE 3 OF FORM 2-C

PART C - If you are a primary industry and this outfall contains process wastewater, refer to Table 2c-2 in the instructions to determine which of the GC/MS fractions you must test for. Mark "X" in column 2-a for all such GC/MS fractions that apply to your industry and for ALL toxic metals, cyanides, and total phenols. If you are not required to mark column 2-a (*secondary industries, nonprocess wastewater outfalls, and nonrequired GC/MS fractions*), mark "X" in column 2-b for each pollutant you know or have reason to believe is present. Mark "X" in column 2-c for each pollutant you believe is absent. If you mark column 2a for any pollutant, you must provide the results of at least one analysis for that pollutant. If you mark column 2b for any pollutant, you must provide the results of at least one analysis for that pollutant if you know or have reason to believe it will be discharged in concentrations of 10 ppb or greater. If you mark column 2b for acrolein, acrylonitrile, 2,4 dinitrophenol, or 2-methyl-4, 6 dinitrophenol, you must provide the results of at least one analysis for each of these pollutants which you know or have reason to believe that you discharge in concentrations of 100 ppb or greater. Otherwise, for pollutants for which you mark column 2b, you must either submit at least one analysis or briefly describe the reasons the pollutant is expected to be discharged. Note that there are 7 pages to this part; please review each carefully. Complete one table (*all 7 pages*) for each outfall. See instructions for additional details and requirements.

1. POLLUTANT AND CAS NUMBER (*if available*)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (*optional*)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (*if available*)		c. LONG TERM AVRG. VALUE (*if available*)		d. NO. OF ANALYSES	a. CONCEN-TRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
METALS, CYANIDE, AND TOTAL PHENOLS															
1M. Antimony, Total (7440-36-0)			X	<QL						1					
2M. Arsenic, Total (7440-38-2)			X	<QL						1					
3M. Beryllium, Total (7440-41-7)			X	<QL						1					
4M. Cadmium, Total (7440-43-9)			X	<QL						1					
5M. Chromium, Total (7440-47-3)			X	<QL						1					
6M. Copper, Total (7440-50-8)		X		0.014	.150					1	mg/L	lbs			
7M. Lead, Total (7439-92-1)			X	<QL						1					
8M. Mercury, Total (7439-97-6)			X	<QL						1					
9M. Nickel, Total (7440-02-0)			X	<QL						1					
10M. Selenium, Total (7782-49-2)			X	<QL						1					
11M. Silver, Total (7440-22-4)			X	<QL						1					
12M. Thallium, Total (7440-28-0)			X	0.010	.108					1	mg/L	lbs			
13M. Zinc, Total (7440-66-6)		X		0.021	.226					1	mg/L	lbs			
14M. Cyanide, Total (57-12-5)			X	<QL						1					
15M. Phenols, Total			X	<QL						1					
DIOXIN															
2,3,7,8-Tetra-chlorodibenzo-P-Dioxin (1764-01-6)			X	DESCRIBE RESULTS <QL											

CONTINUE ON REVERSE

CONTINUED FROM THE FRONT

1. POLLUTANT AND CAS NUMBER (*if available*)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (*optional*)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (*if available*)		c. LONG TERM AVRG. VALUE (*if available*)		d. NO. OF ANALYSES	a. CONCEN-TRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
GC/MS FRACTION – VOLATILE COMPOUNDS															
1V. Accrolein (107-02-8)			X	<QL						1					
2V. Acrylonitrile (107-13-1)			X	<QL						1					
3V. Benzene (71-43-2)			X	<QL						1					
4V. Bis (*Chloro-methyl*) Ether (542-88-1)			X			X									
5V. Bromoform (75-25-2)			X	<QL						1					
6V. Carbon Tetrachloride (56-23-5)			X	<QL						1					
7V. Chlorobenzene (108-90-7)			X	<QL						1					
8V. Chlorodi-bromomethane (124-48-1)			X	<QL						1					
9V. Chloroethane (75-00-3)			X	<QL						1					
10V. 2-Chloro-ethylvinyl Ether (110-75-8)			X	<QL						1					
11V. Chloroform (67-66-3)			X	<QL						1					
12V. Dichloro-bromomethane (75-27-4)			X	<QL						1					
13V. Dichloro-difluoromethane (75-71-8)			X			X									
14V. 1,1-Dichloro-ethane (75-34-3)			X	<QL						1					
15V. 1,2-Dichloro-ethane (107-06-2)			X	<QL						1					
16V. 1,1-Dichloro-ethylene (75-35-4)			X	<QL						1					
17V. 1,2-Dichloro-propane (78-87-5)			X	<QL						1					
18V. 1,3-Dichloro-propylene (542-75-6)			X	<QL						1					
19V. Ethylbenzene (100-41-4)			X	<QL						1					
20V. Methyl Bromide (74-83-9)			X	<QL						1					
21V. Methyl Chloride (74-87-3)			X	<QL						1					

 CONTINUE ON PAGE V-5

CONTINUED FROM PAGE V-4

1. POLLUTANT AND CAS NUMBER (*if available*)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (*optional*)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (*if available*)		c. LONG TERM AVRG. VALUE (*if available*)		d. NO. OF ANALYSES	a. CONCEN-TRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
GC/MS FRACTION – VOLATILE COMPOUNDS (*continued*)															
22V. Methylene Chloride (75-09-2)			X	<QL						1					
23V. 1,1,2,2-Tetrachloroethane (79-34-5)			X	<QL						1					
24V. Tetrachloro-ethylene (127-18-4)			X	<QL						1					
25V. Toluene (108-88-3)			X	<QL						1					
26V. 1,2-Trans-Dichloroethylene (156-60-5)			X	<QL						1					
27V. 1,1,1-Trichloro-ethane (71-55-6)			X	<QL						1					
28V. 1,1,2-Trichloro-ethane (79-00-5)			X	<QL						1					
29V Trichloro-ethylene (79-01-6)			X	<QL						1					
30V. Trichloro-fluoromethane (75-69-4)			X			X				1					
31V. Vinyl Chloride (75-01-4)			X	<QL						1					
GC/MS FRACTION – ACID COMPOUNDS															
1A. 2-Chlorophenol (95-57-8)			X	<QL						1					
2A. 2,4-Dichloro-phenol (120-83-2)			X	<QL						1					
3A. 2,4-Dimethyl-phenol (105-67-9)			X	<QL						1					
4A. 4,6-Dinitro-O-Cresol (534-52-1)			X	<QL						1					
5A. 2,4-Dinitro-phenol (51-28-5)			X	<QL						1					
6A. 2-Nitrophenol (88-75-5)			X	<QL						1					
7A. 4-Nitrophenol (100-02-7)			X	<QL						1					
8A. P-Chloro-M-Cresol (59-50-7)			X	<QL						1					
9A. Pentachloro-phenol (87-86-5)			X	<QL						1					
10A. Phenol (108-95-2)			X	<QL						1					
11A. 2,4,6-Trichloro-phenol (88-05-2)			X	<QL						1					

CONTINUE ON REVERSE

CONTINUED FROM THE FRONT

1. POLLUTANT AND CAS NUMBER (*if available*)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (*optional*)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (*if available*)		c. LONG TERM AVRG. VALUE (*if available*)		d. NO. OF ANALYSES	a. CONCEN-TRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
GC/MS FRACTION – BASE/NEUTRAL COMPOUNDS															
1B. Acenaphthene (83-32-9)			X	<QL						1					
2B. Acenaphtylene (208-96-8)			X	<QL						1					
3B. Anthracene (120-12-7)			X	<QL						1					
4B. Benzidine (92-87-5)			X	<QL						1					
5B. Benzo (*a*) Anthracene (56-55-3)			X	<QL						1					
6B. Benzo (*a*) Pyrene (50-32-8)			X	<QL						1					
7B. 3,4-Benzo-fluoranthene (205-99-2)			X	<QL						1					
8B. Benzo (*ghi*) Perylene (191-24-2)			X	<QL						1					
9B. Benzo (*k*) Fluoranthene (207-08-9)			X	<QL						1					
10B. Bis (*2-Chloro-ethoxy*) Methane (111-91-1)			X	<QL						1					
11B. Bis (*2-Chloro-ethyl*) Ether (111-44-4)			X	<QL						1					
12B. Bis (*2-Chloroisopropyl*) Ether (102-80-1)			X	<QL						1					
13B. Bis (*2-Ethyl-hexyl*) Phthalate (117-81-7)			X	<QL						1					
14B. 4-Bromophenyl Phenyl Ether (101-55-3)			X	<QL											
15B. Butyl Benzyl Phthalate (85-68-7)			X	<QL						1					
16B. 2-Chloro-naphthalene (91-58-7)			X	<QL						1					
17B. 4-Chloro-phenyl Phenyl Ether (7005-72-3)			X	<QL						1					
18B. Chrysene (218-01-9)			X	<QL						1					
19B. Dibenzo (*a,h*) Anthracene (53-70-3)			X	<QL						1					
20B. 1,2-Dichloro-benzene (95-50-1)			X	<QL						1					
21B. 1,3-Di-chloro-benzene (541-73-1)			X	<QL						1					

 CONTINUE ON PAGE V-7

CONTINUED FROM PAGE V-6

1. POLLUTANT AND CAS NUMBER (*if available*)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (*optional*)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (*if available*)		c. LONG TERM AVRG. VALUE (*if available*)		d. NO. OF ANALYSES	a. CONCEN-TRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
GC/MS FRACTION – BASE/NEUTRAL COMPOUNDS (*continued*)															
22B. 1,4-Dichloro-benzene (106-46-7)			X	<QL						1					
23B. 3,3-Dichloro-benzidine (91-94-1)			X	<QL						1					
24B. Diethyl Phthalate (84-66-2)			X	<QL						1					
25B. Dimethyl Phthalate (131 -11-3)			X	<QL						1					
26B. Di-N-Butyl Phthalate (84-74-2)			X	<QL						1					
27B. 2,4-Dinitro-toluene (121-14-2)			X	<QL						1					
28B. 2,6-Dinitro-toluene (606-20-2)			X	<QL						1					
29B. Di-N-Octyl Phthalate (117-84-0)			X	<QL						1					
30B. 1,2-Diphenyl-hydrazine (*as Azo-benzene*) (122-66-7)			X	<QL						1					
31B. Fluoranthene (206-44-0)			X	<QL						1					
32B. Fluorene (86-73-7)			X	<QL						1					
33B. Hexachloro-benzene (118-74-1)			X	<QL						1					
34B. Hexachloro-butadiene (87-68-3)			X	<QL						1					
35B. Hexachloro-cyclopentadiene (77-47-4)			X	<QL						1					
36B Hexachloro-ethane (67-72-1)			X	<QL						1					
37B. Indeno (*1,2,3-cd*) Pyrene (193-39-5)			X	<QL						1					
38B. Isophorone (78-59-1)			X	<QL						1					
39B. Naphthalene (91-20-3)			X	<QL						1					
40B. Nitrobenzene (98-95-3)			X	<QL						1					
41B. N-Nitro-sodimethylamine (62-75-9)			X	<QL						1					
42B. N-Nitrosodi-N-Propylamine (621-64-7)			X	<QL						1					

CONTINUE ON REVERSE

CONTINUED FROM THE FRONT

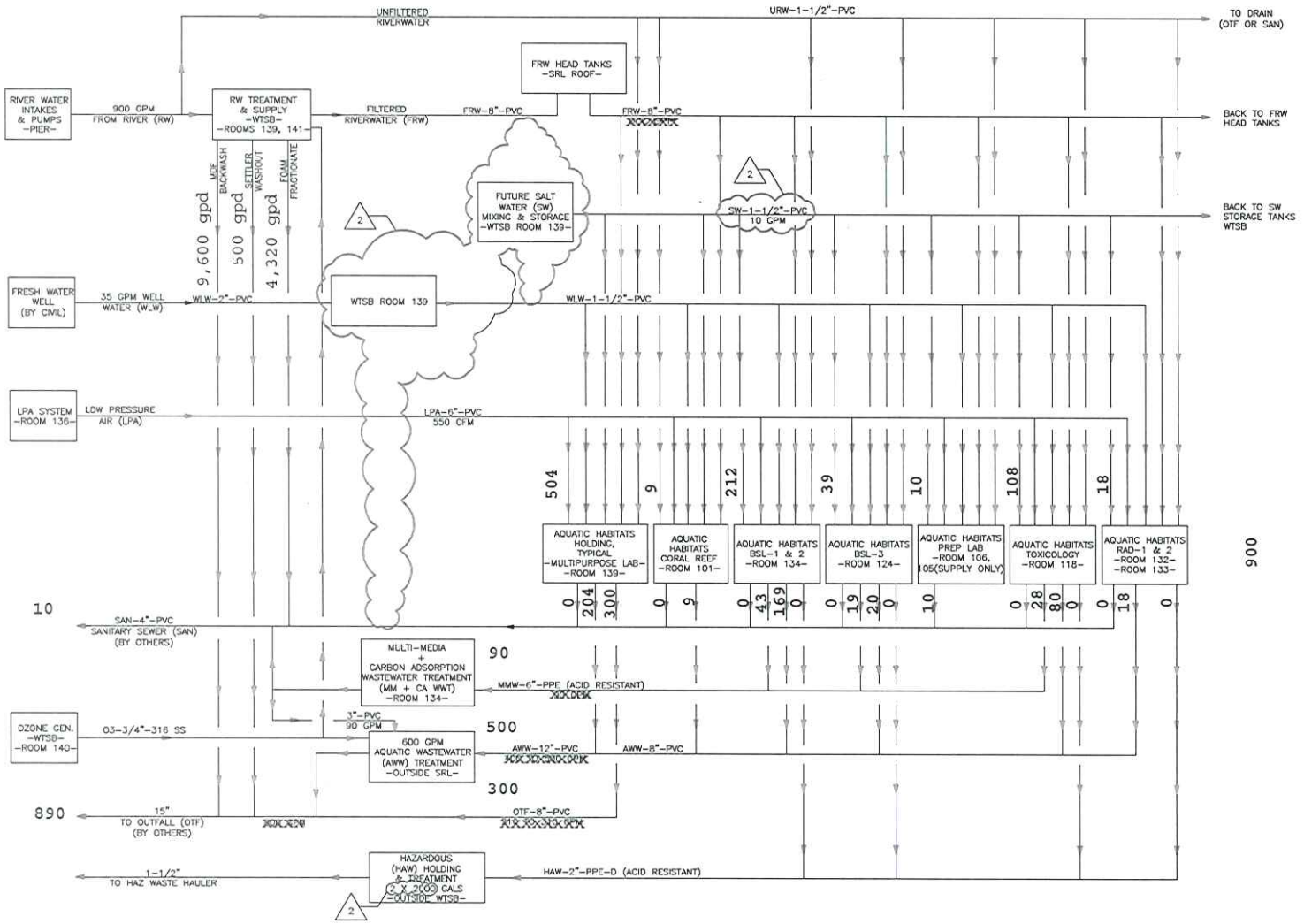
1. POLLUTANT AND CAS NUMBER (*if available*)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (*optional*)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (*if available*)		c. LONG TERM AVRG. VALUE (*if available*)		d. NO. OF ANALYSES	a. CONCEN-TRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
GC/MS FRACTION – BASE/NEUTRAL COMPOUNDS (*continued*)															
43B. N-Nitro-sodiphenylamine (86-30-6)			X	<QL						1					
44B. Phenanthrene (85-01-8)			X	<QL						1					
45B. Pyrene (129-00-0)			X	<QL						1					
46B. 1,2,4-Tri-chlorobenzene (120-82-1)			X	<QL						1					
GC/MS FRACTION – PESTICIDES															
1P. Aldrin (309-00-2)			X	<QL						1					
2P. α-BHC (319-84-6)			X	<QL						1					
3P. β-BHC (319-85-7)			X	<QL						1					
4P. γ-BHC (58-89-9)			X	<QL						1					
5P. δ-BHC (319-86-8)			X	<QL						1					
6P. Chlordane (57-74-9)			X	<QL						1					
7P. 4,4'-DDT (50-29-3)			X	<QL						1					
8P. 4,4'-DDE (72-55-9)			X	<QL						1					
9P. 4,4'-DDD (72-54-8)			X	<QL						1					
10P. Dieldrin (60-57-1)			X	<QL						1					
11P. α-Enosulfan (115-29-7)			X	<QL						1					
12P. β-Endosulfan (115-29-7)			X	<QL						1					
13P. Endosulfan Sulfate (1031-07-8)			X	<QL						1					
14P. Endrin (72-20-8)			X	<QL						1					
15P. Endrin Aldehyde (7421-93-4)			X	<QL						1					
16P. Heptachlor (76-44-8)			X	<QL						1					

CONTINUE ON PAGE V-9

EPA I.D. NUMBER (*copy from Item 1 of Form 1*)	OUTFALL NUMBER
VA0071528	004

CONTINUED FROM PAGE V-8

1. POLLUTANT AND CAS NUMBER (*if available*)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (*optional*)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (*if available*)		c. LONG TERM AVRG. VALUE (*if available*)		d. NO. OF ANALYSES	a. CONCEN-TRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
GC/MS FRACTION – PESTICIDES (*continued*)															
17P. Heptachlor Epoxide (1024-57-3)			X	<QL						1					
18P. PCB-1242 (53469-21-9)			X	<QL						1					
19P. PCB-1254 (11097-69-1)			X	<QL						1					
20P. PCB-1221 (11104-28-2)			X	<QL						1					
21P. PCB-1232 (11141-16-5)			X	<QL						1					
22P. PCB-1248 (12672-29-6)			X	<QL						1					
23P. PCB-1260 (11096-82-5)			X	<QL						1					
24P. PCB-1016 (12674-11-2)			X	<QL						1					
25P. Toxaphene (8001-35-2)			X	<QL						1					



SEAWATER LAB – AQUACULTURAL SYSTEMS BLOCK DIAGRAM

SCALE: NONE

ATTACHMENT A, Form 2C

SEAWATER RESEARCH LABORATORY
VIRGINIA INSTITUTE OF MARINE SCIENCE
GLOUCESTER POINT, VIRGINIA

NOT FOR CONSTRUCTION

AQUACULTURAL SYSTEMS DIAGRAMS

AQ304B

ATTACHMENT A
DEPARTMENT OF ENVIRONMENTAL QUALITY
WATER QUALITY CRITERIA MONITORING

Effective January 1, 2012, all analyses shall be in accordance with 1VAC30-45, Certification for Noncommercial Environmental Laboratories, or 1VAC30-46, Accreditation for Commercial Environmental Laboratories.

A listing of Virginia Environmental Laboratory Accreditation Program (VELAP) certified and/or accredited laboratories can be found at the following website:
http://www.dgs.state.va.us/DivisionofConsolidatedLaboratoryServices/Services/EnvironmentalLaboratoryCertification/tabid/1059/Default.aspx

Please be advised that additional water quality analyses may be necessary and/or required for permitting purposes.

CASRN	CHEMICAL	EPA ANALYSIS NO.	QUANTIFICATION LEVEL[1]	REPORTING RESULTS	SAMPLE TYPE[2]	SAMPLE FREQUENCY
		METALS				
7440-36-0	Antimony, dissolved	(3)	1.4	<QL	G or C	1/5 YR
7440-38-2	Arsenic, dissolved	(3)	1.0	<QL	G or C	1/5 YR
7440-43-9	Cadmium, dissolved	(3)	0.3	<QL	G or C	1/5 YR
16065-83-1	Chromium III, dissolved [6]	(3)	3.6	<QL	G or C	1/5 YR
18540-29-9	Chromium VI, dissolved [6]	(3)	1.6	<QL	G or C	1/5 YR
7440-50-8	Copper, dissolved	(3)	0.50	0.014	G or C	1/5 YR
7439-92-1	Lead, dissolved	(3)	0.50	<QL	G or C	1/5 YR
7439-97-6	Mercury, dissolved	(3)	1.0	<QL	G or C	1/5 YR
7440-02-0	Nickel, dissolved	(3)	0.94	<QL	G or C	1/5 YR
7782-49-2	Selenium, dissolved	(3)	2.0	<QL	G or C	1/5 YR (SW)
7440-22-4	Silver, dissolved	(3)	0.20	<QL	G or C	1/5 YR
7440-28-0	Thallium, dissolved	(3)	(4)	0.010	G or C	1/5 YR
7440-66-6	Zinc, dissolved	(3)	3.6	0.021	G or C	1/5 YR
		PESTICIDES/PCBs				
309-00-2	Aldrin	608/625	0.05	<QL	G or C	1/5 YR
57-74-9	Chlordane	608/625	0.2	<QL	G or C	1/5 YR
2921-88-2	Chlorpyrifos (synonym = Dursban)	622	(4)	<QL	G or C	1/5 YR
72-54-8	DDD	608/625	0.1	<QL	G or C	1/5 YR
72-55-9	DDE	608/625	0.1	<QL	G or C	1/5 YR
50-29-3	DDT	608/625	0.1	<QL	G or C	1/5 YR

CASRN	CHEMICAL	EPA ANALYSIS NO.	QUANTIFICATION LEVEL[1]	REPORTING RESULTS	SAMPLE TYPE[2]	SAMPLE FREQUENCY
8065-48-3	Demeton (synonym = Dementon-O,S)	622	(4)	<QL	G or C	1/5 YR
333-41-5	Diazinon	622	(4)	<QL	G or C	1/5 YR
60-57-1	Dieldrin	608/625	0.1	<QL	G or C	1/5 YR
959-98-8	Alpha-Endosulfan (synonym = Endosulfan I)	608/625	0.1	<QL	G or C	1/5 YR
33213-65-9	Beta-Endosulfan (synonym = Endosulfan II)	608625	0.1	<QL	G or C	1/5 YR
1031-07-8	Endosulfan Sulfate	608/625	0.1	<QL	G or C	1/5 YR
72-20-8	Endrin	608/625	0.1	<QL	G or C	1/5 YR
7421-93-4	Endrin Aldehyde	608/625	(4)	<QL	G or C	1/5 YR
86-50-0	Guthion (synonym = Azinphos Methyl)	622	(4)	<QL	G or C	1/5 YR
76-44-8	Heptachlor	608/625	0.05	<QL	G or C	1/5 YR
1024-57-3	Heptachlor Epoxide	608/625	(4)	<QL	G or C	1/5 YR
319-84-6	Hexachlorocyclohexane Alpha-BHC	608/625	(4)	<QL	G or C	1/5 YR
319-85-7	Hexachlorocyclohexane Beta-BHC	608/625	(4)	<QL	G or C	1/5 YR
58-89-9	Hexachlorocyclohexane Gamma-BHC (syn. = Lindane)	608/625	(4)	<QL	G or C	1/5 YR
143-50-0	Kepone	8081 Extended/ 8270C/8270D	(4)	<QL	G or C	1/5 YR
121-75-5	Malathion	614	(4)	<QL	G or C	1/5 YR
72-43-5	Methoxychlor	608.2	(4)	<QL	G or C	1/5 YR
2385-85-5	Mirex	8081 Extended/ 8270C/8270D	(4)	<QL	G or C	1/5 YR
56-38-2	Parathion (synonym = Parathion Ethyl)	614	(4)	<QL	G or C	1/5 YR
1336-36-3	PCB, total	608/625	7.0	<QL	G or C	1/5 YR
8001-35-2	Toxaphene	608/625	5.0	<QL	G or C	1/5 YR
BASE NEUTRAL EXTRACTABLES						
83-32-9	Acenaphthene	610/625	10.0	<QL	G or C	1/5 YR
120-12-7	Anthracene	610/625	10.0	<QL	G or C	1/5 YR
92-87-5	Benzidine	625	(4)	<QL	G or C	1/5 YR
56-55-3	Benzo (a) anthracene	610/625	10.0	<QL	G or C	1/5 YR
205-99-2	Benzo (b) fluoranthene	610/625	10.0	<QL	G or C	1/5 YR
207-08-9	Benzo (k) fluoranthene	610/625	10.0	<QL	G or C	1/5 YR
50-32-8	Benzo (a) pyrene	610/625	10.0	<QL	G or C	1/5 YR
111-44-4	Bis 2-Chloroethyl Ether	625	(4)	<QL	G or C	1/5 YR

CASRN	CHEMICAL	EPA ANALYSIS NO.	QUANTIFICATION LEVEL[1]	REPORTING RESULTS	SAMPLE TYPE[2]	SAMPLE FREQUENCY
108-60-1	Bis 2-Chloroisopropyl Ether	625	(4)	<QL	G or C	1/5 YR
117-81-7	Bis 2-Ethylhexyl Phthalate (syn. = Di-2-Ethylhexyl Phthalate)	625	10.0	<QL	G or C	1/5 YR
85-68-7	Butyl benzyl phthalate	625	10.0	<QL	G or C	1/5 YR
91-58-7	2-Chloronaphthalene	625	(4)	<QL	G or C	1/5 YR
218-01-9	Chrysene	610/625	10.0	<QL	G or C	1/5 YR
53-70-3	Dibenzo (a,h) anthracene	610/625	20.0	<QL	G or C	1/5 YR
95-50-1	1,2-Dichlorobenzene	602/624	10.0	<QL	G or C	1/5 YR
541-73-1	1,3-Dichlorobenzene	602/624	10.0	<QL	G or C	1/5 YR
106-46-7	1,4-Dichlorobenzene	602/624	10.0	<QL	G or C	1/5 YR
91-94-1	3,3-Dichlorobenzidine	625	(4)	<QL	G or C	1/5 YR
84-66-2	Diethyl phthalate	625	10.0	<QL	G or C	1/5 YR
131-11-3	Dimethyl phthalate	625	(4)	<QL	G or C	1/5 YR
84-74-2	Di-n-butyl Phthalate (synonym = Dibutyl Phthalate)	625	10.0	<QL	G or C	1/5 YR
121-14-2	2,4-Dinitrotoluene	625	10.0	<QL	G or C	1/5 YR
122-66-7	1,2-Diphenylhydrazine	625/ 8270C/8270D	(4)	<QL	G or C	1/5 YR
206-44-0	Fluoranthene	610/625	10.0	<QL	G or C	1/5 YR
86-73-7	Fluorene	610/625	10.0	<QL	G or C	1/5 YR
118-74-1	Hexachlorobenzene	625	(4)	<QL	G or C	1/5 YR
87-68-3	Hexachlorobutadiene	625	(4)	<QL	G or C	1/5 YR
77-47-4	Hexachlorocyclopentadiene	625	(4)	<QL	G or C	1/5 YR
67-72-1	Hexachloroethane	625	(4)	<QL	G or C	1/5 YR
193-39-5	Indeno(1,2,3-cd)pyrene	610/625	20.0	<QL	G or C	1/5 YR
78-59-1	Isophorone	625	10.0	<QL	G or C	1/5 YR
98-95-3	Nitrobenzene	625	10.0	<QL	G or C	1/5 YR
62-75-9	N-Nitrosodimethylamine	625	(4)	<QL	G or C	1/5 YR
621-64-7	N-Nitrosodi-n-propylamine	625	(4)	<QL	G or C	1/5 YR
86-30-6	N-Nitrosodiphenylamine	625	(4)	<QL	G or C	1/5 YR
129-00-0	Pyrene	610/625	10.0	<QL	G or C	1/5 YR
120-82-1	1,2,4-Trichlorobenzene	625	10.0	<QL	G or C	1/5 YR
VOLATILES						

CASRN	CHEMICAL	EPA ANALYSIS NO.	QUANTIFICATION LEVEL[1]	REPORTING RESULTS	SAMPLE TYPE[2]	SAMPLE FREQUENCY
107-02-8	Acrolein	624	(4)	<QL	G	1/5 YR
107-13-1	Acrylonitrile	624	(4)	<QL	G	1/5 YR
71-43-2	Benzene	602/624	10.0	<QL	G	1/5 YR
75-25-2	Bromoform	624	10.0	<QL	G	1/5 YR
56-23-5	Carbon Tetrachloride	624	10.0	<QL	G	1/5 YR
108-90-7	Chlorobenzene (synonym = Monochlorobenzene)	602/624	50.0	<QL	G	1/5 YR
124-48-1	Chlorodibromomethane	624	10.0	<QL	G	1/5 YR
67-66-3	Chloroform	624	10.0	<QL	G	1/5 YR
75-27-4	Dichlorobromomethane	624	10.0	<QL	G	1/5 YR
107-06-2	1,2-Dichloroethane	624	10.0	<QL	G	1/5 YR
75-35-4	1,1-Dichloroethylene	624	10.0	<QL	G	1/5 YR
156-60-5	1,2-trans-dichloroethylene	624	(4)	<QL	G	1/5 YR
78-87-5	1,2-Dichloropropane	624	(4)	<QL	G	1/5 YR
542-75-6	1,3-Dichloropropene	624	(4)	<QL	G	1/5 YR
100-41-4	Ethylbenzene	602/624	10.0	<QL	G	1/5 YR
74-83-9	Methyl Bromide (synonym = Bromomethane)	624	(4)	<QL	G	1/5 YR
75-09-2	Methylene Chloride (synonym = Dichloromethane)	624	20.0	<QL	G	1/5 YR
79-34-5	1,1,2,2-Tetrachloroethane	624	(4)	<QL	G	1/5 YR
127-18-4	Tetrachloroethylene (synonym = Tetrachloroethene)	624	10.0	<QL	G	1/5 YR
10-88-3	Toluene	602/624	10.0	<QL	G	1/5 YR
79-00-5	1,1,2-Trichloroethane	624	(4)	<QL	G	1/5 YR
79-01-6	Trichloroethylene (synonym = Trichloroethene)	624	10.0	<QL	G	1/5 YR
75-01-4	Vinyl Chloride	624	10.0	<QL	G	1/5 YR
ACID EXTRACTABLES						
95-57-8	2-Chlorophenol	625	10.0	<QL	G or C	1/5 YR
120-83-2	2,4 Dichlorophenol	625	10.0	<QL	G or C	1/5 YR
105-67-9	2,4 Dimethylphenol	625	10.0	<QL	G or C	1/5 YR
51-28-5	2,4-Dinitrophenol	625	(4)	<QL	G or C	1/5 YR
534-52-1	2-Methyl-4,6-Dinitrophenol	625	(4)	<QL	G or C	1/5 YR
25154-52-3	Nonylphenol	ASTM D 7065-06	(4)	<QL	G or C	1/5 YR

CASRN	CHEMICAL	EPA ANALYSIS NO.	QUANTIFICATION LEVEL[1]	REPORTING RESULTS	SAMPLE TYPE[2]	SAMPLE FREQUENCY
87-86-5	Pentachlorophenol	625	50.0	<QL	G or C	1/5 YR
108-95-2	Phenol	625	10.0	<QL	G or C	1/5 YR
88-06-2	2,4,6-Trichlorophenol	625	10.0	<QL	G or C	1/5 YR
MISCELLANEOUS						
776-41-7	Ammonia as NH3-N	350.1	200	<QL	C	1/5 YR
16887-00-6	Chloride	(3)	(4)	12,710	C	1/5 YR (FW and PWS)
7782-50-5	Chlorine, Total Residual	(3)	100	<QL	G	1/5 YR
57-12-5	Cyanide, Free [8]	ASTM 4282-02	10.0	<QL	G	1/5 YR
N/A	*E. coli / Enterococcus* (N/CML)	(3)	(4)	34.2	G	1/5 YR
18496-25-8	Sulfide, dissolved [7]	SM 4500 S^2 B	100	0.6	G or C	1/5 YR
60-10-5	Tributyltin	(5)	(4)	<QL	G or C	1/5 YR
471-34-1	Hardness (mg/L as $CaCO_3$)	(3)	(4)	4100	G or C	1/5 YR (FW & TZs)

Dr. John Wells, Dean & Director, VIMS/SMS

Name of Principal Executive Officer or Authorized Agent & Title

John L. Wells 2/10/16

Signature of Principal Executive Officer or Authorized Agent & Date

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

FOOTNOTES:

(1) Quantification level (QL) means the minimum levels, concentrations, or quantities of a target variable (e.g. target analyte) that can be reported with a specified degree of confidence in accordance with 1VAC30-45, Certification for Noncommercial Environmental Laboratories, or 1VAC30-46, Accreditation for Commercial Environmental Laboratories.

The quantification levels indicated for the metals are actually Specific Target Values developed for this permit. The Specific Target Value is the approximate value that may initiate a wasteload allocation analysis. Target values are not wasteload allocations or effluent limitations. The Specific Target Values are subject to change based on additional information such as hardness data, receiving stream flow, and design flows.

Units for the quantification level are micrograms/liter unless otherwise specified.

Quality control and quality assurance information (i.e. laboratory certificates of analysis) shall be submitted to document that the required quantification level has been attained.

(2) Sample Type

G = Grab = An individual sample collected in less than 15 minutes. Substances specified with "grab" sample type shall only be collected as grabs. The permittee may analyze multiple grabs and report the average results provided that the individual grab results are also reported. For grab metals samples, the individual samples shall be filtered and preserved immediately upon collection.

C = Composite = A 24-hour **(PW - Revise as required to require same composite duration as BOD_5)** composite unless otherwise specified. The composite shall be a combination of individual samples, taken proportional to flow, obtained at hourly or smaller time intervals. The individual samples may be of equal volume for flows that do not vary by +/- 10 percent over a 24-hour period.

(3) A specific analytical method is not specified; however, an appropriate method to meet the QL shall be selected from any approved method presented in 40 CFR Part 136.

(4) The QL is at the discretion of the permittee. If the test result is less than the method QL, a "<[QL]" shall be reported where the actual analytical test QL is substituted for [QL].

(5) Analytical Methods: Analysis of Butyltins in Environmental Systems by the Virginia Institute of Marine Science, dated November 1996 (currently the only Virginia Environmental Laboratory Accreditation Program (VELAP) accredited method).

(6) Both Chromium III and Chromium VI may be measured by the total chromium analysis. The total chromium analytical test QL shall be less than or equal to the lesser of the Chromium III or Chromium VI method QL listed above. If the result of the total chromium analysis is less than the analytical test QL, both Chromium III and Chromium VI can be reported as "<[QL]", where the actual analytical test QL is substituted for [QL].

(7) Dissolved sulfide may be measured by the total sulfide analysis. The total sulfide analytical test QL shall be less than or equal to the dissolved sulfide method QL listed above. If the result of the total sulfide analysis is less than the analytical test QL, dissolved sulfide can be reported as "<[QL]", where the actual analytical test QL is substituted for [QL].

(8) Free cyanide may be measured by the total cyanide analysis. The total cyanide analytical test QL shall be less than or equal to the free cyanide method QL listed above. If the result of the total cyanide analysis is less than the analytical test QL, free cyanide can be reported as "<[QL]", where the actual analytical test QL is substituted for [QL].

REVISED
SS 1/28/16

Universal Laboratories
20 Research Drive
Hampton, VA 23666
Phone: 1-800-695-2162
Fax: **757-865-8014**

Client Report For:	**Virginia Institute of Marine Science**
Attention:	Mr. Jim Brister
Client Address:	P.O. Box 1346 Rt. 1208 Greate Road Gloucester Point, VA 23062
Project:	**Permit Renewal**
Order Number:	**1512195**
Report Date:	01/28/2016
Lab Receipt Date:	12/17/2015
Comment:	This report contains the analytical results for the indicated Project and Order. The results contained in this report relate only to the samples identified in this Order. The analytical results meet all requirements of NELAC unless specifically stated. This report shall not be reproduced except in full.

The data in this report has been reviewed and validated by: _____ Signature

Stacie Splinter Name

Quality Director Title

Universal Laboratories

Client:	Virginia Institute of Marine Science	**Client Sample ID:**	Effluent
Lab ID:	1512195-001	**Collection Date:**	12/17/2015 11:50
Permit ID		**Matrix:**	AQUEOUS

Analyses

Metals Dissolved by ICP — *EPA 200.7*

	Test Result	Unit	RL	Analysis Date	Analysis By	Qualifier	Cert #
Antimony, Dissolved	ND	mg/L	0.005	12/22/2015 18:31	EK		460036
Arsenic, Dissolved	ND	mg/L	0.005	12/22/2015 18:31	EK		460036
Beryllium, Dissolved	ND	mg/L	0.001	12/22/2015 18:31	EK		460036
Cadmium, Dissolved	ND	mg/L	0.005	12/22/2015 18:31	EK		460036
Chromium, Dissolved	ND	mg/L	0.005	12/22/2015 18:31	EK		460036
Copper, Dissolved	0.014	mg/L	0.005	12/22/2015 18:31	EK		460036
Lead, Dissolved	ND	mg/L	0.005	12/22/2015 18:31	EK		460036
Nickel, Dissolved	ND	mg/L	0.005	12/22/2015 18:31	EK		460036
Selenium, Dissolved	ND	mg/L	0.005	12/22/2015 18:31	EK		460036
Thallium, Dissolved	0.010	mg/L	0.005	12/22/2015 18:31	EK		460036
Zinc, Dissolved	0.021	mg/L	0.005	12/22/2015 18:31	EK		460036

Chromium, Hexavalent — *SM 3500-CR B (2011)*

	Test Result	Unit	RL	Analysis Date	Analysis By	Qualifier	Cert #
Chromium, Hexavalent	ND	mg/L	0.005	12/18/2015 11:34	EK		460036

Chromium, Trivalent by ICP — *EPA 200.7*

	Test Result	Unit	RL	Analysis Date	Analysis By	Qualifier	Cert #
Chromium, Trivalent	ND	ug/L	5	12/22/2015 18:31	EK		

Metals by ICP — *EPA 200.7*

	Test Result	Unit	RL	Analysis Date	Analysis By	Qualifier	Cert #
Tin, Total	0.010	mg/L	0.005	12/24/2015 11:30	EK		
Aluminum, Total	0.033	mg/L	0.005	12/22/2015 18:31	EK		460036
Barium, Total	0.017	mg/L	0.005	12/22/2015 18:31	EK		460036
Boron, Total	2.793	mg/L	0.005	12/22/2015 18:31	EK		460036
Cobalt, Total	ND	mg/L	0.005	12/22/2015 18:31	EK		460036
Iron, Total	0.05	mg/L	0.02	12/22/2015 18:31	EK		460036
Magnesium, Total	871.50	mg/L	0.05	12/22/2015 18:31	EK		460036
Manganese, Total	0.020	mg/L	0.02	12/22/2015 18:31	EK		460036
Molybdenum, Total	0.008	mg/L	0.003	12/22/2015 18:31	EK		460036
Titanium, Total	ND	mg/L	0.005	12/22/2015 18:31	EK		460036
Zinc, Total	ND	mg/L	0.005	12/22/2015 18:31	EK		460036

Silver, Dissolved by ICP — *EPA 200.7*

	Test Result	Unit	RL	Analysis Date	Analysis By	Qualifier	Cert #
Silver, Dissolved	ND	mg/L	0.05	12/18/2015 14:49	EK		460036

Universal Laboratories

Client: Virginia Institute of Marine Science
Client Sample ID: Effluent
Lab ID: 1512195-001
Collection Date: 12/17/2015 11:50
Permit ID
Matrix: AQUEOUS

Analyses

Silver, Total by ICP — *EPA 200.7*

	Test Result	Unit	RL	Analysis Date	Analysis By	Qualifier	Cert #
Silver, Total	ND	mg/L	0.05	12/18/2015 14:49			460036

Ammonia as N, Total — *EPA 350.1*

	Test Result	Unit	RL	Analysis Date	Analysis By	Qualifier	Cert #
Ammonia as N	ND	mg/L	0.2	12/22/2015 21:28	LS		460036

Biochemical Oxygen Demand (BOD) 5 Day — *SM 5210 B (2011)*

	Test Result	Unit	RL	Analysis Date	Analysis By	Qualifier	Cert #
Biochemical Oxygen Demand	<2	mg/L	2	12/17/2015 16:54	LP		460036

Chemical Oxygen Demand — *HACH 8000*

	Test Result	Unit	RL	Analysis Date	Analysis By	Qualifier	Cert #
Chemical Oxygen Demand	435.0	mg/L	20	12/18/2015 15:40	LP		460036

Cyanide, Total — *EPA 335.4*

	Test Result	Unit	RL	Analysis Date	Analysis By	Qualifier	Cert #
Cyanide, Total	ND	mg/L	0.01	12/23/2015 18:09	LS.		460036

Fluoride — *SM 4500 F C (2011)*

	Test Result	Unit	RL	Analysis Date	Analysis By	Qualifier	Cert #
Fluoride	0.7	mg/L	0.1	12/23/2015 18:02	LS	MS	460036

Nitrate and Nitrite — *EPA 353.2*

	Test Result	Unit	RL	Analysis Date	Analysis By	Qualifier	Cert #
Nitrate/Nitrite as N	ND	mg/L	0.1	12/18/2015 12:44	LS		460036

Nitrogen, Organic — *EPA 351.2/ EPA 350.1*

	Test Result	Unit	RL	Analysis Date	Analysis By	Qualifier	Cert #
Ammonia as N	ND	mg/L	0.2	12/22/2015 21:28	LS		
Nitrogen, Total Kjeldahl	0.51	mg/L	0.2	12/22/2015 21:28	LS		
Nitrogen, Organic	0.51	mg/L	0.2	12/22/2015 21:28	LS		

Oil and Grease — *EPA 1664A*

	Test Result	Unit	RL	Analysis Date	Analysis By	Qualifier	Cert #
Oil and Grease	ND	mg/L	5	12/22/2015 17:31	EK		460036

Universal Laboratories

Client:	Virginia Institute of Marine Science	**Client Sample ID:**	Effluent
Lab ID:	1512195-001	**Collection Date:**	12/17/2015 11:50
Permit ID		**Matrix:**	AQUEOUS

Analyses

Phosphorus, Total — *EPA 365.1*

	Test Result	Unit	RL	Analysis Date	Analysis By	Qualifier	Cert #
Phosphorus, Total	0.02	mg/L	0.02	12/21/2015 20:02	LS		460036

Solids, Total Suspended — *SM 2540D (2011)*

	Test Result	Unit	RL	Analysis Date	Analysis By	Qualifier	Cert #
Solids, Total Suspended	1.7	mg/L	1	12/18/2015 15:32	LP		460036

Methylene Blue Active Substances — *SM 5540C (2011)*

	Test Result	Unit	RL	Analysis Date	Analysis By	Qualifier	Cert #
Methylene Blue Active Substances	ND	mg/L	0.2	12/18/2015 14:42	LS	MS	460036

Hardness as CaCO3 — *SM 2340C (2011)*

	Test Result	Unit	RL	Analysis Date	Analysis By	Qualifier	Cert #
Hardness, Total	4100	mg/L	2	12/23/2015 16:16	LS		460036

Phenolics, Total by Seal — *EPA 420.4*

	Test Result	Unit	RL	Analysis Date	Analysis By	Qualifier	Cert #
Phenolics	ND	mg/L	0.025	12/24/2015 12:43	LS.		460036

Enterococci — *Enterolert*

	Test Result	Unit	RL	Analysis Date	Analysis By	Qualifier	Cert #
Enterococci	7	MPN/100mL	1	12/17/2015 16:52	LS		460036

Escherichia Coli — *Colilert MPN*

	Test Result	Unit	RL	Analysis Date	Analysis By	Qualifier	Cert #
E. Coli	27.2	MPN/100mL	1	12/17/2015 16:50	LS		460036

Sulfide — *SM 4500-S2 F (2011)*

	Test Result	Unit	RL	Analysis Date	Analysis By	Qualifier	Cert #
Sulfide	0.6	mg/L	0.5	12/21/2015 20:09	LS		460036

Sulfate — *ASTM D516-07*

	Test Result	Unit	RL	Analysis Date	Analysis By	Qualifier	Cert #
Sulfate as SO4	1840	mg/L	250	12/23/2015 14:17	LS.		460036

Sulfite — *SM 4500 SO3 B-2011*

	Test Result	Unit	RL	Analysis Date	Analysis By	Qualifier	Cert #
Sulfite	ND	mg/L	2	12/17/2015 20:16	LS		

Universal Laboratories

Client: Virginia Institute of Marine Science	**Client Sample ID:** Effluent
Lab ID: 1512195-001	**Collection Date:** 12/17/2015 11:50
Permit ID	**Matrix:** AQUEOUS

Analyses

Volatile Organics AQ *EPA 624*

	Test Result	Unit	RL	Analysis Date	Analysis By	Qualifier	Cert #
1,1,1-Trichloroethane	ND	ug/L	1	12/30/2015 22:57	LS		460036
1,1,2,2-Tetrachloroethane	ND	ug/L	5	12/30/2015 22:57	LS		460036
1,1,2-Trichloroethane	ND	ug/L	5	12/30/2015 22:57	LS		460036
1,1-Dichloroethane	ND	ug/L	1	12/30/2015 22:57	LS		460036
1,1-Dichloroethene	ND	ug/L	5	12/30/2015 22:57	LS		460036
1,2-Dichlorobenzene	ND	ug/L	10	12/30/2015 22:57	LS		460036
1,2-Dichloroethane	ND	ug/L	5	12/30/2015 22:57	LS		460036
1,2-Dichloropropane	ND	ug/L	1	12/30/2015 22:57	LS		460036
1,3-Dichlorobenzene	ND	ug/L	1	12/30/2015 22:57	LS		460036
1,4-Dichlorobenzene	ND	ug/L	5	12/30/2015 22:57	LS		460036
2-Butanone	ND	ug/L	5	12/30/2015 22:57	LS		460036
2-Chloroethylvinyl ether	ND	ug/L	1	12/30/2015 22:57	LS		460036
4-Methyl-2-pentanone	ND	ug/L	5	12/30/2015 22:57	LS		460036
Acrolein	ND	ug/L	10	12/30/2015 22:57	LS		460036
Acrylonitrile	ND	ug/L	10	12/30/2015 22:57	LS	V	460036
Benzene	ND	ug/L	1	12/30/2015 22:57	LS		460036
Bromodichloromethane	ND	ug/L	1	12/30/2015 22:57	LS		460036
Bromoform	ND	ug/L	1	12/30/2015 22:57	LS		460036
Bromomethane	ND	ug/L	10	12/30/2015 22:57	LS		460036
Carbon tetrachloride	ND	ug/L	1	12/30/2015 22:57	LS		460036
Chlorobenzene	ND	ug/L	1	12/30/2015 22:57	LS		460036
Chloroethane	ND	ug/L	5	12/30/2015 22:57	LS		460036
Chloroform	ND	ug/L	1	12/30/2015 22:57	LS		460036
Chloromethane	ND	ug/L	1	12/30/2015 22:57	LS		460036
cis-1,3-Dichloropropene	ND	ug/L	1	12/30/2015 22:57	LS		460036
Dibromochloromethane	ND	ug/L	1	12/30/2015 22:57	LS		460036
Ethylbenzene	ND	ug/L	1	12/30/2015 22:57	LS		460036
Methylene chloride	ND	ug/L	10	12/30/2015 22:57	LS		460036
Tetrachloroethene	ND	ug/L	1	12/30/2015 22:57	LS		460036
Toluene	ND	ug/L	1	12/30/2015 22:57	LS		460036
trans-1,2-Dichloroethene	ND	ug/L	1	12/30/2015 22:57	LS		460036
trans-1,3-Dichloropropene	ND	ug/L	1	12/30/2015 22:57	LS		460036
Trichloroethene	ND	ug/L	1	12/30/2015 22:57	LS		460036
Trichlorofluoromethane	ND	ug/L	5	12/30/2015 22:57	LS		460036
Vinyl chloride	ND	ug/L	1	12/30/2015 22:57	LS		460036
Xylenes, m and p	ND	ug/L	1	12/30/2015 22:57	LS	MS	460036
Xylenes, o	ND	ug/L	1	12/30/2015 22:57	LS	MS	460036
surrogate 1,2-Dichloroethane-d4 (% Recovery)	105	%	69.5-130.5	12/30/2015 22:57	LS		
surrogate 4-Bromofluorobenzene (% Recovery)	87	%	69.5-130.5	12/30/2015 22:57	LS		
surrogate Dibromofluoromethane (% Recovery)	98	%	69.5-130.5	12/30/2015 22:57	LS		

Universal Laboratories

Client: Virginia Institute of Marine Science	**Client Sample ID:** Effluent
Lab ID: 1512195-001	**Collection Date:** 12/17/2015 11:50
Permit ID	**Matrix:** AQUEOUS

Analyses

Volatile Organics AQ — ***EPA 624***

	Test Result	Unit	RL	Analysis Date	Analysis By	Qualifier	Cert #
surrogate Toluene-d8 (% Recovery)	92	%	69.5-130.5	12/30/2015 22:57	LS		

Tributyltin AQ — ***Analysis of Butyltins in Env. Samples***

	Test Result	Unit	RL	Analysis Date	Analysis By	Qualifier	Cert #
Tributyltin	ND	ug/L	0.03	12-18-2015 05:20:00 PM	BD		460036
surrogate Tripentyltin (% Recovery)	66	%	49.5-150.5	12-18-2015 05:20:00 PM	BD		

Chlorine, Residual — ***SM 4500CL G (2011)***

	Test Result	Unit	RL	Analysis Date	Analysis By	Qualifier	Cert #
Chlorine, Residual	<0.1	mg/L	0.1	12/17/2015 11:55	CK		

pH — ***SM 4500-H B (2011)***

	Test Result	Unit	RL	Analysis Date	Analysis By	Qualifier	Cert #
Temperature	14.1	C		12/17/2015 11:51	CK		
pH	7.9	pH Units	0.1	12/17/2015 11:51	CK		

Temperature — ***SM 2550B (2011)***

	Test Result	Unit	RL	Analysis Date	Analysis By	Qualifier	Cert #
Temperature	14.1	C		12/17/2015 11:51	CK		

Color — ***SM 2120B (2001)***

	Test Result	Unit	RL	Analysis Date	Analysis By	Qualifier	Cert #
Color	5	CU	1	12/18/2015 13:15	LS		460036
Temperature	21.8	C	0.1	12/18/2015 13:15	LS		
pH	8.0	pH Units	0.1	12/18/2015 13:15	LS		

Semi Volatile Organics AQ — ***EPA 625***

	Test Result	Unit	RL	Analysis Date	Analysis By	Qualifier	Cert #
1,2,4-Trichlorobenzene	ND	ug/L	5	12/23/2015 16:29	BD		460036
2,4,6-Trichlorophenol	ND	ug/L	5	12/23/2015 16:29	BD		460036
2,4-Dichlorophenol	ND	ug/L	5	12/23/2015 16:29	BD		460036
2,4-Dimethylphenol	ND	ug/L	5	12/23/2015 16:29	BD		460036
2,4-Dinitrophenol	ND	ug/L	10	12/23/2015 16:29	BD		460036
2,4-Dinitrotoluene	ND	ug/L	5	12/23/2015 16:29	BD		460036
2,6-Dinitrotoluene	ND	ug/L	5	12/23/2015 16:29	BD		460036
2-Chloronaphthalene	ND	ug/L	5	12/23/2015 16:29	BD		460036
2-Chlorophenol	ND	ug/L	5	12/23/2015 16:29	BD		460036

Universal Laboratories

Client: Virginia Institute of Marine Science	**Client Sample ID:** Effluent
Lab ID: 1512195-001	**Collection Date:** 12/17/2015 11:50
Permit ID	**Matrix:** AQUEOUS

Analyses

Semi Volatile Organics AQ *EPA 625*

	Test Result	Unit	RL	Analysis Date	Analysis By	Qualifier	Cert #
2-Methyl-4,6-dinitrophenol	ND	ug/L	10	12/23/2015 16:29	BD		460036
2-Nitrophenol	ND	ug/L	5	12/23/2015 16:29	BD		460036
3,3'-Dichlorobenzidine	ND	ug/L	5	12/23/2015 16:29	BD		460036
4-Bromophenyl phenyl ether	ND	ug/L	5	12/23/2015 16:29	BD		460036
4-Chloro-3-methylphenol	ND	ug/L	5	12/23/2015 16:29	BD		460036
4-Chlorophenyl phenyl ether	ND	ug/L	5	12/23/2015 16:29	BD		460036
4-Nitrophenol	ND	ug/L	10	12/23/2015 16:29	BD		460036
Acenaphthene	ND	ug/L	5	12/23/2015 16:29	BD		460036
Acenaphthylene	ND	ug/L	5	12/23/2015 16:29	BD		460036
Anthracene	ND	ug/L	5	12/23/2015 16:29	BD		460036
Azobenzene	ND	ug/L	5	12/23/2015 16:29	BD		
Benzidine	ND	ug/L	10	12/23/2015 16:29	BD		460036
Benzo (a) anthracene	ND	ug/L	5	12/23/2015 16:29	BD		460036
Benzo (a) pyrene	ND	ug/L	5	12/23/2015 16:29	BD		460036
Benzo (b) fluoranthene	ND	ug/L	5	12/23/2015 16:29	BD		460036
Benzo (g,h,i) perylene	ND	ug/L	5	12/23/2015 16:29	BD		460036
Benzo (k) fluoranthene	ND	ug/L	10	12/23/2015 16:29	BD		460036
Bis(2-chloroethoxy)methane	ND	ug/L	5	12/23/2015 16:29	BD		460036
Bis(2-chloroethyl)ether	ND	ug/L	5	12/23/2015 16:29	BD		460036
Bis(2-chloroisopropyl)ether	ND	ug/L	5	12/23/2015 16:29	BD		460036
Bis(2-ethylhexyl)phthalate	ND	ug/L	5	12/23/2015 16:29	BD		460036
Butyl benzyl phthalate	ND	ug/L	5	12/23/2015 16:29	BD		460036
Chrysene	ND	ug/L	5	12/23/2015 16:29	BD		460036
Di-n-butyl phthalate	ND	ug/L	5	12/23/2015 16:29	BD		460036
Di-n-octyl phthalate	ND	ug/L	5	12/23/2015 16:29	BD		460036
Dibenz (a,h) anthracene	ND	ug/L	5	12/23/2015 16:29	BD		460036
Diethyl phthalate	ND	ug/L	5	12/23/2015 16:29	BD		460036
Dimethyl phthalate	ND	ug/L	5	12/23/2015 16:29	BD		460036
Fluoranthene	ND	ug/L	5	12/23/2015 16:29	BD		460036
Fluorene	ND	ug/L	5	12/23/2015 16:29	BD		460036
Hexachlorobenzene	ND	ug/L	5	12/23/2015 16:29	BD		460036
Hexachlorobutadiene	ND	ug/L	5	12/23/2015 16:29	BD		460036
Hexachlorocyclopentadiene	ND	ug/L	5	12/23/2015 16:29	BD		460036
Hexachloroethane	ND	ug/L	5	12/23/2015 16:29	BD		460036
Indeno (1,2,3-cd) pyrene	ND	ug/L	5	12/23/2015 16:29	BD		460036
Isophorone	ND	ug/L	5	12/23/2015 16:29	BD		460036
Kepone	ND	ug/L	10	12/23/2015 16:29	BD		460036
m,p-Cresols	ND	ug/L	5	12/23/2015 16:29	BD		460036
N-Nitrosodi-n-propylamine	ND	ug/L	5	12/23/2015 16:29	BD		460036
N-Nitrosodimethylamine	ND	ug/L	5	12/23/2015 16:29	BD		460036
N-Nitrosodiphenylamine	ND	ug/L	5	12/23/2015 16:29	BD		460036
Naphthalene	ND	ug/L	5	12/23/2015 16:29	BD		460036

Universal Laboratories

Client:	Virginia Institute of Marine Science	**Client Sample ID:**	Effluent
Lab ID:	1512195-001	**Collection Date:**	12/17/2015 11:50
Permit ID		**Matrix:**	AQUEOUS

Analyses

Semi Volatile Organics AQ ***EPA 625***

	Test Result	Unit	RL	Analysis Date	Analysis By	Qualifier	Cert #
Nitrobenzene	ND	ug/L	5	12/23/2015 16:29	BD		460036
Pentachlorophenol	ND	ug/L	5	12/23/2015 16:29	BD		460036
Phenanthrene	ND	ug/L	5	12/23/2015 16:29	BD		460036
Phenol	ND	ug/L	5	12/23/2015 16:29	BD		460036
Pyrene	ND	ug/L	5	12/23/2015 16:29	BD		460036
surrogate 2,4,6-Tribromophenol (% Recovery)	70	%	9.5-123.4	12/23/2015 16:29	BD		
surrogate 2-Fluorobiphenyl (% Recovery)	48	%	42.6-116.5	12/23/2015 16:29	BD		
surrogate 2-Fluorophenol (% Recovery)	31	%	20.6-110.5	12/23/2015 16:29	BD		
surrogate Nitrobenzene-d5 (% Recovery)	58	%	34.6-114.5	12/23/2015 16:29	BD		
surrogate p-Terphenyl-d14 (% Recovery)	75	%	32.6-141.4	12/23/2015 16:29	BD		
surrogate Phenol-d5 (% Recovery)	23	%	9.5-110.5	12/23/2015 16:29	BD		

Pesticides AQ ***EPA 8081B***

	Test Result	Unit	RL	Analysis Date	Analysis By	Qualifier	Cert #
4,4'-DDD	ND	ug/L	0.1	12-23-2015 04:34:23 PM	BD		460036
4,4'-DDE	ND	ug/L	0.1	12-23-2015 04:34:23 PM	BD		460036
4,4'-DDT	ND	ug/L	0.1	12-23-2015 04:34:23 PM	BD		460036
Aldrin	ND	ug/L	0.05	12-23-2015 04:34:23 PM	BD		460036
alpha-BHC	ND	ug/L	0.5	12-23-2015 04:34:23 PM	BD		460036
alpha-Chlordane	ND	ug/L	0.05	12-23-2015 04:34:23 PM	BD		460036
beta-BHC	ND	ug/L	0.05	12-23-2015 04:34:23 PM	BD		460036
Chlordane (tech)	ND	ug/L	0.1	12-23-2015 04:34:23 PM	BD		
Chlorpyrifos (Dursban)	ND	ug/L	0.1	12/23/2015 16:34	BD		460036
delta-BHC	ND	ug/L	0.1	12-23-2015 04:34:23 PM	BD		460036
Dieldrin	ND	ug/L	0.05	12-23-2015 04:34:23 PM	BD		460036
Endosulfan I	ND	ug/L	0.1	12-23-2015 04:34:23 PM	BD		460036
Endosulfan II	ND	ug/L	0.1	12-23-2015 04:34:23 PM	BD		460036
Endosulfan sulfate	ND	ug/L	0.1	12-23-2015 04:34:23 PM	BD		460036
Endrin	ND	ug/L	0.1	12-23-2015 04:34:23 PM	BD	MS, QC	460036

Universal Laboratories

Client:	Virginia Institute of Marine Science	**Client Sample ID:**	Effluent
Lab ID:	1512195-001	**Collection Date:**	12/17/2015 11:50
Permit ID		**Matrix:**	AQUEOUS

Analyses

Pesticides AQ ***EPA 8081B***

	Test Result	Unit	RL	Analysis Date	Analysis By	Qualifier	Cert #
Endrin aldehyde	ND	ug/L	0.05	12-23-2015 04:34:23 PM	BD		460036
Endrin ketone	ND	ug/L	0.05	12-23-2015 04:34:23 PM	BD	V	460036
gamma-BHC (Lindane)	ND	ug/L	0.05	12-23-2015 04:34:23 PM	BD		460036
gamma-Chlordane	ND	ug/L	0.05	12-23-2015 04:34:23 PM	BD		460036
Heptachlor	ND	ug/L	0.5	12-23-2015 04:34:23 PM	BD		460036
Mirex	ND	ug/L	0.1	12/23/2015 16:34	BD		460036
Heptachlor epoxide	ND	ug/L	0.05	12-23-2015 04:34:23 PM	BD		460036
Methoxychlor	ND	ug/L	0.05	12-23-2015 04:34:23 PM	BD		460036
Toxaphene (tech)	ND	ug/L	0.5	12-23-2015 04:34:23 PM	BD		
surrogate TCMX (% Recovery)	33	%	29.5-130.5	12-23-2015 04:34:23 PM	BD		
surrogate TCMX (% Recovery)	37	%	29.5-130.5	12/23/2015 16:34	BD		
surrogate DCB (% Recovery)	35	%	29.5-130.5	12-23-2015 04:34:23 PM	BD		
surrogate DCB (% Recovery)	52	%	29.5-130.5	12/23/2015 16:34	BD		

Polychlorinated Biphenyls AQ ***EPA 8082A***

	Test Result	Unit	RL	Analysis Date	Analysis By	Qualifier	Cert #
PCBs, Total	ND	ug/L	1	12/23/2015 16:34	BD		
PCB-1016	ND	ug/L	1	12/23/2015 16:34	BD		460036
PCB-1260	ND	ug/L	1	12/23/2015 16:34	BD		460036
PCB-1221	ND	ug/L	1	12/23/2015 16:34	BD		460036
PCB-1232	ND	ug/L	1	12/23/2015 16:34	BD		460036
PCB-1242	ND	ug/L	1	12/23/2015 16:34	BD		460036
PCB-1248	ND	ug/L	1	12/23/2015 16:34	BD		460036
PCB-1254	ND	ug/L	1	12/23/2015 16:34	BD		460036
PCB-1262	ND	ug/L	1	12/23/2015 16:34	BD		460036
PCB-1268	ND	ug/L	1	12/23/2015 16:34	BD		460036
surrogate TCMX (% Recovery)	47	%	29.5-150.5	12/23/2015 16:34	BD		
surrogate DCB (% Recovery)	80	%	29.5-150.5	12/23/2015 16:34	BD		

Glossary of Terms and Abbreviations

ND	No Analyte Detected
NR	No Results available, analyte not in instrument calibration
RL	(Reporting Limit) The minimum levels, concentrations, or quantities of a target analyte that can be reported within a specified degree of confidence. Generally, this number is equal to or just above the lowest calibration standard run with the analytical batch.
B	Analyte was found in the method blank
D	RPD outside acceptable limits
H	Holding time exceeeded
IS	Internal standard outside acceptable limits
J	Result above calibration curve - results are approximate
L	LCS Outside acceptable limits
MI	Matrix interence
MS	Matrix spike recovery outside acceptable limits
QC	Method QC criteria not met
S	Surrogate outside acceptable limits
V	ICV/CCV/FCV outside acceptable limits
LCS	(Laboratory Control Sample) A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	Method Detection Limitis is an estimate of the minimum amount of a substance that an analytical process can reliably detect
RPD	(Relative Percent Difference) The difference between a set of duplicates or sample spike duplicates.
MS/MSD	(Matrix Spike or Matrix Spike Duplicate) A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analytes concentration is available. Matrix Spikes are used, for example, to determine the effect of the matrix on a method's recovery efficiency.
Calibration Verification	(Initial, Continuing, or Final) A standard analyzed at different times to verify that the initial calibration curve is still valid.
Holding Time	The maximum time that samples may be held prior to analysis and still be considered valid or not compromised.
Internal Standard	A known amount of standard added to a test portion of a sample as a reference for evaluating and controlling the precision and bias of the applied analytical method.
Method Blank	A sample of a matrix similar to the batch associated samples (when available) that is free from the analytes of interest and is processed simulatanously with and under the same conditions as samples.
Surrogate	A substance with properties that mimic the analyte of interest. It is unlikely to be found in environmental samples and is added to them for quality control purposes in Organics.
EPL	Exceeds Permit Limit. This is a qualifier to denote that the result exceeds the permit limit of the sample location.
Exceeds Benchmark Concentration	Result Exceeds Benchmark concentration listed in the General Permit. Benchmark Concentrations are primarily used to determine the overall effectivenss of the Stormwater pollution prevention plan. Excedence of Benchamrk concentrations does NOT constitute a violation of this permit and does NOT indicate that violation of a water quality standard has occured.

eurofins | Lancaster Laboratories Environmental

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Analysis Report

ANALYTICAL RESULTS

Prepared by:

Eurofins Lancaster Laboratories Environmental
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

Universal Laboratories
20 Research Drive
Hampton VA 23666-1396

December 21, 2015

Project: Water

Submittal Date: 12/18/2015
Group Number: 1618842
PO Number: 121715-019
State of Sample Origin: VA

Client Sample Description	Lancaster Labs (LL) #
1512195-001DD Effluent Water	8182963

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

Regulatory agencies do not accredit laboratories for all methods, analytes, and matrices. Our scopes of accreditation can be viewed at http://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/resources/certifications/ .

ELECTRONIC COPY TO Universal Laboratories Attn: Dan Thornton

Respectfully Submitted,

Stacy L. Butt
Specialist

(717) 556-7236

eurofins | Lancaster Laboratories Environmental

Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: 1512195-001DD Effluent Water

Project Name: Water

Collected: 12/17/2015 11:50

Submitted: 12/18/2015 11:20
Reported: 12/21/2015 14:23

LL Sample # WW 8182963
LL Group # 1618842
Account # 02171

Universal Laboratories
20 Research Drive
Hampton VA 23666-1396

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
Wet Chemistry		SM 4500-CN E-1999	mg/l	mg/l	mg/l	
00241	Cyanide (Free)	n.a.	N.D.	0.0040	0.010	1

General Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
00241	Cyanide (Free)	SM 4500-CN E-1999	1	15354114101A	12/20/2015 20:26	Joseph E McKenzie	1

*=This limit was used in the evaluation of the final result

eurofins | Lancaster Laboratories Environmental

Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Quality Control Summary

Client Name: Universal Laboratories
Reported: 12/21/2015 14:23

Group Number: 1618842

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

Laboratory Compliance Quality Control

Analysis Name	Blank Result	Blank MDL**	Blank LOQ	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: 15354114101A	Sample number(s): 8182963								
Cyanide (Free)	N.D.	0.0040	0.010	mg/l	98		90-110		

Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike
Background (BKG) = the sample used in conjunction with the duplicate

Analysis Name	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD MAX	BKG Conc	DUP Conc	DUP RPD	Dup RPD Max
Batch number: 15354114101A	Sample number(s): 8182963 UNSPK: P163671 BKG: P163671								
Cyanide (Free)	96		90-110			0.0047 J	0.0043 J	9 (1)	20

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P####### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

2171 / 1618842 / 8152963

Universal Laboratories
Subcontract Chain of Custody

20 Research Drive Hampton, VA 23666
Phone: 757-865-0880
Fax: 757-865-8014
UL Contact: Dan Thornton

To: Sample Receiving
Eurofins Lancaster

SUB PO Number: 121715-019

Sample #	Sample Location	Test	Matrix	Sample Date	Sample Time
1512195-001 DD	Effluent	Cyanide, Free - SUB	Aqueous	12/17/2015 11:50AM	

Comments:		Cooler Temp:	
		Preservation:	

Relinquish By	Date/Time	Receive By:	Date/Time
	12-17-15 / 1635		
			12-17-15 / 1130

eurofins | Lancaster Laboratories Environmental

Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

RL	Reporting Limit	**BMQL**	Below Minimum Quantitation Level
N.D.	none detected	**MPN**	Most Probable Number
TNTC	Too Numerous To Count	**CP Units**	cobalt-chloroplatinate units
IU	International Units	**NTU**	nephelometric turbidity units
umhos/cm	micromhos/cm	**ng**	nanogram(s)
C	degrees Celsius	**F**	degrees Fahrenheit
meq	milliequivalents	**lb.**	pound(s)
g	gram(s)	**kg**	kilogram(s)
µg	microgram(s)	**mg**	milligram(s)
mL	milliliter(s)	**L**	liter(s)
m3	cubic meter(s)	**µL**	microliter(s)
		pg/L	picogram/liter

< less than

> greater than

ppm parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.

ppb parts per billion

Dry weight basis Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.

Laboratory Data Qualifiers:

B - Analyte detected in the blank
C - Result confirmed by reanalysis
E - Concentration exceeds the calibration range
J (or G, I, X) - estimated value ≥ the Method Detection Limit (MDL or DL) and < the Limit of Quantitation (LOQ or RL)
P - Concentration difference between the primary and confirmation column >40%. The lower result is reported.
U - Analyte was not detected at the value indicated
V - Concentration difference between the primary and confirmation column >100%. The reporting limit is raised due to this disparity and evident interference...

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods. Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

This report shall not be reproduced except in full, without the written approval of the laboratory.

Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as "analyze immediately" are not performed within 15 minutes.

WARRANTY AND LIMITS OF LIABILITY - In accepting analytical work, we warrant the accuracy of test results for the sample as submitted. THE FOREGOING EXPRESS WARRANTY IS EXCLUSIVE AND IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. WE DISCLAIM ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING A WARRANTY OF FITNESS FOR PARTICULAR PURPOSE AND WARRANTY OF MERCHANTABILITY. IN NO EVENT SHALL EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL, LLC BE LIABLE FOR INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF PROFIT OR GOODWILL REGARDLESS OF (A) THE NEGLIGENCE (EITHER SOLE OR CONCURRENT) OF EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL AND (B) WHETHER EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL HAS BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES. We accept no legal responsibility for the purposes for which the client uses the test results. No purchase order or other order for work shall be accepted by Eurofins Lancaster Laboratories Environmental which includes any conditions that vary from the Standard Terms and Conditions, and Eurofins Lancaster Laboratories Environmental hereby objects to any conflicting terms contained in any acceptance or order submitted by client.

REPORT OF ANALYSIS

CLIENT: Universal Laboratories
ATTN: Dan Thornton
ADDRESS: 20 Research Drive
Hampton, VA 23666
PHONE: (757) 865-0880
FAX: e: d.thornton@universallaborato

Special Notes:

SAMPLE COLLECTED BY: CLIENT
GRAB COLLECTION:
Date: 12/17/2015 Time: 1150
COMPOSITE COLLECTION:
Start Date: Time:
End Date: Time:

PICK UP BY: CLIENT
SAMPLE RECEIPT:
Date: 12/18/2015 Time: 1035
NUMBER OF CONTAINERS: 1
SAMPLE CONDITION: ☑ Good ☐ Other (See C-O-C)
REPORT NO: 15-19973 12:24

SAMPLE ID: 1512195-001 EFFLUENT
SAMPLE NO: 15-19973

Parameter	Method Number	JRA QL	Result	Unit	Analyst	Date	Time
Parathion	614	1	< 1	ug/L	JFS	12/21/15	2326
Malathion	614	1	< 1	ug/L	JFS	12/21/15	2326
Demeton	614	1	< 1	ug/L	JFS	12/21/15	2326
Diazinon	614	1	< 1	ug/L	JFS	12/21/15	2326
Guthion	622	1	< 1	ug/L	JFS	12/28/15	2239
Nonylphenol	D7065-06	5	< 5	ug/L	CLH	12/22/15	1714

NOTES

JRA Quantification Level is the concentration of the lowest calibration standard above zero with a reliable signal.

Reproduction of this report is not permitted, except in full, without written approval from James R Reed & Associates.

The results on this report relate only to the sample(s) provided for analysis.

Results conform to NELAC standards, where applicable, unless otherwise indicated.

Method ASTM 7065-06 and 622 - Insufficient volume to perform required QC

Authorized By: Elaine Claiborne
Elaine Claiborne, Laboratory Director
Date: 30-Dec-15

James R. Reed & Associates
770 Pilot House Drive, Newport News, VA 23606
(757) 873-4703 • Fax: (757) 873-1498

VELAP# 460013
EPA# VA00015

Universal Laboratories
Subcontract Chain of Custody

20 Research Drive Hampton, VA 23666
Phone: 757-865-0880
Fax: 757-865-8014
UL Contact: Dan Thornton

To: Sample Receiving
James R Reed & Assoc

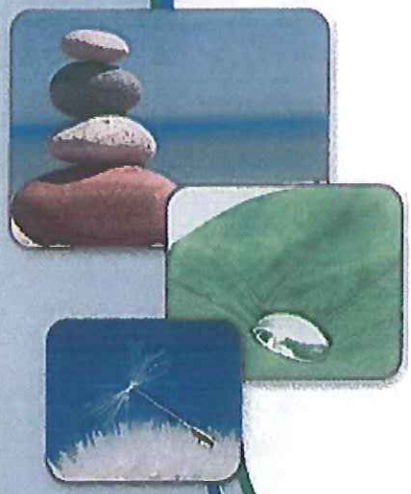
SUB PO Number: 121715-021

(A1) CWH 12/22/15

Sample #	Sample Location	Test	Matrix	Sample Date	Sample Time
1512195-001 NN,PP,SS	Effluent	Nonyl phenol SUB		12/17/2015 11:50AM	~~15-19972~~ ~~A1-3-A4~~ ~~B1-B3~~
1512195-001 O,Q,R	Effluent	Pesticides, organophosphorus - SUB		12/17/2015 11:50AM	15-19973 A1-3

Comments:	O.Pest = Demeton, Diazinon, Guthion, Malathion, Parathion	Cooler Temp:	4.0 °C
		Preservation:	

Relinquish By	Date/Time	Receive By:	Date/Time
[signature]	12-18-15/1000	[signature]	12/18/15@1000
[signature]	12/18/15 @ 10:35	[signature]	12/18/15@1035



TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

TestAmerica Job ID: 680-120224-1
Client Project/Site: 1512195

For:
C.K. Analytics, Inc dba Universal Labs
20 Research Drive
Hampton, Virginia 23666

Attn: Mr. Geoff Hinshelwood

Authorized for release by:
1/20/2016 2:39:33 PM

Sheila Hoffman, Project Manager II
(912)354-7858 e.3004
sheila.hoffman@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Cover Page 1
Table of Contents 2
Sample Summary 3
Method Summary 4
Case Narrative 5
Definitions/Glossary 7
Detection Summary 8
Client Sample Results 9
Surrogate Summary 10
Internal Standard Summary 11
Tracer Carrier Summary 12
QC Sample Results 13
QC Association Summary 17
Lab Chronicle 19
Chain of Custody 20
Receipt Checklists 21
Certification Summary 24

Sample Summary

Client: C.K. Analytics, Inc dba Universal Labs
Project/Site: 1512195

TestAmerica Job ID: 680-120224-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-120224-1	1512195-001	Water	12/17/15 11:50	12/18/15 09:28

Method Summary

Client: C.K. Analytics, Inc dba Universal Labs
Project/Site: 1512195

TestAmerica Job ID: 680-120224-1

Method	Method Description	Protocol	Laboratory
300.1B	Disinfection By-Products, (IC)	EPA	TAL SAV
1613B	Dioxins/Furans, HRGC/HRMS (1613B)	EPA-5	TAL KNX
245.1	Mercury (CVAA)	EPA	TAL SAV
SM 5310B	Organic Carbon, Total (TOC)	SM	TAL IRV
900.0	Gross Alpha and Gross Beta Radioactivity	EPA	TAL SL
903.0	Radium-226 (GFPC)	EPA	TAL SL
904.0	Radium-228 (GFPC)	EPA	TAL SL

Protocol References:

EPA = US Environmental Protection Agency
EPA-5 = EPA-5
SM = "Standard Methods For The Examination Of Water And Wastewater",

Laboratory References:

TAL IRV = TestAmerica Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022
TAL KNX = TestAmerica Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000
TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858
TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Job ID: 680-120224-1

Laboratory: TestAmerica Savannah

Narrative

CASE NARRATIVE

Client: C.K. Analytics, Inc dba Universal Labs

Project: 1512195

Report Number: 680-120224-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT
The samples were received on 12/18/2015; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 3.2 C.

DISSOLVED MERCURY (CVAA)
Sample 1512195-001 (680-120224-1) was analyzed for dissolved mercury (CVAA) in accordance with EPA Method 245.1. The samples were prepared on 12/24/2015 and analyzed on 12/28/2015.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

DISINFECTION BYPRODUCTS
Sample 1512195-001 (680-120224-1) was analyzed for Disinfection Byproducts in accordance with EPA Method 300.1B. The samples were analyzed on 12/30/2015.

Sample 1512195-001 (680-120224-1)[100X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TOTAL ORGANIC CARBON
Sample 1512195-001 (680-120224-1) was analyzed for total organic carbon in accordance with SM 5310B. The samples were analyzed on 12/21/2015.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GROSS ALPHA AND GROSS BETA RADIOACTIVITY
Sample 1512195-001 (680-120224-1) was analyzed for Gross Alpha and Gross Beta Radioactivity in accordance with EPA Method 900.0. The samples were prepared on 01/05/2016 and analyzed on 01/11/2016.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

RADIUM-226
Sample 1512195-001 (680-120224-1) was analyzed for Radium-226 in accordance with EPA Method 903.0. The samples were prepared on 12/24/2015 and analyzed on 01/19/2016.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

RADIUM-228 (GFPC)

Job ID: 680-120224-1 (Continued)

Laboratory: TestAmerica Savannah (Continued)

Sample 1512195-001 (680-120224-1) was analyzed for Radium-228 (GFPC) in accordance with EPA Method 904.0. The samples were prepared on 12/24/2015 and analyzed on 01/15/2016.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Definitions/Glossary

Client: C.K. Analytics, Inc dba Universal Labs
Project/Site: 1512195

TestAmerica Job ID: 680-120224-1

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

Metals

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

General Chemistry

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

Rad

Qualifier	Qualifier Description
G	The Sample MDC is greater than the requested RL.
U	Result is less than the sample detection limit.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Detection Summary

Client: C.K. Analytics, Inc dba Universal Labs
Project/Site: 1512195

TestAmerica Job ID: 680-120224-1

Client Sample ID: 1512195-001

Lab Sample ID: 680-120224-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Bromide	45000		2000	470	ug/L	100		300.1B	Total/NA
Total Organic Carbon	3.0		1.0	0.65	mg/L	1		SM 5310B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: C.K. Analytics, Inc dba Universal Labs
Project/Site: 1512195

TestAmerica Job ID: 680-120224-1

Client Sample ID: 1512195-001

Date Collected: 12/17/15 11:50
Date Received: 12/18/15 09:28

Lab Sample ID: 680-120224-1
Matrix: Water

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromide	45000		2000	470	ug/L			12/30/15 04:09	100

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	96		90 - 115		12/30/15 04:09	100

Method: 1613B - Dioxins/Furans, HRGC/HRMS (1613B)

Analyte	Result	Qualifier	ML	EDL	TEF	TEQ	Unit	D	Prepared	Analyzed	Dil Fac
2,3,7,8-TCDD	ND		10.0	0.0632	1		pg/L		12/22/15 16:00	01/05/16 06:08	1
Total TEQ (EPA 1989)						0.00					

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
37Cl4-2,3,7,8-TCDD	104		35 - 197	12/22/15 16:00	01/05/16 06:08	1

Internal Standard	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C-2,3,7,8-TCDD	85		25 - 164	12/22/15 16:00	01/05/16 06:08	1

Method: 245.1 - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury, Dissolved	0.20	U	0.20	0.080	ug/L		12/24/15 09:08	12/28/15 21:05	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	3.0		1.0	0.65	mg/L			12/21/15 09:17	1

Method: 900.0 - Gross Alpha and Gross Beta Radioactivity

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	-30.3	U G	71.8	71.9	3.00	162	pCi/L	01/05/16 12:07	01/11/16 07:41	1
Gross Beta	98.0	U G	63.7	64.4	4.00	98.7	pCi/L	01/05/16 12:07	01/11/16 07:41	1

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0489	U	0.0491	0.0493	1.00	0.0764	pCi/L	12/24/15 11:02	01/19/16 06:33	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	101		40 - 110	12/24/15 11:02	01/19/16 06:33	1

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.177	U	0.196	0.196	1.00	0.321	pCi/L	12/24/15 14:33	01/15/16 12:10	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	101		40 - 110	12/24/15 14:33	01/15/16 12:10	1
Y Carrier	102		40 - 110	12/24/15 14:33	01/15/16 12:10	1

Surrogate Summary

Client: C.K. Analytics, Inc dba Universal Labs
Project/Site: 1512195

TestAmerica Job ID: 680-120224-1

Method: 300.1B - Disinfection By-Products, (IC)

Matrix: Water — **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)							
		ɔacetic ac (90-115)							
680-120224-1	1512195-001	96							
LCS 680-416456/4	Lab Control Sample	101							
LCSD 680-416456/5	Lab Control Sample Dup	98							
MB 680-416456/2	Method Blank	97							

Surrogate Legend

Dichloroacetic acid(Surr) = Dichloroacetic acid(Surr)

Method: 1613B - Dioxins/Furans, HRGC/HRMS (1613B)

Matrix: Water — **Prep Type: Total**

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)							
		37TCDD (35-197)							
680-120224-1	1512195-001	104							
H5L220000011B	Method Blank	101							

Surrogate Legend

37TCDD = 37Cl4-2,3,7,8-TCDD

Method: 1613B - Dioxins/Furans, HRGC/HRMS (1613B)

Matrix: Water — **Prep Type: Total**

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)							
		37TCDD (31-191)							
H5L220000011C	Lab Control Sample	105							

Surrogate Legend

37TCDD = 37Cl4-2,3,7,8-TCDD

Internal Standards Summary

Client: C.K. Analytics, Inc dba Universal Labs
Project/Site: 1512195

TestAmerica Job ID: 680-120224-1

Method: 1613B - Dioxins/Furans, HRGC/HRMS (1613B)

Matrix: Water **Prep Type: Total**

		Percent Internal Standard Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	TCDD (25-164)							
680-120224-1	1512195-001	85							
H5L220000011B	Method Blank	71							

Internal Standard Legend
TCDD = 13C-2,3,7,8-TCDD

Method: 1613B - Dioxins/Furans, HRGC/HRMS (1613B)

Matrix: Water **Prep Type: Total**

		Percent Internal Standard Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	TCDD (20-175)							
H5L220000011C	Lab Control Sample	72							

Internal Standard Legend
TCDD = 13C-2,3,7,8-TCDD

Tracer/Carrier Summary

Client: C.K. Analytics, Inc dba Universal Labs
Project/Site: 1512195

TestAmerica Job ID: 680-120224-1

Method: 903.0 - Radium-226 (GFPC)

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)
Lab Sample ID	Client Sample ID	Ba (40-110)
680-120224-1	1512195-001	101
LCS 160-229500/2-A	Lab Control Sample	106
LCSD 160-229500/3-A	Lab Control Sample Dup	80.4
MB 160-229500/1-A	Method Blank	109

Tracer/Carrier Legend

Ba = Ba Carrier

Method: 904.0 - Radium-228 (GFPC)

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (40-110)	Y (40-110)
680-120224-1	1512195-001	101	102
LCS 160-229522/2-A	Lab Control Sample	106	106
LCSD 160-229522/3-A	Lab Control Sample Dup	80.4	104
MB 160-229522/1-A	Method Blank	109	104

Tracer/Carrier Legend

Ba = Ba Carrier
Y = Y Carrier

QC Sample Results

Client: C.K. Analytics, Inc dba Universal Labs
Project/Site: 1512195

TestAmerica Job ID: 680-120224-1

Method: 300.1B - Disinfection By-Products, (IC)

Lab Sample ID: MB 680-416456/2
Matrix: Water
Analysis Batch: 416456

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromide	20	U	20	4.7	ug/L			12/29/15 13:49	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	97		90 - 115		12/29/15 13:49	1

Lab Sample ID: LCS 680-416456/4
Matrix: Water
Analysis Batch: 416456

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Bromide	50.0	52.9		ug/L		106	85 - 115

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Dichloroacetic acid(Surr)	101		90 - 115

Lab Sample ID: LCSD 680-416456/5
Matrix: Water
Analysis Batch: 416456

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Bromide	50.0	50.7		ug/L		101	85 - 115	4	10

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
Dichloroacetic acid(Surr)	98		90 - 115

Method: 1613B - Dioxins/Furans, HRGC/HRMS (1613B)

Lab Sample ID: H5L220000011B
Matrix: Water
Analysis Batch: 5356011

Client Sample ID: Method Blank
Prep Type: Total
Prep Batch: 5356011_P

Analyte	MB Result	MB Qualifier	ML	EDL	TEF	TEQ	Unit	D	Prepared	Analyzed	Dil Fac
2,3,7,8-TCDD	ND		10.0	0.0856	1		pg/L		12/22/15 16:00	01/05/16 00:00	1
Total TEQ						0.00					

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
37Cl4-2,3,7,8-TCDD	101		35 - 197	12/22/15 16:00	01/05/16 00:00	1

Internal Standard	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C-2,3,7,8-TCDD	71		25 - 164	12/22/15 16:00	01/05/16 00:00	1

QC Sample Results

Client: C.K. Analytics, Inc dba Universal Labs
Project/Site: 1512195

TestAmerica Job ID: 680-120224-1

Method: 1613B - Dioxins/Furans, HRGC/HRMS (1613B) (Continued)

Lab Sample ID: H5L220000011C
Matrix: Water
Analysis Batch: 5356011

Client Sample ID: Lab Control Sample
Prep Type: Total
Prep Batch: 5356011_P

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
2,3,7,8-TCDD	200	178		pg/L		89	67 - 158

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
37Cl4-2,3,7,8-TCDD	*105*		*31 - 191*

Internal Standard	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C-2,3,7,8-TCDD	*72*		*20 - 175*

Method: 245.1 - Mercury (CVAA)

Lab Sample ID: MB 680-416075/1-A
Matrix: Water
Analysis Batch: 416402

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 416075

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury, Dissolved	0.20	U	0.20	0.080	ug/L		12/24/15 07:13	12/28/15 19:57	1

Lab Sample ID: LCS 680-416075/2-A
Matrix: Water
Analysis Batch: 416402

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 416075

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury, Dissolved	2.50	2.48		ug/L		99	85 - 115

Method: SM 5310B - Organic Carbon, Total (TOC)

Lab Sample ID: MB 440-301701/9
Matrix: Water
Analysis Batch: 301701

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	1.0	U	1.0	0.65	mg/L			12/21/15 04:04	1

Lab Sample ID: LCS 440-301701/8
Matrix: Water
Analysis Batch: 301701

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon	10.0	10.5		mg/L		105	90 - 110

QC Sample Results

Client: C.K. Analytics, Inc dba Universal Labs
Project/Site: 1512195

TestAmerica Job ID: 680-120224-1

Method: 900.0 - Gross Alpha and Gross Beta Radioactivity

Lab Sample ID: MB 160-230661/1-A
Matrix: Water
Analysis Batch: 231446

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 230661

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	-0.01005	U	0.480	0.480	3.00	0.945	pCi/L	01/05/16 12:07	01/10/16 19:08	1
Gross Beta	-0.003394	U	0.461	0.461	4.00	0.833	pCi/L	01/05/16 12:07	01/10/16 19:08	1

Lab Sample ID: LCS 160-230661/2-A
Matrix: Water
Analysis Batch: 231446

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 230661

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Gross Alpha	50.0	49.31		7.05	3.00	1.66	pCi/L	99	73 - 133

Lab Sample ID: LCSB 160-230661/3-A
Matrix: Water
Analysis Batch: 231446

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 230661

Analyte	Spike Added	LCSB Result	LCSB Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Gross Beta	93.6	93.15		9.84	4.00	0.919	pCi/L	100	75 - 125

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-229500/1-A
Matrix: Water
Analysis Batch: 233143

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 229500

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-0.001013	U	0.0484	0.0484	1.00	0.0952	pCi/L	12/24/15 11:02	01/19/16 06:29	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*109*		*40 - 110*	*12/24/15 11:02*	*01/19/16 06:29*	*1*

Lab Sample ID: LCS 160-229500/2-A
Matrix: Water
Analysis Batch: 233143

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 229500

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Radium-226	11.2	10.59		1.06	1.00	0.0986	pCi/L	95	68 - 137

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Ba Carrier	*106*		*40 - 110*

Method: 903.0 - Radium-226 (GFPC) (Continued)

Lab Sample ID: LCSD 160-229500/3-A
Matrix: Water
Analysis Batch: 233143

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 229500

Analyte			Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Radium-226			11.2	10.94		1.12	1.00	0.104	pCi/L	98	68 - 137	0.16	1

Carrier	LCSD %Yield	LCSD Qualifier	Limits
Ba Carrier	80.4		40 - 110

Method: 904.0 - Radium-228 (GFPC)

Lab Sample ID: MB 160-229522/1-A
Matrix: Water
Analysis Batch: 232602

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 229522

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.1170	U	0.143	0.144	1.00	0.237	pCi/L	12/24/15 14:33	01/15/16 12:02	1

Carrier	MB %Yield	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	109		40 - 110	12/24/15 14:33	01/15/16 12:02	1
Y Carrier	104		40 - 110	12/24/15 14:33	01/15/16 12:02	1

Lab Sample ID: LCS 160-229522/2-A
Matrix: Water
Analysis Batch: 232602

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 229522

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Radium-228			3.16	2.445		0.372	1.00	0.241	pCi/L	77	56 - 140		

Carrier	LCS %Yield	LCS Qualifier	Limits
Ba Carrier	106		40 - 110
Y Carrier	106		40 - 110

Lab Sample ID: LCSD 160-229522/3-A
Matrix: Water
Analysis Batch: 232602

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 229522

Analyte			Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Radium-228			3.16	1.995		0.375	1.00	0.318	pCi/L	63	56 - 140	0.60	1

Carrier	LCSD %Yield	LCSD Qualifier	Limits
Ba Carrier	80.4		40 - 110
Y Carrier	104		40 - 110

QC Association Summary

Client: C.K. Analytics, Inc dba Universal Labs
Project/Site: 1512195

TestAmerica Job ID: 680-120224-1

HPLC/IC

Analysis Batch: 416456

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-120224-1	1512195-001	Total/NA	Water	300.1B	
LCS 680-416456/4	Lab Control Sample	Total/NA	Water	300.1B	
LCSD 680-416456/5	Lab Control Sample Dup	Total/NA	Water	300.1B	
MB 680-416456/2	Method Blank	Total/NA	Water	300.1B	

Specialty Organics

Analysis Batch: 5356011

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-120224-1	1512195-001	Total	Water	1613B	
H5L220000011B	Method Blank	Total	Water	1613B	
H5L220000011C	Lab Control Sample	Total	Water	1613B	

Prep Batch: 5356011_P

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-120224-1	1512195-001	Total	Water	1613	
H5L220000011B	Method Blank	Total	Water	1613	
H5L220000011C	Lab Control Sample	Total	Water	1613	

Metals

Prep Batch: 416075

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-120224-1	1512195-001	Dissolved	Water	245.1	
LCS 680-416075/2-A	Lab Control Sample	Total/NA	Water	245.1	
MB 680-416075/1-A	Method Blank	Total/NA	Water	245.1	

Analysis Batch: 416402

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-120224-1	1512195-001	Dissolved	Water	245.1	416075
LCS 680-416075/2-A	Lab Control Sample	Total/NA	Water	245.1	416075
MB 680-416075/1-A	Method Blank	Total/NA	Water	245.1	416075

General Chemistry

Analysis Batch: 301701

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-120224-1	1512195-001	Total/NA	Water	SM 5310B	
LCS 440-301701/8	Lab Control Sample	Total/NA	Water	SM 5310B	
MB 440-301701/9	Method Blank	Total/NA	Water	SM 5310B	

Rad

Prep Batch: 229500

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-120224-1	1512195-001	Total/NA	Water	PrecSep-21	
LCS 160-229500/2-A	Lab Control Sample	Total/NA	Water	PrecSep-21	
LCSD 160-229500/3-A	Lab Control Sample Dup	Total/NA	Water	PrecSep-21	
MB 160-229500/1-A	Method Blank	Total/NA	Water	PrecSep-21	

QC Association Summary

Client: C.K. Analytics, Inc dba Universal Labs
Project/Site: 1512195

TestAmerica Job ID: 680-120224-1

Rad (Continued)

Prep Batch: 229522

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-120224-1	1512195-001	Total/NA	Water	PrecSep_0	
LCS 160-229522/2-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
LCSD 160-229522/3-A	Lab Control Sample Dup	Total/NA	Water	PrecSep_0	
MB 160-229522/1-A	Method Blank	Total/NA	Water	PrecSep_0	

Prep Batch: 230661

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-120224-1	1512195-001	Total/NA	Water	Evaporation	
LCS 160-230661/2-A	Lab Control Sample	Total/NA	Water	Evaporation	
LCSB 160-230661/3-A	Lab Control Sample	Total/NA	Water	Evaporation	
MB 160-230661/1-A	Method Blank	Total/NA	Water	Evaporation	

Lab Chronicle

Client: C.K. Analytics, Inc dba Universal Labs
Project/Site: 1512195

TestAmerica Job ID: 680-120224-1

Client Sample ID: 1512195-001

Date Collected: 12/17/15 11:50
Date Received: 12/18/15 09:28

Lab Sample ID: 680-120224-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B		100	5 mL	5 mL	416456	12/30/15 04:09	SMC	TAL SAV
	Instrument ID: CICN									
Total	Prep	1613			996 mL	20 uL	5356011_P	12/22/15 16:00		TAL KNX
Total	Analysis	1613B		1			5356011	01/05/16 06:08	LKM	TAL KNX
	Instrument ID: D2A									
Dissolved	Prep	245.1			50 mL	50 mL	416075	12/24/15 09:08	BCB	TAL SAV
Dissolved	Analysis	245.1		1	50 mL	50 mL	416402	12/28/15 21:05	BCB	TAL SAV
	Instrument ID: LEEMAN2									
Total/NA	Analysis	SM 5310B		1		100 mL	301701	12/21/15 09:17	YZ	TAL IRV
	Instrument ID: TOC-04									
Total/NA	Prep	Evaporation			2 mL	1.0 g	230661	01/05/16 12:07	MJS	TAL SL
Total/NA	Analysis	900.0		1	2 mL		231475	01/11/16 07:41	RTM	TAL SL
	Instrument ID: GFPCPROTEAN									
Total/NA	Prep	PrecSep-21			960.06 mL	1.0 g	229500	12/24/15 11:02	CMT	TAL SL
Total/NA	Analysis	903.0		1	960.06 mL		233143	01/19/16 06:33	MFM	TAL SL
	Instrument ID: GFPCORANGE									
Total/NA	Prep	PrecSep_0			960.06 mL	1.0 g	229522	12/24/15 14:33	CMT	TAL SL
Total/NA	Analysis	904.0		1	960.06 mL		232603	01/15/16 12:10	ALS	TAL SL
	Instrument ID: GFPCPURPLE									

Laboratory References:

TAL IRV = TestAmerica Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022
TAL KNX = TestAmerica Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000
TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858
TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Universal Laboratories
Subcontract Chain of Custody

20 Research Drive Hampton, VA 23666
Phone: 757-865-0880
Fax: 757-865-8014
UL Contact: Dan Thornton

To: Sample Receiving
TestAmerica

SUB PO Number: 121715-018

Sample #	Sample Location	Test	Matrix	Sample Date	Sample Time
1512195-001 E	Effluent	Mercury, Dissolved - SUB	Aqueous	12/17/2015 11:50AM	
1512195-001 M, H, L	Effluent	Dioxin - SUB	Aqueous	12/17/2015 11:50AM	
1512195-001 RR	Effluent	Bromide SUB	Aqueous	12/17/2015 11:50AM	
1512195-001 KK, LL, MM	Effluent	Gross Beta - SUB	Aqueous	12/17/2015 11:50AM	
1512195-001	Effluent	Radium 226 - SUB	Aqueous	12/17/2015 11:50AM	
1512195-001	Effluent	Radium 228 - SUB	Aqueous	12/17/2015 11:50AM	
1512195-001 Z	Effluent	Organic Carbon, Total - SU	Aqueous	12/17/2015 11:50AM	
1512195-001 KK, LL, MM	Effluent	Gross Alpha - SUB	Aqueous	12/17/2015 11:50AM	

680-120224 Chain of Custody

Comments:		Cooler Temp:	
		Preservation:	

Relinquish By	Date/Time	Receive By:	Date/Time
	12-17-15/1635		12/18/15 9:28

2.8/3.2 CP

Login Sample Receipt Checklist

Client: C.K. Analytics, Inc dba Universal Labs

Job Number: 680-120224-1

Login Number: 120224
List Number: 1
Creator: White, Menica R

List Source: TestAmerica Savannah

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: C.K. Analytics, Inc dba Universal Labs

Job Number: 680-120224-1

Login Number: 120224
List Number: 3
Creator: Garcia, Veronica G

List Source: TestAmerica Irvine
List Creation: 12/19/15 11:49 AM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: C.K. Analytics, Inc dba Universal Labs

Job Number: 680-120224-1

Login Number: 120224
List Number: 2
Creator: McKinney, Gerrod E

List Source: TestAmerica St. Louis
List Creation: 12/19/15 10:16 AM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	19.2°C
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	False	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Certification Summary

Client: C.K. Analytics, Inc dba Universal Labs
Project/Site: 1512195

TestAmerica Job ID: 680-120224-1

Laboratory: TestAmerica Savannah

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Virginia	NELAP	3	460161	06-14-16

Laboratory: TestAmerica Irvine

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Alaska	State Program	10	CA01531	06-30-16
Arizona	State Program	9	AZ0671	10-13-16
California	LA Cty Sanitation Districts	9	10256	01-31-17 *
California	State Program	9	2706	06-30-16
Guam	State Program	9	Cert. No. 12.002r	01-23-16 *
Hawaii	State Program	9	N/A	01-29-17
Kansas	NELAP Secondary AB	7	E-10420	07-31-16
Nevada	State Program	9	CA015312007A	07-31-16
New Mexico	State Program	6	N/A	01-29-16 *
Northern Mariana Islands	State Program	9	MP0002	01-29-16 *
Oregon	NELAP	10	4005	01-29-16 *
USDA	Federal		P330-09-00080	07-08-18
Washington	State Program	10	900	09-03-16

Laboratory: TestAmerica Knoxville

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Arkansas DEQ	State Program	6	88-0688	06-16-16
California	State Program	9	2423	06-30-16
Colorado	State Program	8	N/A	02-28-16
Connecticut	State Program	1	PH-0223	09-30-17
Florida	NELAP	4	E87177	06-30-16
Georgia	State Program	4	906	04-13-17
Hawaii	State Program	9	N/A	04-13-16
Kansas	NELAP	7	E-10349	01-31-16
Kentucky (DW)	State Program	4	90101	12-31-16
L-A-B	DoD ELAP		L2311	02-13-16
Louisiana	NELAP	6	83979	06-30-16
Louisiana (DW)	NELAP	6	LA110001	12-31-16
Maryland	State Program	3	277	03-31-16
Michigan	State Program	5	9933	04-13-17
Nevada	State Program	9	TN00009	07-31-16
New Jersey	NELAP	2	TN001	06-30-16
New York	NELAP	2	10781	03-31-16
North Carolina (DW)	State Program	4	21705	07-31-16
North Carolina (WW/SW)	State Program	4	64	12-31-16
Ohio VAP	State Program	5	CL0059	01-16-17
Oklahoma	State Program	6	9415	08-31-16
Pennsylvania	NELAP	3	68-00576	12-31-16
South Carolina	State Program	4	84001	06-30-16
Tennessee	State Program	4	2014	04-13-17
Texas	NELAP	6	T104704380-15-8	08-31-16
USDA	Federal		P330-13-00260	08-29-16
Utah	NELAP	8	QUAN3	07-31-16

* Certification renewal pending - certification considered valid.

Certification Summary

Client: C.K. Analytics, Inc dba Universal Labs
Project/Site: 1512195

TestAmerica Job ID: 680-120224-1

Laboratory: TestAmerica Knoxville (Continued)

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Virginia	NELAP	3	460176	09-14-16
Washington	State Program	10	C593	01-19-16
West Virginia (DW)	State Program	3	9955C	12-31-15
West Virginia DEP	State Program	3	345	04-30-16
Wisconsin	State Program	5	998044300	08-31-16

Laboratory: TestAmerica St. Louis

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Alaska	State Program	10	MO00054	06-30-16
California	ELAP	9	2886	03-31-16
Connecticut	State Program	1	PH-0241	03-31-17
Florida	NELAP	4	E87689	06-30-16
Illinois	NELAP	5	003757	11-30-16
Iowa	State Program	7	373	12-01-16
Kansas	NELAP	7	E-10236	01-31-16 *
Kentucky (DW)	State Program	4	90125	12-31-15 *
L-A-B	DoD ELAP		L2305	04-10-16 *
Louisiana	NELAP	6	04080	06-30-16
Louisiana (DW)	NELAP	6	LA160008	12-31-16
Maryland	State Program	3	310	09-30-16
Missouri	State Program	7	780	06-30-16
Nevada	State Program	9	MO000542016-1	07-31-16
New Jersey	NELAP	2	MO002	06-30-16
New York	NELAP	2	11616	03-31-16 *
North Dakota	State Program	8	R207	06-30-16
NRC	NRC		24-24817-01	12-31-22
Oklahoma	State Program	6	9997	08-31-16
Pennsylvania	NELAP	3	68-00540	02-28-16 *
South Carolina	State Program	4	85002001	06-30-16
Texas	NELAP	6	T104704193-15-9	07-31-16
USDA	Federal		P330-07-00122	01-09-17
Utah	NELAP	8	MO000542015-7	07-31-16
Virginia	NELAP	3	460230	06-14-16
Washington	State Program	10	C592	08-30-16
West Virginia DEP	State Program	3	381	08-31-16

* Certification renewal pending - certification considered valid.

Virginia Institute of Marine Science
P.O. Box 1346
Gloucester Point,VA,23062
Contact:Jim Brister,804-684-7255,jebrister@vims.edu

Client PO/Project Name

Universal Laboratories

CHAIN OF CUSTODY

ID: 1512195

Permit Renewal

20 Research Drive
Hampton, VA 23666
1-800-695-2162
http://www.universallaboratories.net

Sample Name	UL_Sample ID	Matrix	Sample Date/Time/Initials	BottleID	Sample Container	Preservation	Testing
Effluent	1512195-001	AQUEOUS	12/~~16~~ 17/15 @ 11:50 CK 12/17	001A	1/HDPE	<6°C	METALSDISS, HGD, CR6, Cr3, METALS, AGDISS, Metals, AG, NH3, BOD, COD, CN, FLUORIDE, NN, ORGNIT, OGT, T.PHOS, TSS, MBAS, HARD, PHENOL, ENTERO, E.COLI MPN, SULFIDE, SULFATE, sulfite, CNfree, 608, 625, 624, 8141sub, TBT, TOC, nonylSUB, GrossA, GrossB, RADIUM226, RADIUM228, FCHLORINE, GRAB SAMPLE, FPH, FTEMP, TRANS, BrSUB, COLOR, FILTER, FILTER, FILTER, Dioxinsub
		AQUEOUS		01AA	2/HDPE	<6°C	
		AQUEOUS		001B	1/HDPE	H2SO4/<6°C	
		AQUEOUS		01BB	125/Sterile	Na2S2O3/<6°C	
		AQUEOUS		001C	1/HDPE	HNO3/<6°C	
		AQUEOUS		01CC	125/Sterile	Na2S2O3/<6°C	
		AQUEOUS		001D	500/Polysterene/ dissolved	HNO3/<6°C	
		AQUEOUS		01DD	1/HDPE	NaOH/<6°C	
		AQUEOUS		001E	500/Polysterene/ dissolved	HNO3/<6°C	
		AQUEOUS		01EE	1/HDPE	NaOH/<6°C	
		AQUEOUS		001F	500/Polysterene/ dissolved	<6°C	
		AQUEOUS		01FF	1/Glass/Solvent Rinsed	H2SO4/<6°C	
		AQUEOUS		001G	1/Glass/Solvent Rinsed	<6°C	
		AQUEOUS		01GG	250/HDPE	HNO3/<6°C	
		AQUEOUS		001H	1/Glass/Solvent Rinsed	<6°C	
		AQUEOUS		01HH	1/HDPE	H2SO4/<6°C	
		AQUEOUS		001I	1/Glass/Solvent Rinsed	<6°C	
		AQUEOUS		01II	500/HDPE/Amber	ZnAcetate/NaOH	

Universal Laboratories

CHAIN OF CUSTODY

ID: 1512195

Permit Renewal

Virginia Institute of Marine Science
P.O. Box 1346
Gloucester Point,VA,23062

Contact:Jim Brister,804-684-7255,jebrister@vims.edu

Client PO/Project Name

20 Research Drive
Hampton, VA 23666
1-800-695-2162
http://www.universallaboratories.net

Sample Name	UL_Sample ID	Matrix	Sample Date/Time/Initials	BottleID	Sample Container	Preservation	Testing
		AQUEOUS		001J	1/Glass/Solvent Rinsed	<6°C	
		AQUEOUS		01JJ	1/HDPE	<6°C	
		AQUEOUS		001K	1/Glass/Solvent Rinsed	<6°C	
		AQUEOUS		01KK	1/HDPE	HNO3/<6°C	
		AQUEOUS		001L	1/Glass/Solvent Rinsed	<6°C	
		AQUEOUS		01LL	1/HDPE	HNO3/<6°C	
		AQUEOUS		001M	1/Glass/Solvent Rinsed	<6°C	
		AQUEOUS		01MM	1/HDPE	HNO3/<6°C	
		AQUEOUS		001N	1/Glass/Solvent Rinsed	<6°C	
		AQUEOUS		01NN	1/Glass/Solvent Rinsed	<6°C	
		AQUEOUS		001O	1/Glass/Solvent Rinsed	<6°C	
		AQUEOUS		01OO	1/Glass/Solvent Rinsed	<6°C	
		AQUEOUS		001P	1/Glass/Solvent Rinsed	<6°C	
		AQUEOUS		01PP	1/Glass/Solvent Rinsed	<6°C	
		AQUEOUS		001Q	1/Glass/Solvent Rinsed	<6°C	
		AQUEOUS		01QQ	1/HDPE	<6°C	
		AQUEOUS		001R	1/Glass/Solvent Rinsed	<6°C	
		AQUEOUS		01RR	250/HDPE	<6°C	
		AQUEOUS		001S	1/Glass/Solvent Rinsed	H2SO4/<6°C	
		AQUEOUS		01SS	1/Glass/Solvent Rinsed	<6°C	
		AQUEOUS		001T	1/Glass/Solvent Rinsed	H2SO4/<6°C	

Universal Laboratories

CHAIN OF CUSTODY

ID: 1512195

Permit Renewal

Virginia Institute of Marine Science
P.O. Box 1346
Gloucester Point,VA,23062

Contact:Jim Brisler,804-684-7255,jebrister@vims.edu

20 Research Drive
Hampton, VA 23666
1-800-695-2162
http://www.universallaboratories.net

Client PO/Project Name

Sample Name	UL_Sample ID	Matrix	Sample Date/Time/Initials	BottleID	Sample Container	Preservation	Testing
		AQUEOUS		01TT	1/Glass/Solvent Rinsed	<6°C	
		AQUEOUS		001U	1/Glass/Solvent Rinsed	H2SO4/<6°C	
		AQUEOUS		01UU	1/Glass/Solvent Rinsed	<6°C	
		AQUEOUS		001V	40/Glass	HCl/<6°C	
		AQUEOUS		001W	40/Glass	HCl/<6°C	
		AQUEOUS		001X	40/Glass	HCl/<6°C	
		AQUEOUS		001Y	2/Polycarbonate	HCl/<6°C	
		AQUEOUS		001Z	150/HDPE	H2SO4/<6°C	

NOTES:
Phenol int check Neg CN int check Neg BOD int check Neg NH3 int check Neg
CoolerTemp 1 °C

TRANSFER	SIGNATURE	DATE/TIME	TRANSFER	SIGNATURE	DATE/TIME
Relinquished by	[illegible]	12/17/15@ 15:40	Received by	[illegible]	12-17-15/1540
Relinquished by		12/17/15	Received by		
Relinquished by			Received by		
Relinquished by			Received by		

Universal Laboratories
20 Research Drive
Hampton, VA 23666
Phone: 1-800-695-2162
Fax: **757-865-8014**

Client Report For:	**Virginia Institute of Marine Science**
Attention:	Mr. Jim Brister
Client Address:	P.O. Box 1346 Rt. 1208 Greate Road Gloucester Point, VA 23062
Project:	**Permit Renewal**
Order Number:	**1601359**
Report Date:	02/08/2016
Lab Receipt Date:	01/29/2016
Comment:	This report contains the analytical results for the indicated Project and Order. The results contained in this report relate only to the samples identified in this Order. The analytical results meet all requirements of NELAC unless specifically stated. This report shall not be reproduced except in full.

The data in this report has been reviewed and validated by: Carol K Zeno Signature

Carol K Zeno Name

Pres/Tech Director Title

Universal Laboratories

Client:	Virginia Institute of Marine Science	**Client Sample ID:**	Effluent
Lab ID:	1601359-001	**Collection Date:**	01/29/2016 10:33
Permit ID		**Matrix:**	AQUEOUS

Analyses

Coliform, Fecal ***SM 9222D (1997)***

	Test Result	Unit	RL	Analysis Date	Analysis By	Qualifier	Cert #
Coliforms, Fecal	1	cfu/100mL	1	01/29/2016 14:55	LS		460036

Chloride ***SM 4500CL E (2011)***

	Test Result	Unit	RL	Analysis Date	Analysis By	Qualifier	Cert #
Chloride	12710	mg/L	1000	02/05/2016 14:33	LS.		460036

Glossary of Terms and Abbreviations

ND	No Analyte Detected
NR	No Results available, analyte not in instrument calibration
RL	(Reporting Limit) The minimum levels, concentrations, or quantities of a target analyte that can be reported within a specified degree of confidence. Generally, this number is equal to or just above the lowest calibration standard run with the analytical batch.
B	Analyte was found in the method blank
D	RPD outside acceptable limits
H	Holding time exceeeded
IS	Internal standard outside acceptable limits
J	Result above calibration curve - results are approximate
L	LCS Outside acceptable limits
MI	Matrix Interence
MS	Matrix spike recovery outside acceptable limits
QC	Method QC criteria not met
S	Surrogate outside acceptable limits
V	ICV/CCV/FCV outside acceptable limits
LCS	(Laboratory Control Sample) A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	Method Detection Limitis is an estimate of the minimum amount of a substance that an analytical process can reliably detect
RPD	(Relative Percent Difference) The difference between a set of duplicates or sample spike duplicates.
MS/MSD	(Matrix Spike or Matrix Spike Duplicate) A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analytes concentration is available. Matrix Spikes are used, for example, to determine the effect of the matrix on a method's recovery efficiency.
Calibration Verfication	(Initial, Continuing, or Final) A standard analyzed at different times to verify that the initial calibration curve is still valid.
Holding Time	The maximum time that samples may be held prior to analysis and still be considered valid or not compromised.
Internal Standard	A known amount of standard added to a test portion of a sample as a reference for evaluating and controlling the precision and bias of the applied analytical method.
Method Blank	A sample of a matrix similar to the batch associated samples (when available) that is free from the analytes of interest and is processed simulatanously with and under the same conditions as samples.
Surrogate	A substance with properties that mimic the analyte of interest. It is unlikely to be found in environmental samples and is added to them for quality control purposes in Organics.
EPL	Exceeds Permit Limit. This is a qualifier to denote that the result exceeds the permit limit of the sample location.
Exceeds Benchmark Concentration	Result Exceeds Benchmark concentration listed in the General Permit. Benchmark Concentrations are primarily used to determine the overall effectivenss of the Stormwater pollution prevention plan. Excedence of Benchamrk concentrations does NOT constitute a violation of this permit and does NOT indicate that violation of a water quality standard has occured.

Universal Laboratories

CHAIN OF CUSTODY

ID: 1601359

permit Renewal

Virginia Institute of Marine Science
P.O. Box 1346
Gloucester Point,VA,23062

Contact:Jim Brister,804-684-7255,jebrister@vims.edu

Client PO/Project Name

20 Research Drive
Hampton, VA 23666
1-800-695-2162
http://www.universallaboratories.net

Sample Name	UL_Sample ID	Matrix	Sample Date/Time/Initials	BottleID	Sample Container	Preservation	Testing
Effluent	1601359-001	AQUEOUS	1/29/16 1033	001A	500/HDPE	<6°C	FECAL MF, CHLORIDE, GRAB SAMPLE, TRANS
		AQUEOUS		001B	125/Sterile	Na2S2O3/<6°C	

NOTES:_____ CoolerTemp 6°C C

Phenol int check_____ CN int check_____ BOD int check_____ NH3 int check_____

TRANSFER	SIGNATURE	DATE/TIME	TRANSFER	SIGNATURE	DATE/TIME
Relinquished by		1/29/16 1304	Received by		1-29-16/1304
Relinquished by			Received by		
Relinquished by			Received by		
Relinquished by			Received by		

Client: Virginia Institute of Marine Science
Project ID: VIMS1502
Client Sample ID: Seawater Lab Outfall 004
Permit No: VA0071528
Sample Period: 12/15/15 to 12/18/15

Coastal Bioanalysts, Inc.

Report of Analysis: Whole Effluent Toxicity (WET)

Submitted To:	**Prepared By:**
Mr. Jim Brister Virginia Institute of Marine Science 1208 Greate Road Gloucester Point, VA 23062	Coastal Bioanalysts, Inc. 6400 Enterprise Court Gloucester, VA 23071 (804) 694-8285 www.coastalbio.com Contact: Peter F. De Lisle, Technical Director

Chronic Test Results*

Species-Test Method	Endpoint	NOEC	LOEC	ChrV	PMSD	$T.U._C$	IC25	48-h LC50	LC50 95% C.L.	$T.U._{Ac}$
M. bahia EPA 1007.0	Survival	100	>100	>100	N/A	1.00	N/A	>100	N/A	<1.00
	Biomass	100	>100	>100	18	**1.00**	>100	N/A	N/A	N/A
	Fecundity	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
C. variegatus EPA 1004.0	Survival	100	>100	>100	N/A	1.00	N/A	>100	N/A	<1.00
	Biomass	100	>100	>100	12	**1.00**	>100	N/A	N/A	N/A

*Note: Details regarding test conduct and data analysis provided in attached bench sheets and printouts as applicable. Although the name of *Mysidopsis bahia* has officially been changed to *Americamysis bahia*, the former name is referenced because of its use in the EPA method manuals and most NPDES permits.
For each test method record the highest endpoint T.U.c value (bold) on the DMR.

Chronic Test QA/QC Reference Toxicant: KCl Units: mg/l Test Organism Source: CBI Stock Cultures

Species-Method (Ref. Test Date)	Data Source	% Survival Cont	% Survival NOEC	Biomass (mg) Cont.	Biomass (mg) NOEC	Biomass (mg) PMSD	Biomass (mg) IC25	Biomass (mg) IC25 A.L.	RTT in Control?
M. bahia 1007.0 (12/3/15-12/10/15)	RTT	100	250	0.31	250	19	319	N/A	Yes
	CC	95	250	0.31	250	15	319	250-387	
C. variegatus 1004.0 (12/9/15-12/16/15)	RTT	100	1000	1.40	500	10	1049	N/A	Yes
	CC	100	1000	1.10	500	10	1116	1004-1228	

Note: RTT = Reference Toxicant Test, CC = Control Chart, Cont. = Control group. Based on control chart data (n>197) fecundity (Method 1007.0) is not a sensitive endpoint for KCl toxicity and hence not reported; fecundity data available upon request.

The results of analysis contained within this report relate only to the sample as received in the laboratory. This report shall not be reproduced except in full without written approval from the laboratory. Unless noted below, these test results meet all requirements of NELAP.

APPROVED:

Peter F. De Lisle, Ph.D.
Technical Director

12/23/15
Date

Deviations from, additions to, or exclusions from the test method, non-standard conditions or data qualifiers and, as appropriate, a statement of compliance/non-compliance: **NONE**

VELAP# 460030
EPA# VA01116

Coastal Bioanalysts, Inc.

GLOSSARY OF TERMS AND ABBREVIATIONS

A.L. (Acceptance Limits): The results of a given reference toxicant test are compared to the control chart mean value ± 2 standard deviations. These limits approximate the 95% probability limits for the "true" reference toxicant value.

Chronic Value (ChrV): The geometric mean of the NOEC and LOEC. Units are same as test concentration units.

C.L. (Confidence Limits): These are the probability limits, based on the data set and statistical model employed, that the "true value" lies within the limits specified. Typically limits are based on 95% or 99% probabilities.

Control chart: A cumulative summary chart of results from QC tests with reference toxicants. The results of a given reference toxicant test are compared to the control chart mean value and 95% Acceptance Limits (A.L.) (mean ± 2 standard deviations).

IC25: The concentration of sample or chemical, calculated from the data set using statistical models, causing a 25% reduction in test organism growth, reproduction, etc. The lower the IC25, the more toxic the chemical or sample. Units are same as test concentration units.

LC50: The concentration of sample or chemical, calculated from the data set using statistical models, causing a 50% reduction in test organism survival. The lower the LC50, the more toxic the chemical or sample. Units are same as test concentration units. Note: The LC50 value must always be associated with the duration of exposure. Thus 48-h LC50, 96-h LC50, etc. are calculated.

LOEC: Lowest-observable-effect-concentration. The lowest concentration of sample or chemical in a chronic test dilution series in which the test organisms exhibit a statistically significant reduction in any of the test end points (e.g. growth, survival, reproduction) compared to control organisms. Units are same as test concentration units.

PMSD: Percent Minimum Significant Difference: The minimum difference which can exist between a test treatment and the controls in a particular test and be statistically significant; a measure of test sensitivity. The lower the PMSD the more sensitive the test.

N/A: Not applicable.

N/D: Not determined or measured.

NOAEC: No-observable-acute-effect-concentration. The highest concentration of sample or chemical in an acute test dilution series in which the test organisms exhibit no statistically significant reduction in the test end point (e.g. survival) compared to control organisms. Units are same as test concentration units.

NOEC: No-observable-effect-concentration. The highest concentration of sample or chemical in a chronic test dilution series in which the test organisms exhibit no statistically significant reduction in any of the test end points (e.g. growth, survival, reproduction) compared to control organisms. Some regulatory definitions also require that the NOEC be less than the LOEC. Units are same as test concentration units.

Q.L.: Quantitation Limit. Level, concentration, or quantity of a target variable (analyte) that can be reported at a specified degree of confidence.

T.U.: Toxic units. Expresses the relative toxicity of an effluent in such a manner that the larger the toxic unit value the more toxic the effluent. $T.U._{Ac}$ = 100/LC50. $T.U._{Chr}$ = 100/NOEC or 100/IC25. A dimensionless unit.

VELAP# 460030
EPA# VA01116

PUBLIC NOTICE BILLING INFORMATION

I hereby authorize the Department of Environmental Quality to have the cost of publishing a public notice billed to the Agent/Department shown below. The public notice will be published once a week for two consecutive weeks in Gloucester-Mathews Gazette-Journal in accordance with 9 VAC 25-32-140.A.

Agent/Department to be billed:	Virginia Institute of Marine Science, College of William & Mary
Owner:	Dr. John Wells, Dean & Director, VIMS/SMS
Agent/Department Address:	PO Box 1346
	Gloucester Point, VA 23062
Agent's Telephone No.:	804-684-7850
Printed Name:	Carol Birch
Authorizing Agent – Signature:	Carol Birch
Date:	2/10/16

VPA Permit No. VPA0075128
Virginia Institute of Marine Science, College of William & Mary