GREIF

P.O. Box 339
Amherst, VA 24521
434-933-4117

Express Service
861 Fibre Plant Road
Riverville, VA 24553
Fax: 434-933-4148
www.greif.com

RECEIVED
DEC 08 2011
DEQ – BRRO

December 8, 2011

Federal Express

Mr. Robert J. Weld
Regional Director
Department of Environmental Quality
7705 Timberlake Rd
Lynchburg, VA 24502

RE: VPDES Permit Application for Greif Packaging LLC – VA0006408

Dear Mr. Weld:

Please find enclosed two copies of the application to renew the VPDES permit for the Greif Packaging facility located in Amherst Co. This complete application includes the public notice authorization, EPA forms 1, 2C and 2F along with the DEQ application addendum form. All pertinent analytical reports, site maps, process descriptions and flow diagrams are included as well.

If you have any questions or requests please feel free to contact me.

Sincerely,

John J. Petchul

John J. Petchul, P.E.
Staff Environmental Engineer

CC: M. V. Heishman, P.E.
D. B. Painter

✓ pl

GREIF

Packaging LLC

VPDES Permit Renewal

December 8, 2011

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.)

RECEIVED DEC 08 2011 DEQ - BRRO

I. EPA I.D. NUMBER

S		T/A	C
F	VA0006408		D
13		14	15

LABEL ITEMS

- I. EPA I.D. NUMBER
- III. FACILITY NAME
- V. FACILITY MAILING ADDRESS
- VI. FACILITY LOCATION

PLEASE PLACE LABEL IN THIS SPACE

GENERAL INSTRUCTIONS

If a preprinted label has been provided, affix 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	
	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: Greif Packaging LLC

IV. FACILITY CONTACT

A. NAME & TITLE *(last, first, & title)*: C 2 Petchul, John, Staff Environmental Engineer

B. PHONE *(area code & no.)*: (434) 933-4117

V. FACILITY MAILING ADDRESS

A. STREET OR P.O. BOX: C 3 P. O. Box 339

B. CITY OR TOWN: C 4 Amherst

C. STATE: VA

D. ZIP CODE: 24521

VI. FACILITY LOCATION

A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER: C 5 861 Fibre Plant Road

B. COUNTY NAME: Amherst

C. CITY OR TOWN: C 6 Riverville

D. STATE: VA

E. ZIP CODE: 24553

F. COUNTY CODE *(if known)*:

CONTINUED FROM THE FRONT

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

A. FIRST	B. SECOND
C 7 2631 *(specify)* Paperboard Manufacturing	C 7 *(specify)*
C. THIRD	**D. FOURTH**
C 7 *(specify)*	C 7 *(specify)*

VIII. OPERATOR INFORMATION

A. NAME: C 8 Greif Packaging LLC

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)*

P *(specify)*

D. PHONE *(area code & no.)*: C A (434) 933-4100

E. STREET OR P.O. BOX: P. O. Box 339

F. CITY OR TOWN: C B Amherst

G. STATE: VA

H. ZIP CODE: 24521

IX. INDIAN LAND

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

X. EXISTING ENVIRONMENTAL PERMITS

A. NPDES *(Discharges to Surface Water)*	C T I 9 N VA0006408	D. PSD *(Air Emissions from Proposed Sources)*	C T I 9 P NA
B. UIC *(Underground Injection of Fluids)*	C T I 9 U NA	E. OTHER *(specify)*	C T I 9 30549 *(specify)* Air Operating
C. RCRA *(Hazardous Wastes)*	C T I 9 R VAD065392813	E. OTHER *(specify)*	C T I 9 536 *(specify)* Industrial Landfill

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)*

Manufacturer of semi-chemical corrugated medium and recycled linerboard.

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
David T. Scott Mill Manager		12-6-11

COMMENTS FOR OFFICIAL USE ONLY

C

Please print or type in the unshaded areas only.

EPA I.D. NUMBER (*copy from Item 1 of Form 1*)
VA0006408

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.	
001	37.00	30.00	47.00	78.00	54.00	5.00	James 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	
001	#1 Paper Machine	2.81	Primary Clarification	1U	
	#2 Paper Machine	0.64	Activated Sludge	3A	
	OCC Plant	0.85	Surface Discharge	4A	
	Pulp Mill/Chem. Rec	0.65	Belt Filter Press	5C	
			Screw Press		
	Power House	0.50	Composting	5G	
	Stormwater	0.06	Landfill	5Q	
	Landfill Leachate	0.02	Sludge Lagoons	5T	

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

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	

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*)	
845	tons/day	#1 Paper Machine	001
540	tons/day	#2 Paper Machine	001

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*)
VA0006408

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
Acetaldehyde	Wood Pulping Note: Acetaldehyde is present in the treatment plant influent, however it is readily biodegraded by the activated sludge process. Testing of secondary effluent over the past permit term has been below detection levels.		

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*)

 CONTINUE ON REVERSE

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*)

Acute 48 hour static tests and chronic static renewal tests are conducted on outfall 001 annually in accordance to the VPDES permit. No toxicity has been observed.

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*)
REI Consultants Inc.	225 Airport Industrial Park Road Beaver, WV 25813	304-255-2500	COD TOC Ammonia Nitrate/Nitrite TKN TP Sulfate Iron Manganese Metals, Cyanide, Phenols GC/MS-All Fractions

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.*)
David T. Scott, Mill Manager	(434) 933-4159
C. SIGNATURE	D. DATE SIGNED
D T Scott	12-6-11

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*): VA0006408

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

OUTFALL NO. 001

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) MASS	b. MAXIMUM 30 DAY VALUE (*if available*) (1) CONCENTRATION	(2) MASS	c. LONG TERM AVRG. VALUE (*if available*) (1) CONCENTRATION	(2) MASS	d. NO. OF ANALYSES	3. UNITS (*specify if blank*) a. CONCEN-TRATION	b. MASS	4. INTAKE (*optional*) a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	(2) MASS	b. NO. OF ANALYSES
a. Biochemical Oxygen Demand (*BOD*)	76	3507	54	2532	27	1268	52	PPM	lbs	NA	NA	NA
b. Chemical Oxygen Demand (*COD*)	232	11880	NA	NA	NA	NA	1	PPM	lbs	NA	NA	NA
c. Total Organic Carbon (*TOC*)	48	2473	NA	NA	NA	NA	1	PPM	lbs	NA	NA	NA
d. Total Suspended Solids (*TSS*)	144	6954	108	5122	58	2746	52	PPM	lbs	NA	NA	NA
e. Ammonia (*as N*)	0.2	10	NA	NA	NA	NA	1	PPM	lbs	NA	NA	NA
f. Flow	VALUE 7.45 MGD		VALUE 6.57 MGD		VALUE 5.83 MGD		365	NA	NA	VALUE NA		NA
g. Temperature (*winter*)	VALUE 22		VALUE 19		VALUE 17		90	°C		VALUE NA		NA
h. Temperature (*summer*)	VALUE 33		VALUE 31		VALUE 30		92	°C		VALUE NA		NA
i. pH	MINIMUM 6.8	MAXIMUM 8.5	MINIMUM 7.5	MAXIMUM 7.9			260	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	b. BELIEVED ABSENT	3. EFFLUENT a. MAXIMUM DAILY VALUE (1) CONCENTRATION	(2) MASS	b. MAXIMUM 30 DAY VALUE (*if available*) (1) CONCENTRATION	(2) MASS	c. LONG TERM AVRG. VALUE (*if available*) (1) CONCENTRATION	(2) MASS	d. NO. OF ANALYSES	4. UNITS a. CONCEN-TRATION	b. MASS	5. INTAKE (*optional*) a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	(2) MASS	b. NO. OF ANALYSES
a. Bromide (24959-67-9)		X												
b. Chlorine, Total Residual		X												
c. Color	X		2130	NA	1420	NA	997	NA	104	CU	NA			
d. Fecal Coliform		X												
e. Fluoride (16984-48-8)		X												
f. Nitrate-Nitrite (as *N*)	X		1.5	77	0.3	16	0.1	4	52	PPM	lb			

 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		0.3	15	NA	NA	NA	NA	1	PPM	lb			
h. Oil and Grease		X												
i. Phosphorus (as P), Total (7723-14-0)	X		3.3	189	2.4	132	0.5	26	52	PPM	lb			
j. Radioactivity														
(1) Alpha, Total		X												
(2) Beta, Total		X												
(3) Radium, Total		X												
(4) Radium 226, Total		X												
k. Sulfate (*as SO_4*) (14808-79-8)	X		142	7271	NA	NA	NA	NA	1	PPM	lb			
l. Sulfide (*as S*)		X												
m. Sulfite (*as SO_3*) (14265-45-3)		X												
n. Surfactants		X												
o. Aluminum, Total (7429-90-5)		X												
p. Barium, Total (7440-39-3)		X												
q. Boron, Total (7440-42-8)		X												
r. Cobalt, Total (7440-48-4)		X												
s. Iron, Total (7439-89-6)	X		ND	NA	NA	NA	NA	NA	1	PPM	lb			
t. Magnesium, Total (7439-95-4)	X		4.2	213	NA	NA	NA	NA	1	PPM	lb			
u. Molybdenum, Total (7439-98-7)		X												
v. Manganese, Total (7439-96-5)		X												
w. Tin, Total (7440-31-5)		X												
x. Titanium, Total (7440-32-6)		X												

 CONTINUE ON PAGE V-3

EPA I.D. NUMBER (*copy from Item 1 of Form 1*)	OUTFALL NUMBER
VA0006408	001

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			ND											
2M. Arsenic, Total (7440-38-2)	X			ND											
3M. Beryllium, Total (7440-41-7)	X			ND											
4M. Cadmium, Total (7440-43-9)	X			ND											
5M. Chromium, Total (7440-47-3)	X			ND											
6M. Copper, Total (7440-50-8)	X			ND											
7M. Lead, Total (7439-92-1)	X			ND											
8M. Mercury, Total (7439-97-6)	X			ND											
9M. Nickel, Total (7440-02-0)	X			ND											
10M. Selenium, Total (7782-49-2)	X			ND											
11M. Silver, Total (7440-22-4)	X			ND											
12M. Thallium, Total (7440-28-0)	X			ND											
13M. Zinc, Total (7440-66-6)	X			ND											
14M. Cyanide, Total (57-12-5)	X			ND											
15M. Phenols, Total	X			0.1	5	NA	NA	0.06	2.6	2	PPM	lb			
DIOXIN															
2,3,7,8-Tetra-chlorodibenzo-P-Dioxin (1764-01-6)			X	DESCRIBE RESULTS											

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			ND											
2V. Acrylonitrile (107-13-1)	X			ND											
3V. Benzene (71-43-2)	X			ND											
4V. Bis (*Chloro-methyl*) Ether (542-88-1)	X			Delisted											
5V. Bromoform (75-25-2)	X			ND											
6V. Carbon Tetrachloride (56-23-5)	X			ND											
7V. Chlorobenzene (108-90-7)	X			ND											
8V. Chlorodi-bromomethane (124-48-1)	X			ND											
9V. Chloroethane (75-00-3)	X			ND											
10V. 2-Chloro-ethylvinyl Ether (110-75-8)	X			ND											
11V. Chloroform (67-66-3)	X			ND											
12V. Dichloro-bromomethane (75-27-4)	X			ND											
13V. Dichloro-difluoromethane (75-71-8)	X			ND											
14V. 1,1-Dichloro-ethane (75-34-3)	X			ND											
15V. 1,2-Dichloro-ethane (107-06-2)	X			ND											
16V. 1,1-Dichloro-ethylene (75-35-4)	X			ND											
17V. 1,2-Dichloro-propane (78-87-5)	X			ND											
18V. 1,3-Dichloro-propylene (542-75-6)	X			ND											
19V. Ethylbenzene (100-41-4)	X			ND											
20V. Methyl Bromide (74-83-9)	X			ND											
21V. Methyl Chloride (74-87-3)	X			ND											

 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			ND											
23V. 1,1,2,2-Tetrachloroethane (79-34-5)	X			ND											
24V. Tetrachloro-ethylene (127-18-4)	X			ND											
25V. Toluene (108-88-3)	X			ND											
26V. 1,2-Trans-Dichloroethylene (156-60-5)	X			ND											
27V. 1,1,1-Trichloro-ethane (71-55-6)	X			ND											
28V. 1,1,2-Trichloro-ethane (79-00-5)	X			ND											
29V Trichloro-ethylene (79-01-6)	X			ND											
30V. Trichloro-fluoromethane (75-69-4)	X			ND											
31V. Vinyl Chloride (75-01-4)	X			ND											
GC/MS FRACTION – ACID COMPOUNDS															
1A. 2-Chlorophenol (95-57-8)	X			ND											
2A. 2,4-Dichloro-phenol (120-83-2)	X			ND											
3A. 2,4-Dimethyl-phenol (105-67-9)	X			ND											
4A. 4,6-Dinitro-O-Cresol (534-52-1)	X			ND											
5A. 2,4-Dinitro-phenol (51-28-5)	X			ND											
6A. 2-Nitrophenol (88-75-5)	X			ND											
7A. 4-Nitrophenol (100-02-7)	X			ND											
8A. P-Chloro-M-Cresol (59-50-7)	X			ND											
9A. Pentachloro-phenol (87-86-5)	X			ND											
10A. Phenol (108-95-2)	X			ND											
11A. 2,4,6-Trichloro-phenol (88-05-2)	X			ND											

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			ND											
2B. Acenaphtylene (208-96-8)	X			ND											
3B. Anthracene (120-12-7)	X			ND											
4B. Benzidine (92-87-5)	X			ND											
5B. Benzo (*a*) Anthracene (56-55-3)	X			ND											
6B. Benzo (*a*) Pyrene (50-32-8)	X			ND											
7B. 3,4-Benzo-fluoranthene (205-99-2)	X			ND											
8B. Benzo (*ghi*) Perylene (191-24-2)	X			ND											
9B. Benzo (*k*) Fluoranthene (207-08-9)	X			ND											
10B. Bis (*2-Chloro-ethoxy*) Methane (111-91-1)	X			ND											
11B. Bis (*2-Chloro-ethyl*) Ether (111-44-4)	X			ND											
12B. Bis (*2-Chloroisopropyl*) Ether (102-80-1)	X			ND											
13B. Bis (*2-Ethyl-hexyl*) Phthalate (117-81-7)	X			0.03	1	NA	NA	0.03	1	2	PPM	lb			
14B. 4-Bromophenyl Phenyl Ether (101-55-3)	X			ND											
15B. Butyl Benzyl Phthalate (85-68-7)	X			ND											
16B. 2-Chloro-naphthalene (91-58-7)	X			ND											
17B. 4-Chloro-phenyl Phenyl Ether (7005-72-3)	X			ND											
18B. Chrysene (218-01-9)	X			ND											
19B. Dibenzo (*a,h*) Anthracene (53-70-3)	X			ND											
20B. 1,2-Dichloro-benzene (95-50-1)	X			ND											
21B. 1,3-Di-chloro-benzene (541-73-1)	X			ND											

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			ND											
23B. 3,3-Dichloro-benzidine (91-94-1)	X			ND											
24B. Diethyl Phthalate (84-66-2)	X			ND											
25B. Dimethyl Phthalate (131 -11-3)	X			ND											
26B. Di-N-Butyl Phthalate (84-74-2)	X			ND											
27B. 2,4-Dinitro-toluene (121-14-2)	X			ND											
28B. 2,6-Dinitro-toluene (606-20-2)	X			ND											
29B. Di-N-Octyl Phthalate (117-84-0)	X			ND											
30B. 1,2-Diphenyl-hydrazine (*as Azo-benzene*) (122-66-7)	X			ND											
31B. Fluoranthene (206-44-0)	X			ND											
32B. Fluorene (86-73-7)	X			ND											
33B. Hexachloro-benzene (118-74-1)	X			ND											
34B. Hexachloro-butadiene (87-68-3)	X			ND											
35B. Hexachloro-cyclopentadiene (77-47-4)	X			ND											
36B Hexachloro-ethane (67-72-1)	X			ND											
37B. Indeno (*1,2,3-cd*) Pyrene (193-39-5)	X			ND											
38B. Isophorone (78-59-1)	X			ND											
39B. Naphthalene (91-20-3)	X			ND											
40B. Nitrobenzene (98-95-3)	X			ND											
41B. N-Nitro-sodimethylamine (62-75-9)	X			ND											
42B. N-Nitrosodi-N-Propylamine (621-64-7)	X			ND											

 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			ND											
44B. Phenanthrene (85-01-8)	X			ND											
45B. Pyrene (129-00-0)	X			ND											
46B. 1,2,4-Tri-chlorobenzene (120-82-1)	X			ND											
GC/MS FRACTION – PESTICIDES															
1P. Aldrin (309-00-2)	X			ND											
2P. α-BHC (319-84-6)	X			ND											
3P. β-BHC (319-85-7)	X			ND											
4P. γ-BHC (58-89-9)	X			ND											
5P. δ-BHC (319-86-8)	X			ND											
6P. Chlordane (57-74-9)	X			ND											
7P. 4,4'-DDT (50-29-3)	X			ND											
8P. 4,4'-DDE (72-55-9)	X			ND											
9P. 4,4'-DDD (72-54-8)	X			ND											
10P. Dieldrin (60-57-1)	X			ND											
11P. α-Enosulfan (115-29-7)	X			ND											
12P. β-Endosulfan (115-29-7)	X			ND											
13P. Endosulfan Sulfate (1031-07-8)	X			ND											
14P. Endrin (72-20-8)	X			ND											
15P. Endrin Aldehyde (7421-93-4)	X			ND											
16P. Heptachlor (76-44-8)	X			ND											

 CONTINUE ON PAGE V-9

EPA I.D. NUMBER (*copy from Item 1 of Form 1*)	OUTFALL NUMBER
VA0006408	001

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			ND											
18P. PCB-1242 (53469-21-9)	X			ND											
19P. PCB-1254 (11097-69-1)	X			ND											
20P. PCB-1221 (11104-28-2)	X			ND											
21P. PCB-1232 (11141-16-5)	X			ND											
22P. PCB-1248 (12672-29-6)	X			ND											
23P. PCB-1260 (11096-82-5)	X			ND											
24P. PCB-1016 (12674-11-2)	X			ND											
25P. Toxaphene (8001-35-2)	X			ND											

Please print or type in the unshaded areas only.

EPA ID Number (*copy from Item 1 of Form 1*)
VA0006408

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

FORM 2F NPDES

EPA

U.S. Environmental Protection Agency
Washington, DC 20460

Application for Permit to Discharge Storm Water Discharges Associated with Industrial Activity

Paperwork Reduction Act Notice

Public reporting burden for this application is estimated to average 28.6 hours per application, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate, any other aspect of this collection of information, or suggestions for improving this form, including suggestions which may increase or reduce this burden to: Chief, Information Policy Branch, PM-223, U.S. Environmental Protection Agency, 1200 Pennsylvania Avenue, NW, Washington, DC 20460, or Director, Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503.

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*)
002	N	37°	30'15"	E	78°	55'30"	James River UT
003	N	37°	30'15"	E	78°	54'45"	James River
004	N	37°	30'45"	E	78°	54'15"	James River
005	N	37°	30'45"	E	78°	54'00"	James River

II. Improvements

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

1. Identification of Conditions, Agreements, Etc.	2. Affected Outfalls		3. Brief Description of Project	4. Final Compliance Date	
	number	source of discharge		a. req.	b. proj.
NA					

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

III. Site Drainage Map

Attach a site map showing topography (or indicating the outline of drainage areas served by the outfalls(s) covered in the application if a topographic map is unavailable) depicting the facility including: each of its intake and discharge structures; the drainage area of each storm water outfall; paved areas and buildings within the drainage area of each storm water outfall, each known past or present areas used for outdoor storage of disposal of significant materials, each existing structural control measure to reduce pollutants in storm water runoff, materials loading and access areas, areas where pesticides, herbicides, soil conditioners and fertilizers are applied; each of its hazardous waste treatment, storage or disposal units (including each area not required to have a RCRA permit which is used for accumulating hazardous waste under 40 CFR 262.34); each well where fluids from the facility are injected underground; springs, and other surface water bodies which received storm water discharges from the facility.

 Continue on Page 2

Continued from the Front

IV. Narrative Description of Pollutant Sources

A. For each outfall, provide an estimate of the area (include units) of imperious surfaces (including paved areas and building roofs) drained to the outfall, and an estimate of the total surface area drained by the outfall.

Outfall Number	Area of Impervious Surface *(provide units)*	Total Area Drained *(provide units)*	Outfall Number	Area of Impervious Surface *(provide units)*	Total Area Drained *(provide units)*
	See Attached				

B. Provide a narrative description of significant materials that are currently or in the past three years have been treated, stored or disposed in a manner to allow exposure to storm water; method of treatment, storage, or disposal; past and present materials management practices employed to minimize contact by these materials with storm water runoff; materials loading and access areas, and the location, manner, and frequency in which pesticides, herbicides, soil conditioners, and fertilizers are applied.

See Attached

C. For each outfall, provide the location and a description of existing structural and nonstructural control measures to reduce pollutants in storm water runoff; and a description of the treatment the storm water receives, including the schedule and type of maintenance for control and treatment measures and the ultimate disposal of any solid or fluid wastes other than by discharge.

Outfall Number	Treatment	List Codes from Table 2F-1
	See Attached	

V. Nonstormwater Discharges

A. I certify under penalty of law hat the outfall(s) covered by this application have been tested or evaluated for the presence of nonstormwater discharges, and that all nonstormwater discharged from these outfall(s) are identified in either an accompanying Form 2C or From 2E application for the outfall.

Name and Official Title *(type or print)*	Signature	Date Signed
David T. Scott, Mill Manager	D T Scott	12-6-11

B. Provide a description of the method used, the date of any testing, and the onsite drainage points that were directly observed during a test.

See Attached Report

VI. Significant Leaks or Spills

Provide existing information regarding the history of significant leaks or spills of toxic or hazardous pollutants at the facility in the last three years, including the approximate date and location of the spill or leak, and the type and amount of material released.

None

 Continue on Page 3

Continued from Page 2

EPA ID Number *(copy from Item 1 of Form 1)*
VA0006408

VII. Discharge Information

A, B, C, & D: See instructions before proceeding. Complete one set of tables for each outfall. Annotate the outfall number in the space provided. Table VII-A, VII-B, VII-C are included on separate sheets numbers VII-1 and VII-2.

E. Potential discharges not covered by analysis – is any toxic pollutant listed in table 2F-2, 2F-3, or 2F-4, 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 Section IX*)

Acetaldehyde

VIII. 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 (*list all such pollutants below*) ☑ No (*go to Section IX*)

IX. Contract Analysis Information

Were any of the analyses reported in Item VII 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 X*)

A. Name	B. Address	C. Area Code & Phone No.	D. Pollutants Analyzed
REI Consultants Inc.	225 Airport Industrial Park Road Beaver, WV 25813	304-255-2500	All pollutants reported in Section VII

X. 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. Area Code and Phone No.
David T. Scott, Mill Manager	(434) 933-4159
C. Signature	D. Date Signed
D T Scott	12-6-11

EPA ID Number (*copy from Item 1 of Form 1*)
VA0006408

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

VII. Discharge information *(Continued from page 3 of Form 2F)*

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.

Pollutant and CAS Number *(if available)*	Maximum Values *(include units)*		Average Values *(include units)*		Number of Storm Events Sampled	002 Sources of Pollutants
	Grab Sample Taken During First 20 Minutes	Flow-Weighted Composite	Grab Sample Taken During First 20 Minutes	Flow-Weighted Composite		
Oil and Grease	< 5.0 ppm	N/A	< 5.0 ppm	NA	2	NA
Biological Oxygen Demand (BOD5)	3.5 ppm	2.1 ppm	< 2.0 ppm	NA	3	NA
Chemical Oxygen Demand (COD)	56.5 ppm	51.4 ppm	36.6 ppm	NA	2	NA
Total Suspended Solids (TSS)	57.5 ppm	16.8 ppm	27.9 ppm	NA	3	NA
Total Nitrogen	0.9 ppm	1.1 ppm	0.6 ppm	NA	2	NA
Total Phosphorus	0.2 ppm	0.2 ppm	0.1 ppm	NA	2	NA
pH	Minimum 6.9	Maximum 8.0	Minimum NA	Maximum NA	3	NA

Part B – List each pollutant that is limited in an effluent guideline which the facility is subject to or any pollutant listed in the facility's NPDES permit for its process wastewater (if the facility is operating under an existing NPDES permit). Complete one table for each outfall. See the instructions for additional details and requirements.

Pollutant and CAS Number *(if available)*	Maximum Values *(include units)*		Average Values *(include units)*		Number of Storm Events Sampled	Sources of Pollutants
	Grab Sample Taken During First 20 Minutes	Flow-Weighted Composite	Grab Sample Taken During First 20 Minutes	Flow-Weighted Composite		
Color	106cu	77cu	59cu	NA	2	NA

Continued from the Front

Part C - List each pollutant shown in Table 2F-2, 2F-3, and 2F-4 that you know or have reason to believe is present. See the instructions for additional details and requirements. Complete one table for each outfall.

Pollutant and CAS Number (if available)	Maximum Values (include units)		Average Values (include units)		Number of Storm Events Sampled	002 Sources of Pollutants
	Grab Sample Taken During First 20 Minutes	Flow-Weighted Composite	Grab Sample Taken During First 20 Minutes	Flow-Weighted Composite		
Ammonia	0.2 ppm	0.2 ppm	0.1 ppm	NA	2	NA
Nitrite &	0.4 ppm	<0.1 ppm	0.2 ppm	NA	2	NA
Nitrate						
TKN	1.1 ppm	1.3 ppm	0.7 ppm	NA	2	NA
Iron	6.3 ppm	3.3 ppm	2.7 ppm	NA	3	NA

Part D – Provide data for the storm event(s) which resulted in the maximum values for the flow weighted composite sample.

1. Date of Storm Event	2. Duration of Storm Event (in minutes)	3. Total rainfall during storm event (in inches)	4. Number of hours between beginning of storm measured and end of previous measurable rain event	5. Maximum flow rate during rain event (gallons/minute or specify units)	6. Total flow from rain event (gallons or specify units)
10/18/11	1656	0.61	>72 hours	45.1 gpm	71,722 gallons

7. Provide a description of the method of flow measurement or estimate.

See Attached

EPA ID Number (*copy from Item 1 of Form 1*)
VA0006408

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

VII. Discharge information *(Continued from page 3 of Form 2F)*

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.

Pollutant and CAS Number *(if available)*	Maximum Values *(include units)*		Average Values *(include units)*		Number of Storm Events Sampled	003 Sources of Pollutants
	Grab Sample Taken During First 20 Minutes	Flow-Weighted Composite	Grab Sample Taken During First 20 Minutes	Flow-Weighted Composite		
Oil and Grease	< 5 ppm	N/A	< 5 ppm	NA	2	NA
Biological Oxygen Demand (BOD5)	< 2 ppm	< 2 ppm	< 2 ppm	NA	3	NA
Chemical Oxygen Demand (COD)	< 10 ppm	12 ppm	< 10 ppm	NA	2	NA
Total Suspended Solids (TSS)	27 ppm	2 ppm	21 ppm	NA	2	NA
Total Nitrogen	0.3 ppm	0.3 ppm	0.2 ppm	NA	2	NA
Total Phosphorus	0.1 ppm	0.1 ppm	0.1 ppm	NA	2	NA
pH	Minimum 7.0	Maximum 7.9	Minimum NA	Maximum NA	3	NA

Part B – List each pollutant that is limited in an effluent guideline which the facility is subject to or any pollutant listed in the facility's NPDES permit for its process wastewater (if the facility is operating under an existing NPDES permit). Complete one table for each outfall. See the instructions for additional details and requirements.

Pollutant and CAS Number *(if available)*	Maximum Values *(include units)*		Average Values *(include units)*		Number of Storm Events Sampled	Sources of Pollutants
	Grab Sample Taken During First 20 Minutes	Flow-Weighted Composite	Grab Sample Taken During First 20 Minutes	Flow-Weighted Composite		
Color	<25cu	<25cu	<25cu	NA	2	NA

Continued from the Front

Part C - List each pollutant shown in Table 2F-2, 2F-3, and 2F-4 that you know or have reason to believe is present. See the instructions for additional details and requirements. Complete one table for each outfall.

Pollutant and CAS Number (if available)	Maximum Values (include units)		Average Values (include units)		Number of Storm Events Sampled	003 Sources of Pollutants
	Grab Sample Taken During First 20 Minutes	Flow-Weighted Composite	Grab Sample Taken During First 20 Minutes	Flow-Weighted Composite		
Ammonia	0.1 ppm	<0.1 ppm	<0.1 ppm	NA	2	NA
Nitrite &	1.0 ppm	0.9 ppm	0.7 ppm	NA	2	NA
Nitrate						
TKN	0.3 ppm	0.3 ppm	0.3 ppm	NA	2	NA
Iron	0.8 ppm	0.2 ppm	0.6 ppm	NA	2	NA

Part D – Provide data for the storm event(s) which resulted in the maximum values for the flow weighted composite sample.

1. Date of Storm Event	2. Duration of Storm Event (in minutes)	3. Total rainfall during storm event (in inches)	4. Number of hours between beginning of storm measured and end of previous measurable rain event	5. Maximum flow rate during rain event (gallons/minute or specify units)	6. Total flow from rain event (gallons or specify units)
10/18/11	1656	0.61	>72 hours	634.8 gpm	784,944 gallons

7. Provide a description of the method of flow measurement or estimate.

See Attached

EPA ID Number (*copy from Item 1 of Form 1*)
VA0006408

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

VII. Discharge information *(Continued from page 3 of Form 2F)*

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.

Pollutant and CAS Number *(if available)*	Maximum Values *(include units)*		Average Values *(include units)*		Number of Storm Events Sampled	004 Sources of Pollutants
	Grab Sample Taken During First 20 Minutes	Flow-Weighted Composite	Grab Sample Taken During First 20 Minutes	Flow-Weighted Composite		
Oil and Grease	< 5 ppm	N/A	NA	NA	1	NA
Biological Oxygen Demand (BOD5)	< 2 ppm	4 ppm	< 2 ppm	NA	2	NA
Chemical Oxygen Demand (COD)	16 ppm	396 ppm	NA	NA	1	NA
Total Suspended Solids (TSS)	8 ppm	483 ppm	NA	NA	1	NA
Total Nitrogen	<0.4 ppm	<6.1 ppm	NA	NA	1	NA
Total Phosphorus	0.1 ppm	1.0 ppm	NA	NA	1	NA
pH	Minimum 6.9	Maximum 7.4	Minimum NA	Maximum NA	2	NA

Part B – List each pollutant that is limited in an effluent guideline which the facility is subject to or any pollutant listed in the facility's NPDES permit for its process wastewater (if the facility is operating under an existing NPDES permit). Complete one table for each outfall. See the instructions for additional details and requirements.

Pollutant and CAS Number *(if available)*	Maximum Values *(include units)*		Average Values *(include units)*		Number of Storm Events Sampled	Sources of Pollutants
	Grab Sample Taken During First 20 Minutes	Flow-Weighted Composite	Grab Sample Taken During First 20 Minutes	Flow-Weighted Composite		
Color	<25cu	49cu	NA	NA	1	NA

Continued from the Front

Part C - List each pollutant shown in Table 2F-2, 2F-3, and 2F-4 that you know or have reason to believe is present. See the instructions for additional details and requirements. Complete one table for each outfall.

Pollutant and CAS Number (if available)	Maximum Values (include units)		Average Values (include units)		Number of Storm Events Sampled	004 Sources of Pollutants
	Grab Sample Taken During First 20 Minutes	Flow-Weighted Composite	Grab Sample Taken During First 20 Minutes	Flow-Weighted Composite		
Ammonia	<0.1 ppm	<0.1 ppm	NA	NA	1	NA
Nitrite &	0.2 ppm	0.6 ppm	NA	NA	1	NA
Nitrate						
TKN	0.4 ppm	6.1 ppm	NA	NA	1	NA
Iron	0.4 ppm	63.6 ppm	NA	NA	1	NA

Part D – Provide data for the storm event(s) which resulted in the maximum values for the flow weighted composite sample.

1. Date of Storm Event	2. Duration of Storm Event (in minutes)	3. Total rainfall during storm event (in inches)	4. Number of hours between beginning of storm measured and end of previous measurable rain event	5. Maximum flow rate during rain event (gallons/minute or specify units)	6. Total flow from rain event (gallons or specify units)
10/11/11	1740	3.05	>72 hours	6800.7 gpm	5,028,600 gallons

7. Provide a description of the method of flow measurement or estimate.

See Attached

EPA ID Number (*copy from Item 1 of Form 1*)
VA0006408

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

VII. Discharge information *(Continued from page 3 of Form 2F)*

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.

Pollutant and CAS Number (*if available*)	Maximum Values (*include units*)		Average Values (*include units*)		Number of Storm Events Sampled	005 Sources of Pollutants
	Grab Sample Taken During First 20 Minutes	Flow-Weighted Composite	Grab Sample Taken During First 20 Minutes	Flow-Weighted Composite		
Oil and Grease	< 5 ppm	N/A	< 5 ppm	NA	2	NA
Biological Oxygen Demand (BOD5)	4 ppm	<2 ppm	2 ppm	NA	3	NA
Chemical Oxygen Demand (COD)	23 ppm	30 ppm	22 ppm	NA	2	NA
Total Suspended Solids (TSS)	20 ppm	5 ppm	10 ppm	NA	3	NA
Total Nitrogen	1.0 ppm	0.8 ppm	0.8 ppm	NA	2	NA
Total Phosphorus	0.1 ppm	0.1 ppm	0.1 ppm	NA	2	NA
pH	Minimum 7.3	Maximum 7.7	Minimum NA	Maximum NA	3	NA

Part B – List each pollutant that is limited in an effluent guideline which the facility is subject to or any pollutant listed in the facility's NPDES permit for its process wastewater (if the facility is operating under an existing NPDES permit). Complete one table for each outfall. See the instructions for additional details and requirements.

Pollutant and CAS Number (*if available*)	Maximum Values (*include units*)		Average Values (*include units*)		Number of Storm Events Sampled	Sources of Pollutants
	Grab Sample Taken During First 20 Minutes	Flow-Weighted Composite	Grab Sample Taken During First 20 Minutes	Flow-Weighted Composite		
Color	54cu	64cu	41cu	NA	2	NA

Continued from the Front

Part C - List each pollutant shown in Table 2F-2, 2F-3, and 2F-4 that you know or have reason to believe is present. See the instructions for additional details and requirements. Complete one table for each outfall.

Pollutant and CAS Number *(if available)*	Maximum Values *(include units)*		Average Values *(include units)*		Number of Storm Events Sampled	005 Sources of Pollutants
	Grab Sample Taken During First 20 Minutes	Flow-Weighted Composite	Grab Sample Taken During First 20 Minutes	Flow-Weighted Composite		
Ammonia	<0.1 ppm	<0.1 ppm	<0.1 ppm	NA	2	NA
Nitrite &	3.3 ppm	2.2 ppm	3.0 ppm	NA	2	NA
Nitrate						
TKN	1.0 ppm	0.8 ppm	0.8 ppm	NA	2	NA
Iron	1.1 ppm	0.7 ppm	0.7 ppm	NA	3	NA

Part D – Provide data for the storm event(s) which resulted in the maximum values for the flow weighted composite sample.

1. Date of Storm Event	2. Duration of Storm Event *(in minutes)*	3. Total rainfall during storm event *(in inches)*	4. Number of hours between beginning of storm measured and end of previous measurable rain event	5. Maximum flow rate during rain event *(gallons/minute or specify units)*	6. Total flow from rain event *(gallons or specify units)*
10/18/11	1656	0.61	>72 hours	388.7 gpm	582,912 gallons

7. Provide a description of the method of flow measurement or estimate.

See Attached

Supplement to Form 2F
(pages VII-1 & VII-2)

	002	003	004	005
	lbs	lbs	lbs	lbs
BOD	1	<10	167	<5
COD	31	78	16,513	145
TSS	10	13	20,141	24
TN	1	2	<127	4
TP	<1	<1	42	<1
NH3	<1	<1	<2	<1
NO2/NO3	<1	6	25	11
TKN	<1	2	254	4
Fe	2	1	2,652	3

VPDES PERMIT APPLICATION ADDENDUM – SUPPLEMENTARY INFORMATION

A. General Information

1. Entity to whom the permit is to be issued: Greif Packaging LLC
   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. Classify the discharge as one of the following by checking the appropriate line:

   X a. Existing discharge
   _____ b. Proposed discharge
   _____ c. Proposed expansion of an existing discharge

B. Location

1. Is this facility located within city or town boundaries? Y / (N)

2. What is the tax map parcel number for the land where this facility is located? 130A15

3. 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? 0

4. What is the total acreage of the property on which the treatment plant is located? 40

5. Give the minimum elevation of the treatment plant site. 465 feet

6. Flood elevations of the treatment plant site:

   25 year flood 430 feet
   100 year flood 444 feet

7. Attach to the back of this application a location map(s) which may be traced from or is/are a production of a U.S. Geological Survey topographic quadrangle(s) or other appropriately scaled contour map(s). The location map(s) shall show the following:

   a. Treatment Plant
   b. Discharge Point
   c. Receiving waters
   d. Boundaries of the property on which the treatment plant is located, or to be located.
   e. Distance from the treatment plant to the nearest: (Indicate "not applicable" for any distance greater than 2000 feet)
      i. Residence NA
      ii. Distribution line for potable water supply NA
      iii. Reservoir, well, or other source of water supply 680 Feet
      iv. Recreational area NA

f. Distance from the discharge point to the nearest: (Indicate "not applicable" for any distance greater than 15 miles)
   i. Downstream community Riverville (1mile)
   ii. Upstream and downstream water intake points No Potable Water Intakes
   iii. Shellfishing waters NA
   iv. Wetlands area NA
   v. Downstream impoundment NA
   vi. Downstream recreational area Bent Creek (6 Miles)

C. Discharge Description

1. Provide a brief description of the wastewater treatment scheme. Also, to the back of this application, attach a process flow diagram showing each process unit of the treatment plant, including all bypass piping and all backup power sources or redundancy in the system.

   See Attached

2. What is the design average flow of this facility? 6.5 MGD
   Industrial facilities:
   What is the max. 300-day avg. production levels (include units)? 1385 tons/day

3. In addition to the above design flow or production level, should the permit be written with limits for any other discharge flow tiers or production levels? Y (N)

   If "Yes," please specify the other flow ties (in MGD) or production levels: _____
   Please consider: Is you facility's design flow considerably greater than your current flow? Do you plan to expand operations during the next five years?

4. Nature of operations generating wastewater: Paper Manufacturing

   0 % of flow from domestic connections/sources

   Number of private residences to be served by the wastewater treatment facilities: NA
   _____ 0 _____ 1-49 _____ 50 or more

   100 % of flow from non-domestic connections/sources

5. Mode of discharge: X Continuous _____ Intermittent _____ Seasonal
   Describe frequency and duration of intermittent or seasonal discharges:
   NA

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

X Permanent stream, never dry
_____ Intermittent stream, usually flowing, sometimes dry
_____ Ephemeral stream, wet-weather flow, often dry
_____ Effluent-dependent stream, usually or always dry
_____ Lake or pond at or below the discharge point
_____ Other: _____

D. Anticipated Phasing Schedule for Plant Capacity – Proposed/Expanding Discharges NA

If this application is for a proposed or expanded discharge(s), complete the phasing schedule below beginning with the year in which construction completion is anticipated and progressing in increments of 5 years for 30 years thereafter.

Proposed Design Capacity: _____ MGD

Anticipated Date of Construction Completion: _____ Month/Year

Years after Completion	Projected Flow (MGD)
0	
5	
10	
15	
20	
25	
30	

E. Interim Facilities NA

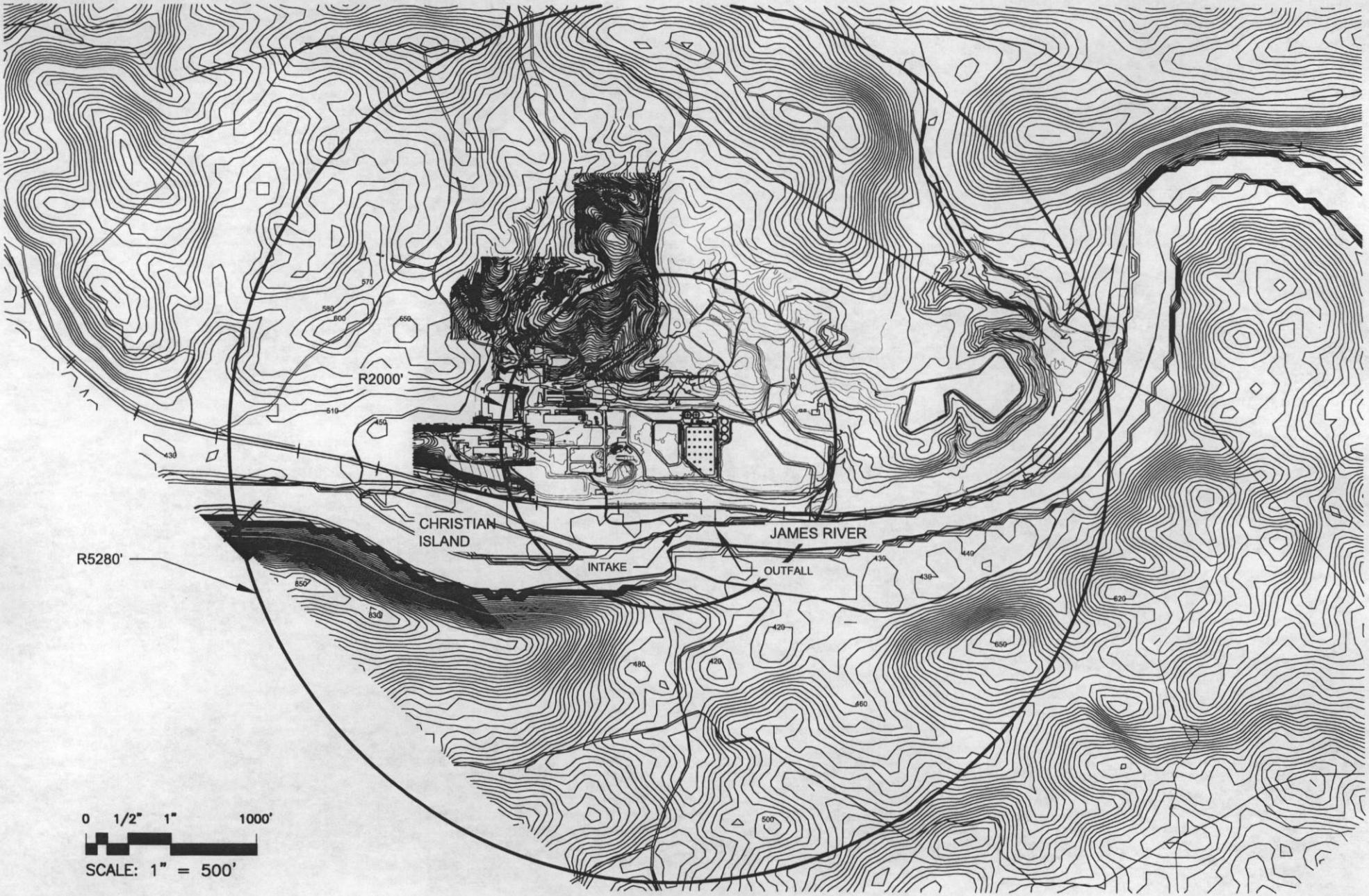
Are the wastewater treatment facilities interim? (Designed for a useful life of less than 5 years) Y / N

If "Yes," provide the estimated date to be discontinued (month,year) _____, and the name and location of the intended replacement facility.

_____

F. List of Materials Stored at Facility (i.e, chemicals, petroleum products)

Material	Amount (monthly avg)	Stored Location
See Attached		


R2000'
R5280'
CHRISTIAN ISLAND
JAMES RIVER
INTAKE
OUTFALL
0 1/2" 1" 1000'
SCALE: 1" = 500'

Notification of Un-scanned Pages

The purpose of this form is to notify the reader that portions of this document could not be scanned or stored with the document within DEQ's electronic filing system. The information below provides details for what portion of this document is stored separately and where it is stored.

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Select Type/Format**		Description
☐	Blueprints	
☐	Color Pages	
☐	Diagrams	
☒	Maps	Stormwater Conveyance Structures/Storm Water Outfalls Site Plan
☐	Pictures/Photos	
☐	Plans (rolled)	
☐	Plans (flat)	
☐	Slides	
☐	Other	

****It is important to note that all documents and portions of those documents that can be scanned or submitted to FileNet should be. The list is not intended to indicate that certain types/formats should not be scanned. It is merely provided for the convenience of DEQ staff when processing documents.**

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	☒ BRRO-L	☐ NRO	☐ SWRO	☐ VRO
	☐ BRRO-R	☐ PRO	☐ TRO	☐ Central

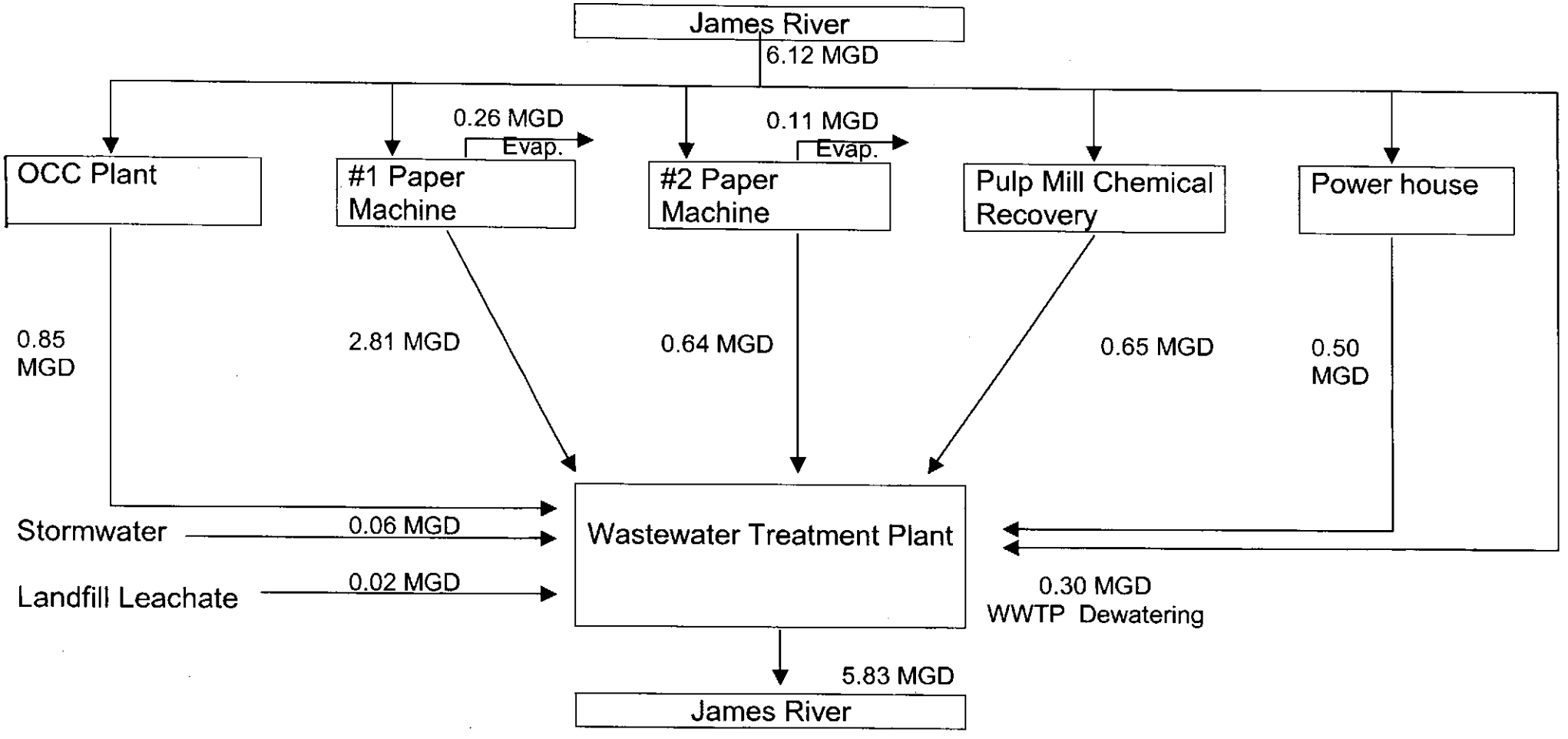
Indicate specific physical location of the un-scanned portion(s) of this document:	Stored Location – Water File Cabinet

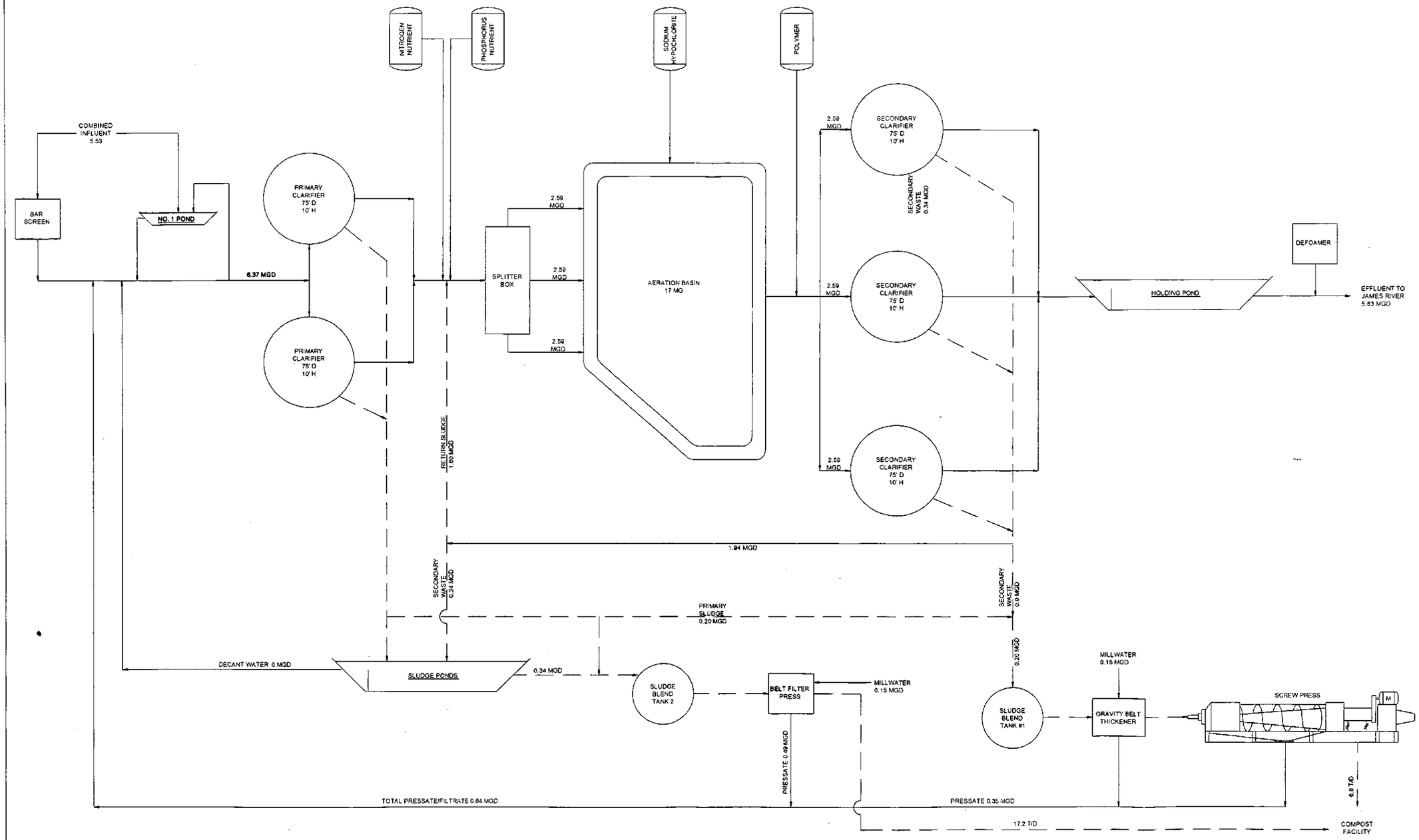
Description of Process

The Riverville Mill in Amherst County, Virginia, manufactures unbleached semi-chemical corrugating medium and recycled liner board. Paper machine no. 1 uses 70% hardwood fiber derived from the semi-chemical pulping process and 30% recycled fiber. Paper machine no. 2 uses 100 percent recycled fiber.

For the semi-chemical process, long and short wood (logs) are mechanically debarked and chipped. Chips are heated with cooking liquor containing sodium carbonate and sodium hydroxide to produce wood pulp. The pulp is refined, separated, agitated and then washed in a three-stage countercurrent washer. Recovered liquor is concentrated by a five-effect evaporation system to form heavy black liquor. This heavy black liquor is burned in a recovery boiler to recover molten sodium carbonate.

Wastewater Source Diagram





NOTE:

1) ALL VALUES ARE AVERAGE

LEGEND:

SLUDGE FLOW

LIQUID FLOW

NO.	DATE	BY	REVISION	APP'D
5	10/31/11	PSD	UPDATED FLOW RATES	JJP
4	09/18/06	TBD	PROPOSED PUMP STATION	JJP
3	09/20/05	KRM	GENERAL REVISION	JJP
2	6/15/00	KRW	DELETED REV. 1 ADDED BELT PRESS	JJP
1	11/30/99	TBD	ADD PROPOSED BELT PRESS	MVH
0	01/15/98	TAG	AS REQUESTED	JJP

03/15/2000

STD. NO.	STANDARD TITLE	DWG. NO.	REFERENCE DRAWING

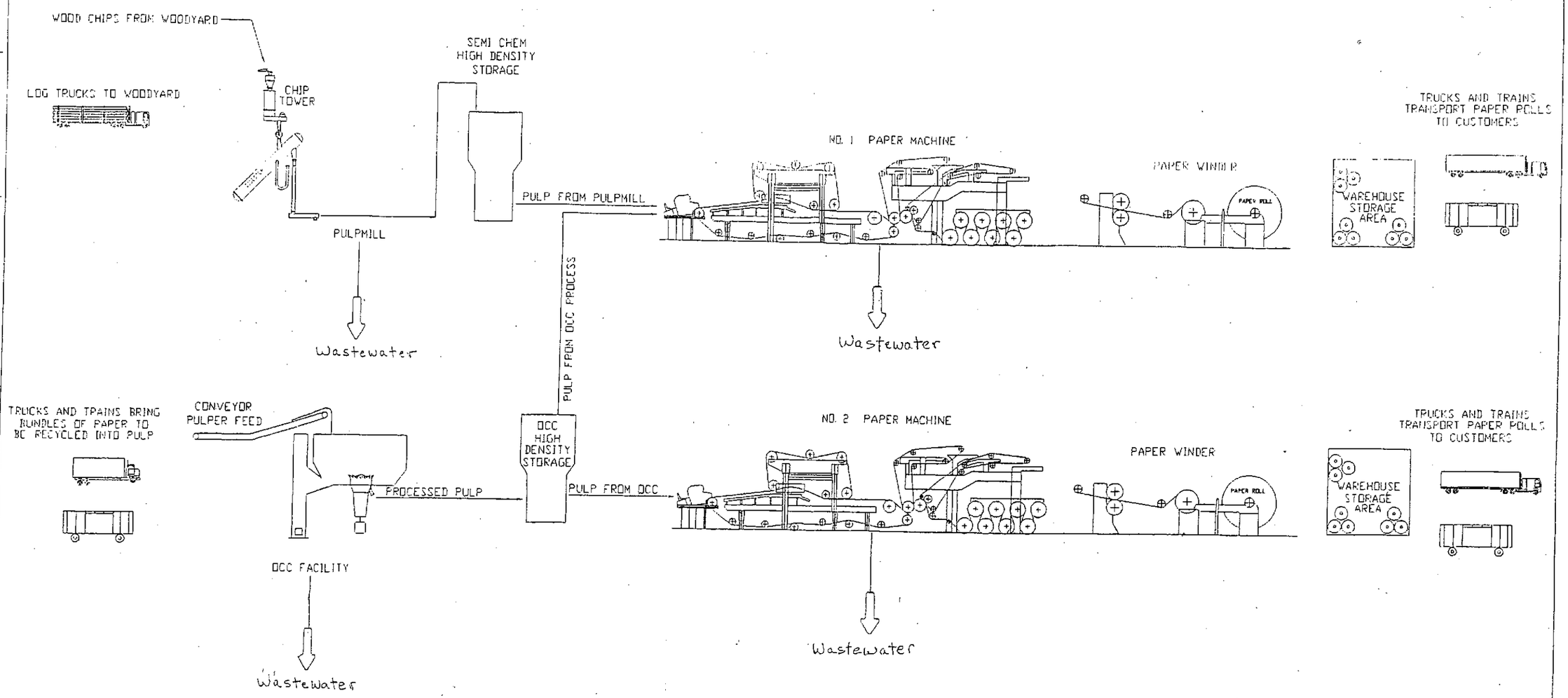
GREIF BROS. CORPORATION

RIVERVILLE VA.

TITLE: WASTEWATER TREATMENT PLANT FLOW SCHEMATIC

SHEET	CREATED BY	CHECKED BY	DRAWING NUMBER	REVISION
1 OF 1	TAG	NONE	29-PF004	5
	ENGINEER JJP	SCALE NONE		
	LAST EDIT BY TBD	DATE OF LAST EDIT 09/18/06	CURRENT PROJECT NUMBER 29-0068	DATE OF ISSUE 2/23/98

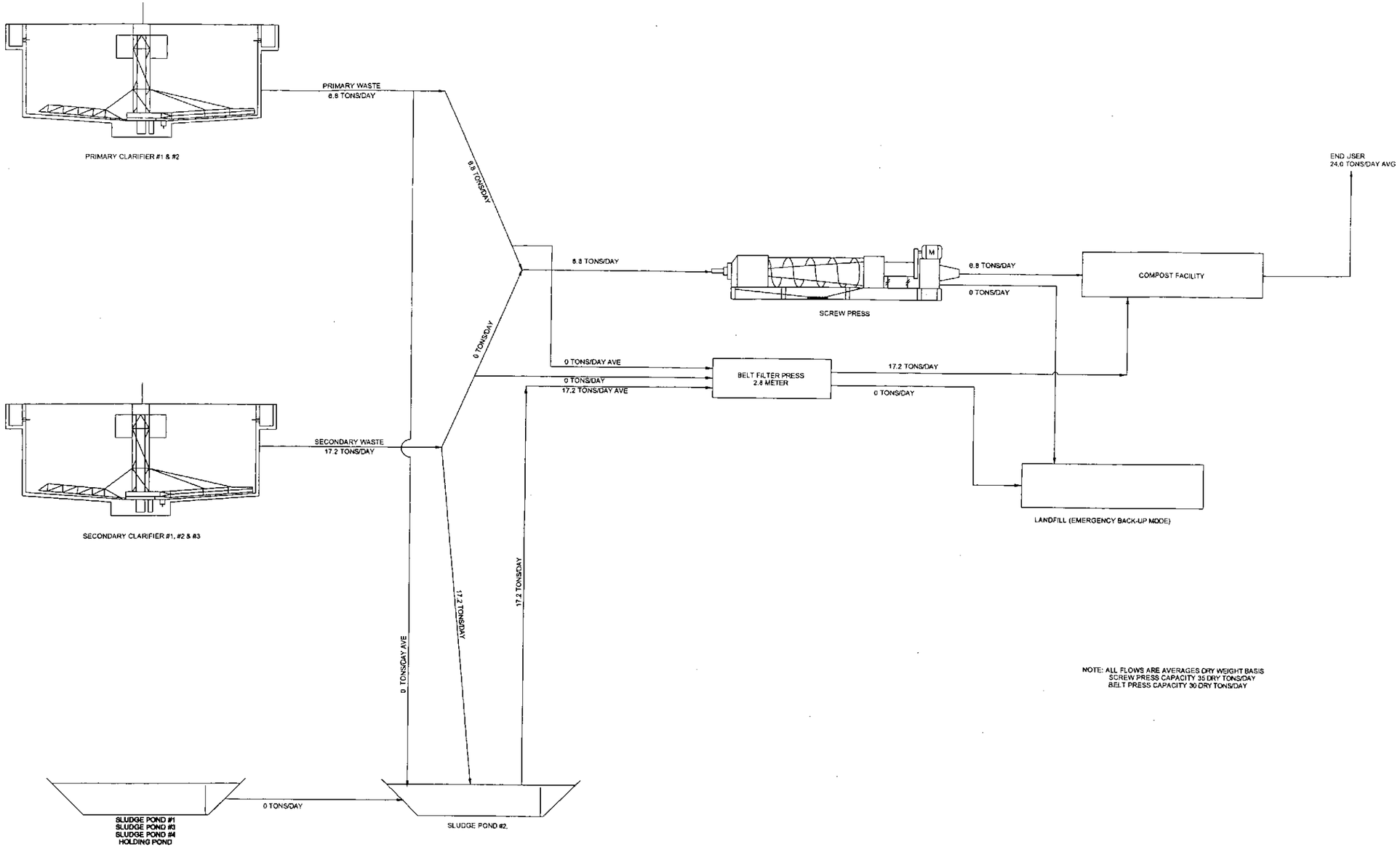
C-1.b.



GREIF BROS. CORPORATION
Virginia Fibre Mill

VIRGINIA FIBRE MILL
OVERVIEW FLOW DIAGRAM

CREATED BY: TAC
CHECKED BY: TBD
DRAWING NUMBER: 10-(D)F-000-F
REVISION: 0



NOTE: ALL FLOWS ARE AVERAGES DRY WEIGHT BASIS
SCREW PRESS CAPACITY 35 DRY TONS/DAY
BELT PRESS CAPACITY 30 DRY TONS/DAY

NOTE:

1) ALL VALUES ARE AVERAGE

6	11/01/11	PSD	UPDATED FLOW RATES	JJP
5	03/18/06	TBD	GENERAL REVISION AND UPDATE	JJP
4	02/28/05	KRM	UPDATED FLOW RATES	JJP
3	07/05/01	KRM	MADE BELT FILTER PRESS PERMANENT	JJP
2	06/02/01	TBD	MODIFIED PROPOSED BELT PRESS & UPDATED SLUDGE GENERATION RATES	JJP
1	11/03/98	TBD	ADD PROPOSED BELT PRESS	MVH

GREIF BROS. CORPORATION

TITLE: SLUDGE FLOW DIAGRAM

SHEET	CREATED BY	CHECKED BY	DRAWING NUMBER	REVISION
1 OF 1	TAG	NONE	29-P1001	6
	ENGINEER JJP	SCALE NONE		

REIC

Improving the environment, one client at a time...

225 Industrial Park Drive
Beaver, WV 25813
TEL: 304.255.2500
FAX: 304.255.2572

3029-C Peters Creek Road
Roanoke, VA 24019
TEL: 540.777.1276
FAX: 540.400.8508

101 17th Street
Ashland, KY 41101
TEL: 606.393.5027

1557 Commerce Road, Suite 201
Verona, VA 24482
TEL: 540.248.0183

November 09, 2011

Mr. Darrell Painter
GREIF LLC
P O BOX 339
AMHERST VA 24521

TEL: (434) 933-4116
FAX (434) 933-4129

RE: FORM 2C

Order No.: 1110N41

Dear Mr. Darrell Painter:

REI Consultants, Inc. received 3 sample(s) on 10/26/2011 for the analyses presented in the following report.

Please note two changes you may see on your report.

- Results for "Dissolved" parameters will be shown under a separate sample ID, rather than as a separate analysis under the same sample ID. The sample ID for "Dissolved" parameters will include "Field Filtered" or "Lab Filtered", as appropriate.
- Metals results will no longer be identified as "Total" or "Total Recoverable". The methods have not been changed, only their appearance on the report.

If you have any questions regarding these results, please do not hesitate to call.

Sincerely,

Scott Gross
Project Manager

ACCREDITED IN ACCORDANCE WITH nelac

REIC

Improving the environment, one client at a time...

225 Industrial Park Drive
Beaver, WV 25813
TEL: 304.255.2500
FAX: 304.255.2572

3029-C Peters Creek Road
Roanoke, VA 24019
TEL: 540.777.1276
FAX: 540.400.8508

101 17th Street
Ashland, KY 41101
TEL: 606.393.5027

1557 Commerce Road, Suite 201
Verona, VA 24482
TEL: 540.248.0183

Report Narrative

Project Manager:: **Scott Gross**

WO#: **1110N41**
Date: **11/9/2011**

CLIENT: GREIF LLC
Project: FORM 2C

All analyses were performed using documented laboratory SOPs that incorporate appropriate quality control procedures as described in the applicable methods. Any deviation from compliance or method modification is explained below and/or identified within the body of this report by a qualifier footnote which is defined at the bottom of each page.

All sample results are reported on an "as-received" wet weight basis unless otherwise noted.

Results reported for sums of individual parameters, such as Total Trihalomethanes (TTHM) and Total Haloacetic Acids (HAA5), may vary slightly from the sum of the individual parameter results. This apparent anomaly is caused by rounding individual results and summations at reporting, as required by EPA.

Following standard laboratory protocol, sample preservation, such as pH, is verified at time of extraction or analysis based on client requested parameters. Improper preservation is noted on the analytical bench sheet, extraction log, or preservation log and client is notified by close of following business day. All results are reported using preservation compliant samples unless otherwise noted in the analytical report.

The test results in this report meet all NELAP requirements for parameters for which accreditations are required or available. Any exceptions are noted in this report. This report may not be reproduced, except in full, without the written approval of REIC.

In compliance with federal guidelines and standard operating procedures, all reports, including raw data and supporting quality control, will be disposed of after five years unless otherwise arranged by the client via written notification or contract requirement.

If you have any questions please contact the project manager whose name is listed above.

REI Consultants, Inc. Analytical Results

Date: *09-Nov-11*

CLIENT:	GREIF LLC	**WorkOrder**	1110N41	**Lab ID**	1110N41-01A
Client Sample ID:	EFFLUENT 001	**DateReceived**	10/26/2011		
Project:	FORM 2C	**Collection Date:**	10/25/2011 12:30:00 AM		
Site ID:	AMHERST, VA	**Matrix:**	WASTE WATER		

Analyses	Result	Units	Qual	PQL	MCL	Prep Date	Date Analyzed
METALS BY ICP			**E200.7**			Analyst: **LF**	
Antimony	ND	mg/L		0.200	NA	10/27/11 8:36 AM	10/31/11 9:02 PM
Arsenic	ND	mg/L		0.200	NA	10/27/11 8:36 AM	10/31/11 9:02 PM
Beryllium	ND	mg/L		0.010	NA	10/27/11 8:36 AM	10/31/11 9:02 PM
Cadmium	ND	mg/L		0.020	NA	10/27/11 8:36 AM	10/31/11 9:02 PM
Chromium	ND	mg/L		0.100	NA	10/27/11 8:36 AM	10/31/11 9:02 PM
Copper	ND	mg/L		0.100	NA	10/27/11 8:36 AM	10/31/11 9:02 PM
Iron	ND	mg/L		0.100	NA	10/27/11 8:36 AM	10/31/11 9:02 PM
Lead	ND	mg/L		0.200	NA	10/27/11 8:36 AM	10/31/11 9:02 PM
Magnesium	4.15	mg/L		0.500	NA	10/27/11 8:36 AM	10/31/11 9:02 PM
Nickel	ND	mg/L		0.100	NA	10/27/11 8:36 AM	10/31/11 9:02 PM
Selenium	ND	mg/L		0.200	NA	10/27/11 8:36 AM	10/31/11 9:02 PM
Silver	ND	mg/L		0.050	NA	10/27/11 8:36 AM	11/01/11 1:08 PM
Thallium	ND	mg/L		0.200	NA	10/27/11 8:36 AM	10/31/11 9:02 PM
Zinc	ND	mg/L		0.050	NA	10/27/11 8:36 AM	10/31/11 9:02 PM
MERCURY, TOTAL			**E245.1**			Analyst: **DL**	
Mercury	ND	mg/L		0.0010	NA	10/28/11 4:47 PM	10/31/11 12:56 PM
PESTICIDES/PCBS			**E608**			Analyst: **NC**	
Aroclor 1016	ND	mg/L		0.000540	NA	10/29/11 8:16 AM	10/31/11 4:14 PM
Aroclor 1221	ND	mg/L		0.000540	NA	10/29/11 8:16 AM	10/31/11 4:14 PM
Aroclor 1232	ND	mg/L		0.000540	NA	10/29/11 8:16 AM	10/31/11 4:14 PM
Aroclor 1242	ND	mg/L		0.000540	NA	10/29/11 8:16 AM	10/31/11 4:14 PM
Aroclor 1248	ND	mg/L		0.000540	NA	10/29/11 8:16 AM	10/31/11 4:14 PM
Aroclor 1254	ND	mg/L		0.000540	NA	10/29/11 8:16 AM	10/31/11 4:14 PM
Aroclor 1260	ND	mg/L		0.000540	NA	10/29/11 8:16 AM	10/31/11 4:14 PM
Aldrin	ND	mg/L		0.000540	NA	10/29/11 8:16 AM	10/31/11 4:14 PM
beta-BHC	ND	mg/L		0.000540	NA	10/29/11 8:16 AM	10/31/11 4:14 PM
delta-BHC	ND	mg/L		0.000540	NA	10/29/11 8:16 AM	10/31/11 4:14 PM
gamma-BHC	ND	mg/L		0.000540	NA	10/29/11 8:16 AM	10/31/11 4:14 PM
Chlordane	ND	mg/L		0.00540	NA	10/29/11 8:16 AM	10/31/11 4:14 PM
4,4'-DDD	ND	mg/L		0.000540	NA	10/29/11 8:16 AM	10/31/11 4:14 PM
4,4'-DDE	ND	mg/L		0.000540	NA	10/29/11 8:16 AM	10/31/11 4:14 PM
4,4'-DDT	ND	mg/L		0.000540	NA	10/29/11 8:16 AM	10/31/11 4:14 PM
Dieldrin	ND	mg/L		0.000540	NA	10/29/11 8:16 AM	10/31/11 4:14 PM
Endosulfan I	ND	mg/L		0.000540	NA	10/29/11 8:16 AM	10/31/11 4:14 PM
Endosulfan II	ND	mg/L		0.000540	NA	10/29/11 8:16 AM	10/31/11 4:14 PM
Endosulfan sulfate	ND	mg/L		0.000540	NA	10/29/11 8:16 AM	10/31/11 4:14 PM
Endrin	ND	mg/L		0.000540	NA	10/29/11 8:16 AM	10/31/11 4:14 PM

Key:
- MCL Maximum Contaminant Level
- MDL Minimum Detection Limit
- NA Not Applicable
- ND Not Detected at the PQL or MDL
- PQL Practical Quantitation Limit
- TIC Tentatively Identified Compound, Estimated Concentration

Qualifiers:
- B Analyte detected in the associated Method Blank
- E Estimated Value above quantitation range
- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate Recovery exceeds REIC control limits
- * Value exceeds MCL or Regulatory Limits

REI Consultants, Inc. **Analytical Results** **Date:** *09-Nov-11*

CLIENT:	GREIF LLC	**WorkOrder**	1110N41	**Lab ID**	1110N41-01A
Client Sample ID:	EFFLUENT 001	**DateReceived**	10/26/2011		
Project:	FORM 2C	**Collection Date:**	10/25/2011 12:30:00 AM		
Site ID:	AMHERST, VA	**Matrix:**	WASTE WATER		

Analyses	Result	Units	Qual	PQL	MCL	Prep Date	Date Analyzed
PESTICIDES/PCBS			**E608**			Analyst: **NC**	
Endrin aldehyde	ND	mg/L		0.000540	NA	10/29/11 8:16 AM	10/31/11 4:14 PM
Heptachlor	ND	mg/L		0.000540	NA	10/29/11 8:16 AM	10/31/11 4:14 PM
Heptachlor epoxide	ND	mg/L		0.000540	NA	10/29/11 8:16 AM	10/31/11 4:14 PM
Toxaphene	ND	mg/L		0.00540	NA	10/29/11 8:16 AM	10/31/11 4:14 PM
Surr: decachlorobiphenyl	14.5	%REC		5.3-110	NA	10/29/11 8:16 AM	10/31/11 4:14 PM
Surr: tetrachloro-m-xylene	57.0	%REC		7.29-128	NA	10/29/11 8:16 AM	10/31/11 4:14 PM

NOTES:
Elevated PQLs are due to matrix interference.

SEMIVOLATILE ORGANIC COMPOUNDS			**E625**			Analyst: **CLS**	
Acenaphthene	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
Acenaphthylene	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
Anthracene	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
Benzidine	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
Benzo(a)anthracene	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
Benzo(a)pyrene	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
Benzo(b)fluoranthene	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
Benzo(g,h,i)perylene	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
Benzo(k)fluoranthene	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
Bis(2-chloroethoxy)methane	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
Bis(2-chloroethyl)ether	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
Bis(2-chloroisopropyl)ether	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
Bis(2-ethylhexyl)phthalate	0.0223	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
4-Bromophenyl phenyl ether	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
Butyl benzyl phthalate	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
4-Chloro-3-methylphenol	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
2-Chloronaphthalene	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
2-Chlorophenol	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
4-Chlorophenyl phenyl ether	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
Chrysene	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
Dibenzo(a,h)anthracene	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
Di-n-butyl phthalate	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
1,2-Dichlorobenzene	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
1,3-Dichlorobenzene	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
1,4-Dichlorobenzene	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
3,3'-Dichlorobenzidine	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
2,4-Dichlorophenol	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
Diethyl phthalate	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
Dimethyl phthalate	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM

Key:
- MCL Maximum Contaminant Level
- MDL Minimum Detection Limit
- NA Not Applicable
- ND Not Detected at the PQL or MDL
- PQL Practical Quantitation Limit
- TIC Tentatively Identified Compound, Estimated Concentration

Qualifiers:
- B Analyte detected in the associated Method Blank
- E Estimated Value above quantitation range
- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate Recovery exceeds REIC control limits
- * Value exceeds MCL or Regulatory Limits

REI Consultants, Inc. **Analytical Results** **Date:** *09-Nov-11*

CLIENT:	GREIF LLC	**WorkOrder**	1110N41	**Lab ID**	1110N41-01A
Client Sample ID:	EFFLUENT 001	**DateReceived**	10/26/2011		
Project:	FORM 2C	**Collection Date:**	10/25/2011 12:30:00 AM		
Site ID:	AMHERST, VA	**Matrix:**	WASTE WATER		

Analyses	Result	Units	Qual	PQL	MCL	Prep Date	Date Analyzed
SEMIVOLATILE ORGANIC COMPOUNDS			**E625**			Analyst: **CLS**	
2,4-Dimethylphenol	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
4,6-Dinitro-2-methylphenol	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
2,4-Dinitrophenol	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
2,4-Dinitrotoluene	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
2,6-Dinitrotoluene	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
Di-n-octyl phthalate	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
1,2-Diphenylhydrazine	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
Fluoranthene	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
Fluorene	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
Hexachlorobenzene	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
Hexachlorobutadiene	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
Hexachlorocyclopentadiene	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
Hexachloroethane	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
Indeno(1,2,3-cd)pyrene	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
Isophorone	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
Naphthalene	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
Nitrobenzene	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
2-Nitrophenol	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
4-Nitrophenol	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
N-Nitrosodimethylamine	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
N-Nitrosodiphenylamine	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
N-Nitrosodi-n-propylamine	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
Pentachlorophenol	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
Phenanthrene	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
Phenol	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
Pyrene	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
1,2,4-Trichlorobenzene	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
2,4,6-Trichlorophenol	ND	mg/L		0.0104	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
Surr: 2-Fluorophenol	55.4	%REC		32.9-110	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
Surr: Phenol-d5	41.4	%REC		25.8-110	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
Surr: 2,4,6-Tribromophenol	83.5	%REC		63.8-110	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
Surr: Nitrobenzene-d5	88.2	%REC		61.8-110	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
Surr: 2-Fluorobiphenyl	71.5	%REC		58.6-110	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
Surr: 4-Terphenyl-d14	72.9	%REC		55.1-110	NA	10/27/11 9:03 AM	10/28/11 1:16 AM
VOLATILE ORGANIC COMPOUNDS			**SW8015C**			Analyst: **CB**	
Methanol	ND	mg/L		10.0	NA	10/26/11 2:06 PM	11/07/11 9:30 AM

Key:
- MCL Maximum Contaminant Level
- MDL Minimum Detection Limit
- NA Not Applicable
- ND Not Detected at the PQL or MDL
- PQL Practical Quantitation Limit
- TIC Tentatively Identified Compound, Estimated Concentration

Qualifiers:
- B Analyte detected in the associated Method Blank
- E Estimated Value above quantitation range
- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate Recovery exceeds REIC control limits
- * Value exceeds MCL or Regulatory Limits

REI Consultants, Inc. Analytical Results

Date: *09-Nov-11*

CLIENT:	GREIF LLC	**WorkOrder**	1110N41	**Lab ID**	1110N41-01A
Client Sample ID:	EFFLUENT 001	**DateReceived**	10/26/2011		
Project:	FORM 2C	**Collection Date:**	10/25/2011 12:30:00 AM		
Site ID:	AMHERST, VA	**Matrix:**	WASTE WATER		

Analyses	Result	Units	Qual	PQL	MCL	Prep Date	Date Analyzed
VOLATILE ORGANIC COMPOUNDS			**E624**			Analyst: **AS**	
Benzene	ND	µg/L		5.0	NA		10/28/11 1:34 PM
Bromodichloromethane	ND	µg/L		5.0	NA		10/28/11 1:34 PM
Bromoform	ND	µg/L		5.0	NA		10/28/11 1:34 PM
Bromomethane	ND	µg/L		5.0	NA		10/28/11 1:34 PM
Carbon tetrachloride	ND	µg/L		5.0	NA		10/28/11 1:34 PM
Chlorobenzene	ND	µg/L		5.0	NA		10/28/11 1:34 PM
Chloroethane	ND	µg/L		5.0	NA		10/28/11 1:34 PM
Chloroform	ND	µg/L		5.0	NA		10/28/11 1:34 PM
Chloromethane	ND	µg/L		5.0	NA		10/28/11 1:34 PM
Dibromochloromethane	ND	µg/L		5.0	NA		10/28/11 1:34 PM
1,1-Dichloroethane	ND	µg/L		5.0	NA		10/28/11 1:34 PM
1,2-Dichloroethane	ND	µg/L		5.0	NA		10/28/11 1:34 PM
1,1-Dichloroethene	ND	µg/L		5.0	NA		10/28/11 1:34 PM
trans-1,2-Dichloroethene	ND	µg/L		5.0	NA		10/28/11 1:34 PM
1,2-Dichloropropane	ND	µg/L		5.0	NA		10/28/11 1:34 PM
cis-1,3-Dichloropropene	ND	µg/L		5.0	NA		10/28/11 1:34 PM
trans-1,3-Dichloropropene	ND	µg/L		5.0	NA		10/28/11 1:34 PM
Ethylbenzene	ND	µg/L		5.0	NA		10/28/11 1:34 PM
Methylene chloride	ND	µg/L		5.0	NA		10/28/11 1:34 PM
1,1,2,2-Tetrachloroethane	ND	µg/L		5.0	NA		10/28/11 1:34 PM
Tetrachloroethene	ND	µg/L		5.0	NA		10/28/11 1:34 PM
Toluene	ND	µg/L		5.0	NA		10/28/11 1:34 PM
1,1,1-Trichloroethane	ND	µg/L		5.0	NA		10/28/11 1:34 PM
1,1,2-Trichloroethane	ND	µg/L		5.0	NA		10/28/11 1:34 PM
Trichloroethene	ND	µg/L		5.0	NA		10/28/11 1:34 PM
Trichlorofluoromethane	ND	µg/L		5.0	NA		10/28/11 1:34 PM
Vinyl chloride	ND	µg/L		5.0	NA		10/28/11 1:34 PM
Surr: Dibromofluoromethane	114	%REC		63.5-143	NA		10/28/11 1:34 PM
Surr: 1,2-Dichloroethane-d4	102	%REC		82.6-125	NA		10/28/11 1:34 PM
Surr: Toluene-d8	95.9	%REC		72.8-117	NA		10/28/11 1:34 PM
Surr: 4-Bromofluorobenzene	90.1	%REC		86.9-124	NA		10/28/11 1:34 PM
VOLATILE ORGANIC COMPOUNDS			**E624**			Analyst: **AS**	
2-Chloroethyl vinyl ether	ND	µg/L		25.0	NA		10/28/11 1:34 PM
Acetaldehyde	ND	µg/L		50.0	NA		10/28/11 1:34 PM
Dichlorodifluoromethane	ND	µg/L		5.0	NA		10/28/11 1:34 PM
Acrolein	ND	µg/L		50.0	NA		10/28/11 1:34 PM
Acrylonitrile	ND	µg/L		50.0	NA		10/28/11 1:34 PM
Surr: 1,2-Dichloroethane-d4	102	%REC		80-120	NA		10/28/11 1:34 PM

Key:
- MCL Maximum Contaminant Level
- MDL Minimum Detection Limit
- NA Not Applicable
- ND Not Detected at the PQL or MDL
- PQL Practical Quantitation Limit
- TIC Tentatively Identified Compound, Estimated Concentration

Qualifiers:
- B Analyte detected in the associated Method Blank
- E Estimated Value above quantitation range
- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate Recovery exceeds REIC control limits
- * Value exceeds MCL or Regulatory Limits

REI Consultants, Inc. **Analytical Results** **Date:** *09-Nov-11*

CLIENT:	GREIF LLC	**WorkOrder**	1110N41	**Lab ID**	1110N41-01A
Client Sample ID:	EFFLUENT 001	**DateReceived**	10/26/2011		
Project:	FORM 2C	**Collection Date:**	10/25/2011 12:30:00 AM		
Site ID:	AMHERST, VA	**Matrix:**	WASTE WATER		

Analyses	Result	Units	Qual	PQL	MCL	Prep Date	Date Analyzed
VOLATILE ORGANIC COMPOUNDS			**E624**			Analyst: **AS**	
Surr: Toluene-d8	95.9	%REC		88-110	NA		10/28/11 1:34 PM
Surr: 4-Bromofluorobenzene	90.1	%REC		86-115	NA		10/28/11 1:34 PM
CHEMICAL OXYGEN DEMAND			**E410.4**			Analyst: **RJ**	
Chemical Oxygen Demand	232	mg/L		50	NA		10/31/11 12:00 AM
ANIONS BY ION CHROMATOGRAPHY			**E300.0**			Analyst: **CF**	
Sulfate	142	mg/L		25.0	NA		11/03/11 2:10 PM
PHENOLICS			**E420.1**			Analyst: **BA**	
Phenolics	0.120	mg/L		0.100	NA		11/01/11 11:00 AM
CYANIDE			**E335.4**			Analyst: **RJ**	
Cyanide, Total	ND	mg/L		0.020	NA	10/27/11 1:20 PM	10/28/11 1:34 PM
AMMONIA NITROGEN			**E350.1**			Analyst: **RJ**	
Nitrogen, Ammonia (As N)	0.22	mg/L		0.10	NA		10/27/11 10:46 AM
ORGANIC CARBON, TOTAL			**SM5310 C**			Analyst: **DSD**	
Total Organic Carbon	48.3	mg/L		1.00	NA		10/26/11 3:36 PM

Key:	MCL	Maximum Contaminant Level	**Qualifiers:**	B	Analyte detected in the associated Method Blank
	MDL	Minimum Detection Limit		E	Estimated Value above quantitation range
	NA	Not Applicable		H	Holding times for preparation or analysis exceeded
	ND	Not Detected at the PQL or MDL		S	Spike/Surrogate Recovery exceeds REIC control limits
	PQL	Practical Quantitation Limit		*	Value exceeds MCL or Regulatory Limits
	TIC	Tentatively Identified Compound, Estimated Concentration			

REI Consultants, Inc. **Analytical Results** **Date:** *09-Nov-11*

CLIENT:	GREIF LLC	**WorkOrder**	1110N41	**Lab ID**	1110N41-02A
Client Sample ID:	INFLUENT	**DateReceived**	10/26/2011		
Project:	FORM 2C	**Collection Date:**	10/25/2011 12:20:00 AM		
Site ID:	AMHERST, VA	**Matrix:**	WASTE WATER		

Analyses	Result	Units	Qual	PQL	MCL	Prep Date	Date Analyzed
VOLATILE ORGANIC COMPOUNDS			**SW8015C**			Analyst: **CB**	
Methanol	ND	mg/L		10.0	NA	10/26/11 2:06 PM	11/07/11 9:26 AM
VOLATILE ORGANIC COMPOUNDS			**E624**			Analyst: **AS**	
Acetaldehyde	646	µg/L		50.0	NA		10/28/11 2:08 PM
Surr: 1,2-Dichloroethane-d4	102	%REC		80-120	NA		10/28/11 2:08 PM
Surr: Toluene-d8	94.6	%REC		88-110	NA		10/28/11 2:08 PM
Surr: 4-Bromofluorobenzene	90.6	%REC		86-115	NA		10/28/11 2:08 PM

Key:			Qualifiers:		
	MCL	Maximum Contaminant Level		B	Analyte detected in the associated Method Blank
	MDL	Minimum Detection Limit		E	Estimated Value above quantitation range
	NA	Not Applicable		H	Holding times for preparation or analysis exceeded
	ND	Not Detected at the PQL or MDL		S	Spike/Surrogate Recovery exceeds REIC control limits
	PQL	Practical Quantitation Limit		*	Value exceeds MCL or Regulatory Limits
	TIC	Tentatively Identified Compound, Estimated Concentration			

REI Consultants, Inc. Analytical Results

Date: *09-Nov-11*

CLIENT:	GREIF LLC	**WorkOrder**	1110N41	**Lab ID**	1110N41-03A
Client Sample ID:	TRIP BLANK	**DateReceived**	10/26/2011		
Project:	FORM 2C	**Collection Date:**	10/24/2011		
Site ID:	AMHERST, VA	**Matrix:**	TRIP BLANK		

Analyses	Result	Units	Qual	PQL	MCL	Prep Date	Date Analyzed
VOLATILE ORGANIC COMPOUNDS			**SW8015C**			Analyst: **CB**	
Methanol	ND	mg/L		10.0	NA	10/26/11 2:06 PM	11/07/11 9:23 AM
VOLATILE ORGANIC COMPOUNDS			**E624**			Analyst: **AS**	
Benzene	ND	µg/L		1.0	NA		10/28/11 11:53 AM
Bromodichloromethane	ND	µg/L		1.0	NA		10/28/11 11:53 AM
Bromoform	ND	µg/L		1.0	NA		10/28/11 11:53 AM
Bromomethane	ND	µg/L		1.0	NA		10/28/11 11:53 AM
Carbon tetrachloride	ND	µg/L		1.0	NA		10/28/11 11:53 AM
Chlorobenzene	ND	µg/L		1.0	NA		10/28/11 11:53 AM
Chloroethane	ND	µg/L		1.0	NA		10/28/11 11:53 AM
Chloroform	ND	µg/L		1.0	NA		10/28/11 11:53 AM
Chloromethane	ND	µg/L		1.0	NA		10/28/11 11:53 AM
Dibromochloromethane	ND	µg/L		1.0	NA		10/28/11 11:53 AM
1,1-Dichloroethane	ND	µg/L		1.0	NA		10/28/11 11:53 AM
1,2-Dichloroethane	ND	µg/L		1.0	NA		10/28/11 11:53 AM
1,1-Dichloroethene	ND	µg/L		1.0	NA		10/28/11 11:53 AM
trans-1,2-Dichloroethene	ND	µg/L		1.0	NA		10/28/11 11:53 AM
1,2-Dichloropropane	ND	µg/L		1.0	NA		10/28/11 11:53 AM
cis-1,3-Dichloropropene	ND	µg/L		1.0	NA		10/28/11 11:53 AM
trans-1,3-Dichloropropene	ND	µg/L		1.0	NA		10/28/11 11:53 AM
Ethylbenzene	ND	µg/L		1.0	NA		10/28/11 11:53 AM
Methylene chloride	ND	µg/L		1.0	NA		10/28/11 11:53 AM
1,1,2,2-Tetrachloroethane	ND	µg/L		1.0	NA		10/28/11 11:53 AM
Tetrachloroethene	ND	µg/L		1.0	NA		10/28/11 11:53 AM
Toluene	ND	µg/L		1.0	NA		10/28/11 11:53 AM
1,1,1-Trichloroethane	ND	µg/L		1.0	NA		10/28/11 11:53 AM
1,1,2-Trichloroethane	ND	µg/L		1.0	NA		10/28/11 11:53 AM
Trichloroethene	ND	µg/L		1.0	NA		10/28/11 11:53 AM
Trichlorofluoromethane	ND	µg/L		1.0	NA		10/28/11 11:53 AM
Vinyl chloride	ND	µg/L		1.0	NA		10/28/11 11:53 AM
Surr: Dibromofluoromethane	115	%REC		63.5-143	NA		10/28/11 11:53 AM
Surr: 1,2-Dichloroethane-d4	97.7	%REC		82.6-125	NA		10/28/11 11:53 AM
Surr: Toluene-d8	96.7	%REC		72.8-117	NA		10/28/11 11:53 AM
Surr: 4-Bromofluorobenzene	90.9	%REC		86.9-124	NA		10/28/11 11:53 AM
VOLATILE ORGANIC COMPOUNDS			**E624**			Analyst: **AS**	
2-Chloroethyl vinyl ether	ND	µg/L		5.0	NA		10/28/11 11:53 AM
Acetaldehyde	ND	µg/L		10.0	NA		10/28/11 11:53 AM
Dichlorodifluoromethane	ND	µg/L		1.0	NA		10/28/11 11:53 AM

Key:
- MCL Maximum Contaminant Level
- MDL Minimum Detection Limit
- NA Not Applicable
- ND Not Detected at the PQL or MDL
- PQL Practical Quantitation Limit
- TIC Tentatively Identified Compound, Estimated Concentration

Qualifiers:
- B Analyte detected in the associated Method Blank
- E Estimated Value above quantitation range
- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate Recovery exceeds REIC control limits
- * Value exceeds MCL or Regulatory Limits

REI Consultants, Inc. **Analytical Results** **Date:** *09-Nov-11*

CLIENT:	GREIF LLC	**WorkOrder**	1110N41	**Lab ID**	1110N41-03A
Client Sample ID:	TRIP BLANK	**DateReceived**	10/26/2011		
Project:	FORM 2C	**Collection Date:**	10/24/2011		
Site ID:	AMHERST, VA	**Matrix:**	TRIP BLANK		

Analyses	Result	Units	Qual	PQL	MCL	Prep Date	Date Analyzed
VOLATILE ORGANIC COMPOUNDS			**E624**			Analyst: **AS**	
Acrolein	ND	µg/L		10.0	NA		10/28/11 11:53 AM
Acrylonitrile	ND	µg/L		10.0	NA		10/28/11 11:53 AM
Surr: 1,2-Dichloroethane-d4	97.7	%REC		80-120	NA		10/28/11 11:53 AM
Surr: Toluene-d8	96.7	%REC		88-110	NA		10/28/11 11:53 AM
Surr: 4-Bromofluorobenzene	90.9	%REC		86-115	NA		10/28/11 11:53 AM

Key:	MCL	Maximum Contaminant Level	**Qualifiers:**	B	Analyte detected in the associated Method Blank
	MDL	Minimum Detection Limit		E	Estimated Value above quantitation range
	NA	Not Applicable		H	Holding times for preparation or analysis exceeded
	ND	Not Detected at the PQL or MDL		S	Spike/Surrogate Recovery exceeds REIC control limits
	PQL	Practical Quantitation Limit		*	Value exceeds MCL or Regulatory Limits
	TIC	Tentatively Identified Compound, Estimated Concentration			

REIC

Improving the environment, one client at a time...

225 Industrial Park Drive
Beaver, WV 25813
TEL: 304.255.2500
FAX: 304.255.2572

3029-C Peters Creek Road
Roanoke, VA 24019
TEL: 540.777.1276
FAX: 540.400.8508

101 17th Street
Ashland, KY 41101
TEL: 606.393.5027

1557 Commerce Road, Suite 201
Verona, VA 24482
TEL: 540.248.0183

December 01, 2011

Mr. Darrell Painter
GREIF LLC
P O BOX 339
AMHERST VA 24521

TEL: (434) 933-4116
FAX (434) 933-4129

RE: WEEKLY NUTRIENTS

Order No.: 1111M65

Dear Mr. Darrell Painter:

REI Consultants, Inc. received 1 sample(s) on 11/22/2011 for the analyses presented in the following report.

Please note two changes you may see on your report.

- Results for "Dissolved" parameters will be shown under a separate sample ID, rather than as a separate analysis under the same sample ID. The sample ID for "Dissolved" parameters will include "Field Filtered" or "Lab Filtered", as appropriate.
- Metals results will no longer be identified as "Total" or "Total Recoverable". The methods have not been changed, only their appearance on the report.

If you have any questions regarding these results, please do not hesitate to call.

Sincerely,

Scott Gross
Project Manager

Accredited in accordance with nelac

REIC

Improving the environment, one client at a time...

225 Industrial Park Drive
Beaver, WV 25813
TEL: 304.255.2500
FAX: 304.255.2572

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TEL: 606.393.5027

1557 Commerce Road, Suite 201
Verona, VA 24482
TEL: 540.248.0183

Report Narrative

Project Manager:: **Scott Gross**

WO#: **1111M65**
Date: **12/1/2011**

CLIENT: GREIF LLC
Project: WEEKLY NUTRIENTS

All analyses were performed using documented laboratory SOPs that incorporate appropriate quality control procedures as described in the applicable methods. Any deviation from compliance or method modification is explained below and/or identified within the body of this report by a qualifier footnote which is defined at the bottom of each page.

All sample results are reported on an "as-received" wet weight basis unless otherwise noted.

Following standard laboratory protocol, sample preservation, such as pH, is verified at time of extraction or analysis based on client requested parameters. Improper preservation is noted on the analytical bench sheet, extraction log, or preservation log and client is notified by close of following business day. All results are reported using preservation compliant samples unless otherwise noted in the analytical report.

The test results in this report meet all NELAP requirements for parameters for which accreditations are required or available. Any exceptions are noted in this report. This report may not be reproduced, except in full, without the written approval of REIC.

In compliance with federal guidelines and standard operating procedures, all reports, including raw data and supporting quality control, will be disposed of after five years unless otherwise arranged by the client via written notification or contract requirement.

Due to a computer error in which the original sample analysis data was overwritten the Ortho-Phosphate had to be re-analyzed outside of the 48hr. holding time and is therefore reported with an "H" qualifier.

If you have any questions please contact the project manager whose name is listed above.

REI Consultants, Inc. Analytical Results

Date: *01-Dec-11*

CLIENT:	GREIF LLC	**WorkOrder**	1111M65	**Lab ID**	1111M65-01A
Client Sample ID:	EFFLUENT 001	**DateReceived**	11/22/2011		
Project:	WEEKLY NUTRIENTS	**Collection Date:**	11/22/2011 12:30:00 AM		
Site ID:	AMHERST, VA	**Matrix:**	WASTE WATER		

Analyses	Result	Units	Qual	PQL	MCL	Prep Date	Date Analyzed
SEMIVOLATILE ORGANIC COMPOUNDS			**E625**			Analyst: **CLS**	
Bis(2-ethylhexyl)phthalate	0.0286	mg/L		0.0102	NA	11/28/11 11:53 AM	11/29/11 11:04 AM
Phenol	ND	mg/L		0.0102	NA	11/28/11 11:53 AM	11/29/11 11:04 AM
Surr: 2-Fluorophenol	44.4	%REC		32.9-110	NA	11/28/11 11:53 AM	11/29/11 11:04 AM
Surr: Phenol-d5	36.3	%REC		25.8-110	NA	11/28/11 11:53 AM	11/29/11 11:04 AM
Surr: Nitrobenzene-d5	85.6	%REC		61.8-110	NA	11/28/11 11:53 AM	11/29/11 11:04 AM
Surr: 2-Fluorobiphenyl	66.7	%REC		58.6-110	NA	11/28/11 11:53 AM	11/29/11 11:04 AM
Surr: 2,4,6-Tribromophenol	68.8	%REC		63.8-110	NA	11/28/11 11:53 AM	11/29/11 11:04 AM
Surr: 4-Terphenyl-d14	71.1	%REC		55.1-110	NA	11/28/11 11:53 AM	11/29/11 11:04 AM
ANIONS BY ION CHROMATOGRAPHY			**SM4110B**			Analyst: **CF**	
Nitrogen, Nitrate-Nitrite	ND	mg/L		0.10	NA		11/23/11 11:40 PM
TOTAL KJELDAHL NITROGEN (TKN)			**E351.2**			Analyst: **RJ**	
Nitrogen, Kjeldahl, Total	ND	mg/L		0.50	NA	11/30/11 9:35 AM	11/30/11 4:25 PM
PHOSPHORUS			**SM4500-P BE**			Analyst: **BA**	
Phosphorus, Total	0.34	mg/L		0.05	NA		11/29/11 2:00 PM

Key:	MCL	Maximum Contaminant Level	**Qualifiers:**	B	Analyte detected in the associated Method Blank
	MDL	Minimum Detection Limit		E	Estimated Value above quantitation range
	NA	Not Applicable		H	Holding times for preparation or analysis exceeded
	ND	Not Detected at the PQL or MDL		S	Spike/Surrogate Recovery exceeds REIC control limits
	PQL	Practical Quantitation Limit		*	Value exceeds MCL or Regulatory Limits
	TIC	Tentatively Identified Compound, Estimated Concentration			

REI Consultants, Inc. **Analytical Results** **Date:** *01-Dec-11*

CLIENT:	GREIF LLC	**WorkOrder**	1111M65	**Lab ID**	1111M65-01B
Client Sample ID:	EFFLUENT 001/FIELD FILTERED	**DateReceived**	11/22/2011		
Project:	WEEKLY NUTRIENTS	**Collection Date:**	11/22/2011 12:30:00 AM		
Site ID:	AMHERST, VA	**Matrix:**	WASTE WATER		

Analyses	Result	Units	Qual	PQL	MCL	Prep Date	Date Analyzed
ANIONS BY ION CHROMATOGRAPHY			**E300.0**			Analyst: **CF**	
Orthophosphate (As P)	ND	mg/L	H	0.10	NA		11/28/11 10:57 AM

Key:

MCL	Maximum Contaminant Level
MDL	Minimum Detection Limit
NA	Not Applicable
ND	Not Detected at the PQL or MDL
PQL	Practical Quantitation Limit
TIC	Tentatively Identified Compound, Estimated Concentration

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Estimated Value above quantitation range
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate Recovery exceeds REIC control limits
*	Value exceeds MCL or Regulatory Limits

NO. 339177

CHAIN OF CUSTODY RECORD

REIC
Research Environmental & Industrial Consultants, Inc.

MAIN LABORATORY & CORPORATE HEADQUARTERS:
P.O. Box 286 • 225 Industrial Park Rd, Beaver, WV 25813
800-999-0105 • 304-255-2500 • www.reiclabs.com

MID-OHIO VALLEY Service Center
209 15th Street
Ashland, KY 41101
606-393-6027

SHENANDOAH Service Center
1557 Commerce Rd., Ste. 201
Verona, VA 24482
540-248-0183

ROANOKE Service Center
3029-C Peters Creek Rd
Roanoke, VA 24019
540-777-1276

Client: GREIF PACKAGING LLC
PO # 242900065
Contact Person: DARRELL PAINTER
Phone: 434-933-4116
QUOTE # JP0521080
Fax: 434-933-4129
Email: darrell.painter@greif.com
Address: P.O. Box 339
City: Amherst
State: VA
Zip: 24521
Billing Address (if different):
City:
State:
Zip:
Site ID & State: Amherst, VA
Project ID: Weekly Nutrients
Sampler: R.H. McFadden

SAMPLE LOG & ANALYSIS REQUEST

TURNAROUND TIME: ✓ NORMAL
RUSH TURNAROUND: ☐ 5 DAY ☐ 3 DAY ☐ 2 DAY ☐ 1 DAY
*Rush work needs prior laboratory approval and will incur additional charges

ANALYSIS & METHOD REQUESTED:
- SM-4500PBE
- SM-4500 N ORGC
- SM 4110B
- E 300.0
- E 625
- (-HEXYL) phthalate E 625

SAMPLE ID	No. & Type of Containers	Sampling Date/Time	Matrix	Sample Comp/Grab	TOTAL Phosphorus	TKN	NO_2/NO_3	ORTHOPHOSPHATE	TOTAL PHENOL	BIS(2-ETH)			
					3	3	3	0	0	0			
EFFLUENT 001	1-500ml-P	11/21-22/11 / 0030	WW	Comp	X	X	X						
EFFLUENT 001	1-250ml-P	" / "	WW	Comp				X					
EFFLUENT 001	1-1000ml-AG	" / "	WW	Comp					X	X			
EFFLUENT 001	1-1000ml-AG	" / "	WW	Comp									

ENTER PRESERVATIVE CODE:
0 None
1 Hydrochloric Acid
2 Nitric Acid
3 Sulfuric Acid
4 Sodium Thiosulfate
5 Sodium Hydroxide
6 Zinc Acetate
7 EDTA
8 Ascorbic Acid

COMMENTS:
ORTHO FIELD-FILTERED; 0110 / 11/22/11
TKN - NO CL2 DETECTED

All analytical requests are subject to REIC's Standard Terms and Conditions.

Temperature at arrival: 5° °C (ICED) Y ✓ N ___

1 R.H. McFadden Jr. (Relinquished by signature) Date/Time 11/22/11 0130
[signature] (Received by signature) Date/Time 11-22-11 1303

2 (Relinquished by signature) Date/Time
(Received by signature) Date/Time

FAX RESULTS ☐ EMAIL RESULTS ☑
Shipping: ___ Hand Delivered ✓ Courier ___ UPS ___ FEDEX ___ USPS ___ OTHER

COC-NCR-031110

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☐	Plans (rolled)	
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☐	Slides	
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Select Type/Format**		Description
☐	Blueprints	
☐	Color Pages	
☐	Diagrams	
☒	Maps	Gladstone Quadrangle/Geological Survey - 1969
☐	Pictures/Photos	
☐	Plans (rolled)	
☐	Plans (flat)	
☐	Slides	
☐	Other	

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	☒ BRRO-L	☐ NRO	☐ SWRO	☐ VRO
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GREIF RIVERVILLE LLC
AMHERST, VIRGINIA

IV. A. Narrative Description of Pollutant Sources

Outfall No.	Area of Impervious Surface **(Not Drained to WWTP)**	Total Area Drained
002	0	280 acres
003	552,000 SF	345 acres
004	0	58 acres
005	3,000 SF	349 acres

IV. B. Narrative Description of Pollutant Sources (Continued)

Roundwood – 1500 cords are stockpiled at the woodyard

Wood Chips – 7500 cords are stockpiled at the woodyard

Wood Fuel – 4800 tons are stored adjacent to #1 sludge pond

Compost – 4500 cubic yards are stored adjacent to #1 sludge pond

Ash – 400 cubic yards are stored adjacent to the compost pad

All above materials are stored outside and exposed to storm water. Runoff from the compost facility including ash storage and wood fuel pile is contained and directed to #1 sludge pond which drains to the waste water treatment facility head works.

Twelve gallons of herbicide and 6000 pounds of fertilizer are applied on the property each year.

All chemical and oil storage facilities are contained and drained to the treatment plant except the #6 oil storage tank dike which drains through outfall 301 to outfall 003.

A stormwater pollution prevention plan establishes the process that is used to minimize the release of pollutants into the stormwater runoff. Various inspections are conducted daily, weekly, monthly and quarterly. An annual comprehensive site inspection is conducted in the first quarter of each year.

IV. B. Narrative Description of Pollutant Sources

Outfall No.	Significant Materials Treated, Stored, Disposed and Management Practices, etc.
002	This drainage area surrounds the active industrial landfill. The landfill is lined with a leachate collection system that discharges to the wastewater treatment plant. The landfill is staffed 24 hours per day, 7 days per week. Stormwater runoff is diverted through a sediment pond. The potential for contamination of Outfall 002 is minimal.
003	This drainage area includes the employee parking lot, liquor prep, the OCC building, #2 paper machine building, and the #6 Fuel oil containment area. OCC can be stored outside at times and therefore contact rainwater. Outside chemical tanks at #2 paper machine are within concrete containment areas that drain to the wastewater treatment facility (See figure A-5 for tank listing). Rainwater collected in the #6 fuel oil area is tested per the VPDES permit prior to release through internal outfall 301. All chemical tanks at liquor prep are within concrete containment areas that drain to the wastewater treatment facility (See figure A-2 for chemical tank listing).
004	This draining area includes the vehicle fuel storage area, maintenance shop, maintenance lay down area, powerhouse, evaporators, #1 paper machine, pulp mill and cooling tower. All chemical tanks are within concrete containment areas that drain to the wastewater treatment plant (See Figures A-1 and A-2).
005	This drainage area includes the woodyard, wood fuel storage area, combination boiler, compost facility, ash storage, wastewater treatment plant and the closed landfill. Run off from the compost facility, combination boiler, wood fuel storage and ash storage drain to the wastewater treatment plant. Areas around the closed landfill and woodyard drain to Outfall 005.

GREIF RIVERVILLE LLC
AMHERST, VIRGINIA

IV. C. Narrative Description of Pollutant Sources

Outfall Number	
002	The drainage area surrounding the landfill (approx. 70 acres) is diverted to a sediment pond where suspended solids are allowed to settle. The pond is inspected annually at a minimum. The pond will be dredged should a significant level of sediment accumulate in the pond. The remainder of the area, 210 acres, is not used for industrial purposes.
003	Industrial facilities within this drainage area are constructed in such a manner as to minimize impact on stormwater discharge. Containment dikes are built around storage tanks and discharged to the wastewater treatment plant. The containment area (Outfall 301) around the large #6 fuel oil storage tank is tested prior to release as per the VPDES permit. Runoff from areas surrounding #2 paper machine building is diverted to a sediment pond. The pond is inspected annually at a minimum.
004	Industrial facilities within this drainage area are constructed in such a manner as to minimize impact on stormwater discharge. The vehicle fuel storage area is contained as well as the tank filling area.
005	Areas around the wastewater treatment plant are bermed such that runoff is directed to the treatment plant. Runoff from the compost pad and wood fuel storage area are directed to #1 sludge pond which discharges to the headworks of the treatment plant

V. B. Nonstormwater Discharges

On 2/24/11, 10/11/11 and 10/18/11 stormwater samples were collected from those outfalls associated with the drainage areas of the facility at which industrial activities occur or materials are stored. No unusual discharges were observed. The current stormwater pollution prevention plan also requires that routine inspections be conducted at the facility to ensure that no contamination of the stormwater is occurring. These are conducted daily, weekly, monthly, and quarterly by mill personnel. Also, the stormwater pollution prevention team conducts a comprehensive annual inspection of the entire mill site and issues a report with recommendations. The VPDES Permit also requires routine pollutant analyses on various stormwater outfalls.

3. Description of Potential Pollutant Sources

A. **Drainage**

(1) Site maps are attached in Appendix B.

(2) A prediction of the direction of flow at the facility is indicated by outfall boundary divisions on the attached maps. A list of potential pollutant sources identified on the site maps is included with the maps in Appendix A. A more complete description of possible pollutants is included in Part 2.E. of the SWPPP, Risk Identification and Summary of Potential Pollutant Sources. Flows with a significant potential for causing erosion are also identified on the site maps.

B. **Inventory of Exposed Materials**

The following is a brief description of the types of materials handled at the site that may be exposed to stormwater:

The new wood fuel storage pile and chip storage are located north of Paper Machine #1. Runoff from the wood fuel pile is diverted to number 1 sludge pond while runoff from the chip pile is monitored though stormwater outfall 005. No chemicals are added or applied to the bark or chip piles as they are stored for use as raw materials or fuel. The log storage is located adjacent to the chip storage area. Runoff from this area discharges into a drainage ditch and then through outfall 005.

Secondary fiber known as Old Correlated Cardboard (OCC) is used as a fiber source for the paper produced at Paper Machine #1 and #2. The OCC is received in bales via trucks and railroad cars. The material is unloaded and stored inside

the OCC building. Litter from handling the paper bales accumulates along the railroad tracks and truck unloading areas at the southern and northern end of the building. Waste material from the OCC bales is stored on a concrete pad prior to disposal at the landfill or used as fuel in the combination boiler. Stormwater from this outdoor storage area on the northern end of the building is contained and diverted to the mill sewer. Stormwater from the truck unloading dock flows to the river via concrete and earthen ditches. The entire area is managed by routinely picking up scrap paper and debris.

The Greif landfill is located northwest of the OCC building and is currently in operation. Waste is hauled from the production facilities in dump trucks. No more than one cell is exposed to precipitation. All precipitation that falls in this cell is captured as leachate and is treated in the WWTP. There is a leachate overflow tank at the landfill in case of an emergency to protect against untreated leachate being released to the river. There is a sediment basin at the landfill to trap sediment from runoff around the landfill prior to Outfall #002. The sediment basin is periodically cleaned to maintain storage capacity and sediment trapping capability.

All chemical storage areas are contained and drained to the wastewater treatment plant.

No other material are handled, treated, stored, or disposed in a manner to allow exposure to stormwater between the time of three years prior to the effective date of this permit and the present.

C. Spills and Leaks

There have been no reportable spills or leaks at this facility within the last 3 years.

A detailed letter shall be written about any future spill or leak that occurs and a copy of the letter shall be included in Appendix E.

D. **Sampling Data**

Discharge sampling data from 4 representative stormwater outfalls of Greif's 10 stormwater outfalls is included in Appendix B of this plan. A summary of discharge sampling data collected during the term of this permit are filed in the environmental official area entitled "Stormwater Monitoring".

E. **Risk Identification and Summary of Potential Pollutant Sources (See SPCC Plan, Table A)**

The following is a list of all potential pollutant sources from the following activities: loading and unloading operations; outdoor storage activities; outdoor manufacturing or processing activities; significant dust or particulate generating processes; and on-site waste disposal practices. Identified below is the discharge point of the drainage area by outfall or WWTP. The item numbers correspond to the numbers shown on the maps in Appendix A.

(1) 2,000-gallon gasoline tank: Tank contained and has contained unloading area - general area drains to WWTP. Tank #10-0470

(2) 2,000-gallon diesel tank. Tank contained and has contained unloading area - general area drains to WWTP. Tank #10-0480

(3) 300-gallon diesel tank: Tank contained and general area drains to the Outfall #004. Tank #11-0042

(4) 499,000-gallon #6 Fuel oil tank: This tank is located in a diked secondary containment area that drains to Outfall #003. It also is provided with a contained unloading area. Tank #20-0500.

(5) #6 Fuel oil day tank: The tank is contained and area drains to the WWTP. Tank #20-0330.

(6) Oil reclaim tank: The tank is contained and area drains to the WWTP. Tank #20-0670.

(7) #2 Fuel oil tank: The tank is contained and area drains to the WWTP. Tank #21-0490.

(8) 1,000-gallon diesel tank at sludge pond no. 4: This area drains to the WWTP. Tank #29-0920. - REMOVED

(9) 250-gallon diesel tank: This area drains to the WWTP. Tank #29-0930. - REMOVED

(10) 300-gallon lube oil tank: This area drains to the WWTP. Tank #13-0920 – Not in Service.

(11) 250-gallon contaminated hydraulic fluid tank: This area drains to the WWTP. Tank #41-5120.

(12) 100-gallon hydraulic fluid unit: This area drains to the WWTP. Tank #42-0130.

(13) 1,450-gallon hypochlorite tank: This area is contained and drains to the WWTP. Tank #12-0080.

(14) 1,450-gallon bromine tank: This area drains to the WWTP. Tank #12-0070.

(15) 714-gallon muriatic acid tank: This area drains to the WWTP. Tank #14-0870.

(16) 300-gallon slimicide Tank: This area drains to the WWTP. Tank #16-0250. Moved inside building.

(17) 8,100-gallon defoamer rail car: This area drains to the WWTP. Tank #14-0920.

(18) 800-gallon defoamer tank: This area drains to the WWTP. Tank #16-3000. Removed.

(19) 11,844-gallon sulfuric acid tank: This area drains to the WWTP. Tank #20-0100.

(20) 5,000-gallon sodium hydroxide tank: This area drains to the WWTP. Tank #20-0120.

(21) 2,200-gallon tank - Feedwater Corrosion Inhibitor. This area drains to the WWTP. Tank #20-0495.

(22) 800-gallon oxygen scavenger tank: - BFW Treatment. This area drains to the WWTP. Tank #20-0910.

(23) 850-gallon dispersant tank: - Cooling Water Treatment. This area drains to the WWTP. Tank #20-0690.

(24) 1,000-gallon filming amine tank: This area drains to the WWTP. Tank #20-0700.

(25) 287-gallon polymer mix tank: This area drains to the WWTP. Tank #20-0710.

(26) 300-gallon concentrated sulfuric acid tank: This area drains to the WWTP. Tank #20-0800. Removed.

(27) 250-gallon contaminated hydraulic fluid tank: This area drains to the WWTP.

(28) 115,000-gallon black liquor tank: This area drains to the WWTP.

(29) 5,000-gallon Evaporator Cleaner (HCl) tank: This area drains to the WWTP. Tank #23-0480

(30) 7,500-gallon Evaporator Cleaner (HCl) tank: This area drains to the WWTP. Tank #23-0490.

(31) 19,800-gallon 50% sodium hydroxide tank: This area drains to the WWTP. Tank #27-0140.

(32) 47,000-gallon sodium carbonate tank: This area drains to the WWTP. Tank #27-0170.

(33) Three sodium hydroxide rail cars: This area drains to the WWTP. Tanks #27-0310, #27-0320, #27-0330.

(34) 135,000-gallon sodium carbonate tank: This area drains to the WWTP. Tank #27-0460.

(35) 6,662-gallon urea nutrient tank: This tank contained and drains to the WWTP. Tank #29-0120.

(36) 6,400-gallon sodium hypochlorite tank: This area drains to the WWTP. Tank #29-1450.

(37) 6,500-gallon Phosphorous Nutrient tank (H_3PO_4): This area drains to the WWTP. Tank #29-1455.

(38) 500-gallon Retention Aid tank: This area drains to the WWTP. Tank #41-4150.

(39) 292-gallon silicone transformer: This area drains to the WWTP. Transformer #11-6000.

(40) 181-gallon silicone transformer: This area drains to the WWTP. Transformer #29-6550.

(41) 1,272-gallon silicone transformer: This area is contained. The valved pipe in the curb drains to Outfall #004. Transformer #14-6000.

(42) 2, 181-gallon silicone transformers: This area is contained. The valved pipe in the curb drains to Outfall #004. Transformers #14-6500 and #14-6510.

(43) 1,272-gallon silicone transformer: This area drains to the WWTP. Transformer #15-6000.

(44) 181-gallon silicone transformer: This area drains to the WWTP. Transformer #15-6500.

(45) 1,272-gallon silicone transformer: This area is contained. The valved pipe in the curb drains to Outfall #003. Transformer #16-6000.

(46) 4, 181-gallon silicone transformers: This area is contained. The valved pipe in the curb drains to Outfall #003. Transformers #16-6500, #16-6510, #16-1520, and #20-6500.

(47) 525-gallon silicone transformer: This area is contained. The valved pipe in the curb drains to Outfall #003. Transformer #20-6000.

(48) 175-gallon silicone transformer: This area is contained. The valved pipe in the curb drains to Outfall #003. Transformer #17-6500.

(49) 292-gallon silicone transformer: This area drains to the WWTP. Transformer #11-6000.

(50) 2, 181-gallon silicone transformers: This area drains to the WWTP. Transformers #11-6540 and #13-6520.

(51) 6, 140-gallon mineral oil transformers: This area drains to the Aeration Lagoon of the WWTP. Transformers #29-6500, 29-6510, 29-6520, 29-6530, 29-6540, and 30-6500.

(52) 181-gallon silicone transformer: This area drains to the Sludge Lagoon of the WWTP. Transformer #20-6510.

(53) 140-gallon mineral oil transformer: This area drains to the Outfall #003.

(54) 2, 1,340-gallon silicone transformer: This area is contained. The valved pipe in the curb drains to Outfall #003. Transformer #40-6010, #41-6010.

(55) 4, 390-gallon silicone transformer: This area is contained. The valved pipe in the curb drains to Outfall #003. Transformers #40-6510, 41-6510, 41-6520,

41-6530.

(56) 190-gallon silicone transformer: This area drains to the WWTP.

(57) 1,250-gallon silicone transformer: This area drains to the WWTP. Transformer #89-0069

(58) 2,935-gallon APCO mineral oil transformer: This area is contained. The valved pipe in the curb drains to Outfall #003.

(59) 2,260-gallon APCO mineral oil transformer: This area is contained. The valved pipe in the curb drains to Outfall #003.

(60) Rail loading/unloading docks: Located along the back (south) side of the plant. Raw materials are delivered at these loading docks and finished product is loaded here. Any spills in this area will be channeled into Outfall #003.

(61) Lube oil storage and unloading area and used oil storage area: This area drains to the WWTP.

(62) Truck loading and unloading areas: Finished product is loaded here and raw materials are delivered here. These areas drain to Outfall #003.

(63) Chip storage: This area drains to Outfall #005.

(64) Kerosene storage tank (replaced with 500 gallon tank 3/99): This tank contained and area drains to the WWTP. Tank #16-3320.

(65) Woodyard and conveyor systems. The minimum standards of the Virginia Erosion and Sediment Control Regulations are being followed. This area drains to Outfall #005.

(66) Fuel oil unloading area: This area drains to Outfall #003.

(67) Wastewater Ponds: The wastewater ponds total about 7.0 acres in area. Pond #1 is used for flow equalization. Pond #2 is for sludge holding prior to dewatering on the belt press.

(68) Greif landfill: One cell in this landfill is currently in operation. The landfill is permitted as an industrial landfill and is located on Greif property east of the Mill facility. Hazardous materials are not disposed of in this landfill. Any excess precipitation that falls on this open cell is captured and treated in the WWTP. Any sediment generated at the landfill is captured in a sediment basin so it does not leave the landfill area. The sediment basin drains to Outfall #002.

(69) Fuel Unloading Area: This area drains to the WWTP.

(70) Compost facility run off drains to #1 pond.

(71) 12,000-gallon Sodium Hydroxide Tank: Tank is contained and drains to

WWTP. Tank #41-3540.

(72) 13,000-gallon dry strength additive tank. Tank is contained and drains to WWTP - Tank #41-5210.

(73) 3,900-gallon Fuel Additive Tank: Tank is contained and drains to WWTP - Tank #20-1140.

(74) 1,450-gallon Cooling Tower Corrosion Control Tank: Tank is contained and drains to WWTP - Tank #23-0620.

(75) 350-gallon Tote bin of boiler fuel additive near #6 fuel oil day tank. Area is contained and drains to WWTP.

TABLE A-1
POTENTIAL OIL SPILL SOURCES

Equipment No.	Description	Contents	Maximum Capacity (Gallons)	Storage Conditions Pressure	Storage Conditions Temperature	Material of Construction	Filling Procedure	Level Indication	Secondary Containment	Spill Disposition
10-0470	Gasoline Storage	Gasoline	2,000	Atmospheric	Ambient	Steel	Filled by Commercial Supplier	Local - Gage and Audible High Level Alarm	Concrete Pad and Walls	Contained
10-0480	Diesel Storage	Diesel	2,000	Atmospheric	Ambient	Steel	Filled by Commercial Supplier	Local - Gage and Audible High Level Alarm	Concrete Pad and Walls	Contained
11-0042	Fire Pump Diesel Storage	Diesel	300	Atmospheric	Ambient	Steel	Manually Filled from VFC Truck	Local - Manually Gaged	Concrete Block Walls	Contained
13-1430	Drum Feed Conv. H.P.U.	Hydraulic Fluid	46	Atmospheric	Ambient	Steel	Manually from 55-gal. Drum	Continuous Local	Catch Pan	Contained
13-1450	Drum Gate H.P.U.	Hydraulic Fluid	10	Atmospheric	Ambient	Steel	Manually from 55-gal. Drum	Continuous Local	Catch Pan	Contained
13-1490	Chipper H.P.U.	Hydraulic Fluid	10	Atmospheric	Ambient	Steel	Manually from 55-gal. Drum	Continuous Local	Catch Pan	Contained
13-1500	Knuckleboom H.P.U.	Hydraulic Fluid	42	Atmospheric	Ambient	Steel	Manually from 55-gal. Drum	Continuous Local	None	None

TABLE A-1
POTENTIAL OIL SPILL SOURCES

Equipment No.	Description	Contents	Maximum Capacity (Gallons)	Storage Conditions Pressure	Storage Conditions Temperature	Material of Construction	Filling Procedure	Level Indication	Secondary Containment	Spill Disposition
13-1540	Chip Dumper H.P.U.	Hydraulic Fluid	894	Atmospheric	Ambient	Steel	Manually from 55-gal. Drum	Continuous Local	Concrete Pad w/curb	Contained
13-1590	Stacker H.P.U.	Hydraulic Fluid	110	Atmospheric	Ambient	Steel	Manually from 55-gal. Drum	Continuous Local	Catch Pan	Contained
13-1620	Reclairner H.P.U.	Hydraulic Fluid	110	Atmospheric	Ambient	Steel	Manually from 55-gal. Drum	Continuous Local	Catch Pan	Contained
13-1720	Crane-Reel H.P.U.	Hydraulic Fluid	38	Atmospheric	Ambient	Steel	Manually from 55-gal. Drum	Continuous Local	Catch Pan	Contained
13-1730	Crane-Grapple H.P.U.	Hydraulic Fluid	200	Atmospheric	Ambient	Steel	Manually from 55-gal. Drum	Continuous Local	None	None
13-2210	Fuel Dumper H.P.U.	Hydraulic Fluid	900	Atmospheric	Ambient	Steel	Manually	Continuous Local	Concrete Curb	Contained
14-0100	Lube Oil Reservoir for Bauer Refiner	Lube Oil	56	Atmospheric	116 Degrees F	Steel	Manually Filled from 55-gal. Drum	None	None	Enters Process Sewer
14-0290	Portable Tank	Waste Oil	300	Atmospheric	Ambient		N/A	None	None	Enters Process Sewer
15-0380	Jones Refiner Lube Oil Reservoir	Lube Oil	79	Atmospheric	130 Degrees F	Steel	Manually Filled from 55-gal. Drum	None	None	Enters Process Sewer

TABLE A-1
POTENTIAL OIL SPILL SOURCES

Equipment No.	Description	Contents	Maximum Capacity (Gallons)	Storage Conditions Pressure	Storage Conditions Temperature	Material of Construction	Filling Procedure	Level Indication	Secondary Containment	Spill Disposition
16-0290	Control Crown Roll Lube Reservoir	Lube Oil	296	Atmospheric	130 Degrees F	Steel	Manually Filled from 55-gal. Drum	None	None	Enters Process Sewer
16-0380	Winder Lube Oil Tank	Lube Oil	226	Atmospheric	130 Degrees F	Steel	Manually Filled from 55-gal. Drum	None	None	Enters Process Sewer
16-0520	P.M. Lube Oil Tank	Lube Oil	3,000	Atmospheric	130 Degrees F	Steel	Manually Filled from 55-gal. Drum	Local - Sight Glass	None	Enters Process Sewer
16-0560	Dry End Lube Sump #1	Lube Oil	62	Atmospheric	Ambient	Steel	Manually Filled from 55-gal. Drum	Local - Sight Glass	None	Enters Process Sewer
16-0570	Dry End Lube Sump #2	Lube Oil	62	Atmospheric	Ambient	Steel	Manually Filled from 55-gal. Drum	Local - Sight Glass	None	Enters Process Sewer
16-1640	Lube Oil Return #1	Lube Oil	62	Atmospheric	130 Degrees F	Steel	N/A	None	None	Enters Process Sewer
16-1650	Lube Oil Return #2	Lube Oil	62	Atmospheric	130 Degrees F	Steel	N/A	None	None	Enters Process Sewer
16-2140	Lube Oil Return #3	Lube Oil	62	Atmospheric	130 Degrees F	Steel	N/A	None	None	Enters Process Sewer

TABLE A-1
POTENTIAL OIL SPILL SOURCES

Equipment No.	Description	Contents	Maximum Capacity (Gallons)	Storage Conditions Pressure	Storage Conditions Temperature	Material of Construction	Filling Procedure	Level Indication	Secondary Containment	Spill Disposition
16-2170	Lube Oil Return #4	Lube Oil	62	Atmospheric	130 Degrees F	Steel	N/A	None	None	Enters Process Sewer
16-3320	Kerosene Storage	Kerosene	550	Atmospheric	Ambient	Steel	Filled by Commercial Supplier	Local Gage and Audible High Level Alarm	Catch Pan	Contained
16-3330	Portable Tank	Waste Oil	300	Atmospheric	Ambient	Steel	N/A	None	None	Enters Process Sewer
17-0051	Guillotine H.P.U.	Hydraulic Fluid	20	Atmospheric	Ambient	Steel	Manually from 55-gal. Drums	Local Gauge	Concrete Pad and Curbs	Contained
20-0330	#6 Fuel Oil Day Tank	#6 Fuel Oil	31,345	Atmospheric	Ambient	Steel	Pumped from 20-0500	Remote Indication in Control Room	Concrete Pad and Walls	Contained
20-0500	#6 Fuel Oil Storage	#6 Fuel Oil	499,000	Atmospheric	Ambient	Steel	Filled from Commercial Tank Trucks Using On-site Pumps	Continuous Local Indication	Earthen Dike	Contained
20-0670	Oil Reclaim Tank	#6 Fuel Oil	1,762	Atmospheric	Ambient	Steel	Manually from 55-gal. Drums	None	Concrete Pad and Walls	Contained
21-0490	#2 Fuel Oil Storage	#2 Fuel Oil	14,300	Atmospheric	Ambient	Steel	Filled from Commercial Tank Trucks Using On-Site Pumps	Continuous Local Indication	Concrete Pad and Walls	Contained

TABLE A-1
POTENTIAL OIL SPILL SOURCES

Equipment No.	Description	Contents	Maximum Capacity (Gallons)	Storage Conditions Pressure	Storage Conditions Temperature	Material of Construction	Filling Procedure	Level Indication	Secondary Containment	Spill Disposition
40-4140	Screw Press H.P.U.	Hydraulic Fluid	175	Atmospheric	130 Degrees F	Steel	Manually from 55-gal. Drum	Local – Sight Glass	Concrete Curb	Enters Process Sewer
41-0885	Hydraulic Unit ENP	Hydraulic Fluid	1,400	Atmospheric	130 Degrees F	Steel	Manually from 55-gal. Drum	Local – Sight Glass	Concrete Curb	Enters Process Sewer
41-0940	Hyd. Unit - 2nd Press ENP Roll	Hydraulic Fluid	2,000	Atmospheric	130 Degrees F	Steel	Manually from 55-gal. Drum	Local – Sight Glass	Concrete Curb	Enters Process Sewer
41-2060	Tank - Central Lube Unit	Lube Oil	3,000	Atmospheric	130 Degrees F	Steel	Manually from 55-gal. Drum	Local – Sight Glass	Concrete Curb	Enters Process Sewer
41-2100	Lube Oil Sump - Wet End	Lube Oil	62	Atmospheric	130 Degrees F	Steel	Manually from 55-gal. Drum	Local – High Level Ind.	Concrete Curb	Enters Process Sewer
41-2130	Lube Oil Sump - Dry End	Lube Oil	62	Atmospheric	130 Degrees F	Steel	Manually from 55-gal. Drum	Local - Manually Gaged	Concrete Curb	Enters Process Sewer
41-2500	Calendar C.C. Roll Hyd. Unit	Hydraulic Fluid	2,000	Atmospheric	130 Degrees F	Steel	Manually from 55-gal. Drum	Local - Sight Glass	Concrete Curb	Enters Process Sewer
41-3290	Tank - Winder Hydraulic Unit	Hydraulic Fluid	120	Atmospheric	130 Degrees F	Steel	Manually from 55-gal. Drum	Local - Sight Glass	Concrete Curb	Enters Process Sewer

TABLE A-1
POTENTIAL OIL SPILL SOURCES

Equipment No.	Description	Contents	Maximum Capacity (Gallons)	Storage Conditions Pressure	Storage Conditions Temperature	Material of Construction	Filling Procedure	Level Indication	Secondary Containment	Spill Disposition
41-4790	Hydraulic Unit - Guillotine	Hydraulic Fluid	80	Atmospheric	130 Degrees F	Steel	Manually from 55-gal. Drum	Local - Sight Glass	Concrete Curb	Enters Process Sewer
41-5110	Used Oil Tank	Mixed Waste Oil	300	Atmospheric	Ambient	Polyethylene	N/A	Local - Manually Gaged	None	Enters Process Sewer
41-5120	Hydraulic Oil (Contaminated) Tank	Hydraulic Fluid and Water	250	Atmospheric	130 Degrees F	Steel	Drain Hose from ENP	Local - Manually Gaged	None	Enters Process Sewer
42-0130	Hydraulic Unit - Upender	Hydraulic Fluid	100	Atmospheric	130 Degrees F	Steel	Manually from 55-gal. Drum	Local - Sight Glass	Concrete Curb	Enters Process Sewer
No Number	Woodyard 55 Gallon Drum Storage	Lube and Hydraulic Oils	55 Gallon Drums	Atmospheric	Ambient	Steel	N/A	N/A	Concrete Pad and Curbs	Contained
No Number	Oil/Lube Storage Area in Pulp Mill	Lube Oil	55-Gallon Drums	Atmospheric	Ambient	Steel	N/A	None	Concrete Pad and Walls	Enters Process Sewer
No Number	Oil/Lube Storage Area in Paper Machine No. 1 Area	Lube Oil	55-Gallon Drums	Atmospheric	Ambient	Steel	N/A	None	None	Enters Process Sewer
No Number	Oil/Lube Drum Storage Building	Lube Oil	55-Gallon Drums	Atmospheric	Ambient	Steel	N/A	None	None	Enters Process Sewer
No Number	Oil/Lube Storage Area in Paper Machine No. 2 Area	Lube Oil	55-Gallon Drums	Atmospheric	Ambient	Steel	N/A	None	None	Enters Process Sewer

TABLE A-1
POTENTIAL OIL SPILL SOURCES

Equipment No.	Description	Contents	Maximum Capacity (Gallons)	Storage Conditions Pressure	Storage Conditions Temperature	Material of Construction	Filling Procedure	Level Indication	Secondary Containment	Spill Disposition
No Number	Oil/Lube Storage in OCC Building	Lube Oil	55 Gallon Drums	Atmospheric	Ambient	Steel	N/A	N/A	Catch Pans	Contained-Overflow from Pans Enters Process Sewer
UA-1	Gasoline/Diesel Unloading Area for 10-0470 and 10-0480	Gasoline and Diesel	2,100	N/A	N/A	N/A	N/A	N/A	Concrete Pad and Walls	Contained
UA-2	Diesel Unloading Area for 11-0042	Diesel	1,100	N/A	N/A	N/A	N/A	N/A	Concrete Pad with Curbing	Contained during unloading only
UA-3	#6 Fuel Oil Unloading Area for 20-0490	#6 Fuel Oil	7,000	N/A	N/A	N/A	N/A	N/A	Concrete Pad and Walls	Contained
UA-4	#2 Fuel Oil Unloading Area for 21-0490, Loading area for 20-0670	#2 Fuel Oil, Reclaimed Oil	10,681	N/A	N/A	N/A	N/A	N/A	Concrete Pad with Curbing	Contained

TABLE A-2
POTENTIAL HAZARDOUS AND NONHAZARDOUS MATERIAL SPILL SOURCES

Updated 10/06

Equipment No.	Description	Contents	Maximum Capacity (Gallons)	Storage Conditions Pressure	Storage Conditions Temperature	Material of Construction	Filling Procedure	Level Indication	Secondary Containment	Spill Disposition
09-6500	Scalehouse Transformer	Mineral Oil	122	N/A	N/A	N/A	N/A	N/A	None - Future Concrete Slab and Curb	Future - Contained
11-6000 11-6540	Water Supply Transformers	Silicone Silicone	292 181	N/A	N/A	N/A	N/A	N/A	Concrete Slab and Curb	Contained
11-6500	Water Supply Transformer	Mineral Oil	45	N/A	N/A	N/A	N/A	N/A	Future - Drip Pan	Future – Contained
11-6510	Water Supply Transformer	Mineral Oil	45	N/A	N/A	N/A	N/A	N/A	Future - Drip Pan	Future – Contained
11-6520	Water Supply Transformer	Mineral Oil	45	N/A	N/A	N/A	N/A	N/A	Future - Drip Pan	Future – Contained
11-6530	Water Supply Transformer	Mineral Oil	45	N/A	N/A	N/A	N/A	N/A	Future - Drip Pan	Future – Contained
12-0080	Nalco 7334 Tank	Hypochlorite	1,450	Atmospheric	Ambient	Polyethylene	Pumped from Commercial Tank Truck	Local – Sight Glass	Concrete Pad and Curb	Drains to Mill Water Pond
12-0070	Nalco 7341 Tank	Bromine	1,450	Atmospheric	Ambient	Polyethylene	Pumped from Commercial Tank Truck	Local – Sight Glass	Concrete Pad and Curb	Drains to Mill Water Pond
13-6010	Woodyard Transformer	Silicone	1,450	N/A	N/A	N/A	N/A	N/A	Concrete Pad and Curb	Contained
13-6510	Woodyard Transformer	Silicone	387	N/A	N/A	N/A	N/A	N/A	Concrete Pad and Curb	Contained
13-6520	Woodyard Transformer	Silicone	181	N/A	N/A	N/A	N/A	N/A	Concrete Pad and Curb	Contained
14-1000	Pulp Mill Defoamer Day Tank	Defoamer	800	Atmospheric	Ambient	Plastic	Pumped from Rail Car 14-0920	Local – Sight Glass	None	Enters Floor Drain to Process Sewer
14-0860	Muriatic Acid Tank	Muriatic Acid	714	Atmospheric	Ambient	Nalgene	Pumped from Tank Truck Below	Visual at Tank	None	Enters Floor Drain to Process Sewer

TABLE A-2
POTENTIAL HAZARDOUS AND NONHAZARDOUS MATERIAL SPILL SOURCES

Updated 10/06

Equipment No.	Description	Contents	Maximum Capacity (Gallons)	Storage Conditions Pressure	Storage Conditions Temperature	Material of Construction	Filling Procedure	Level Indication	Secondary Containment	Spill Disposition
14-0870	Liquor Heater Cleaner	Chemical Assoc. C-170	1,000 Tank 55-gallon drums	Atmospheric	Ambient	Fiberglass and Steel	Manually Filled from Drums	Visual at Tank	Concrete Pad and Curbs	Contained-Enters Process Sewer
14-0920	Pulp Mill Defoamer Car	Defoamer	8,100	Atmospheric	Ambient	Steel Rail Car	Pumped from Commercial Tank Truck	Visual at Tank	Concrete Curb and Walls	Drains to Process Sewer
14-6000 14-6500	Pulp Mill Transformers	Silicone Silicone	1,272 181	N/A	N/A	N/A	N/A	N/A	Concrete Curb, Concrete Slab	Contained
14-6510	Pulp Mill Transformer	Silicone	181	N/A	N/A	N/A	N/A	N/A	Concrete Pad and Curb	Drains to Process Sewer
15-6000 15-6010 15-6500	Stock Preparation Area Transformers	Silicone Silicone Silicone	1,272 1,160 181	N/A	N/A	N/A	N/A	N/A	Concrete Curb, Concrete Slab	Contained
16-0250	Slimicide Bin	Slimicide	300-gallon Carboy	Atmospheric	Ambient	Plastic	Filled at Supplier's Facility	Visual	Drip Pan	Contained
16-1885	#1 Paper Machine Defoamer Day Tank #1	Defoamer	270	Atmospheric	Ambient	Steel	Pumped from Rail Car 14-0920	None	None	Enters Floor Drain to Process Sewer
16-2950	Rewetter Storage No. 1	Chemwet 5130	5,000	Atmospheric	Ambient	Polyethylene	Commercial Truck	Local Visual	Concrete Pad	Drains to Process Sewer
16-2960	Rewetter Storage No. 2	Chemwet 5130	5,000	Atmospheric	Ambient	Polyethylene	Commercial Truck	Local Visual	Concrete Pad	Drains to Process Sewer
16-2970	Felt Cleaner Storage No. 1	Betz CCC4Z9	2,100	Atmospheric	Ambient	Polyethylene	Commercial Truck	Local Visual	Concrete Pad	Drains to Process Sewer
16-2980	Wet Strength Surge Tank	EZE217P	2,100	Atmospheric	Ambient	Polyethylene	Commercial Truck	Local Visual	Concrete Pad	Drains to Process Sewer

TABLE A-2
POTENTIAL HAZARDOUS AND NONHAZARDOUS MATERIAL SPILL SOURCES

Updated 10/06

Equipment No.	Description	Contents	Maximum Capacity (Gallons)	Storage Conditions Pressure	Storage Conditions Temperature	Material of Construction	Filling Procedure	Level Indication	Secondary Containment	Spill Disposition
16-2990	Wet Strength Resin Tank		3,750	Atmospheric	Ambient	Fiberglass	Commercial Truck	Local Gage	Concrete Pad	Drains to Process Sewer
16-6000 16-6010 16-6500 16-6510 16-6520	Paper Machine Area Transformers	Silicone Silicone Silicone Silicone Silicone	1,272 1,160 181 181 181	N/A	N/A	N/A	N/A	N/A	Concrete Curb, Concrete Slab	Contained
16-3400	Wire Passivation Tank	Darasperse	190	Atmospheric	Ambient	Polyethylene	Filled from Bin	Control Room	Sloped Concrete Pad	Enters Process Sewer
16-3470	Felt Batch Wash	Caustic	300	Atmospheric	Ambient	Polyethylene	Factory Filled	Local	Sloped Concrete Pad	Enters Process Sewer
Area 16	Darasperse Bin		300	Atmospheric	Ambient	Steel	Factory Filled	None	Concrete Pad	Drains to Process Sewer
Area 16	Caustic Bin	Caustic	300	Atmospheric	Ambient	Plastic	Filled at Supplier's Factory	Visual	Catch Pan	Contained
Area 17	Defoamer Bin	Defoamer	300-gallon Carboys	Atmospheric	Ambient	Plastic	Filled at Supplier's Factory	Visual	None	Enters Process Sewer
17-6000 17-6500 17-6510	OCC Transformers	Silicone Silicone Silicone	1,240 175 175	N/A	N/A	N/A	N/A	N/A	Concrete Curb, Concrete Slab	Contained
20-0100	Sulfuric Acid Tank	Sulfuric Acid	11,844	Atmospheric	Ambient	Steel	Via Pumps on Commercial Truck	Remote at Control Room	Concrete Slab and Walls	Enters Process Sewer
20-0120	NaOH Storage	Sodium Hydroxide	5,000	Atmospheric	Ambient	FRP	Via Pumps on Commercial	Visual at Tank	Sloped Concrete Pad	Enters Process

TABLE A-2
POTENTIAL HAZARDOUS AND NONHAZARDOUS MATERIAL SPILL SOURCES

Updated 10/06

Equipment No.	Description	Contents	Maximum Capacity (Gallons)	Storage Conditions Pressure	Storage Conditions Temperature	Material of Construction	Filling Procedure	Level Indication	Secondary Containment	Spill Disposition
		(Caustic)					Truck			Sewer
20-0495	Nalco Tank #1-BFW Treatment	Nalco 7203	2,200	Atmospheric	Ambient	Polyethylene	Via Pumps on Commercial Trucks	Local	Sloped Concrete Pad	Enters Process Sewer
20-0680	Nalco Tank #2-BFW Treatment	Oxygen Scavenger	850	Atmospheric	Ambient	Polyethylene	Via Pumps on Commercial Truck	Local	Sloped Concrete Pad	Enters Process Sewer
20-0690	Nalco Tank #3-Cooling Water Treatment	Dispersant	850	Atmospheric	Ambient	Polyethylene	Via Pumps on Commercial Truck	Local	Concrete Slab and Curbs	Enters Process Sewer
20-0700	Nalco Tank #4	Filming Amine	1,000	Atmospheric	Ambient	Polyethylene	Via Pumps on Commercial Truck	Local	Sloped Concrete Pad	Enters Process Sewer
20-0710	Polymer Mix Tank	Polymer and Water	287	Atmospheric	Ambient	St. Steel	Via Pumps on Commercial Truck	Local	Sloped Concrete Pad	Enters Process Sewer
20-0800 Removed	Sulfuric Acid Storage	Concentrated Sulfuric Acid	300-gallon Carboy	Atmospheric	Ambient	Plastic	Filled at Supplier's Facility	None	Sloped Concrete Pad	Enters Process Sewer
20-0910	Elimin-OX	Oxygen Scavenger	800	Atmospheric	Ambient	Polyethylene	Via Pumps on Commercial Truck	Local	Sloped Concrete Pad	Enters Process Sewer
20-1140	Fuel Additive	$Mg(OH)_2$	3,900	Atmospheric	Ambient	Plastic	Via Pumps on Truck	Local	Concrete Slab	Enters Process Sewer
20-6000 20-6500 20-6510	Power Plant Area Transformers	Silicone Silicone Silicone	525 181 181	N/A	N/A	N/A	N/A	N/A	Concrete Slab and Curb	Contained
23-0480	Evaporator Cleaner Storage	Hydrochloric Acid	5,000	Atmospheric	Ambient	Plastic	By Process Pumps	Local - Manually Gaged	Concrete Slab and Curb on Three Sides	Open Side is on Concrete Slab that Drains to Process

TABLE A-2
POTENTIAL HAZARDOUS AND NONHAZARDOUS MATERIAL SPILL SOURCES

Updated 10/06

Equipment No.	Description	Contents	Maximum Capacity (Gallons)	Storage Conditions Pressure	Storage Conditions Temperature	Material of Construction	Filling Procedure	Level Indication	Secondary Containment	Spill Disposition
										Sewer
23-0490	Evaporator Cleaner Storage	Hydrochloric Acid	7,500	Atmospheric	Ambient	Fiberglass	Pumped from Commercial Tank Truck	Local - Sight Glass	Concrete Slab and Curb on Three Sides	Open Side is on Concrete Slab that Drains to Process Sewer
23-0500	Black Liquor Viscosity Modifier Tank	Nalco Chemicals	6,400	Atmospheric	Ambient	Plastic	Pumped from Commercial Tank Truck	Local - Sight Glass	Concrete Slab and Curb on Three Sides	Open Side is on Concrete Slab that Drains to Process Sewer
23-0620	Corrosion Control	Nalco 8356D	1,450	Atmospheric	Ambient	Polyethylene	Commercial Tank Truck	Local Gage	Concrete Pad and Curbs	Drains to Process Sewer
23-0630	Corrosion Inhibitor	Nalco 7392	1,450	Atmospheric	Ambient	Polyethylene	Commercial Tank Truck	Local Gage	Concrete Pad and Curbs	Drains to Process Sewer
23-0640	Biocide Bin		300	Atmospheric	Ambient	Steel	Factory Filled	Local	Concrete Pad	Drains to Process Sewer
25-8050 25-8060 25-8070	Precipitator Transformers	Silicone Silicone Silicone	85 94 94	N/A	N/A	N/A	N/A	N/A	Future – Drip Pan	Future - Contained
26-6000 26-6050	Combination Boiler Transformers	Silicone Silicone	645 500	N/A	N/A	N/A	N/A	N/A	Concrete Slab and Curb	Contained
27-0140	NaOH Storage	50% Sodium Hydroxide (Caustic)	19,800	Atmospheric	Ambient	Carbon Steel	Pumped from Commercial Tank Truck or Rail Car	Remote Recording in Control Room	Concrete Slab and Curbs	Drains To Process Sewer

TABLE A-2
POTENTIAL HAZARDOUS AND NONHAZARDOUS MATERIAL SPILL SOURCES

Updated 10/06

Equipment No.	Description	Contents	Maximum Capacity (Gallons)	Storage Conditions Pressure	Storage Conditions Temperature	Material of Construction	Filling Procedure	Level Indication	Secondary Containment	Spill Disposition
27-0170	Na_2CO_3 Storage	Sodium Carbonate (Soda Ash)	47,000	Atmospheric	110 Degrees F	Carbon Steel	Pumped from Commercial Tank Truck or Rail Car	Remote Recording in Central Control Room	Concrete Slab and Curbs	Drains To Process Sewer
27-0310 27-0320 27-0330	NaOH Rail Car Storage #1 through #3	50% Sodium Hydroxide	8,128 8,091 8,051	Atmospheric	Ambient	Carbon Steel	Pumped from Commercial Tank Truck	None	Concrete Slab and Curbs	Drains To Process Sewer
27-0460	Greif NA_2CO_3 Rail Car	Sodium Carbonate	135,000	Atmospheric	Ambient	Carbon Steel	Pumped from Rail Car	None	Pans Beneath Rail Cars	Drains To Process Sewer
29-0120	Nitrogen Nutrient	Urea	6,662	Atmospheric	Ambient	Carbon Steel	Pumped from Commercial Tank Truck	None	Concrete Slab and Curb	To Aeration Pond
29-1120	Press Polymer Bulk Tank	Polymer	7,168	Atmospheric	Ambient	Fiberglass	Pumped from Commercial Tank Truck	Local Sight Glass	Concrete Slab and Curb	Contained
29-1140	Press Polymer Day Tank	Polymer	1,900	Atmospheric	Ambient	Polyethylene	Pumped from 29-1120	Control Room	Concrete Slab and Curb	Contained
29-1310	Polymer Bulk Tank	Polymer	7,000	Atmospheric	Ambient	Polyethylene	Commercial Tank Truck	Local	Concrete Pad	Drains to Aeration Basin
29-1320	Polymer Mix Tank	Polymer	3,000	Atmospheric	Ambient	Polyethylene	Pumped from 29-1310	Local	Concrete Pad	Drains to Aeration Basin
29-1330	Polymer Feed Tank	Polymer	3,000	Atmospheric	Ambient	Polyethylene	Pumped from 29-1320	Local	Concrete Pad	Drains to Aeration Basin
29-1450	Sodium Hypochlorite	Sodium Hypochlorite	6,400	Atmospheric	Ambient	Polyethylene	Pumped from Commercial Tank Truck	Local - Sight Glass	Concrete Slab and Curb	To Aeration Pond
29-1455	Phosphorus Nutrient	H_3PO4	6,500	Atmospheric	Ambient	H.D.P.E.	Pumped from Commercial Truck	Local	Concrete Slab and Curb	Aeration Pond
29-1880	Polymer Bulk Storage #2	Polymer	7,168	Atmospheric	Ambient	Polyethylene	Manual – From Tank Truck	Local – Site Glass	None	Drains to Process

TABLE A-2
POTENTIAL HAZARDOUS AND NONHAZARDOUS MATERIAL SPILL SOURCES

Updated 10/06

Equipment No.	Description	Contents	Maximum Capacity (Gallons)	Storage Conditions Pressure	Storage Conditions Temperature	Material of Construction	Filling Procedure	Level Indication	Secondary Containment	Spill Disposition
										Sewer
29-1920	Polymer Day Tank #2	Polymer	2,100	Atmospheric	Ambient	Polyethylene	Transfer From 29-1880	Remote – Control Room	None	Drains to Process Sewer
29-6500 29-6510 29-6520 29-6530 29-6540 29-6560 29-6600	Aeration Pond Transformers	Mineral Oil Mineral Oil Mineral Oil Mineral Oil Mineral Oil Mineral Oil Mineral Oil	140 140 140 140 140 155 130	N/A	N/A	N/A	N/A	N/A	None Future – Concrete Slab and Curb	Future – Contained
29-6550	Sludge Pond Transformer	Silicone	181	N/A	N/A	N/A	N/A	N/A	None Future – Concrete Slab and Curb	Future – Contained
29-6580	Aerators & Polymer Building	Mineral Oil	130	N/A	N/A	N/A	N/A	N/A	None Future – Concrete Slab and Curb	Future – Contained
29-6590	Maintenance Building	Mineral Oil	31	N/A	N/A	N/A	N/A	N/A	None Future – Drip Pan	Future – Contained
30-6500	Administration Bldg. Transformer	Mineral Oil	140	N/A	N/A	N/A	N/A	N/A	None Future - Concrete Slab and Curb	Future - Contained
40-6010 40-6510 41-6010 41-6510 41-6520 41-6530	Transformers	Silicone Silicone Silicone Silicone Silicone Silicone	1,340 390 1,340 390 390 390	N/A	N/A	N/A	N/A	N/A	Concrete Slab and Curb	Contained

TABLE A-2
POTENTIAL HAZARDOUS AND NONHAZARDOUS MATERIAL SPILL SOURCES

Updated 10/06

Equipment No.	Description	Contents	Maximum Capacity (Gallons)	Storage Conditions Pressure	Storage Conditions Temperature	Material of Construction	Filling Procedure	Level Indication	Secondary Containment	Spill Disposition
41-3500	Caustic Bin	50% Sodium Hydrox. Caustic	250	Atmospheric	Ambient	PVC	Manual from Bin	Trans. Tank	None	Enters Process Sewer
41-3540	Caustic	NaOH	11,844	Atmospheric	Ambient	Steel	Manual Pump/Truck	Local - Sight Glass	Concrete Curb	Contained
41-3630	Tank - Size	Hiphase Size	11,844	Atmospheric	Ambient	Steel	Manual Pump/Truck	Local - Sight Glass	None	Enters Process Sewer
41-3660	Cooling Tower Biocide	Biocide	400	Atmospheric	Ambient	PVC		Local - Sight Glass	Drip Pan	Contained
41-3710	Brown Dye	Basic Brown	300	Atmospheric	Ambient	PVC	Filled from Bins	Electric Probe	None	Enters Process Sewer
41-3740	Brown Dye Bin	Basic Brown	275	Atmospheric	Ambient	316 SS	Factory Filled	None	None	Enters Process Sewer
41-3820	Tank - Felt Cleaning	CC-6368 Solvent Soap	6,000	Atmospheric	Ambient	Steel	Manual Pump/Truck	Local - Sight Glass	None	Enters Process Sewer
41-3860	Batch Felt Cleaner	Betz BCB 089	2,000	Atmospheric	Ambient	PVC	Manual Pump/Truck	Local - Sight Glass	None	Enters Process Sewer
41-3950	Defoamer Day Tank	Defoamer	1,500	Atmospheric	Ambient	PVC	Auto Transformer	Level Trans. Control Room	None	Enters Process Sewer
41-3980	Defoamer	Paper Chem 5147		Atmospheric	Ambient	Fiberglass	Manual Pump/Truck		None	Enters Process Sewer
41-3990	Talon Bin	Corrosion Inhibitor	400			PVC	Factory Filled	None	Sloped Concrete Pad	Enters Process Sewer
41-4140	Tank - Defoamer Mix	5061 Paperchem Defoamer	300	Atmospheric	Ambient	PVC	Manual	Control Room	None	Enters Process Sewer

TABLE A-2
POTENTIAL HAZARDOUS AND NONHAZARDOUS MATERIAL SPILL SOURCES

Updated 10/06

Equipment No.	Description	Contents	Maximum Capacity (Gallons)	Storage Conditions Pressure	Storage Conditions Temperature	Material of Construction	Filling Procedure	Level Indication	Secondary Containment	Spill Disposition
41-4150	Retention Aid Hold Tank	Polyplus 713	500	Atmospheric	Ambient	SS	Auto	Local - Sight Glass	None	Enters Process Sewer
41-4160	RX-47W Bin (Biocide)	Rx-47W Biocide	400	Atmospheric	Ambient	SS	Manual Bin to Bin	None	Catch Bin	Contained
41-4190	BC-B084 Bin (Boil Out)	BC-B084 Boil Out	400	Atmospheric	Ambient	SS	Factory Filled	None	None	Enters Process Sewer
41-4490	Abandoned	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
41-4520	Antiskid Tank	Antiskid Vining's Noslip 7K	5,200	Atmospheric	Ambient	Polyethylene		None	Concrete Pad and Curbs	Enters Process Sewer
41-5210	Hercobond Tank	Dry Strength Additive	12,956	Atmospheric	70°F	Polyethylene	Manual Pump/Truck	Remote – Control Room	Concrete Curb	Contained
89-0068 89-0069 89-0401 89- 89- 25-8050 89- Scrapped	Spare Transformers	Silicone Silicone Silicone Mineral Oil Mineral Oil Silicone Silicone Silicone	175 1,250 387 244 15 94 292 181	N/A N/A N/A N/A N/A N/A N/A N/A	N/A N/A N/A N/A N/A N/A N/A N/A	N/A N/A N/A N/A N/A N/A N/A N/A	N/A N/A N/A N/A N/A N/A N/A N/A	N/A N/A N/A N/A N/A N/A N/A N/A	None Future - Concrete Slab and Curb	Future - Contained
APCO	Three APCO Transformers	#1 Mineral Oil #2 Mineral Oil #3 Mineral Oil	2,935 2,260	N/A	N/A	N/A	N/A	N/A	Plastic Liner and Gravel Bed Future - Concrete Slab and Curb	Ground Future - Contained
UA-4	Truck Unloading Area for 20-0100, 20-0120	Sulfuric Acid, Caustic	10,681	N/A	N/A	N/A	N/A	N/A	Concrete Slab and Curb	Drains to Process Sewer
UA-5	Truck Unloading Area for 27-0170, 27-0140, 27-0310, -0330, 14-0920	Sodium Carbonate, Sodium Hydroxide, Defoamer	N/A	N/A	N/A	N/A	N/A	N/A	Concrete Slab and Curb	Drains To Process Sewer

TABLE A-2
POTENTIAL HAZARDOUS AND NONHAZARDOUS MATERIAL SPILL SOURCES

Updated 10/06

Equipment No.	Description	Contents	Maximum Capacity (Gallons)	Storage Conditions Pressure	Storage Conditions Temperature	Material of Construction	Filling Procedure	Level Indication	Secondary Containment	Spill Disposition
UA-6	Rail Car Unloading Area for 27-0140, 27-0170	50% Sodium Hydroxide, Sodium Carbonate	N/A	N/A	N/A	N/A	N/A	N/A	Concrete Slab and Curb	Drains To Process Sewer
UA-7	Truck Unloading Area for 14-0860	Muriatic Acid	N/A	N/A	N/A	N/A	N/A	N/A	Provided by Curbs and Crest of Roadway	Drains to Process Sewer
UA-8	Truck Unloading Area for #1 Paper Machine Chemicals	Misc.	N/A	N/A	N/A	N/A	N/A	N/A	Concrete Slab	Drains to Process Sewer
UA-9	Truck Unloading Area for #2 Paper Machine Chemicals	Size, Sulfuric Acid, Hercobond		N/A	N/A	N/A	N/A	N/A	Concrete Slab and Curb	Drains to Process Sewer

Draper Aden Associates
Engineering • Surveying • Environmental Services

8090 Villa Park Drive
Richmond, Virginia 23228
(804) 264-2228 • Fax (804) 264-8773
www.daa.com

MEMORANDUM

TO: Mr. John Petchul
Greif Packaging, LLC

FROM: Leonard 'Rip' Ford, Jr.
Environmental Services

DATE: 11-07-11

SUBJECT: Greif Packaging Stormwater Monitoring Program
Form 2F Stormwater Sampling Assistance
Sampling Date: 10-11-11 + 10-12-11

VPDES Permit No. 0006408
DAA Project No. 22299-119

On October 5, 2011, Draper Aden Associates (DAA) personnel visited Greif Packaging to temporarily install and program stormwater sampling equipment at Outfall 002, Outfall 003, Outfall 004, and Outfall 005.

A significant rainfall event was predicted to occur during the evening hours of October 11, 2011. Accordingly, on October 11, 2011, DAA personnel visited Greif Packaging to conduct flow-proportional stormwater sampling.

STORMWATER SAMPLING

Outfall 004. At about 9:00 PM, October 11, 2011, a steady rainfall began at Greif Packaging, LLC. DAA personnel mobilized to Outfall 004. The sampling equipment at Outfall 004 was electronically linked to a rain gauge and programmed to begin collecting the flow-proportional composite sample once the storm event had yielded 0.10 inch of rainfall.

At about 9:30 PM, October 11, 2011, the rain gauge linked to the ISCO 4700 composite sampler at Outfall 004 had registered 0.10 inch of rainfall and the automated sampler began collecting the 24-hour flow-proportional composite sample. DAA personnel obtained a grab sample and measured pH (6.90 SU) and temperature (16.8° C). Additional grab samples were ~~for~~ obtained for chemical analysis.

At 9:30 PM, October 12, 2011, Greif personnel obtained the composite stormwater samples from the ISCO 4700 composite sampler and prepared the samples for delivery to the laboratory.

Outfalls 002, 003, 005. Flow-proportional sampling could not be conducted during this rainfall event at Outfall 002, Outfall 003, and Outfall 005. The equipment installed at each of the outfalls consisted of an ISCO 6712 Composite Sampler equipped with an ISCO 750 Area Velocity Module.

Upon arrival at each outfall, the ISCO 6712 was not properly registering flow from the ISCO 750 Area Velocity Meters. Technical issues could not be resolved in the field during this storm event. Field personnel re-programmed the ISCO composite samplers to collect a 100 mL sample every 5 minutes for a 24-hour period.

DAA personnel obtained grab samples from each outfall and measured pH and temperature:

Outfall 002	pH = 7.52 SU	temperature = 14.7° C
Outfall 003	pH = 7.85 SU	temperature = 16.6° C
Outfall 005	pH = 7.60 SU	temperature = 15.2° C

Greif personnel obtained the composite stormwater samples from Outfall 002, Outfall 003, and Outfall 005 and prepared the samples for delivery to the laboratory.

SAMPLE TRANSPORT

On October 12, 2011, Draper Aden Associates submitted grab samples obtained from Outfall 002, Outfall 003, Outfall 004, and Outfall 005 to Air, Water & Soil Laboratories for chemical analysis of the following parameters: oil & grease, BOD, COD, TSS, ammonia, TKN, nitrite, nitrate, total phosphorus, color, iron (Fe-total recoverable)

On October 13, 2011, possession of the composite samples obtained from Outfall 002, Outfall 003, Outfall 004, and Outfall 005 were transferred from Greif personnel to DAA personnel.

On October 13, 2011, DAA submitted the composite samples to Air, Water & Soil Laboratories for chemical analysis of the following parameters: oil & grease, BOD, COD, TSS, ammonia, TKN, nitrite, nitrate, total phosphorus, color, iron (Fe-total recoverable)

RECORDED PRECIPITATION

The rain gauge at Outfall 004 registered 3.05 inches of precipitation from 8:30 PM, October 11, 2011, through 1:30 AM, October 13, 2011. The rain gauge at Outfall 004 registered 2.15 inches of precipitation during the 24-hour composite sampling period.

FLOW RATE

Flow rate was measured with automated equipment at Outfall 004 during the 24-hour composite sampling period. The average flow rate is discussed below. Specific details pertaining to the flow rates during the storm event are documented on the attached storm event data forms.

Outfall 004. Based upon site conditions prior to the storm event, the ISCO 4700 was programmed to collect a 100 mL subsample for every 800 gallons of flow.

Flow data collected from the ISCO Bubbler Flow Meter indicates that the average flow rate during the composite sampling period was 2890 gpm.

If you have any questions, please contact Mr. Jeff Norman (Facility Geologist; jnorman@daa.com) or me (Environmental Program Manager; rford@daa.com) by e-mail or telephone (804.264.2228).

Attachments: certificates-of-analyses
storm event data

cc: Mr. Darrell Painter (Greif Packaging, LLC)
Mr. Jeff Norman (DAA - Environmental Services)

CERTIFICATE OF ANALYSIS

GRAB SAMPLES: 10/11/11

AIR WATER & SOIL LABORATORIES, INC.

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Certificate of Analysis

Final Report

Laboratory Order ID 11100186

Client Name:	Draper Aden 8090 Villa Park Dr. Richmond, VA 23228	Date Received: Date Issued:	October 12, 2011 October 20, 2011
Submitted To:	Leonard Ford Jr.	Project Number:	22299-119
Client Site I.D.:	Greif Bros	Purchase Order:	NA

Sample Summary List

Laboratory Sample ID	Sample ID	Sample Date	Receive Date
11100186-001	Outfall 002	10/11/2011	10/12/2011
11100186-002	Outfall 003	10/11/2011	10/12/2011
11100186-003	Outfall 004	10/11/2011	10/12/2011
11100186-004	Outfall 005	10/11/2011	10/12/2011

Ted Soyars

Laboratory Manager

End Notes:

The test results listed in this report relate only to the samples submitted to the laboratory and as received by the Laboratory.

Unless otherwise noted, the test results for solid materials are calculated on a dry weight basis. Analyses for pH, dissolved oxygen, temperature, residual chlorine and sulfite that are performed in the laboratory do not meet NELAC requirements due to extremely short holding times. These analyses should be performed in the field. The results of field analyses performed by the Sampler included in the Certificate of Analysis are done so at the client's request and are not included in the laboratory's fields of certification nor have they been audited for adherence to a reference method or procedure.

The signature on the final report certifies that these results conform to all applicable NELAC standards unless otherwise specified. For a complete list of the Laboratory's NELAC certified parameters please contact customer service.

This report shall not be reproduced except in full without the expressed and written approval of an authorized representative of Air Water & Soil Laboratories, Inc.

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Commonwealth of Virginia
Accreditation # 460021

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Certificate of Analysis

Final Report

Laboratory Order ID 11100186

Client Name: Draper Aden
8090 Villa Park Dr.
Richmond, VA 23228

Date Received: October 12, 2011
Date Issued: October 20, 2011

Submitted To: Leonard Ford Jr.

Project Number: 22299-119

Client Site I.D.: Greif Bros

Purchase Order: NA

Analytical Results

Sample I.D.: Outfall 002

Laboratory Sample I.D.: 11100186-001

Date/Time Sampled: 10/11/11 22:35

Parameter	Method	Sample Results	Qual	Rep Limit	Samp Prep Date/Time	Analysis Date/Time	Analyst
Iron	EPA200.7/R4.4	0.7510 mg/L		0.01	10/14/2011 15:30	10/18/2011 16:14	MWL
ADMI Color pH as received	SM18/2120E	< 25 ADMI Units		25	10/13/2011 12:15	10/13/2011 12:15	JPV
ADMI Color pH = 7.6	SM18/2120E	< 25 ADMI Units		25	10/13/2011 12:15	10/13/2011 12:15	JPV
Ammonia	EPA350.1/R2.0	< 0.1 mg/L		0.1	10/13/2011 13:42	10/13/2011 13:42	JPV
BOD	SM18/5210B	< 2 mg/L		2	10/12/2011 13:17	10/12/2011 13:17	NMK
COD	EPA410.4/R2.0	16.7 mg/L		10	10/17/2011 10:00	10/17/2011 10:00	JPV
Nitrate	Calc.	0.4 mg/L		0.1	10/13/2011 18:04	10/13/2011 18:04	JPV
Nitrate+Nitrite	SM18/4500-NO3 F	0.35 mg/L		0.1	10/14/2011 16:32	10/14/2011 16:32	JPV
Nitrite	SM18/4500-NO2 B	< 0.05 mg/L		0.05	10/13/2011 18:04	10/13/2011 18:04	JPV
Oil and Grease	EPA1664A	< 5 mg/L		5	10/18/2011 10:30	10/18/2011 10:30	NMK
Phosphorus, Total	SM18/4500-P E	0.07 mg/L		0.01	10/13/2011 14:00	10/13/2011 14:00	NMK
TKN	EPA351.2/R2.0	0.3 mg/L		0.2	10/20/2011 12:19	10/20/2011 12:19	JPV
TSS	SM18/2540D	12.2 mg/L		1	10/13/2011 15:43	10/13/2011 15:43	JPV

Initial Grab

102020111710

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Client Site I.D.: Greif Bros

Purchase Order: NA

Analytical Results

Sample I.D.: Outfall 003
Date/Time Sampled: 10/11/11 22:15

Laboratory Sample I.D.: 11100186-002

Parameter	Method	Sample Results	Qual	Rep Limit	Samp Prep Date/Time	Analysis Date/Time	Analyst
Iron	EPA200.7/R4.4	0.7660 mg/L		0.01	10/14/2011 15:30	10/18/2011 16:17	MWL
ADMI Color pH as received	SM18/2120E	< 25 ADMI Units		25	10/13/2011 12:15	10/13/2011 12:15	JPV
ADMI Color pH = 7.6	SM18/2120E	< 25 ADMI Units		25	10/13/2011 12:15	10/13/2011 12:15	JPV
Ammonia	EPA350.1/R2.0	0.13 mg/L		0.1	10/13/2011 13:53	10/13/2011 13:53	JPV
BOD	SM18/5210B	< 2 mg/L		2	10/12/2011 13:21	10/12/2011 13:21	NMK
COD	EPA410.4/R2.0	< 10 mg/L		10	10/17/2011 10:00	10/17/2011 10:00	JPV
Nitrate	Calc.	0.5 mg/L		0.1	10/13/2011 18:04	10/13/2011 18:04	JPV
Nitrate+Nitrite	SM18/4500-NO3 F	0.46 mg/L		0.1	10/14/2011 16:47	10/14/2011 16:47	JPV
Nitrite	SM18/4500-NO2 B	< 0.05 mg/L		0.05	10/13/2011 18:04	10/13/2011 18:04	JPV
Oil and Grease	EPA1664A	< 5 mg/L		5	10/18/2011 10:30	10/18/2011 10:30	NMK
Phosphorus, Total	SM18/4500-P E	0.07 mg/L		0.01	10/13/2011 14:00	10/13/2011 14:00	NMK
TKN	EPA351.2/R2.0	0.2 mg/L		0.2	10/20/2011 12:21	10/20/2011 12:21	JPV
TSS	SM18/2540D	26.8 mg/L		1	10/13/2011 15:43	10/13/2011 15:43	JPV

Initial Grab

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Project Number: 22299-119

Client Site I.D.: Greif Bros

Purchase Order: NA

Analytical Results

Sample I.D.: Outfall 004
Date/Time Sampled: 10/11/11 21:30

Laboratory Sample I.D.: 11100186-003

Parameter	Method	Sample Results	Qual	Rep Limit	Samp Prep Date/Time	Analysis Date/Time	Analyst
Iron	EPA200.7/R4.4	0.4250 mg/L		0.01	10/14/2011 15:30	10/18/2011 16:20	MWL
ADMI Color pH as received	SM18/2120E	< 25 ADMI Units		25	10/13/2011 12:15	10/13/2011 12:15	JPV
ADMI Color pH = 7.6	SM18/2120E	< 25 ADMI Units		25	10/13/2011 12:15	10/13/2011 12:15	JPV
Ammonia	EPA350.1/R2.0	< 0.1 mg/L		0.1	10/13/2011 13:56	10/13/2011 13:56	JPV
BOD	SM18/5210B	< 2 mg/L		2	10/12/2011 13:25	10/12/2011 13:25	NMK
COD	EPA410.4/R2.0	15.8 mg/L		10	10/17/2011 10:00	10/17/2011 10:00	JPV
Nitrate	Calc.	0.2 mg/L		0.1	10/13/2011 18:04	10/13/2011 18:04	JPV
Nitrate+Nitrite	SM18/4500-NO3 F	0.20 mg/L		0.1	10/17/2011 14:32	10/17/2011 14:32	JPV
Nitrite	SM18/4500-NO2 B	< 0.05 mg/L		0.05	10/13/2011 18:04	10/13/2011 18:04	JPV
Oil and Grease	EPA1664A	< 5 mg/L		5	10/18/2011 10:30	10/18/2011 10:30	NMK
Phosphorus, Total	SM18/4500-P E	0.14 mg/L		0.01	10/13/2011 14:00	10/13/2011 14:00	NMK
TKN	EPA351.2/R2.0	0.4 mg/L		0.2	10/20/2011 12:23	10/20/2011 12:23	JPV
TSS	SM18/2540D	8.4 mg/L		1	10/13/2011 15:43	10/13/2011 15:43	JPV

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Project Number: 22299-119

Client Site I.D.: Greif Bros

Purchase Order: NA

Analytical Results

Sample I.D.: Outfall 005
Date/Time Sampled: 10/11/11 21:50

Laboratory Sample I.D.: 11100186-004

Parameter	Method	Sample Results	Qual	Rep Limit	Samp Prep Date/Time	Analysis Date/Time	Analyst
Iron	EPA200.7/R4.4	1.10 mg/L		0.01	10/14/2011 15:30	10/18/2011 16:23	MWL
ADMI Color pH as received	SM18/2120E	28.6 ADMI Units		25	10/13/2011 12:15	10/13/2011 12:15	JPV
ADMI Color pH = 7.6	SM18/2120E	25.9 ADMI Units		25	10/13/2011 12:15	10/13/2011 12:15	JPV
Ammonia	EPA350.1/R2.0	< 0.1 mg/L		0.1	10/13/2011 13:58	10/13/2011 13:58	JPV
BOD	SM18/5210B	< 2 mg/L		2	10/12/2011 13:33	10/12/2011 13:33	NMK
COD	EPA410.4/R2.0	21.8 mg/L		10	10/17/2011 10:00	10/17/2011 10:00	JPV
Nitrate	Calc.	3.3 mg/L		0.1	10/13/2011 18:04	10/13/2011 18:04	JPV
Nitrate+Nitrite	SM18/4500-NO3 F	3.29 mg/L		0.1	10/17/2011 14:35	10/17/2011 14:35	JPV
Nitrite	SM18/4500-NO2 B	< 0.05 mg/L		0.05	10/13/2011 18:04	10/13/2011 18:04	JPV
Oil and Grease	EPA1664A	< 5 mg/L		5	10/18/2011 10:30	10/18/2011 10:30	NMK
Phosphorus, Total	SM18/4500-P E	0.08 mg/L		0.01	10/13/2011 14:00	10/13/2011 14:00	NMK
TKN	EPA351.2/R2.0	1.0 mg/L		0.2	10/20/2011 12:25	10/20/2011 12:25	JPV
TSS	SM18/2540D	20.1 mg/L		1	10/13/2011 15:43	10/13/2011 15:43	JPV

Initial Grab

10202011710

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Submitted To: Leonard Ford Jr.

Project Number: 22299-119

Client Site I.D.: Greif Bros

Purchase Order: NA

Summary of Analytical QC Batches

QC Batch ID	Method	Sample List
QC111013018	SM18/2120E	11100186-001, -002, -003, -004
QC111013023	SM18/2540D	11100186-001, -002, -003, -004
QC111014001	SM18/4500-P E	11100186-001, -002, -003, -004
QC111014007	SM18/4500-NO2 B	11100186-001, -002, -003, -004
QC111014027	EPA350.1/R2.0	11100186-001, -002, -003, -004
QC111017026	SM18/4500-NO3 F	11100186-001, -002
QC111018002	SM18/5210B	11100186-001, -002, -003, -004
QC111018019	SM18/4500-NO3 F	11100186-003, -004
QC111018027	EPA410.4/R2.0	11100186-001, -002, -003, -004
QC111019021	EPA200.7/R4.4	11100186-001, -002, -003, -004
QC111019039	EPA1664A	11100186-001, -002, -003, -004

QC ID	Parameter	Qualifier	Comments
MS	Oil and Grease	M	

QC111020025	EPA351.2/R2.0	11100186-001, -002, -003, -004

Qualifier Definations

Qualifier	Description
M	Matrix spike recovery is outside established acceptance limits.

102020111710

ACCREDITED IN ACCORDANCE WITH nelac
Commonwealth of Virginia
Accreditation # 460021

AIR WATER SOIL LABORATORIES, INC.

2109A NORTH HAMPTON STREET
RICHMOND, VIRGINIA 23230
(804) 358-8295 PHONE
(804)358-8297 FAX

CHAIN OF CUSTODY

PAGE ____ OF ____

COMPANY NAME: Draper Aden Associates	INVOICE TO: Draper Aden Associates	PROJECT NAME/Quote #: Form 2F Stormwater
CONTACT: Leonard Ford	INVOICE CONTACT: Leonard Ford	SITE NAME: Greif
ADDRESS: 8090 Villa Park Drive Richmond VA	INVOICE ADDRESS: 8090 Villa Park Drive	PROJECT NUMBER: 22299-119
PHONE #: 804 264 2228	INVOICE PHONE #: 804 264 2228	P.O. #:
FAX #: 804 264 8773 / EMAIL: rford@daa.com		Pretreatment Program:
Is sample for compliance reporting? (YES) NO	Is sample from a chlorinated supply? YES (NO)	PWS I.D. #:
SAMPLER NAME (PRINT): Jeff Norman	SAMPLER SIGNATURE: [signature]	Turn Around Time: Day(s)

Matrix Codes: WW=Water Water GW=Ground Water DW=Drinking Water S=Soil/Solids OR=Organic A=Air WP=Wipe OT=Other_____

CLIENT SAMPLE I.D.	Grab	Composite	Field Filtered (Dissolved Metals)	Composite Start Date	Composite Start Time	Grab Date or Composite Stop Date	Grab Time or Composite Stop Time	Time Preserved	Matrix (See Codes)	Number of Containers	Oil & Grease (C)	BOD	Ammonia / COD (S)	TSS	Iron - Fe total recoverable (2)	Color / Nitrite	Nitrate / TKN (S)	Total Phosphorus	COMMENTS
1) ~~003~~ Outfall 002	X					10-11-11	2235		SW	9	X	X	X	X	X	X	X	X	
2) Outfall 003	X					10-11-11	2215		SW	9	X	X	X	X	X	X	X	X	
3) Outfall 004	X					10-11-11	2130		SW	9	X	X	X	X	X	X	X	X	
4) Outfall 005	X					10-11-11	2150		SW	9	X	X	X	X	X	X	X	X	
5)																			
6)																			
7)																			
8)																			
9)																			
10)																			

ANALYSIS / (PRESERVATIVE)

Preservative Codes: N=Nitric Acid C=Hydrochloric Acid S=Sulfuric Acid H=Sodium Hydroxide A=Ascorbic Acid Z=Zinc Acetate T=Sodium Thiosulfate M=Methanol

PLEASE NOTE PRESERVATIVE(S), INTERFERENCE CHECKS or PUMP RATE (L/min)

RELINQUISHED:	DATE / TIME	RECEIVED:	DATE / TIME
[signature]	10-12-11 / 1210	A Burgan	10-12-11 1212
RELINQUISHED:	DATE / TIME	RECEIVED:	DATE / TIME
RELINQUISHED:	DATE / TIME	RECEIVED:	DATE / TIME

QC Data Package
- Level I ☐
- Level II ☐
- Level III ☐
- Level IV ☐

LAB USE ONLY

COOLER TEMP 3.7 °C

DA

Greif Bros

11100186

DUE: 10 Days
Recd: 10/12/11

3510.xls

TERMS & CONDITIONS

Where a purchaser (Client) places an order for laboratory, consulting or sampling services from Air Water & Soil Laboratories, Inc., a Virginia corporation (referred to as "Air Water & Soil "), Air Water & Soil shall provide the ordered services pursuant to these Terms and Conditions, and the related Quotation or Price Schedule, or as agreed in a negotiated contract. In the absence of a written agreement to the contrary, the Order constitutes an acceptance by the Client of Air Water & Soil's offer to do business under these Terms and Conditions, and an agreement to be bound by these Terms and Conditions. No contrary or additional terms and conditions expressed in a Client's document shall be deemed to become a part of the contract created upon acceptance of these Terms and Conditions, unless accepted by Air Water & Soil in writing.

1. ORDERS AND RECEIPT OF SAMPLES

1.1 The Client may place the Order (i.e., specify a Scope of Work) either by submitting a purchase order to Air Water & Soil in writing or by telephone subsequently confirmed in writing, or by negotiated contract (i.e. Chain of Custody). Whichever option the Client selects for placing the Order, the Order shall not be valid unless it contains sufficient specification to enable Air Water & Soil to carry out the Client's requirements. In particular, samples must be accompanied by: a) adequate instruction on type of analysis requested, and b) complete written disclosure of the known or suspected presence of any hazardous substances, as defined by applicable federal or state law. Where any samples which were not accompanied by the required disclosure, cause interruptions in the lab's ability to process work due to contamination of instruments or work areas, the Client will be responsible for the costs of clean up and recovery.

1.2 The Client shall provide one week's advance notice of the sample delivery schedule, or any changes to the schedule, whenever possible. Upon timely delivery of samples, Air Water & Soil will use its best efforts to meet mutually agreed turnaround times. All turnaround times are based on business days and will be calculated from the point in time when Air Water & Soil has determined that it can proceed with defined work following receipt, inspection of samples, and resolution of any discrepancies in Chain-of-Custody forms and project guidance regarding work to be done (Sample Delivery Acceptance). In the event of any changes in the sample delivery schedule by the Client, prior to Sample Delivery Acceptance, Air Water & Soil reserves the right to modify its turnaround time commitment, to change the date upon which Air Water & Soil will accept samples, or refuse Sample Delivery Acceptance for the affected samples.

1.2.1 Turn around times are defined as follows: Any sample group requiring a turnaround time of less than five(5) business days will be considered a "Rush Turn Around Time". Rush Turnaround samples received after 3:00pm will be considered as received on the next business day.

1.2.2 Air Water & Soil defines "standard turnaround" as Five (5) business days with exception made for Full TCLP analyses.

1.3 Air Water & Soil reserves the right, exercisable at any time, to refuse or revoke Sample Delivery Acceptance for any sample which in the sole judgment of Air Water & Soil : a) is of unsuitable volume; b) may pose a risk or become unsuitable for handling, transport, or processing for any health, safety, environmental or other reason, whether or not due to the presence in the sample of any hazardous substance and whether or not such presence has been disclosed to Air Water & Soil by the Client; or c) holding times cannot be met, due to passage of more than 48 hours from the time of sampling or 1/2 the holding time for the requested test, whichever is less.

1.4 Prior to Sample Delivery Acceptance, the entire risk of loss or damage to samples remains with the Client, except where Air Water & Soil provides courier services. In no event will Air Water & Soil have any responsibility or liability for the action or inaction of any carrier shipping or delivering any sample to or from Air Water & Soil 's premises. Client is responsible to assure that any sample containing any hazardous substance which is to be delivered to Air Water & Soil 's premises will be packaged, labeled, transported and delivered properly and in accordance with applicable laws.

2. PAYMENT TERMS

2.1 Services performed by Air Water & Soil will be in accordance with prices quoted and later confirmed in writing or as stated in the Price Schedule. Quoted prices do not include sales tax. Applicable sales tax will be added to invoices where required by law. An Environmental Management Fee of 5% of the invoice value will also be applied, at Air Water & Soil's discretion.

2.2 Invoices may be submitted to Client upon completion of any sample delivery group. Billing corrections must be requested within 30 days of invoice date. Payment in advance is required for all Clients except those whose credit has been established with Air Water & Soil. For Clients with approved credit, payment terms are net 30 days from the date of invoice by Air Water & Soil. All overdue payments are subject to an additional interest and service charge of one and one half percent (1.5%) (or the maximum rate permissible by law, whichever is lesser) per month or portion thereof from the due date until the date of payment. All fees are charged or billed directly to the Client. The billing of a third party will not be accepted without a statement, signed by the third party, that acknowledges and accepts payment responsibility.

2.3 Air Water & Soil may suspend work and withhold delivery of data under this order at any time in the event Client fails to make timely payment of its invoices. Client shall be responsible for all costs and expenses of collection including reasonable attorney's fees. Air Water & Soil reserves the right to refuse to proceed with work at any time based upon an unfavorable Client credit report.

3. CHANGE ORDERS, TERMINATION

3.1 Changes to the Scope of Work, price, or result delivery date may be initiated by Air Water & Soil after Sample Delivery Acceptance due to any condition which conflicts with analytical, QA or other protocols warranted in these Terms and Conditions. Air Water & Soil will not proceed with such changes until an agreement with the Client is reached on the amount of any cost, schedule change or technical change to the Scope of Work, and such agreement is documented. Email communications are acceptable, telephone conversations however must be followed up with written documentation.

3.2 Changes to the Scope of Work, including but not limited to increasing or decreasing the work, changing test and analysis specification, or acceleration in the performance of the work may be initiated by the Client after sample delivery acceptance. Such a change will be documented in writing and may result in a change in cost and turnaround time commitment. Air Water & Soil's acceptance of such changes is contingent upon technical feasibility and operational capacity.

3.3 Suspension or termination of all or any part of the work may be initiated by the Client. Air Water & Soil will be compensated consistent with Section 2 of these Terms and Conditions. Air Water & Soil will complete all work in progress and be paid in full for all work completed.

4. WARRANTIES AND LIABILITY

4.1 Where applicable, Air Water & Soil will use analytical methodologies which are in substantial conformity with published test methods. Air Water & Soil has implemented these methods in its Laboratory Quality Manual and referenced Standard Operating Procedures and where the nature or composition of the sample requires it, Air Water & Soil reserves the right to deviate from these methodologies as necessary or appropriate, based on the reasonable judgment of Air Water & Soil , which deviations, if any, will be made on a basis consistent with recognized standards of the industry and/or Air Water & Soil 's Laboratory Quality Manuals. Client may request that Air Water & Soil perform according to a mutually agreed Quality Assurance Project Plan (QAPP). In the event that samples arrive prior to agreement on a QAPP, Air Water & Soil will proceed with analyses under its standard Quality Manuals then in effect, and Air Water & Soil will not be responsible for any re-sampling or other charges if work must be repeated to comply with a subsequently finalized QAPP.

4.2 Air Water & Soil shall start preparation and/or analysis within holding times provided that Sample Delivery Acceptance occurs within 48 hours of sampling or 1/2 of the holding time for the test, whichever is less. Where resolution of inconsistencies leading to Sample Delivery Acceptance does not occur within this period, Air Water & Soil will use its best efforts to meet holding times and will proceed with the work provided that, in Air Water & Soil 's judgment, the chain-of-custody or definition of the Scope of Work provide sufficient guidance. Reanalysis of samples to comply with Air Water & Soil 's Quality Manuals will be deemed to have met holding times provided the initial analysis was performed within the applicable holding time. Where reanalysis demonstrates that sample matrix interference is the cause of failure to meet any Quality Manual requirements, the warranty will be deemed to have been met.

4.3 Air Water & Soil warrants that it possesses and maintains all licenses and certifications which are required to perform services under these Terms and Conditions provided that such requirements are specified in writing to Air Water & Soil prior to Sample Delivery Acceptance.

4.4 The warranty obligations set forth in Sections 4.1, 4.2 and 4.3 are the sole and exclusive warranties given by Air Water & Soil in connection with any services performed by Air Water & Soil or any Results generated from such services, and Air Water & Soil gives and makes NO OTHER REPRESENTATION OR WARRANTY OF ANY KIND, EXPRESS OR IMPLIED. No representative of Air Water & Soil is authorized to give or make any other representation or warranty or modify this warranty in any way.

4.5 Client's sole and exclusive remedy for the breach of warranty in connection with any services performed by Air Water & Soil , will be limited to repeating any services performed, contingent on the Client's providing, at the request of Air Water & Soil and at the Client's expense, additional sample(s) if necessary. Any reanalysis requested by the Client generating Results consistent with the original Results will be at the Client's expense. If re-sampling is necessary, Air Water & Soil 's liability for re-sampling costs will be limited to actual cost or one hundred and fifty dollars ($150) per sample, whichever is less.

4.6 Air Water & Soil 's liability for any and all causes of action arising hereunder, whether based in contract, tort, warranty, negligence or otherwise, shall be limited to the lesser amount of compensation for the services performed or $100,000. All claims, including those for negligence, shall be deemed waived unless suit thereon is filed within one year after Air Water & Soil's completion of the services. Under no circumstances, whether arising in contract, tort (including negligence), or otherwise, shall Air Water & Soil be responsible for loss of use, loss of profits, or for any special, indirect, incidental or consequential damages occasioned by the services performed or by application or use of the reports prepared.

4.7 In no event shall Air Water & Soil have any responsibility or liability to the Client for any failure or delay in performance by Air Water & Soil which results, directly or indirectly, in whole or in part, from any cause or circumstance beyond the reasonable control of Air Water & Soil. Such causes and circumstances shall include, but not be limited to, acts of God, acts of Client, acts or orders of any governmental authority, strikes or other labor disputes, natural disasters, accidents, wars, civil disturbances, equipment breakdown, matrix interference or unknown highly contaminated samples that impact instrument operation, unavailability of supplies from usual suppliers, difficulties or delays in transportation, mail or delivery services, or any other cause beyond Air Water & Soil 's reasonable control.

5. RESULTS, WORK PRODUCT

5.1 Data or information provided to Air Water & Soil or generated by services performed under this agreement shall only become the property of the Client upon receipt in full by Air Water & Soil of payment for the whole Order. Ownership of any analytical method, QA/QC protocols, software programs or equipment developed by Air Water & Soil for performance of work will be retained by Air Water & Soil, and Client shall not disclose such information to any third party.

5.2 Data and sample materials provided by Client or at Client's request, and the result obtained by Air Water & Soil shall be held in confidence (unless such information is generally available to the public or is in the public domain or Client has failed to pay Air Water & Soil for all services rendered or is otherwise in breach of these Terms and Conditions), subject to any disclosure required by law or legal process.

5.3 Should the Results delivered by Air Water & Soil be used by the Client or Client's client, even though subsequently determined not to meet the warranties described in these Terms and Conditions, then the compensation will be adjusted based upon mutual agreement. In no case shall the Client unreasonably withhold Air Water & Soil's right to independently defend its data.

5.4 Air Water & Soil reserves the right to subcontract services ordered by the Client to another laboratory or laboratories, if, in Air Water & Soil's sole judgment, it is reasonably necessary, appropriate or advisable to do so. Air Water & Soil will in no way be liable for any subcontracted services except for work performed at laboratories which have been audited and approved by Air Water & Soil.

5.5 Air Water & Soil shall dispose of the Client's samples 30 days after receipt of samples; 15 days after receipt of samples for BOD, CBOD and TSS analyses, unless instructed to store them for an alternate period of time or to return such samples to the Client, in a manner consistent with U.S. Environmental Protection Agency regulations or other applicable federal, state or local requirements. Any samples for projects that are canceled or not accepted, or for which return was requested, will be returned to the Client at his own expense. Air Water & Soil reserves the right to return to the Client any sample or unused portion of a sample that is not within Air Water & Soil's permitted capability or the capabilities of Air Water & Soil's designated waste disposal vendor(s). 5.6 Unless a different time period is agreed to in any order under these Terms and Conditions, Air Water & Soil agrees to retain all records for five (5) years.

5.7 In the event that Air Water & Soil is required to respond to legal process related to services for Client, Client agrees to reimburse Air Water & Soil for hourly charges for personnel involved in the response and attorney fees reasonably incurred in obtaining advice concerning the response, preparation to testify, and appearances related to the legal process, travel and all reasonable expenses associated with the litigation.

6. INSURANCE

6.1 Air Water & Soil shall maintain in force during the performance of services under these Terms and Conditions, Workers' Compensation and Employer's Liability Insurance in accordance with the laws of the states having jurisdiction over Air Water & Soil's employees who are engaged in the performance of the work. Air Water & Soil shall also maintain during such period, Comprehensive General and Contractual Liability (limit of $1,000,000 per occurrence/ $2,000,000 aggregate), Comprehensive Automobile Liability, owned and hired, ($1,000,000 combined single limit), and Professional/Pollution Liability Insurance (limit of $1,000,000 per occurrence/aggregate).

7. AUDIT

7.1 Upon prior notice to Air Water & Soil, the Client may audit and inspect Air Water & Soil's records and accounts covering reimbursable costs related to work done for the Client, for a period of two (2) years after completion of the work. The purpose of any such audit shall be only for verification of such costs, and Air Water & Soil shall not be required to provide access to cost records where prices are expressed as fixed fees or published unit prices.

8. MISCELLANEOUS PROVISIONS

8.1 These Terms and Conditions, together with any additions or revisions which may be agreed to in writing by Air Water & Soil , embody the whole agreement of the parties and provide the only remedies available. There are no promises, terms, conditions, understandings, obligations or agreements other than those contained herein, and these Terms and Conditions shall supersede all previous communications, representations, or agreements, either verbal or written, between the Client and Air Water & Soil . These Terms and Conditions, and any transactions or agreements to which they apply, shall be governed both as to interpretation and performance by the laws of the state where Air Water & Soil's services are performed.

8.2 The invalidity or unenforceability, in whole or in part of any provision, term or condition hereof shall not affect in any way the validity or enforceability of the remainder to these Terms and Conditions, the intent of the parties being that the provisions be severable. The section headings of these Terms and Conditions are intended solely for convenient reference and shall not define, limit or affect in any way these Terms and Conditions or their interpretations. No waiver by either party of any provision, term or condition hereof or of any obligation of the other party hereunder shall constitute a waiver of any subsequent breach or other obligation.

8.3 The obligations, liabilities, and remedies of the parties, as provided herein, are exclusive and in lieu of any others available at law or in equity. Indemnifications, releases from liability and limitations of liability shall apply, notwithstanding the fault, negligence or strict liability of the party to be indemnified, released, or whose liability is limited, the extent of sole negligence or willful misconduct.

AIR WATER & SOIL

2109A North Hamilton Street • Richmond, Virginia 23230 • Tel : (8

DA

Greif Bros

11100186

DUE: 10 Days
Recd: 10/12/11

Sample Conditions Checkl

Opened by: (Initials) ARLB

Lab ID No.:

Date Cooler Opened: 10-12-11

		YES	NO	N/A
1.	How were samples received? Fed Ex ☐ UPS ☐ Courier ☐ Walk In ☑			
2.	Were custody seals used?	☐	☑	☐
3.	If yes, are custody seals unbroken and intact at the date and time of arrival?	☐	☐	☑
4.	Are the custody papers filled out completely and correctly?	☑	☐	☐
5.	Do all bottle labels agree with custody papers?	☑	☐	☐
6.	Are the samples received on ice?	☑	☐	☐
7.	Is the temperature blank or representative sample within acceptable limits? (above freezing to 6°C)	☑	☐	☐
8.	Are all samples within holding time for requested laboratory tests?	☑	☐	☐
9	Is a sufficient amount of sample provided to perform the tests indicated?	☑	☐	☐
10	Are all samples in proper containers for the analyses requested?	☑	☐	☐
11	Are all samples appropriately preserved for the analyses requested?	☑	☐	☐
12	Are all volatile organic containers free of headspace?	☐	☐	☑

COMMENTS

AIR WATER & SOIL LABORATORIES, INC.

pH Preservation Log

Order ID 11100186

Date Performed: 10-12-11

Analyst Performing Check: ACLB

Sample ID	Container ID	Metals pH as Received < 2	Metals pH as Received Other	Metals Final pH (if adjust.)	Cyanide pH as Received > 12	Cyanide pH as Received Other	Cyanide Final pH (if adjust.)	Sulfide pH as Received > 9	Sulfide pH as Received Other	Sulfide Final pH (if adjust.)	Ammonia pH as Received < 2	Ammonia pH as Received Other	Ammonia Final pH (if adjust.)	TKN pH as Received < 2	TKN pH as Received Other	TKN Final pH (if adjust.)	Phos, Tot pH as Received < 2	Phos, Tot pH as Received Other	Phos, Tot Final pH (if adjust.)	NO3+NO2 pH as Received < 2	NO3+NO2 pH as Received Other	NO3+NO2 Final pH (if adjust.)	DRO pH as Received < 2	DRO pH as Received Other	DRO Final pH (if adjust.)	COD pH as Received < 2	COD pH as Received Other	COD Final pH (if adjust.)	pH as Received	pH as Received Other	Final pH (if adjust.)
001	01	✓																													
001	04										✓															✓					
001	05													✓						✓											
001	06																✓														
002	01	✓																													
002	04										✓															✓					
002	05													✓						✓											
002	06																✓														
003	01	✓																													
003	04										✓															✓					
003	05													✓						✓											
003	06																✓														
004	01	✓																													
004	04										✓															✓					
004	05													✓						✓											
004	06																✓														

CERTIFICATE OF ANALYSIS

COMPOSITE SAMPLES: 10/11/11 – 10/12/11

AIR WATER & SOIL LABORATORIES, INC.

2109A North Hamilton Street • Richmond, Virginia 23230 • Tel: (804) 358-8295 Fax: (804) 358-8297

Certificate of Analysis

Final Report

Laboratory Order ID 11100214

Client Name:	Draper Aden 8090 Villa Park Dr. Richmond, VA 23228	Date Received: Date Issued:	October 13, 2011 October 20, 2011
Submitted To:	Leonard Ford Jr.	Project Number:	NA
Client Site I.D.:	Greif Bros Form 2F Stormwater	Purchase Order:	NA

Sample Summary List

Laboratory Sample ID	Sample ID	Sample Date	Receive Date
11100214-001	Outfall 004	10/12/2011	10/13/2011

Ted Soyars

Laboratory Manager

End Notes:

The test results listed in this report relate only to the samples submitted to the laboratory and as received by the Laboratory.

Unless otherwise noted, the test results for solid materials are calculated on a dry weight basis. Analyses for pH, dissolved oxygen, temperature, residual chlorine and sulfite that are performed in the laboratory do not meet NELAC requirements due to extremely short holding times. These analyses should be performed in the field. The results of field analyses performed by the Sampler included in the Certificate of Analysis are done so at the client's request and are not included in the laboratory's fields of certification nor have they been audited for adherence to a reference method or procedure.

The signature on the final report certifies that these results conform to all applicable NELAC standards unless otherwise specified. For a complete list of the Laboratory's NELAC certified parameters please contact customer service.

This report shall not be reproduced except in full without the expressed and written approval of an authorized representative of Air Water & Soil Laboratories, Inc.

AIR WATER SOIL LABORATORIES, INC.
2109A North Hamilton Street • Richmond, Virginia 23230 • Tel: (804) 358-8295 Fax: (804) 358-8297

Certificate of Analysis

Final Report

Laboratory Order ID 11100214

Client Name: Draper Aden
8090 Villa Park Dr.
Richmond, VA 23228

Date Received: October 13, 2011
Date Issued: October 20, 2011

Submitted To: Leonard Ford Jr.

Project Number: NA

Client Site I.D.: Greif Bros Form 2F Stormwater

Purchase Order: NA

Analytical Results

Sample I.D.: Outfall 004

Laboratory Sample I.D.: 11100214-001

Date/Time Sampled (Start/Stop): 10/11/11 21:30 to 10/12/11 21:30

Parameter	Method	Sample Results	Qual	Rep Limit	Samp Prep Date/Time	Analysis Date/Time	Analyst
Iron	EPA200.7/R4.4	63.6 mg/L		0.01	10/14/2011 15:30	10/20/2011 12:54	MWL
ADMI Color pH as received	SM18/2120E	49.4 ADMI Units		25	10/14/2011 15:50	10/14/2011 15:50	JPV
ADMI Color pH = 7.6	SM18/2120E	48.0 ADMI Units		25	10/14/2011 15:50	10/14/2011 15:50	JPV
Ammonia	EPA350.1/R2.0	< 0.1 mg/L		0.1	10/19/2011 13:06	10/19/2011 13:06	JPV
BOD	SM18/5210B	3.8 mg/L		2	10/13/2011 15:41	10/13/2011 15:41	CGT/EML
COD	EPA410.4/R2.0	396 mg/L		10	10/17/2011 10:00	10/17/2011 10:00	JPV
Nitrate	Calc.	0.6 mg/L		0.1	10/13/2011 18:04	10/13/2011 18:04	JPV
Nitrate+Nitrite	SM18/4500-NO3 F	0.57 mg/L		0.1	10/17/2011 15:50	10/17/2011 15:50	JPV
Nitrite	SM18/4500-NO2 B	< 0.05 mg/L		0.05	10/13/2011 18:04	10/13/2011 18:04	JPV
Oil and Grease	EPA1664A	< 5 mg/L		5	10/18/2011 10:30	10/18/2011 10:30	NMK
Phosphorus, Total	SM18/4500-P E	0.95 mg/L		0.01	10/18/2011 13:30	10/18/2011 13:30	JPV
TKN	EPA351.2/R2.0	6.1 mg/L		0.2	10/18/2011 13:14	10/18/2011 13:14	JPV
TSS	SM18/2540D	483 mg/L		1	10/17/2011 15:04	10/17/2011 15:04	EML

Flow proportional

102020111725

ACCREDITED IN ACCORDANCE WITH nelac
Commonwealth of Virginia
Accreditation # 460021

AIR WATER & SOIL LABORATORIES, INC.
2109A North Hamilton Street • Richmond, Virginia 23230 • Tel: (804) 358-8295 Fax: (804) 358-8297

Certificate of Analysis

Final Report

Laboratory Order ID 11100214

Client Name:	Draper Aden 8090 Villa Park Dr. Richmond, VA 23228	Date Received: Date Issued:	October 13, 2011 October 20, 2011
Submitted To:	Leonard Ford Jr.	Project Number:	NA
Client Site I.D.:	Greif Bros Form 2F Stormwater	Purchase Order:	NA

Summary of Analytical QC Batches

QC Batch ID	Method	Sample List
QC111014007	SM18/4500-NO2 B	11100214-001
QC111017010	SM18/2120E	11100214-001
QC111018019	SM18/4500-NO3 F	11100214-001
QC111018026	EPA351.2/R2.0	11100214-001
QC111018027	EPA410.4/R2.0	11100214-001
QC111019020	SM18/5210B	11100214-001
QC111019028	SM18/4500-P E	11100214-001
QC111019030	SM18/2540D	11100214-001
QC ID	Parameter	Qualifier Comments
Duplicate	TSS	P
QC111019039	EPA1664A	11100214-001
QC ID	Parameter	Qualifier Comments
MS	Oil and Grease	M
QC111020026	EPA200.7/R4.4	11100214-001
QC111020034	EPA350.1/R2.0	11100214-001

Qualifier Definations

Qualifier	Description
M	Matrix spike recovery is outside established acceptance limits.
P	Duplicate analysis does not meet the acceptance criteria for precision

Accredited in accordance with nelac
Commonwealth of Virginia
Accreditation # 460021

102020111725

AIR WATER & SOIL LABORATORIES, INC.

2109A NORTH HAMPTON STREET
RICHMOND, VIRGINIA 23230
(804) 358-8295 PHONE
(804)358-8297 FAX

CHAIN OF CUSTODY

PAGE 1 OF 1

COMPANY NAME: Draper Aden Associates	INVOICE TO: Draper Aden Associates	PROJECT NAME/Quote #: Form 2F-Stormwater
CONTACT: Leonard Ford	INVOICE CONTACT: Leonard Ford	SITE NAME: Greif
ADDRESS: 8090 Villa Park Dr Richmond VA	INVOICE ADDRESS: 8090 Villa Park Dr Richmond	PROJECT NUMBER:
PHONE #: 804 264 2228	INVOICE PHONE #: 804-264-2228	P.O. #:
FAX #: 804 264-8773 / EMAIL: lford@daa.com		Pretreatment Program:
Is sample for compliance reporting? (YES) NO	Is sample from a chlorinated supply? YES (NO)	PWS I.D. #:
SAMPLER NAME (PRINT): Darrell Painter	SAMPLER SIGNATURE: Darrell Painter	Turn Around Time: Day(s)

Matrix Codes: WW=Water Water GW=Ground Water DW=Drinking Water S=Soil/Solids OR=Organic A=Air WP=Wipe OT=Other_____

CLIENT SAMPLE I.D.	Grab	Composite	Field Filtered (Dissolved Metals)	Composite Start Date	Composite Start Time	Grab Date or Composite Stop Date	Grab Time or Composite Stop Time	Time Preserved	Matrix (See Codes)	Number of Containers	Oil & Grease / C	BOD	Ammonia/COD / S	TSS	Iron (Fe - Total Recv) / N	Color/Nitrite	Nitrate/TKN / S	Total Phosphorus / S	COMMENTS (Preservative Codes: N=Nitric Acid C=Hydrochloric Acid S=Sulfuric Acid H=Sodium Hydroxide A=Ascorbic Acid Z=Zinc Acetate T=Sodium Thiosulfate M=Methanol; PLEASE NOTE PRESERVATIVE(S), INTERFERENCE CHECKS or PUMP RATE (L/min))
1) OUTFALL 004		X		10/11/11	2130	10/12/11	2130	2130	OT	9	X	X	X	X	X	X	X	X	
2)																			
3)																			
4)																			
5)																			
6)																			
7)																			
8)																			
9)																			
10)																			

RELINQUISHED:	DATE / TIME	RECEIVED:	DATE / TIME
Billy Calderon	10/13/11 11:25	[signature]	10/13/11 11:25
[signature]	10-13-11/14:20	Jessica Reed	10/13/11 1420
RELINQUISHED:	DATE / TIME	RECEIVED:	DATE / TIME

QC Data Package
- Level I ☐
- Level II ☐
- Level III ☐
- Level IV ☐

LAB USE ONLY

COOLER TEMP 3.1 °C
on ice

DA
Greif Bros

11100214

DUE: 10 Days
Recd: 10/13/11

11100214

.510 xls

TERMS & CONDITIONS

Where a purchaser (Client) places an order for laboratory, consulting or sampling services from Air Water & Soil Laboratories, Inc., a Virginia corporation (referred to as "Air Water & Soil"), Air Water & Soil shall provide the ordered services pursuant to these Terms and Conditions, and the related Quotation or Price Schedule, or as agreed in a negotiated contract. In the absence of a written agreement to the contrary, the Order constitutes an acceptance by the Client of Air Water & Soil's offer to do business under these Terms and Conditions, and an agreement to be bound by these Terms and Conditions. No contrary or additional terms and conditions expressed in a Client's document shall be deemed to become a part of the contract created upon acceptance of these Terms and Conditions, unless accepted by Air Water & Soil in writing.

1. ORDERS AND RECEIPT OF SAMPLES

1.1 The Client may place the Order (i.e., specify a Scope of Work) either by submitting a purchase order to Air Water & Soil in writing or by telephone subsequently confirmed in writing, or by negotiated contract (i.e. Chain of Custody). Whichever option the Client selects for placing the Order, the Order shall not be valid unless it contains sufficient specification to enable Air Water & Soil to carry out the Client's requirements. In particular, samples must be accompanied by: a) adequate instruction on type of analysis requested, and b) complete written disclosure of the known or suspected presence of any hazardous substances, as defined by applicable federal or state law. Where any samples which were not accompanied by the required disclosure, cause interruptions in the lab's ability to process work due to contamination of instruments or work areas, the Client will be responsible for the costs of clean up and recovery.

1.2 The Client shall provide one week's advance notice of the sample delivery schedule, or any changes to the schedule, whenever possible. Upon timely delivery of samples, Air Water & Soil will use its best efforts to meet mutually agreed turnaround times. All turnaround times are based on business days and will be calculated from the point in time when Air Water & Soil has determined that it can proceed with defined work following receipt, inspection of samples, and resolution of any discrepancies in Chain-of-Custody forms and project guidance regarding work to be done (Sample Delivery Acceptance). In the event of any changes in the sample delivery schedule by the Client, prior to Sample Delivery Acceptance, Air Water & Soil reserves the right to modify its turnaround time commitment, to change the date upon which Air Water & Soil will accept samples, or refuse Sample Delivery Acceptance for the affected samples.

1.2.1 Turn around times are defined as follows: Any sample group requiring a turnaround time of less than five(5) business days will be considered a "Rush Turn Around Time". Rush Turnaround samples received after 3:00pm will be considered as received on the next business day.

1.2.2 Air Water & Soil defines "standard turnaround" as Five (5) business days with exception made for Full TCLP analyses.

1.3 Air Water & Soil reserves the right, exercisable at any time, to refuse or revoke Sample Delivery Acceptance for any sample which in the sole judgment of Air Water & Soil : a) is of unsuitable volume; b) may pose a risk or become unsuitable for handling, transport, or processing for any health, safety, environmental or other reason, whether or not due to the presence in the sample of any hazardous substance and whether or not such presence has been disclosed to Air Water & Soil by the Client; or c) holding times cannot be met, due to passage of more than 48 hours from the time of sampling or 1/2 the holding time for the requested test, whichever is less.

1.4 Prior to Sample Delivery Acceptance, the entire risk of loss or damage to samples remains with the Client, except where Air Water & Soil provides courier services. In no event will Air Water & Soil have any responsibility or liability for the action or inaction of any carrier shipping or delivering any sample to or from Air Water & Soil 's premises. Client is responsible to assure that any sample containing any hazardous substance which is to be delivered to Air Water & Soil 's premises will be packaged, labeled, transported and delivered properly and in accordance with applicable laws.

2. PAYMENT TERMS

2.1 Services performed by Air Water & Soil will be in accordance with prices quoted and later confirmed in writing or as stated in the Price Schedule. Quoted prices do not include sales tax. Applicable sales tax will be added to invoices where required by law. An Environmental Management Fee of 5% of the invoice value will also be applied, at Air Water & Soil's discretion.

2.2 Invoices may be submitted to Client upon completion of any sample delivery group. Billing corrections must be requested within 30 days of invoice date. Payment in advance is required for all Clients except those whose credit has been established with Air Water & Soil. For Clients with approved credit, payment terms are net 30 days from the date of invoice by Air Water & Soil. All overdue payments are subject to an additional interest and service charge of one and one half percent (1.5%) (or the maximum rate permissible by law, whichever is lesser) per month or portion thereof from the due date until the date of payment. All fees are charged or billed directly to the Client. The billing of a third party will not be accepted without a statement, signed by the third party, that acknowledges and accepts payment responsibility.

2.3 Air Water & Soil may suspend work and withhold delivery of data under this order at any time in the event Client fails to make timely payment of its invoices. Client shall be responsible for all costs and expenses of collection including reasonable attorney's fees. Air Water & Soil reserves the right to refuse to proceed with work at any time based upon an unfavorable Client credit report.

3. CHANGE ORDERS, TERMINATION

3.1 Changes to the Scope of Work, price, or result delivery date may be initiated by Air Water & Soil after Sample Delivery Acceptance due to any condition which conflicts with analytical, QA or other protocols warranted in these Terms and Conditions. Air Water & Soil will not proceed with such changes until an agreement with the Client is reached on the amount of any cost, schedule change or technical change to the Scope of Work, and such agreement is documented. Email communications are acceptable, telephone conversations however must be followed up with written documentation.

3.2 Changes to the Scope of Work, including but not limited to increasing or decreasing the work, changing test and analysis specification, or acceleration in the performance of the work may be initiated by the Client after sample delivery acceptance. Such a change will be documented in writing and may result in a change in cost and turnaround time commitment. Air Water & Soil's acceptance of such changes is contingent upon technical feasibility and operational capacity.

3.3 Suspension or termination of all or any part of the work may be initiated by the Client. Air Water & Soil will be compensated consistent with Section 2 of these Terms and Conditions. Air Water & Soil will complete all work in progress and be paid in full for all work completed.

4. WARRANTIES AND LIABILITY

4.1 Where applicable, Air Water & Soil will use analytical methodologies which are in substantial conformity with published test methods. Air Water & Soil has implemented these methods in its Laboratory Quality Manual and referenced Standard Operating Procedures and where the nature or composition of the sample requires it, Air Water & Soil reserves the right to deviate from these methodologies as necessary or appropriate, based on the reasonable judgment of Air Water & Soil , which deviations, if any, will be made on a basis consistent with recognized standards of the industry and/or Air Water & Soil 's Laboratory Quality Manuals. Client may request that Air Water & Soil perform according to a mutually agreed Quality Assurance Project Plan (QAPP). In the event that samples arrive prior to agreement on a QAPP, Air Water & Soil will proceed with analyses under its standard Quality Manuals then in effect, and Air Water & Soil will not be responsible for any re-sampling or other charges if work must be repeated to comply with a subsequently finalized QAPP.

4.2 Air Water & Soil shall start preparation and/or analysis within holding times provided that Sample Delivery Acceptance occurs within 48 hours of sampling or 1/2 of the holding time for the test, whichever is less. Where resolution of inconsistencies leading to Sample Delivery Acceptance does not occur within this period, Air Water & Soil will use its best efforts to meet holding times and will proceed with the work provided that, in Air Water & Soil 's judgment, the chain-of-custody or definition of the Scope of Work provide sufficient guidance. Reanalysis of samples to comply with Air Water & Soil 's Quality Manuals will be deemed to have met holding times provided the initial analysis was performed within the applicable holding time. Where reanalysis demonstrates that sample matrix interference is the cause of failure to meet any Quality Manual requirements, the warranty will be deemed to have been met.

4.3 Air Water & Soil warrants that it possesses and maintains all licenses and certifications which are required to perform services under these Terms and Conditions provided that such requirements are specified in writing to Air Water & Soil prior to Sample Delivery Acceptance.

4.4 The warranty obligations set forth in Sections 4.1, 4.2 and 4.3 are the sole and exclusive warranties given by Air Water & Soil in connection with any services performed by Air Water & Soil or any Results generated from such services, and Air Water & Soil gives and makes NO OTHER REPRESENTATION OR WARRANTY OF ANY KIND, EXPRESS OR IMPLIED. No representative of Air Water & Soil is authorized to give or make any other representation or warranty or modify this warranty in any way.

4.5 Client's sole and exclusive remedy for the breach of warranty in connection with any services performed by Air Water & Soil , will be limited to repeating any services performed, contingent on the Client's providing, at the request of Air Water & Soil and at the Client's expense, additional sample(s) if necessary. Any reanalysis requested by the Client generating Results consistent with the original Results will be at the Client's expense. If re-sampling is necessary, Air Water & Soil 's liability for re-sampling costs will be limited to actual cost or one hundred and fifty dollars ($150) per sample, whichever is less.

4.6 Air Water & Soil 's liability for any and all causes of action arising hereunder, whether based in contract, tort, warranty, negligence or otherwise, shall be limited to the lesser amount of compensation for the services performed or $100,000. All claims, including those for negligence, shall be deemed waived unless suit thereon is filed within one year after Air Water & Soil's completion of the services. Under no circumstances, whether arising in contract, tort (including negligence), or otherwise, shall Air Water & Soil be responsible for loss of use, loss of profits, or for any special, indirect, incidental or consequential damages occasioned by the services performed or by application or use of the reports prepared.

4.7 In no event shall Air Water & Soil have any responsibility or liability to the Client for any failure or delay in performance by Air Water & Soil which results, directly or indirectly, in whole or in part, from any cause or circumstance beyond the reasonable control of Air Water & Soil. Such causes and circumstances shall include, but not be limited to, acts of God, acts of Client, acts or orders of any governmental authority, strikes or other labor disputes, natural disasters, accidents, wars, civil disturbances, equipment breakdown, matrix interference or unknown highly contaminated samples that impact instrument operation, unavailability of supplies from usual suppliers, difficulties or delays in transportation, mail or delivery services, or any other cause beyond Air Water & Soil 's reasonable control.

5. RESULTS, WORK PRODUCT

5.1 Data or information provided to Air Water & Soil or generated by services performed under this agreement shall only become the property of the Client upon receipt in full by Air Water & Soil of payment for the whole Order. Ownership of any analytical method, QA/QC protocols, software programs or equipment developed by Air Water & Soil for performance of work will be retained by Air Water & Soil, and Client shall not disclose such information to any third party.

5.2 Data and sample materials provided by Client or at Client's request, and the result obtained by Air Water & Soil shall be held in confidence (unless such information is generally available to the public or is in the public domain or Client has failed to pay Air Water & Soil for all services rendered or is otherwise in breach of these Terms and Conditions), subject to any disclosure required by law or legal process.

5.3 Should the Results delivered by Air Water & Soil be used by the Client or Client's client, even though subsequently determined not to meet the warranties described in these Terms and Conditions, then the compensation will be adjusted based upon mutual agreement. In no case shall the Client unreasonably withhold Air Water & Soil's right to independently defend its data.

5.4 Air Water & Soil reserves the right to subcontract services ordered by the Client to another laboratory or laboratories, if, in Air Water & Soil's sole judgment, it is reasonably necessary, appropriate or advisable to do so. Air Water & Soil will in no way be liable for any subcontracted services except for work performed at laboratories which have been audited and approved by Air Water & Soil.

5.5 Air Water & Soil shall dispose of the Client's samples 30 days after receipt of samples; 15 days after receipt of samples for BOD, CBOD and TSS analyses, unless instructed to store them for an alternate period of time or to return such samples to the Client, in a manner consistent with U.S. Environmental Protection Agency regulations or other applicable federal, state or local requirements. Any samples for projects that are canceled or not accepted, or for which return was requested, will be returned to the Client at his own expense. Air Water & Soil reserves the right to return to the Client any sample or unused portion of a sample that is not within Air Water & Soil's permitted capability or the capabilities of Air Water & Soil's designated waste disposal vendor(s). 5.6 Unless a different time period is agreed to in any order under these Terms and Conditions, Air Water & Soil agrees to retain all records for five (5) years.

5.7 In the event that Air Water & Soil is required to respond to legal process related to services for Client, Client agrees to reimburse Air Water & Soil for hourly charges for personnel involved in the response and attorney fees reasonably incurred in obtaining advice concerning the response, preparation to testify, and appearances related to the legal process, travel and all reasonable expenses associated with the litigation.

6. INSURANCE

6.1 Air Water & Soil shall maintain in force during the performance of services under these Terms and Conditions, Workers' Compensation and Employer's Liability Insurance in accordance with the laws of the states having jurisdiction over Air Water & Soil's employees who are engaged in the performance of the work. Air Water & Soil shall also maintain during such period, Comprehensive General and Contractual Liability (limit of $1,000,000 per occurrence/ $2,000,000 aggregate), Comprehensive Automobile Liability, owned and hired, ($1,000,000 combined single limit), and Professional/Pollution Liability Insurance (limit of $1,000,000 per occurrence/aggregate).

7. AUDIT

7.1 Upon prior notice to Air Water & Soil, the Client may audit and inspect Air Water & Soil's records and accounts covering reimbursable costs related to work done for the Client, for a period of two (2) years after completion of the work. The purpose of any such audit shall be only for verification of such costs, and Air Water & Soil shall not be required to provide access to cost records where prices are expressed as fixed fees or published unit prices.

8. MISCELLANEOUS PROVISIONS

8.1 These Terms and Conditions, together with any additions or revisions which may be agreed to in writing by Air Water & Soil , embody the whole agreement of the parties and provide the only remedies available. There are no promises, terms, conditions, understandings, obligations or agreements other than those contained herein, and these Terms and Conditions shall supersede all previous communications, representations, or agreements, either verbal or written, between the Client and Air Water & Soil . These Terms and Conditions, and any transactions or agreements to which they apply, shall be governed both as to interpretation and performance by the laws of the state where Air Water & Soil's services are performed.

8.2 The invalidity or unenforceability, in whole or in part of any provision, term or condition hereof shall not affect in any way the validity or enforceability of the remainder to these Terms and Conditions, the intent of the parties being that the provisions be severable. The section headings of these Terms and Conditions are intended solely for convenient reference and shall not define, limit or affect in any way these Terms and Conditions or their interpretations. No waiver by either party of any provision, term or condition hereof or of any obligation of the other party hereunder shall constitute a waiver of any subsequent breach or other obligation.

8.3 The obligations, liabilities, and remedies of the parties, as provided herein, are exclusive and in lieu of any others available at law or in equity. Indemnifications, releases from liability and limitations of liability shall apply, notwithstanding the fault, negligence or strict liability of the party to be indemnified, released, or whose liability is limited, the extent of sole negligence or willful misconduct.

AIR WATER SOIL

2109A North Hamilton Street • Richmond, Virginia 23230 • Tel : (8

11100214

DA
Greif Bros

11100214

DUE: 10 Days
Recd: 10/13/11

Sample Conditions Checkli

Opened by: (Initials) A

Lab ID No.:

Date Cooler Opened: 10-13-11

		YES	NO	N/A
1.	How were samples received? Fed Ex ☐ UPS ☐ Courier ☐ Walk In ☑			
2.	Were custody seals used?	☐	☑	☐
3.	If yes, are custody seals unbroken and intact at the date and time of arrival?	☐	☐	☑
4.	Are the custody papers filled out completely and correctly?	☑	☐	☐
5.	Do all bottle labels agree with custody papers?	☑	☐	☐
6.	Are the samples received on ice?	☑	☐	☐
7.	Is the temperature blank or representative sample within acceptable limits? (above freezing to 6°C)	☑	☐	☐
8.	Are all samples within holding time for requested laboratory tests?	☑	☐	☐
9	Is a sufficient amount of sample provided to perform the tests indicated?	☑	☐	☐
10	Are all samples in proper containers for the analyses requested?	☑	☐	☐
11	Are all samples appropriately preserved for the analyses requested?	☑	☐	☐
12	Are all volatile organic containers free of headspace?	☐	☐	☑

COMMENTS

AIR WATER SOIL LABORATORIES, INC.

pH Preservation Log

Order ID 11100214

Date Performed: 10-13-11

Analyst Performing Check: RCC

Sample ID	Container ID	Metals			Cyanide			Sulfide			Ammonia			TKN			Phos, Tot			NO3+NO2			DRO			COD					
		pH as Received		Final pH (If adjust.)	pH as Received		Final pH (If adjust.)	pH as Received		Final pH (If adjust.)	pH as Received		Final pH (If adjust.)	pH as Received		Final pH (If adjust.)	pH as Received		Final pH (If adjust.)	pH as Received		Final pH (If adjust.)	pH as Received		Final pH (If adjust.)	pH as Received		Final pH (If adjust.)	pH as Received		Final pH (If adjust.)
		< 2	Other		> 12	Other		> 9	Other		< 2	Other		< 2	Other		< 2	Other		< 2	Other		< 2	Other		< 2	Other			Other	
001	07										✓															✓					
001	08													✓						✓											
001	09																✓														
001	01	✓																													

THIS DOCUMENT IS UNCONTROLLED WHEN PRINTED

AIR WATER & SOIL LABORATORIES, INC.

2109A North Hamilton Street • Richmond, Virginia 23230 • Tel: (804) 358-8295 Fax: (804) 358-8297

Certificate of Analysis

Final Report

Laboratory Order ID 11100213

Client Name:	Draper Aden 8090 Villa Park Dr. Richmond, VA 23228	Date Received: Date Issued:	October 13, 2011 October 20, 2011
Submitted To:	Leonard Ford Jr.	Project Number:	NA
Client Site I.D.:	Greif Bros Form 2F Stormwater	Purchase Order:	NA

Sample Summary List

Laboratory Sample ID	Sample ID	Sample Date	Receive Date
11100213-001	Outfall 002	10/12/2011	10/13/2011
11100213-002	Outfall 003	10/12/2011	10/13/2011
11100213-003	Outfall 005	10/12/2011	10/13/2011

Ted Soyars

Laboratory Manager

End Notes:

The test results listed in this report relate only to the samples submitted to the laboratory and as received by the Laboratory.

Unless otherwise noted, the test results for solid materials are calculated on a dry weight basis. Analyses for pH, dissolved oxygen, temperature, residual chlorine and sulfite that are performed in the laboratory do not meet NELAC requirements due to extremely short holding times. These analyses should be performed in the field. The results of field analyses performed by the Sampler included in the Certificate of Analysis are done so at the client's request and are not included in the laboratory's fields of certification nor have they been audited for adherence to a reference method or procedure.

The signature on the final report certifies that these results conform to all applicable NELAC standards unless otherwise specified. For a complete list of the Laboratory's NELAC certified parameters please contact customer service.

This report shall not be reproduced except in full without the expressed and written approval of an authorized representative of Air Water & Soil Laboratories, Inc.

Accredited in accordance with the nelac
Commonwealth of Virginia
Accreditation # 460021

AIR WATER & SOIL LABORATORIES, INC.

2109A North Hamilton Street • Richmond, Virginia 23230 • Tel: (804) 358-8295 Fax: (804) 358-8297

Certificate of Analysis

Final Report

Laboratory Order ID 11100213

Client Name: Draper Aden
8090 Villa Park Dr.
Richmond, VA 23228

Date Received: October 13, 2011
Date Issued: October 20, 2011

Submitted To: Leonard Ford Jr.

Project Number: NA

Client Site I.D.: Greif Bros Form 2F Stormwater

Purchase Order: NA

Analytical Results

Sample I.D.: Outfall 002

Laboratory Sample I.D.: 11100213-001

Date/Time Sampled (Start/Stop): 10/11/11 22:35 to 10/12/11 22:35

Parameter	Method	Sample Results	Qual	Rep Limit	Samp Prep Date/Time	Analysis Date/Time	Analyst
Iron	EPA200.7/R4.4	5.59 mg/L		0.01	10/14/2011 15:30	10/20/2011 13:44	MWL
ADMI Color pH as received	SM18/2120E	27.8 ADMI Units		25	10/14/2011 15:50	10/14/2011 15:50	JPV
ADMI Color pH = 7.6	SM18/2120E	27.7 ADMI Units		25	10/14/2011 15:50	10/14/2011 15:50	JPV
Ammonia	EPA350.1/R2.0	< 0.1 mg/L		0.1	10/19/2011 12:59	10/19/2011 12:59	JPV
BOD	SM18/5210B	2.7 mg/L		2	10/13/2011 15:22	10/13/2011 15:22	CGT/EML
COD	EPA410.4/R2.0	31.3 mg/L		10	10/17/2011 10:00	10/17/2011 10:00	JPV
Nitrate	Calc.	0.2 mg/L		0.1	10/13/2011 18:04	10/13/2011 18:04	JPV
Nitrate+Nitrite	SM18/4500-NO3 F	0.24 mg/L		0.1	10/17/2011 15:29	10/17/2011 15:29	JPV
Nitrite	SM18/4500-NO2 B	< 0.05 mg/L		0.05	10/13/2011 18:04	10/13/2011 18:04	JPV
Oil and Grease	EPA1664A	< 5 mg/L		5	10/18/2011 10:30	10/18/2011 10:30	NMK
Phosphorus, Total	SM18/4500-P E	0.26 mg/L		0.01	10/18/2011 13:30	10/18/2011 13:30	JPV
TKN	EPA351.2/R2.0	0.8 mg/L		0.2	10/18/2011 13:08	10/18/2011 13:08	JPV
TSS	SM18/2540D	45.4 mg/L		1	10/17/2011 15:04	10/17/2011 15:04	EML

Not flow proportional

102020111724

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Commonwealth of Virginia
Accreditation # 460021

AIR WATER & SOIL LABORATORIES, INC.

2109A North Hamilton Street • Richmond, Virginia 23230 • Tel: (804) 358-8295 Fax: (804) 358-8297

Certificate of Analysis

Final Report

Laboratory Order ID 11100213

Client Name: Draper Aden
8090 Villa Park Dr.
Richmond, VA 23228

Date Received: October 13, 2011
Date Issued: October 20, 2011

Submitted To: Leonard Ford Jr.

Project Number: NA

Client Site I.D.: Greif Bros Form 2F Stormwater

Purchase Order: NA

Analytical Results

Sample I.D.: Outfall 003

Laboratory Sample I.D.: 11100213-002

Date/Time Sampled (Start/Stop): 10/11/11 22:15 to 10/12/11 22:15

Parameter	Method	Sample Results	Qual	Rep Limit	Samp Prep Date/Time	Analysis Date/Time	Analyst
Iron	EPA200.7/R4.4	4.06 mg/L		0.01	10/14/2011 15:30	10/20/2011 13:47	MWL
ADMI Color pH as received	SM18/2120E	44.0 ADMI Units		25	10/14/2011 15:50	10/14/2011 15:50	JPV
ADMI Color pH = 7.6	SM18/2120E	40.0 ADMI Units		25	10/14/2011 15:50	10/14/2011 15:50	JPV
Ammonia	EPA350.1/R2.0	< 0.1 mg/L		0.1	10/19/2011 13:01	10/19/2011 13:01	JPV
BOD	SM18/5210B	2.3 mg/L		2	10/13/2011 15:25	10/13/2011 15:25	CGT/EML
COD	EPA410.4/R2.0	25.3 mg/L		10	10/17/2011 10:00	10/17/2011 10:00	JPV
Nitrate	Calc.	0.6 mg/L		0.1	10/13/2011 18:04	10/13/2011 18:04	JPV
Nitrate+Nitrite	SM18/4500-NO3 F	0.62 mg/L		0.1	10/17/2011 15:44	10/17/2011 15:44	JPV
Nitrite	SM18/4500-NO2 B	< 0.05 mg/L		0.05	10/13/2011 18:04	10/13/2011 18:04	JPV
Oil and Grease	EPA1664A	< 5 mg/L		5	10/18/2011 10:30	10/18/2011 10:30	NMK
Phosphorus, Total	SM18/4500-P E	0.24 mg/L		0.01	10/18/2011 13:30	10/18/2011 13:30	JPV
TKN	EPA351.2/R2.0	0.8 mg/L		0.2	10/18/2011 13:10	10/18/2011 13:10	JPV
TSS	SM18/2540D	52.8 mg/L		1	10/17/2011 15:04	10/17/2011 15:04	EML

not flow proportional

102020111724

ACCREDITED IN ACCORDANCE WITH nelac
Commonwealth of Virginia
Accreditation # 460021

AIR WATER & SOIL LABORATORIES, INC.

2109A North Hamilton Street • Richmond, Virginia 23230 • Tel: (804) 358-8295 Fax: (804) 358-8297

Certificate of Analysis

Final Report

Laboratory Order ID 11100213

Client Name: Draper Aden
8090 Villa Park Dr.
Richmond, VA 23228

Date Received: October 13, 2011
Date Issued: October 20, 2011

Submitted To: Leonard Ford Jr.

Project Number: NA

Client Site I.D.: Greif Bros Form 2F Stormwater

Purchase Order: NA

Analytical Results

Sample I.D.: Outfall 005

Laboratory Sample I.D.: 11100213-003

Date/Time Sampled (Start/Stop): 10/11/11 21:50 to 10/12/11 21:50

Parameter	Method	Sample Results	Qual	Rep Limit	Samp Prep Date/Time	Analysis Date/Time	Analyst
Iron	EPA200.7/R4.4	4.30 mg/L		0.01	10/14/2011 15:30	10/20/2011 13:49	MWL
ADMI Color pH as received	SM18/2120E	81.1 ADMI Units		25	10/14/2011 15:50	10/14/2011 15:50	JPV
ADMI Color pH = 7.6	SM18/2120E	72.9 ADMI Units		25	10/14/2011 15:50	10/14/2011 15:50	JPV
Ammonia	EPA350.1/R2.0	< 0.1 mg/L		0.1	10/19/2011 13:03	10/19/2011 13:03	JPV
BOD	SM18/5210B	6.1 mg/L		2	10/13/2011 15:38	10/13/2011 15:38	CGT/EML
COD	EPA410.4/R2.0	47.8 mg/L		10	10/17/2011 10:00	10/17/2011 10:00	JPV
Nitrate	Calc.	2.4 mg/L		0.1	10/13/2011 18:04	10/13/2011 18:04	JPV
Nitrate+Nitrite	SM18/4500-NO3 F	2.42 mg/L		0.1	10/17/2011 15:47	10/17/2011 15:47	JPV
Nitrite	SM18/4500-NO2 B	< 0.05 mg/L		0.05	10/13/2011 18:04	10/13/2011 18:04	JPV
Oil and Grease	EPA1664A	< 5 mg/L		5	10/18/2011 10:30	10/18/2011 10:30	NMK
Phosphorus, Total	SM18/4500-P E	0.24 mg/L		0.01	10/18/2011 13:30	10/18/2011 13:30	JPV
TKN	EPA351.2/R2.0	1.2 mg/L		0.2	10/18/2011 13:12	10/18/2011 13:12	JPV
TSS	SM18/2540D	9.9 mg/L		1	10/17/2011 15:04	10/17/2011 15:04	EML

Not flow proportional

102020111724

ACCREDITED IN ACCORDANCE WITH nelac
Commonwealth of Virginia
Accreditation # 460021

AIR WATER & SOIL LABORATORIES, INC.
2109A North Hamilton Street • Richmond, Virginia 23230 • Tel: (804) 358-8295 Fax: (804) 358-8297

Certificate of Analysis

Final Report

Laboratory Order ID 11100213

Client Name:	Draper Aden 8090 Villa Park Dr. Richmond, VA 23228	Date Received: Date Issued:	October 13, 2011 October 20, 2011
Submitted To:	Leonard Ford Jr.	Project Number:	NA
Client Site I.D.:	Greif Bros Form 2F Stormwater	Purchase Order:	NA

Summary of Analytical QC Batches

QC Batch ID	Method	Sample List
QC111014007	SM18/4500-NO2 B	11100213-001, -002, -003
QC111017010	SM18/2120E	11100213-001, -002, -003
QC111018019	SM18/4500-NO3 F	11100213-001, -002, -003
QC111018026	EPA351.2/R2.0	11100213-001, -002, -003
QC111018027	EPA410.4/R2.0	11100213-001, -002, -003
QC111019020	SM18/5210B	11100213-001, -002, -003
QC111019028	SM18/4500-P E	11100213-001, -002, -003
QC111019030	SM18/2540D	11100213-001, -002, -003
QC ID	Parameter	Qualifier Comments
Duplicate	TSS	P
QC111019039	EPA1664A	11100213-001, -002, -003
QC ID	Parameter	Qualifier Comments
MS	Oil and Grease	M
QC111020027	EPA200.7/R4.4	11100213-001, -002, -003
QC111020034	EPA350.1/R2.0	11100213-001, -002, -003

Qualifier Definations

Qualifier	Description
M	Matrix spike recovery is outside established acceptance limits.
P	Duplicate analysis does not meet the acceptance criteria for precision

102020111724

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Commonwealth of Virginia
Accreditation # 460021

AIR WATER SOIL LABORATORIES, INC.

2109A NORTH HAMILTON STREET
RICHMOND, VIRGINIA 23230
(804) 358-8295 PHONE
(804)358-8297 FAX

CHAIN OF CUSTODY

COMPANY NAME: Draper Aden Associates	INVOICE TO: Draper Aden Associates	PROJECT NAME/Quote #: Form 2F Stormwater
CONTACT: Leonard Ford	INVOICE CONTACT: Leonard Ford	SITE NAME: Greif
ADDRESS: 8090 Villa Park Dr Richmond VA	INVOICE ADDRESS: 8090 Villa Park Dr Richmond VA	PROJECT NUMBER:
PHONE #: 804 264 2228	INVOICE PHONE #: 804 264 2228	P.O. #:
FAX #: 804 264 ~~2228~~ 8773	EMAIL: kford@daa.com	Pretreatment Program:
Is sample for compliance reporting? YES (NO)	Is sample from a chlorinated supply? YES (NO)	PWS I.D. #:
SAMPLER NAME (PRINT): Darrell Painter	SAMPLER SIGNATURE: Darrell Painter	Turn Around Time: Day(s)

Matrix Codes: WW=Water Water GW=Ground Water DW=Drinking Water S=Soil/Solids OR=Organic A=Air WP=Wipe OT=Other

CLIENT SAMPLE I.D.	Grab	Composite	Field Filtered (Dissolved Metals)	Composite Start Date	Composite Start Time	Grab Date or Composite Stop Date	Grab Time or Composite Stop Time	Time Preserved	Matrix (See Codes)	Number of Containers	Oil & Grease (C)	BOD	Ammonia/COD (S)	TSS	Iron (Fe-Total Zec) (N)	Color/Nitrite	Nitrate/TKN (S)	Total Phosphorus (S)	COMMENTS
1) Outfall 002	X	X		10/11/11	2235	10/12/11	2235	2235	OT	9	X	X	X	X	X	X	X	X	
2) Outfall 003	X	X		10/11/11	2215	10/12/11	2215	2215	OT	9	X	X	X	X	X	X	X	X	
~~3) Outfall 004~~	X																		
4) Outfall 005	X	X		10/11/11	2150	10/12/11	2150	2150	OT	9	X	X	X	X	X	X	X	X	
5)																			
6)																			
7)																			
8)																			
9)																			
10)																			

ANALYSIS / (PRESERVATIVE)

Preservative Codes: N=Nitric Acid C=Hydrochloric Acid S=Sulfuric Acid Na=Sodium Hydroxide A=Ascorbic Acid Z=Zinc Acetate T=Sodium Thiosulfate M=Methanol

PLEASE NOTE PRESERVATIVE(S), INTERFERENCE CHECKS or PUMP RATE (L/min)

RELINQUISHED:	DATE / TIME	RECEIVED:	DATE / TIME
[signature]	10/13/11 11:25	[signature]	10-13-11/11:25
[signature]	10-13-11/14:20	[signature]	10/13/11 1420
RELINQUISHED:	DATE / TIME	RECEIVED:	DATE / TIME

QC Data Package: Level I ☐ Level II ☐ Level III ☐ Level IV ☐

LAB USE ONLY

COOLER TEMP 3.1 °C

11100213

DA
Greif Bros

11100213
DUE: 10 Days
Recd: 10/13/11

TERMS & CONDITIONS

Where a purchaser (Client) places an order for laboratory, consulting or sampling services from Air Water & Soil Laboratories, Inc., a Virginia corporation (referred to as "Air Water & Soil"), Air Water & Soil shall provide the ordered services pursuant to these Terms and Conditions, and the related Quotation or Price Schedule, or as agreed in a negotiated contract. In the absence of a written agreement to the contrary, the Order constitutes an acceptance by the Client of Air Water & Soil's offer to do business under these Terms and Conditions, and an agreement to be bound by these Terms and Conditions. No contrary or additional terms and conditions expressed in a Client's document shall be deemed to become a part of the contract created upon acceptance of these Terms and Conditions, unless accepted by Air Water & Soil in writing.

1. ORDERS AND RECEIPT OF SAMPLES

1.1 The Client may place the Order (i.e., specify a Scope of Work) either by submitting a purchase order to Air Water & Soil in writing or by telephone subsequently confirmed in writing, or by negotiated contract (i.e. Chain of Custody). Whichever option the Client selects for placing the Order, the Order shall not be valid unless it contains sufficient specification to enable Air Water & Soil to carry out the Client's requirements. In particular, samples must be accompanied by: a) adequate instruction on type of analysis requested, and b) complete written disclosure of the known or suspected presence of any hazardous substances, as defined by applicable federal or state law. Where any samples which were not accompanied by the required disclosure, cause interruptions in the lab's ability to process work due to contamination of instruments or work areas, the Client will be responsible for the costs of clean up and recovery.

1.2 The Client shall provide one week's advance notice of the sample delivery schedule, or any changes to the schedule, whenever possible. Upon timely delivery of samples, Air Water & Soil will use its best efforts to meet mutually agreed turnaround times. All turnaround times are based on business days and will be calculated from the point in time when Air Water & Soil has determined that it can proceed with defined work following receipt, inspection of samples, and resolution of any discrepancies in Chain-of-Custody forms and project guidance regarding work to be done (Sample Delivery Acceptance). In the event of any changes in the sample delivery schedule by the Client, prior to Sample Delivery Acceptance, Air Water & Soil reserves the right to modify its turnaround time commitment, to change the date upon which Air Water & Soil will accept samples, or refuse Sample Delivery Acceptance for the affected samples.

1.2.1 Turn around times are defined as follows: Any sample group requiring a turnaround time of less than five(5) business days will be considered a "Rush Turn Around Time". Rush Turnaround samples received after 3:00pm will be considered as received on the next business day.

1.2.2 Air Water & Soil defines "standard turnaround" as Five (5) business days with exception made for Full TCLP analyses.

1.3 Air Water & Soil reserves the right, exercisable at any time, to refuse or revoke Sample Delivery Acceptance for any sample which in the sole judgment of Air Water & Soil : a) is of unsuitable volume; b) may pose a risk or become unsuitable for handling, transport, or processing for any health, safety, environmental or other reason, whether or not due to the presence in the sample of any hazardous substance and whether or not such presence has been disclosed to Air Water & Soil by the Client; or c) holding times cannot be met, due to passage of more than 48 hours from the time of sampling or 1/2 the holding time for the requested test, whichever is less.

1.4 Prior to Sample Delivery Acceptance, the entire risk of loss or damage to samples remains with the Client, except where Air Water & Soil provides courier services. In no event will Air Water & Soil have any responsibility or liability for the action or inaction of any carrier shipping or delivering any sample to or from Air Water & Soil 's premises. Client is responsible to assure that any sample containing any hazardous substance which is to be delivered to Air Water & Soil 's premises will be packaged, labeled, transported and delivered properly and in accordance with applicable laws.

2. PAYMENT TERMS

2.1 Services performed by Air Water & Soil will be in accordance with prices quoted and later confirmed in writing or as stated in the Price Schedule. Quoted prices do not include sales tax. Applicable sales tax will be added to invoices where required by law. An Environmental Management Fee of 5% of the invoice value will also be applied, at Air Water & Soil's discretion.

2.2 Invoices may be submitted to Client upon completion of any sample delivery group. Billing corrections must be requested within 30 days of invoice date. Payment in advance is required for all Clients except those whose credit has been established with Air Water & Soil. For Clients with approved credit, payment terms are net 30 days from the date of invoice by Air Water & Soil. All overdue payments are subject to an additional interest and service charge of one and one half percent (1.5%) (or the maximum rate permissible by law, whichever is lesser) per month or portion thereof from the due date until the date of payment. All fees are charged or billed directly to the Client. The billing of a third party will not be accepted without a statement, signed by the third party, that acknowledges and accepts payment responsibility.

2.3 Air Water & Soil may suspend work and withhold delivery of data under this order at any time in the event Client fails to make timely payment of its invoices. Client shall be responsible for all costs and expenses of collection including reasonable attorney's fees. Air Water & Soil reserves the right to refuse to proceed with work at any time based upon an unfavorable Client credit report.

3. CHANGE ORDERS, TERMINATION

3.1 Changes to the Scope of Work, price, or result delivery date may be initiated by Air Water & Soil after Sample Delivery Acceptance due to any condition which conflicts with analytical, QA or other protocols warranted in these Terms and Conditions. Air Water & Soil will not proceed with such changes until an agreement with the Client is reached on the amount of any cost, schedule change or technical change to the Scope of Work, and such agreement is documented. Email communications are acceptable, telephone conversations however must be followed up with written documentation.

3.2 Changes to the Scope of Work, including but not limited to increasing or decreasing the work, changing test and analysis specification, or acceleration to the performance of the work may be initiated by the Client after sample delivery acceptance. Such a change will be documented in writing and may result in a change in cost and turnaround time commitment. Air Water & Soil's acceptance of such changes is contingent upon technical feasibility and operational capacity.

3.3 Suspension or termination of all or any part of the work may be initiated by the Client. Air Water & Soil will be compensated consistent with Section 2 of these Terms and Conditions. Air Water & Soil will complete all work in progress and be paid in full for all work completed.

4. WARRANTIES AND LIABILITY

4.1 Where applicable, Air Water & Soil will use analytical methodologies which are in substantial conformity with published test methods. Air Water & Soil has implemented these methods in its Laboratory Quality Manual and referenced Standard Operating Procedures and where the nature or composition of the sample requires it, Air Water & Soil reserves the right to deviate from these methodologies as necessary or appropriate, based on the reasonable judgment of Air Water & Soil , which deviations, if any, will be made on a basis consistent with recognized standards of the industry and/or Air Water & Soil 's Laboratory Quality Manuals. Client may request that Air Water & Soil perform according to a mutually agreed Quality Assurance Project Plan (QAPP). In the event that samples arrive prior to agreement on a QAPP, Air Water & Soil will proceed with analyses under its standard Quality Manuals then in effect, and Air Water & Soil will not be responsible for any re-sampling or other charges if work must be repeated to comply with a subsequently finalized QAPP.

4.2 Air Water & Soil shall start preparation and/or analysis within holding times provided that Sample Delivery Acceptance occurs within 48 hours of sampling or 1/2 of the holding time for the test, whichever is less. Where resolution of inconsistencies leading to Sample Delivery Acceptance does not occur within this period, Air Water & Soil will use its best efforts to meet holding times and will proceed with the work provided that, in Air Water & Soil 's judgment, the chain-of-custody or definition of the Scope of Work provide sufficient guidance. Reanalysis of samples to comply with Air Water & Soil 's Quality Manuals will be deemed to have met holding times provided the initial analysis was performed within the applicable holding time. Where reanalysis demonstrates that sample matrix interference is the cause of failure to meet any Quality Manual requirements, the warranty will be deemed to have been met.

4.3 Air Water & Soil warrants that it possesses and maintains all licenses and certifications which are required to perform services under these Terms and Conditions provided that such requirements are specified in writing to Air Water & Soil prior to Sample Delivery Acceptance.

4.4 The warranty obligations set forth in Sections 4.1, 4.2 and 4.3 are the sole and exclusive warranties given by Air Water & Soil in connection with any services performed by Air Water & Soil or any Results generated from such services, and Air Water & Soil gives and makes NO OTHER REPRESENTATION OR WARRANTY OF ANY KIND, EXPRESS OR IMPLIED. No representative of Air Water & Soil is authorized to give or make any other representation or warranty or modify this warranty in any way.

4.5 Client's sole and exclusive remedy for the breach of warranty in connection with any services performed by Air Water & Soil , will be limited to repeating any services performed, contingent on the Client's providing, at the request of Air Water & Soil and at the Client's expense, additional sample(s) if necessary. Any reanalysis requested by the Client generating Results consistent with the original Results will be at the Client's expense. If re-sampling is necessary, Air Water & Soil 's liability for re-sampling costs will be limited to actual cost or one hundred and fifty dollars ($150) per sample, whichever is less.

4.6 Air Water & Soil 's liability for any and all causes of action arising hereunder, whether based in contract, tort, warranty, negligence or otherwise, shall be limited to the lesser amount of compensation for the services performed or $100,000. All claims, including those for negligence, shall be deemed waived unless suit thereon is filed within one year after Air Water & Soil's completion of the services. Under no circumstances, whether arising in contract, tort (including negligence), or otherwise, shall Air Water & Soil be responsible for loss of use, loss of profits, or for any special, indirect, incidental or consequential damages occasioned by the services performed or by application or use of the reports prepared.

4.7 In no event shall Air Water & Soil have any responsibility or liability to the Client for any failure or delay in performance by Air Water & Soil which results, directly or indirectly, in whole or in part, from any cause or circumstance beyond the reasonable control of Air Water & Soil. Such causes and circumstances shall include, but not be limited to, acts of God, acts of Client, acts or orders of any governmental authority, strikes or other labor disputes, natural disasters, accidents, wars, civil disturbances, equipment breakdown, matrix interference or unknown highly contaminated samples that impact instrument operation, unavailability of supplies from usual suppliers, difficulties or delays in transportation, mail or delivery services, or any other cause beyond Air Water & Soil 's reasonable control.

5. RESULTS, WORK PRODUCT

5.1 Data or information provided to Air Water & Soil or generated by services performed under this agreement shall only become the property of the Client upon receipt in full by Air Water & Soil of payment for the whole Order. Ownership of any analytical method, QA/QC protocols, software programs or equipment developed by Air Water & Soil for performance of work will be retained by Air Water & Soil, and Client shall not disclose such information to any third party.

5.2 Data and sample materials provided by Client or at Client's request, and the result obtained by Air Water & Soil shall be held in confidence (unless such information is generally available to the public or is in the public domain or Client has failed to pay Air Water & Soil for all services rendered or is otherwise in breach of these Terms and Conditions), subject to any disclosure required by law or legal process.

5.3 Should the Results delivered by Air Water & Soil be used by the Client or Client's client, even though subsequently determined not to meet the warranties described in these Terms and Conditions, then the compensation will be adjusted based upon mutual agreement. In no case shall the Client unreasonably withhold Air Water & Soil's right to independently defend its data.

5.4 Air Water & Soil reserves the right to subcontract services ordered by the Client to another laboratory or laboratories, if, in Air Water & Soil's sole judgment, it is reasonably necessary, appropriate or advisable to do so. Air Water & Soil will in no way be liable for any subcontracted services except for work performed at laboratories which have been audited and approved by Air Water & Soil.

5.5 Air Water & Soil shall dispose of the Client's samples 30 days after receipt of samples; 15 days after receipt of samples for BOD, CBOD and TSS analyses, unless instructed to store them for an alternate period of time or to return such samples to the Client, in a manner consistent with U.S. Environmental Protection Agency regulations or other applicable federal, state or local requirements. Any samples for projects that are canceled or not accepted, or for which return was requested, will be returned to the Client at his own expense. Air Water & Soil reserves the right to return to the Client any sample or unused portion of a sample that is not within Air Water & Soil's permitted capability or the capabilities of Air Water & Soil's designated waste disposal vendor(s). 5.6 Unless a different time period is agreed to in any order under these Terms and Conditions, Air Water & Soil agrees to retain all records for five (5) years.

5.7 In the event that Air Water & Soil is required to respond to legal process related to services for Client, Client agrees to reimburse Air Water & Soil for hourly charges for personnel involved in the response and attorney fees reasonably incurred in obtaining advice concerning the response, preparation to testify, and appearances related to the legal process, travel and all reasonable expenses associated with the litigation.

6. INSURANCE

6.1 Air Water & Soil shall maintain in force during the performance of services under these Terms and Conditions, Workers' Compensation and Employer's Liability Insurance in accordance with the laws of the states having jurisdiction over Air Water & Soil's employees who are engaged in the performance of the work. Air Water & Soil shall also maintain during such period, Comprehensive General and Contractual Liability (limit of $1,000,000 per occurrence/ $2,000,000 aggregate). Comprehensive Automobile Liability, owned and hired, ($1,000,000 combined single limit), and Professional/Pollution Liability Insurance (limit of $1,000,000 per occurrence/aggregate).

7. AUDIT

7.1 Upon prior notice to Air Water & Soil, the Client may audit and inspect Air Water & Soil's records and accounts covering reimbursable costs related to work done for the Client, for a period of two (2) years after completion of the work. The purpose of any such audit shall be only for verification of such costs, and Air Water & Soil shall not be required to provide access to cost records where prices are expressed as fixed fees or published unit prices.

8. MISCELLANEOUS PROVISIONS

8.1 These Terms and Conditions, together with any additions or revisions which may be agreed to in writing by Air Water & Soil , embody the whole agreement of the parties and provide the only remedies available. There are no promises, terms, conditions, understandings, obligations or agreements other than those contained herein, and these Terms and Conditions shall supersede all previous communications, representations, or agreements, either verbal or written, between the Client and Air Water & Soil . These Terms and Conditions, and any transactions or agreements to which they apply, shall be governed both as to interpretation and performance by the laws of the state where Air Water & Soil's services are performed.

8.2 The invalidity or unenforceability, in whole or in part of any provision, term or condition hereof shall not affect in any way the validity or enforceability of the remainder to these Terms and Conditions, the intent of the parties being that the provisions be severable. The section headings of these Terms and Conditions are intended solely for convenient reference and shall not define, limit or affect in any way these Terms and Conditions or their interpretations. No waiver by either party of any provision, term or condition hereof or of any obligation of the other party hereunder shall constitute a waiver of any subsequent breach or other obligation.

8.3 The obligations, liabilities, and remedies of the parties, as provided herein, are exclusive and in lieu of any others available at law or in equity. Indemnifications, releases from liability and limitations of liability shall apply, notwithstanding the fault, negligence or strict liability of the party to be indemnified, released, or whose liability is limited, the extent of sole negligence or willful misconduct.

AIR WATER & SOIL

2109A North Hamilton Street • Richmond, Virginia 23230 • Tel : (8

11100213

DA

Greif Bros

11100213

DUE: 10 Days
Recd: 10/13/11

Sample Conditions Checkl

Opened by: (Initials) DKB

Lab ID No.:

Date Cooler Opened: 10-13-11

		YES	NO	N/A
1.	How were samples received? Fed Ex ☐ UPS ☐ Courier ☐ Walk In ☑			
2.	Were custody seals used?	☐	☑	☐
3.	If yes, are custody seals unbroken and intact at the date and time of arrival?	☐	☐	☑
4.	Are the custody papers filled out completely and correctly?	☑	☐	☐
5.	Do all bottle labels agree with custody papers?	☑	☐	☐
6.	Are the samples received on ice?	☑	☐	☐
7.	Is the temperature blank or representative sample within acceptable limits? (above freezing to 6°C)	☑	☐	☐
8.	Are all samples within holding time for requested laboratory tests?	☑	☐	☐
9	Is a sufficient amount of sample provided to perform the tests indicated?	☑	☐	☐
10	Are all samples in proper containers for the analyses requested?	☑	☐	☐
11	Are all samples appropriately preserved for the analyses requested?	☑	☐	☐
12	Are all volatile organic containers free of headspace?	☑	☐	☑

AP 10/24

COMMENTS

AIR WATER SOIL LABORATORIES, INC

pH Preservation Log

pH Log
Form #: F1301
Effective: August 2, 2010
Page 1 of 1

Order ID 11100213

Date Performed: 10.03.11

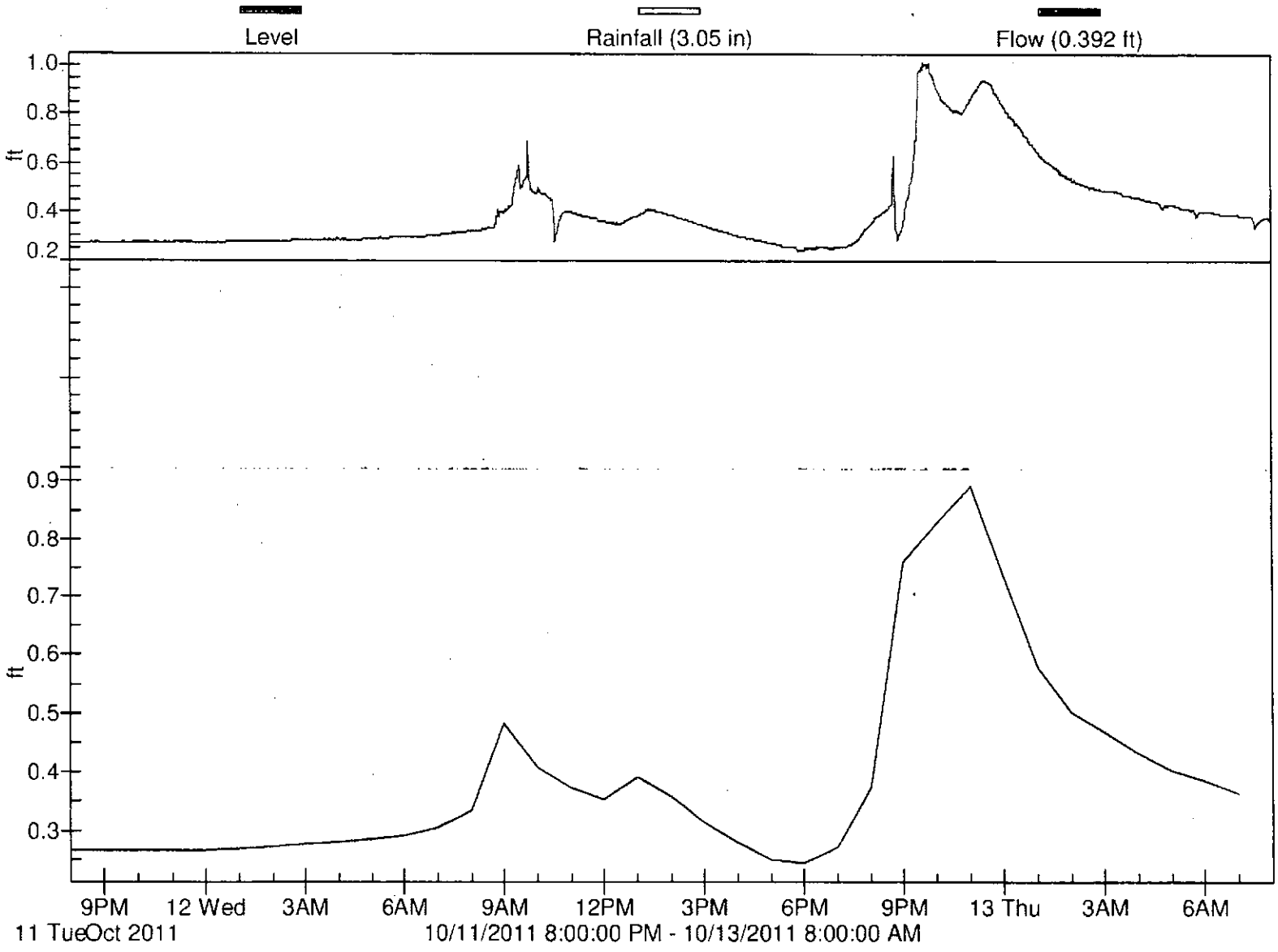
Analyst Performing Check: KCC

Sample ID	Container ID	Metals pH as Received < 2	Metals pH as Received Other	Metals Final pH (if adjust.)	Cyanide pH as Received > 12	Cyanide pH as Received Other	Cyanide Final pH (if adjust.)	Sulfide pH as Received > 9	Sulfide pH as Received Other	Sulfide Final pH (if adjust.)	Ammonia pH as Received < 2	Ammonia pH as Received Other	Ammonia Final pH (if adjust.)	TKN pH as Received < 2	TKN pH as Received Other	TKN Final pH (if adjust.)	Phos, Tot pH as Received < 2	Phos, Tot pH as Received Other	Phos, Tot Final pH (if adjust.)	NO3+NO2 pH as Received < 2	NO3+NO2 pH as Received Other	NO3+NO2 Final pH (if adjust.)	DRO pH as Received < 2	DRO pH as Received Other	DRO Final pH (if adjust.)	COD pH as Received < 2	COD pH as Received Other	COD Final pH (if adjust.)	pH as Received	pH as Received Other	Final pH (if adjust.)
001	04										✓															✓					
001	05													✓						✓											
001	06																✓														
001	01	✓																													
~~002~~ 002	04										✓															✓					
002	05													✓						✓											
002	06																✓														
002	01	✓																													
003	04										✓															✓					
003	05													✓						✓											
003	06																✓														
003	01	✓																													

STORM EVENT DATA

Outfall 004

Greif Packaging - Form 2F Storm Water



Outfall 004

Greif Packaging - Form 2F Storm Water

Date/Time	Average Level (ft)	Summary Rainfall (in)	Average Flow rate (gpm)
10/11/2011 9:00:00 PM	0.265	0.11	1994.7
10/11/2011 10:00:00 PM	0.265	0.00	2001.0
10/11/2011 11:00:00 PM	0.265	0.01	2001.5
10/12/2011 12:00:00 AM	0.265	0.01	2004.1
10/12/2011 1:00:00 AM	0.267	0.05	2033.9
10/12/2011 2:00:00 AM	0.271	0.08	2094.5
10/12/2011 3:00:00 AM	0.277	0.01	2186.6
10/12/2011 4:00:00 AM	0.279	0.16	2214.3
10/12/2011 5:00:00 AM	0.285	0.03	2319.4
10/12/2011 6:00:00 AM	0.291	0.04	2426.2
10/12/2011 7:00:00 AM	0.304	0.18	2652.8
10/12/2011 8:00:00 AM	0.334	0.26	3222.6
10/12/2011 9:00:00 AM	0.483	0.08	6800.6
10/12/2011 10:00:00 AM	0.409	0.01	4856.1
10/12/2011 11:00:00 AM	0.373	0.15	4035.5
10/12/2011 12:00:00 PM	0.352	0.06	3595.3
10/12/2011 1:00:00 PM	0.391	0.02	4439.9
10/12/2011 2:00:00 PM	0.358	0.00	3721.6
10/12/2011 3:00:00 PM	0.315	0.01	2854.5
10/12/2011 4:00:00 PM	0.279	0.00	2221.7
10/12/2011 5:00:00 PM	0.250	0.08	1767.8
10/12/2011 6:00:00 PM	0.244	0.11	1688.1
10/12/2011 7:00:00 PM	0.273	0.06	2116.6
10/12/2011 8:00:00 PM	0.377	0.63	4113.4

Average Level (ft)	Average Rainfall (in)	Average Flow rate (gpm)
0.311	0.09	2890.1
	Total	Total
	2.15 in	4.1618 mgal

Draper Aden Associates
Engineering • Surveying • Environmental Services

8090 Villa Park Drive
Richmond, Virginia 23228
(804) 264-2228 • Fax (804) 264-8773
www.daa.com

MEMORANDUM

TO: Mr. John Petchul
Greif Packaging, LLC

FROM: Leonard 'Rip' Ford, Jr.
Environmental Services

DATE: 11-08-11

SUBJECT: Greif Packaging Stormwater Monitoring Program
Form 2F Stormwater Sampling Assistance
Sampling Date: 10-18-11 + 10-19-11

VPDES Permit No. 0006408
DAA Project No. 22299-119

A significant rainfall event was predicted to occur during the evening hours on October 18, 2011. Accordingly, on October 18, 2011, Draper Aden Associates (DAA) personnel visited Greif Packaging to temporarily install and program stormwater sampling equipment at Outfall 002, Outfall 003, and Outfall 005 to conduct flow-proportional stormwater sampling.

STORMWATER SAMPLING

Outfall 002. At about 11:00 PM, October 18, 2011, a steady rainfall began at Greif Packaging, LLC. DAA personnel mobilized to Outfall 002. The sampling equipment at Outfall 002 was electronically linked to a rain gauge and programmed to begin collecting the flow-proportional composite sample once the storm event had yielded 0.10 inch of rainfall.

At 11:30 PM, October 18, 2011, the rain gauge linked to the ISCO 4700 composite sampler at Outfall 002 had registered 0.10 inch of rainfall and the automated sampler began collecting a 24-hour flow-proportional composite sample.

DAA personnel obtained a grab sample and measured pH (6.85 SU) and temperature (16.3° C). Additional grab samples were obtained for chemical analysis.

At 11:30 PM, October 19, 2011, Greif personnel obtained the composite stormwater samples from the ISCO 4700 and prepared the samples for delivery to the laboratory.

Outfall 003. At 11:45 PM, October 18, 2011, DAA personnel arrived at Outfall 003. Field personnel immediately initiated a 24-hour flow-proportional composite sample using an ISCO 6712, equipped with an ISCO 730 Bubbler Flow Module.

DAA personnel obtained a grab sample and measured pH (7.03 SU) and temperature (16.9° C). Additional grab samples were for obtained for chemical analysis.

At about 11:45 PM, October 19, 2011, Greif personnel obtained the composite stormwater samples from the ISCO 6712 composite sampler and prepared the samples for delivery to laboratory.

Outfall 005. At 11:58 PM, October 18, 2011, DAA personnel arrived at Outfall 005. Field personnel immediately initiated a 24-hour flow-proportional composite sample using an ISCO 6712, equipped with an ISCO 730 Bubbler Flow Module.

DAA personnel obtained a grab sample and measured pH (7.34 SU) and temperature (16.9° C). Additional grab samples were for obtained for chemical analysis.

At about 11:58 PM, October 19, 2011, Greif personnel obtained the composite stormwater samples from the ISCO 6712 composite sampler and prepared the samples for delivery to the laboratory.

SAMPLE TRANSPORT

On October 19, 2011, DAA personnel submitted grab samples obtained from Outfall 002, Outfall 003, and Outfall 005 to Air, Water & Soil Laboratories for chemical analysis of the following parameters: oil & grease, BOD, COD, TSS, ammonia, TKN, nitrite, nitrate, total phosphorus, color, iron (Fe-total recoverable)

On October 20, 2011, possession of the composite samples obtained from Outfall 002, Outfall 003, and Outfall 005 were transferred from Greif personnel to DAA personnel.

On October 20, 2011, DAA personnel submitted the composite samples to Air, Water & Soil Laboratories for chemical analysis of the following parameters: oil & grease, BOD, COD, TSS, ammonia, TKN, nitrite, nitrate, total phosphorus, color, iron (Fe-total recoverable)

RECORDED PRECIPITATION

The rain gauge at Outfall 002 registered 0.61 inches of rain fall from 8:00 PM, October 18, 2011, through 7:00 AM, October 20, 2011. The rain gauge at Outfall 002 registered 0.61 inches of precipitation during the 24-hour composite sampling period.

Note. The ISCO equipment at Outfall 003 and Outfall 005 were not equipped with rain gauges. The precipitation measurements for this stormwater event were based upon data collected by the rain gauge at Outfall 002.

FLOW RATES

Flow rates were measured using automated equipment at each outfall location during the 24-hour composite sampling period. The average flow rates are discussed below. Specific details pertaining to the flow rates during the storm event are documented on the attached storm event data forms.

Outfall 002. Based upon site conditions prior to the storm event, the ISCO 4700 was programmed to collect a 100 mL subsample for every 500 gallons of flow.

Flow data collected from the ISCO Bubbler Flow Meter indicates that the average flow rate during the composite sampling period was 43.31 gpm.

Outfall 003. Based upon site conditions prior to the storm event, the ISCO 6712 was programmed to collect a 100 mL subsample sample for every 800 gallons of flow.

Flow data collected from the ISCO Bubbler Flow Module indicates that the average flow rate during the composite sampling period was 473.67 gpm.

Outfall 005. Based upon site conditions prior to the storm event, the ISCO 6712 was programmed to collect a 100 mL subsample sample for every 1000 gallons of flow.

Flow data collected from the ISCO Bubbler Flow Module indicates that the average flow rate during the composite sampling period was 352.02 gpm.

If you have any questions, please contact Mr. Jeff Norman (Facility Geologist; jnorman@daa.com) or me (Environmental Program Manager; rford@daa.com) by e-mail or telephone (804.264.2228).

Attachments: certificates-of-analyses
storm event data

cc: Mr. Darrell Painter (Greif Packaging, LLC)
Mr. Jeff Norman (DAA - Environmental Services)

AIR WATER & SOIL LABORATORIES, INC.

2109A North Hamilton Street • Richmond, Virginia 23230 • Tel: (804) 358-8295 Fax: (804) 358-8297

Certificate of Analysis

Final Report

Laboratory Order ID 11100337

Client Name:	Draper Aden 8090 Villa Park Dr. Richmond, VA 23228	Date Received: Date Issued:	October 19, 2011 October 26, 2011
Submitted To:	Leonard Ford Jr.	Project Number:	22299-119
Client Site I.D.:	Form 2F Stormwater Greif	Purchase Order:	NA

Sample Summary List

Laboratory Sample ID	Sample ID	Sample Date	Receive Date
11100337-001	Outfall 002	10/18/2011	10/19/2011
11100337-002	Outfall 003	10/18/2011	10/19/2011
11100337-003	Outfall 005	10/18/2011	10/19/2011

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Laboratory Manager

End Notes:

The test results listed in this report relate only to the samples submitted to the laboratory and as received by the Laboratory.

Unless otherwise noted, the test results for solid materials are calculated on a dry weight basis. Analyses for pH, dissolved oxygen, temperature, residual chlorine and sulfite that are performed in the laboratory do not meet NELAC requirements due to extremely short holding times. These analyses should be performed in the field. The results of field analyses performed by the Sampler included in the Certificate of Analysis are done so at the client's request and are not included in the laboratory's fields of certification nor have they been audited for adherence to a reference method or procedure.

The signature on the final report certifies that these results conform to all applicable NELAC standards unless otherwise specified. For a complete list of the Laboratory's NELAC certified parameters please contact customer service.

This report shall not be reproduced except in full without the expressed and written approval of an authorized representative of Air Water & Soil Laboratories, Inc.

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Accreditation # 460021

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Certificate of Analysis

Final Report

Laboratory Order ID 11100337

Client Name: Draper Aden
8090 Villa Park Dr.
Richmond, VA 23228

Date Received: October 19, 2011
Date Issued: October 26, 2011

Submitted To: Leonard Ford Jr.

Project Number: 22299-119

Client Site I.D.: Form 2F Stormwater Greif

Purchase Order: NA

Analytical Results

Sample I.D.: Outfall 002
Date/Time Sampled: 10/18/11 23:35

Laboratory Sample I.D.: 11100337-001

Parameter	Method	Sample Results	Qual	Rep Limit	Samp Prep Date/Time	Analysis Date/Time	Analyst
Iron	EPA200.7/R4.4	6.33 mg/L		0.01	10/20/2011 16:00	10/26/2011 13:00	MWL
ADMI Color pH as received	SM18/2120E	106 ADMI Units		25	10/20/2011 08:40	10/20/2011 08:40	JPV
ADMI Color pH = 7.6	SM18/2120E	112 ADMI Units		25	10/20/2011 08:40	10/20/2011 08:40	JPV
Ammonia	EPA350.1/R2.0	0.20 mg/L		0.1	10/25/2011 14:36	10/25/2011 14:36	JPV
BOD	SM18/5210B	3.5 mg/L		2	10/20/2011 11:09	10/20/2011 11:09	NMK
COD	EPA410.4/R2.0	56.5 mg/L		10	10/24/2011 10:00	10/24/2011 10:00	JPV
Nitrate	Calc.	0.1 mg/L		0.1	10/19/2011 18:45	10/19/2011 18:45	JPV
Nitrate+Nitrite	SM18/4500-NO3 F	0.11 mg/L		0.1	10/24/2011 14:25	10/24/2011 14:25	JPV
Nitrite	SM18/4500-NO2 B	< 0.05 mg/L		0.05	10/19/2011 18:45	10/19/2011 18:45	JPV
Oil and Grease	EPA1664A	< 5 mg/L		5	10/24/2011 11:50	10/24/2011 11:50	NMK
Phosphorus, Total	SM18/4500-P E	0.20 mg/L		0.01	10/26/2011 11:20	10/26/2011 11:20	JPV
TKN	EPA351.2/R2.0	1.1 mg/L		0.2	10/25/2011 13:08	10/25/2011 13:08	JPV
TSS	SM18/2540D	57.5 mg/L		1	10/25/2011 11:22	10/25/2011 11:22	EML/JPV

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Certificate of Analysis

Final Report

Laboratory Order ID 11100337

Client Name: Draper Aden
8090 Villa Park Dr.
Richmond, VA 23228

Date Received: October 19, 2011
Date Issued: October 26, 2011

Submitted To: Leonard Ford Jr.

Project Number: 22299-119

Client Site I.D.: Form 2F Stormwater Greif

Purchase Order: NA

Analytical Results

Sample I.D.: Outfall 003
Date/Time Sampled: 10/18/11 23:48

Laboratory Sample I.D.: 11100337-002

Parameter	Method	Sample Results	Qual	Rep Limit	Samp Prep Date/Time	Analysis Date/Time	Analyst
Iron	EPA200.7/R4.4	0.4360 mg/L		0.01	10/20/2011 16:00	10/26/2011 13:03	MWL
ADMI Color pH as received	SM18/2120E	< 25 ADMI Units		25	10/20/2011 08:40	10/20/2011 08:40	JPV
ADMI Color pH = 7.6	SM18/2120E	< 25 ADMI Units		25	10/20/2011 08:40	10/20/2011 08:40	JPV
Ammonia	EPA350.1/R2.0	< 0.1 mg/L		0.1	10/25/2011 14:39	10/25/2011 14:39	JPV
BOD	SM18/5210B	< 2 mg/L		2	10/20/2011 11:12	10/20/2011 11:12	NMK
COD	EPA410.4/R2.0	< 10 mg/L		10	10/24/2011 10:00	10/24/2011 10:00	JPV
Nitrate	Calc.	1.0 mg/L		0.1	10/19/2011 18:45	10/19/2011 18:45	JPV
Nitrate+Nitrite	SM18/4500-NO3 F	0.96 mg/L		0.1	10/24/2011 14:40	10/24/2011 14:40	JPV
Nitrite	SM18/4500-NO2 B	< 0.05 mg/L		0.05	10/19/2011 18:45	10/19/2011 18:45	JPV
Oil and Grease	EPA1664A	< 5 mg/L		5	10/24/2011 11:50	10/24/2011 11:50	NMK
Phosphorus, Total	SM18/4500-P E	0.06 mg/L		0.01	10/26/2011 11:20	10/26/2011 11:20	JPV
TKN	EPA351.2/R2.0	0.3 mg/L		0.2	10/25/2011 13:10	10/25/2011 13:10	JPV
TSS	SM18/2540D	15.5 mg/L		1	10/25/2011 11:22	10/25/2011 11:22	EML/JPV

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Certificate of Analysis

Final Report

Laboratory Order ID 11100337

Client Name: Draper Aden
8090 Villa Park Dr.
Richmond, VA 23228

Date Received: October 19, 2011
Date Issued: October 26, 2011

Submitted To: Leonard Ford Jr.
Project Number: 22299-119
Client Site I.D.: Form 2F Stormwater Greif
Purchase Order: NA

Analytical Results

Sample I.D.: Outfall 005
Laboratory Sample I.D.: 11100337-003
Date/Time Sampled: 10/18/11 23:59

Parameter	Method	Sample Results	Qual	Rep Limit	Samp Prep Date/Time	Analysis Date/Time	Analyst
Iron	EPA200.7/R4.4	0.6150 mg/L		0.01	10/20/2011 16:00	10/26/2011 13:06	MWL
ADMI Color pH as received	SM18/2120E	53.9 ADMI Units		25	10/20/2011 08:40	10/20/2011 08:40	JPV
ADMI Color pH = 7.6	SM18/2120E	51.1 ADMI Units		25	10/20/2011 08:40	10/20/2011 08:40	JPV
Ammonia	EPA350.1/R2.0	< 0.1 mg/L		0.1	10/25/2011 14:41	10/25/2011 14:41	JPV
BOD	SM18/5210B	3.5 mg/L		2	10/20/2011 11:16	10/20/2011 11:16	NMK
COD	EPA410.4/R2.0	23.0 mg/L		10	10/24/2011 10:00	10/24/2011 10:00	JPV
Nitrate	Calc.	2.6 mg/L		0.1	10/19/2011 18:45	10/19/2011 18:45	JPV
Nitrate+Nitrite	SM18/4500-NO3 F	2.64 mg/L		0.1	10/24/2011 14:43	10/24/2011 14:43	JPV
Nitrite	SM18/4500-NO2 B	0.05 mg/L		0.05	10/19/2011 18:45	10/19/2011 18:45	JPV
Oil and Grease	EPA1664A	< 5 mg/L		5	10/24/2011 11:50	10/24/2011 11:50	NMK
Phosphorus, Total	SM18/4500-P E	0.07 mg/L		0.01	10/26/2011 11:20	10/26/2011 11:20	JPV
TKN	EPA351.2/R2.0	0.6 mg/L		0.2	10/25/2011 13:12	10/25/2011 13:12	JPV
TSS	SM18/2540D	4.2 mg/L		1	10/25/2011 11:22	10/25/2011 11:22	EML/JPV

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Client Name:	Draper Aden 8090 Villa Park Dr. Richmond, VA 23228	Date Received: Date Issued:	October 19, 2011 October 26, 2011
Submitted To:	Leonard Ford Jr.	Project Number:	22299-119
Client Site I.D.:	Form 2F Stormwater Greif	Purchase Order:	NA

Summary of Analytical QC Batches

QC Batch ID	Method	Sample List
QC111020032	SM18/4500-NO2 B	11100337-001, -002, -003
QC111024028	SM18/2120E	11100337-001, -002, -003
QC111024042	SM18/4500-NO3 F	11100337-001, -002, -003
QC111025017	EPA351.2/R2.0	11100337-001, -002, -003
QC111025023	EPA410.4/R2.0	11100337-001, -002, -003
QC111025027	EPA1664A	11100337-001, -002, -003
QC111026002	SM18/2540D	11100337-001, -002, -003
QC111026033	SM18/5210B	11100337-001, -002, -003
QC111026043	SM18/4500-P E	11100337-001, -002, -003
QC111026045	EPA200.7/R4.4	11100337-001, -002, -003
QC111026048	EPA350.1/R2.0	11100337-001, -002, -003

AIR WATER & SOIL LABORATORIES, INC.

2109A NORTH HAMILTON STREET
RICHMOND, VIRGINIA 23230
(804) 358-8295 PHONE
(804)358-8297 FAX

CHAIN OF CUSTODY

PAGE 1 OF 1

COMPANY NAME: Draper Aden Associates	INVOICE TO: Draper Aden Associates	PROJECT NAME/Quote #: Form 2F Stormwater
CONTACT: Leonard Ford	INVOICE CONTACT: Leonard Ford	SITE NAME: Greif
ADDRESS: 8090 Villa Park Drive Richmond VA	INVOICE ADDRESS: 8090 Villa Park Dr Rich VA	PROJECT NUMBER: 22299-119
PHONE #: 804 264 2228	INVOICE PHONE #: 804 264 2228	P.O. #:
FAX #: 804 264 8773	EMAIL: rford@daa.com	Pretreatment Program:
Is sample for compliance reporting? (YES) NO	Is sample from a chlorinated supply? YES (NO)	PWS I.D. #:
SAMPLER NAME (PRINT): Jeff Norman	SAMPLER SIGNATURE: [signature]	Turn Around Time: 5 Day(s)

Matrix Codes: WW=Water Water GW=Ground Water DW=Drinking Water S=Soil/Solids OR=Organic A=Air WP=Wipe OT=Other_____

CLIENT SAMPLE I.D.	Grab	Composite	Field Filtered (Dissolved Metals)	Composite Start Date	Composite Start Time	Grab Date or Composite Stop Date	Grab Time or Composite Stop Time	Time Preserved	Matrix (See Codes)	Number of Containers	Oil & Grease (C)	TSS	BOD	Ammonia / Nitrate (S)	COD / total phosphorus (S)	Iron [Fe - total rec] (N)	Color / Nitrite	TKN (S)	COMMENTS
1) Outfall 002	X					10-18-11	2335		SW	9	X	X	X	X	X	X	X	X	
2) Outfall 003	X					10-18-11	2348		SW	9	X	X	X	X	X	X	X	X	
3) Outfall 005	X					10-18-11	2359		SW	9	X	X	X	X	X	X	X	X	
4)																			
5)																			
6)																			
7)																			
8)																			
9)																			
10)																			

ANALYSIS / (PRESERVATIVE)

Preservative Codes: N=Nitric Acid C=Hydrochloric Acid S=Sulfuric Acid H=Sodium Hydroxide A=Ascorbic Acid Z=Zinc Acetate T=Sodium Thiosulfate M=Methanol

PLEASE NOTE PRESERVATIVE(S), INTERFERENCE CHECKS or PUMP RATE (L/min)

RELINQUISHED:	DATE / TIME	RECEIVED:	DATE / TIME
[signature]	10-19-11 / 1530	Jessica Rex	10/19/11 1530
RELINQUISHED:	DATE / TIME	RECEIVED:	DATE / TIME
RELINQUISHED:	DATE / TIME	RECEIVED:	DATE / TIME

QC Data Package
- Level I ☐
- Level II ☐
- Level III ☐
- Level IV ☐

LAB USE ONLY

COOLER TEMP 3.0 °C
ice

DA
Form 2F Stormwater Greif

11100337
DUE: 5 Days
Recd: 10/19/11

v1105

TERMS & CONDITIONS

Where a purchaser (Client) places an order for laboratory, consulting or sampling services from Air Water & Soil Laboratories, Inc., a Virginia corporation (referred to as "Air Water & Soil"), Air Water & Soil shall provide the ordered services pursuant to these Terms and Conditions, and the related Quotation or Price Schedule, or as agreed in a negotiated contract. In the absence of a written agreement to the contrary, the Order constitutes an acceptance by the Client of Air Water & Soil's offer to do business under these Terms and Conditions, and an agreement to be bound by these Terms and Conditions. No contrary or additional terms and conditions expressed in a Client's document shall be deemed to become a part of the contract created upon acceptance of these Terms and Conditions, unless accepted by Air Water & Soil in writing.

1. ORDERS AND RECEIPT OF SAMPLES

1.1 The Client may place the Order (i.e., specify a Scope of Work) either by submitting a purchase order to Air Water & Soil in writing or by telephone subsequently confirmed in writing, or by negotiated contract (i.e. Chain of Custody). Whichever option the Client selects for placing the Order, the Order shall not be valid unless it contains sufficient specification to enable Air Water & Soil to carry out the Client's requirements. In particular, samples must be accompanied by: a) adequate instruction on type of analysis requested, and b) complete written disclosure of the known or suspected presence of any hazardous substances, as defined by applicable federal or state law. Where any samples which were not accompanied by the required disclosure, cause interruptions in the lab's ability to process work due to contamination of instruments or work areas, the Client will be responsible for the costs of clean up and recovery.

1.2 The Client shall provide one week's advance notice of the sample delivery schedule, or any changes to the schedule, whenever possible. Upon timely delivery of samples, Air Water & Soil will use its best efforts to meet mutually agreed turnaround times. All turnaround times are based on business days and will be calculated from the point in time when Air Water & Soil has determined that it can proceed with defined work following receipt, inspection of samples, and resolution of any discrepancies in Chain-of-Custody forms and project guidance regarding work to be done (Sample Delivery Acceptance). In the event of any changes in the sample delivery schedule by the Client, prior to Sample Delivery Acceptance, Air Water & Soil reserves the right to modify its turnaround time commitment, to change the date upon which Air Water & Soil will accept samples, or refuse Sample Delivery Acceptance for the affected samples.

1.2.1 Turn around times are defined as follows: Any sample group requiring a turnaround time of less than five(5) business days will be considered a "Rush Turn Around Time". Rush Turnaround samples received after 3.00pm will be considered as received on the next business day.

1.2.2 Air Water & Soil defines "standard turnaround" as Five (5) business days with exception made for Full TCLP analyses.

1.3 Air Water & Soil reserves the right, exercisable at any time, to refuse or revoke Sample Delivery Acceptance for any sample which in the sole judgment of Air Water & Soil : a) is of unsuitable volume; b) may pose a risk or become unsuitable for handling, transport, or processing for any health, safety, environmental or other reason, whether or not due to the presence in the sample of any hazardous substance and whether or not such presence has been disclosed to Air Water & Soil by the Client; or c) holding times cannot be met, due to passage of more than 48 hours from the time of sampling or 1/2 the holding time for the requested test, whichever is less.

1.4 Prior to Sample Delivery Acceptance, the entire risk of loss or damage to samples remains with the Client, except where Air Water & Soil provides courier services. In no event will Air Water & Soil have any responsibility or liability for the action or inaction of any carrier shipping or delivering any sample to or from Air Water & Soil 's premises. Client is responsible to assure that any sample containing any hazardous substance which is to be delivered to Air Water & Soil 's premises will be packaged, labeled, transported and delivered properly and in accordance with applicable laws.

2. PAYMENT TERMS

2.1 Services performed by Air Water & Soil will be in accordance with prices quoted and later confirmed in writing or as stated in the Price Schedule. Quoted prices do not include sales tax. Applicable sales tax will be added to invoices where required by law. An Environmental Management Fee of 5% of the invoice value will also be applied, at Air Water & Soil's discretion.

2.2 Invoices may be submitted to Client upon completion of any sample delivery group. Billing corrections must be requested within 30 days of invoice date. Payment in advance is required for all Clients except those whose credit has been established with Air Water & Soil. For Clients with approved credit, payment terms are net 30 days from the date of invoice by Air Water & Soil. All overdue payments are subject to an additional interest and service charge of one and one half percent (1.5%) (or the maximum rate permissible by law, whichever is lesser) per month or portion thereof from the due date until the date of payment. All fees are charged or billed directly to the Client. The billing of a third party will not be accepted without a statement, signed by the third party, that acknowledges and accepts payment responsibility.

2.3 Air Water & Soil may suspend work and withhold delivery of data under this order at any time in the event Client fails to make timely payment of its invoices. Client shall be responsible for all costs and expenses of collection including reasonable attorney's fees. Air Water & Soil reserves the right to refuse to proceed with work at any time based upon an unfavorable Client credit report.

3. CHANGE ORDERS, TERMINATION

3.1 Changes to the Scope of Work, price, or result delivery date may be initiated by Air Water & Soil after Sample Delivery Acceptance due to any condition which conflicts with analytical, QA or other protocols warranted in these Terms and Conditions. Air Water & Soil will not proceed with such changes until an agreement with the Client is reached on the amount of any cost, schedule change or technical change to the Scope of Work, and such agreement is documented. Email communications are acceptable, telephone conversations however must be followed up with written documentation.

3.2 Changes to the Scope of Work, including but not limited to increasing or decreasing the work, changing test and analysis specification, or acceleration in the performance of the work may be initiated by the Client after sample delivery acceptance. Such a change will be documented in writing and may result in a change in cost and turnaround time commitment. Air Water & Soil's acceptance of such changes is contingent upon technical feasibility and operational capacity.

3.3 Suspension or termination of all or any part of the work may be initiated by the Client. Air Water & Soil will be compensated consistent with Section 2 of these Terms and Conditions. Air Water & Soil will complete all work in progress and be paid in full for all work completed.

4. WARRANTIES AND LIABILITY

4.1 Where applicable, Air Water & Soil will use analytical methodologies which are in substantial conformity with published test methods. Air Water & Soil has implemented these methods in its Laboratory Quality Manual and referenced Standard Operating Procedures and where the nature or composition of the sample requires it, Air Water & Soil reserves the right to deviate from these methodologies as necessary or appropriate, based on the reasonable judgment of Air Water & Soil , which deviations, if any, will be made on a basis consistent with recognized standards of the industry and/or Air Water & Soil 's Laboratory Quality Manuals. Client may request that Air Water & Soil perform according to a mutually agreed Quality Assurance Project Plan (QAPP). In the event that samples arrive prior to agreement on a QAPP, Air Water & Soil will proceed with analyses under its standard Quality Manuals then in effect, and Air Water & Soil will not be responsible for any re-sampling or other charges if work must be repeated to comply with a subsequently finalized QAPP.

4.2 Air Water & Soil shall start preparation and/or analysis within holding times provided that Sample Delivery Acceptance occurs within 48 hours of sampling or 1/2 of the holding time for the test, whichever is less. Where resolution of inconsistencies leading to Sample Delivery Acceptance does not occur within this period, Air Water & Soil will use its best efforts to meet holding times and will proceed with the work provided that, in Air Water & Soil 's judgment, the chain-of-custody or definition of the Scope of Work provide sufficient guidance. Reanalysis of samples to comply with Air Water & Soil 's Quality Manuals will be deemed to have met holding times provided the initial analysis was performed within the applicable holding time. Where reanalysis demonstrates that sample matrix interference is the cause of failure to meet any Quality Manual requirements, the warranty will be deemed to have been met.

4.3 Air Water & Soil warrants that it possesses and maintains all licenses and certifications which are required to perform services under these Terms and Conditions provided that such requirements are specified in writing to Air Water & Soil prior to Sample Delivery Acceptance.

4.4 The warranty obligations set forth in Sections 4.1, 4.2 and 4.3 are the sole and exclusive warranties given by Air Water & Soil in connection with any services performed by Air Water & Soil or any Results generated from such services, and Air Water & Soil gives and makes NO OTHER REPRESENTATION OR WARRANTY OF ANY KIND, EXPRESS OR IMPLIED. No representative of Air Water & Soil is authorized to give or make any other representation or warranty or modify this warranty in any way.

4.5 Client's sole and exclusive remedy for the breach of warranty in connection with any services performed by Air Water & Soil , will be limited to repeating any services performed, contingent on the Client's providing, at the request of Air Water & Soil and at the Client's expense, additional sample(s) if necessary. Any reanalysis requested by the Client generating Results consistent with the original Results will be at the Client's expense. If re-sampling is necessary, Air Water & Soil 's liability for re-sampling costs will be limited to actual cost or one hundred and fifty dollars ($150) per sample, whichever is less.

4.6 Air Water & Soil 's liability for any and all causes of action arising hereunder, whether based in contract, tort, warranty, negligence or otherwise, shall be limited to the lesser amount of compensation for the services performed or $100,000. All claims, including those for negligence, shall be deemed waived unless suit thereon is filed within one year after Air Water & Soil's completion of the services. Under no circumstances, whether arising in contract, tort (including negligence), or otherwise, shall Air Water & Soil be responsible for loss of use, loss of profits, or for any special, indirect, incidental or consequential damages occasioned by the services performed or by application or use of the reports prepared.

4.7 In no event shall Air Water & Soil have any responsibility or liability to the Client for any failure or delay in performance by Air Water & Soil which results, directly or indirectly, in whole or in part, from any cause or circumstance beyond the reasonable control of Air Water & Soil. Such causes and circumstances shall include, but not be limited to, acts of God, acts of Client, acts or orders of any governmental authority, strikes or other labor disputes, natural disasters, accidents, wars, civil disturbances, equipment breakdown, matrix interference or unknown highly contaminated samples that impact instrument operation, unavailability of supplies from usual suppliers, difficulties or delays in transportation, mail or delivery services, or any other cause beyond Air Water & Soil 's reasonable control.

5. RESULTS, WORK PRODUCT

5.1 Data or information provided to Air Water & Soil or generated by services performed under this agreement shall only become the property of the Client upon receipt in full by Air Water & Soil of payment for the whole Order. Ownership of any analytical method, QA/QC protocols, software programs or equipment developed by Air Water & Soil for performance of work will be retained by Air Water & Soil, and Client shall not disclose such information to any third party.

5.2 Data and sample materials provided by Client or at Client's request, and the result obtained by Air Water & Soil shall be held in confidence (unless such information is generally available to the public or is in the public domain or Client has failed to pay Air Water & Soil for all services rendered or is otherwise in breach of these Terms and Conditions), subject to any disclosure required by law or legal process.

5.3 Should the Results delivered by Air Water & Soil be used by the Client or Client's client, even though subsequently determined not to meet the warranties described in these Terms and Conditions, then the compensation will be adjusted based upon mutual agreement. In no case shall the Client unreasonably withhold Air Water & Soil's right to independently defend its data.

5.4 Air Water & Soil reserves the right to subcontract services ordered by the Client to another laboratory or laboratories, if, in Air Water & Soil's sole judgment, it is reasonably necessary, appropriate or advisable to do so. Air Water & Soil will in no way be liable for any subcontracted services except for work performed at laboratories which have been audited and approved by Air Water & Soil.

5.5 Air Water & Soil shall dispose of the Client's samples 30 days after receipt of samples; 15 days after receipt of samples for BOD, CBOD and TSS analyses, unless instructed to store them for an alternate period of time or to return such samples to the Client, in a manner consistent with U.S. Environmental Protection Agency regulations or other applicable federal, state or local requirements. Any samples for projects that are canceled or not accepted, or for which return was requested, will be returned to the Client at his own expense. Air Water & Soil reserves the right to return to the Client any sample or unused portion of a sample that is not within Air Water & Soil's permitted capability or the capabilities of Air Water & Soil's designated waste disposal vendor(s). 5.6 Unless a different time period is agreed to in any order under these Terms and Conditions, Air Water & Soil agrees to retain all records for five (5) years.

5.7 In the event that Air Water & Soil is required to respond to legal process related to services for Client, Client agrees to reimburse Air Water & Soil for hourly charges for personnel involved in the response and attorney fees reasonably incurred in obtaining advice concerning the response, preparation to testify, and appearances related to the legal process, travel and all reasonable expenses associated with the litigation.

6. INSURANCE

6.1 Air Water & Soil shall maintain in force during the performance of services under these Terms and Conditions, Workers' Compensation and Employer's Liability Insurance in accordance with the laws of the states having jurisdiction over Air Water & Soil's employees who are engaged in the performance of the work. Air Water & Soil shall also maintain during such period, Comprehensive General and Contractual Liability (limit of $1,000,000 per occurrence/ $2,000,000 aggregate), Comprehensive Automobile Liability, owned and hired, ($1,000,000 combined single limit), and Professional/Pollution Liability Insurance (limit of $1,000,000 per occurrence/aggregate).

7. AUDIT

7.1 Upon prior notice to Air Water & Soil, the Client may audit and inspect Air Water & Soil's records and accounts covering reimbursable costs related to work done for the Client, for a period of two (2) years after completion of the work. The purpose of any such audit shall be only for verification of such costs, and Air Water & Soil shall not be required to provide access to cost records where prices are expressed as fixed fees or published unit prices.

8. MISCELLANEOUS PROVISIONS

8.1 These Terms and Conditions, together with any additions or revisions which may be agreed to in writing by Air Water & Soil , embody the whole agreement of the parties and provide the only remedies available. There are no promises, terms, conditions, understandings, obligations or agreements other than those contained herein, and these Terms and Conditions shall supersede all previous communications, representations, or agreements, either verbal or written, between the Client and Air Water & Soil . These Terms and Conditions, and any transactions or agreements to which they apply, shall be governed both as to interpretation and performance by the laws of the state where Air Water & Soil's services are performed.

8.2 The invalidity or unenforceability, in whole or in part of any provision, term or condition hereof shall not affect in any way the validity or enforceability of the remainder to these Terms and Conditions, the intent of the parties being that the provisions be severable. The section headings of these Terms and Conditions are intended solely for convenient reference and shall not define, limit or affect in any way these Terms and Conditions or their interpretations. No waiver by either party of any provision, term or condition hereof or of any obligation of the other party hereunder shall constitute a waiver of any subsequent breach or other obligation.

8.3 The obligations, liabilities, and remedies of the parties, as provided herein, are exclusive and in lieu of any others available at law or in equity. Indemnifications, releases from liability and limitations of liability shall apply, notwithstanding the fault, negligence or strict liability of the party to be indemnified, released, or whose liability is limited, the extent of sole negligence or willful misconduct.

AIR WATER SOIL Laboratories, Inc.

2109A North Hamilton Street • Richmond, Virginia 23230 • Tel : (804) 358-828

DA

11100337

Form 2F Stormwater Greif

DUE: 5 Days
Recd: 10/19/11

Sample Conditions Checklist

Opened by: (Initials) _____ Lab ID No.: _____

Date Cooler Opened: 10/19/11

		YES	NO	N/A
1.	How were samples received? Fed Ex ☐ UPS ☐ Courier ☐ Walk In ☑			
2.	Were custody seals used?	☐	☐	☑
3.	If yes, are custody seals unbroken and intact at the date and time of arrival?	☐	☐	☑
4.	Are the custody papers filled out completely and correctly?	☑	☐	☐
5.	Do all bottle labels agree with custody papers?	☑	☐	☐
6.	Are the samples received on ice?	☑	☐	☐
7.	Is the temperature blank or representative sample within acceptable limits? (above freezing to 6°C)	☑	☐	☐
8	Are all samples within holding time for requested laboratory tests?	☑	☐	☐
9	Is a sufficient amount of sample provided to perform the tests indicated?	☑	☐	☐
10	Are all samples in proper containers for the analyses requested?	☑	☐	☐
11	Are all samples appropriately preserved for the analyses requested?	☑	☐	☐
12	Are all volatile organic containers free of headspace?	☐	☐	☑

COMMENTS

AIR WATER & SOIL LABORATORIES, INC.

pH Preservation Log

Order ID 1100337

Date Performed: 10/19/11

Analyst Performing Check: [illegible]

Sample ID	Container ID	Metals			Cyanide			Sulfide			Ammonia			TKN			Phos, Tot			NO3+NO2			DRO								
		pH as Received		Final pH (if adjust.)	pH as Received		Final pH (if adjust.)	pH as Received		Final pH (if adjust.)	pH as Received		Final pH (if adjust.)	pH as Received		Final pH (if adjust.)	pH as Received		Final pH (if adjust.)	pH as Received		Final pH (if adjust.)	pH as Received		Final pH (if adjust.)	pH as Received		Final pH (if adjust.)	pH as Received		Final pH (if adjust.)
		< 2	Other		> 12	Other		> 9	Other		< 2	Other		< 2	Other		< 2	Other		< 2	Other		< 2	Other			Other			Other	
001	01	✓																													
001	07													✓																	
001	08										✓									✓											
001	09																✓														
002	01	✓																													
002	07													✓																	
002	08										✓									✓											
002	09																✓														
003	01	✓																													
003	07 ~~02~~													✓																	
003	08										✓									✓											
003	09																✓														

AIR WATER & SOIL LABORATORIES, INC.

2109A North Hamilton Street • Richmond, Virginia 23230 • Tel: (804) 358-8295 Fax: (804) 358-8297

Certificate of Analysis

Final Report

Laboratory Order ID 11100360

Client Name:	Draper Aden 8090 Villa Park Dr. Richmond, VA 23228	Date Received: Date Issued:	October 20, 2011 October 27, 2011
Submitted To:	Leonard Ford Jr.	Project Number:	NA
Client Site I.D.:	Greif Bros Form 2F Stormwater	Purchase Order:	NA

Sample Summary List

Laboratory Sample ID	Sample ID	Sample Date	Receive Date
11100360-001	Outfall 002	10/19/2011	10/20/2011
11100360-002	Outfall 003	10/19/2011	10/20/2011
11100360-003	Outfall 005	10/19/2011	10/20/2011

Ted Soyars

Laboratory Manager

End Notes:

The test results listed in this report relate only to the samples submitted to the laboratory and as received by the Laboratory.

Unless otherwise noted, the test results for solid materials are calculated on a dry weight basis. Analyses for pH, dissolved oxygen, temperature, residual chlorine and sulfite that are performed in the laboratory do not meet NELAC requirements due to extremely short holding times. These analyses should be performed in the field. The results of field analyses performed by the Sampler included in the Certificate of Analysis are done so at the client's request and are not included in the laboratory's fields of certification nor have they been audited for adherence to a reference method or procedure.

The signature on the final report certifies that these results conform to all applicable NELAC standards unless otherwise specified. For a complete list of the Laboratory's NELAC certified parameters please contact customer service.

This report shall not be reproduced except in full without the expressed and written approval of an authorized representative of Air Water & Soil Laboratories, Inc.

102720111705

Accredited in accordance with nelac
Commonwealth of Virginia
Accreditation # 460021

AIR WATER & SOIL LABORATORIES, INC.
2109A North Hamilton Street • Richmond, Virginia 23230 • Tel: (804) 358-8295 Fax: (804) 358-8297

Certificate of Analysis

Final Report

Laboratory Order ID 11100360

Client Name: Draper Aden
8090 Villa Park Dr.
Richmond, VA 23228

Date Received: October 20, 2011
Date Issued: October 27, 2011

Submitted To: Leonard Ford Jr.
Project Number: NA

Client Site I.D.: Greif Bros Form 2F Stormwater
Purchase Order: NA

Analytical Results

Sample I.D.: Outfall 002
Laboratory Sample I.D.: 11100360-001
Date/Time Sampled (Start/Stop): 10/18/11 13:30 to 10/19/11 23:30

Parameter	Method	Sample Results	Qual	Rep Limit	Samp Prep Date/Time	Analysis Date/Time	Analyst
Iron	EPA200.7/R4.4	3.26 mg/L		0.01	10/21/2011 16:55	10/24/2011 13:27	MWL
ADMI Color pH as received	SM18/2120E	76.7 ADMI Units		25	10/21/2011 16:30	10/21/2011 16:30	JPV
ADMI Color pH = 7.6	SM18/2120E	81.7 ADMI Units		25	10/21/2011 16:30	10/21/2011 16:30	JPV
Ammonia	EPA350.1/R2.0	0.19 mg/L		0.1	10/25/2011 14:46	10/25/2011 14:46	JPV
BOD	SM18/5210B	2.1 mg/L		2	10/21/2011 09:24	10/21/2011 09:24	EML
COD	EPA410.4/R2.0	51.4 mg/L		10	10/24/2011 10:00	10/24/2011 10:00	JPV
Nitrate	Calc.	< 0.1 mg/L		0.1	10/24/2011 14:55	10/24/2011 14:55	JPV
Nitrate+Nitrite	SM18/4500-NO3 F	< 0.1 mg/L		0.1	10/24/2011 14:55	10/24/2011 14:55	JPV
Nitrite	SM18/4500-NO2 B	< 0.05 mg/L		0.05	10/24/2011 00:00	10/24/2011 00:00	JPV
Oil and Grease	EPA1664A	< 5 mg/L		5	10/26/2011 10:00	10/26/2011 10:00	NMK
Phosphorus, Total	SM18/4500-P E	0.16 mg/L		0.01	10/26/2011 11:20	10/26/2011 11:20	JPV
TKN	EPA351.2/R2.0	1.3 mg/L		0.2	10/26/2011 17:34	10/26/2011 17:34	JPV
TSS	SM18/2540D	16.8 mg/L		1	10/25/2011 11:22	10/25/2011 11:22	EML/JPV

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Certificate of Analysis

Final Report

Laboratory Order ID 11100360

Client Name: Draper Aden
8090 Villa Park Dr.
Richmond, VA 23228

Date Received: October 20, 2011
Date Issued: October 27, 2011

Submitted To: Leonard Ford Jr.
Project Number: NA

Client Site I.D.: Greif Bros Form 2F Stormwater
Purchase Order: NA

Analytical Results

Sample I.D.: Outfall 003
Laboratory Sample I.D.: 11100360-002
Date/Time Sampled (Start/Stop): 10/18/11 23:45 to 10/19/11 23:45

Parameter	Method	Sample Results	Qual	Rep Limit	Samp Prep Date/Time	Analysis Date/Time	Analyst
Iron	EPA200.7/R4.4	0.1600 mg/L		0.01	10/21/2011 16:55	10/24/2011 13:30	MWL
ADMI Color pH as received	SM18/2120E	< 25 ADMI Units		25	10/21/2011 16:30	10/21/2011 16:30	JPV
ADMI Color pH = 7.6	SM18/2120E	< 25 ADMI Units		25	10/21/2011 16:30	10/21/2011 16:30	JPV
Ammonia	EPA350.1/R2.0	< 0.1 mg/L		0.1	10/25/2011 14:48	10/25/2011 14:48	JPV
BOD	SM18/5210B	< 2 mg/L		2	10/21/2011 09:27	10/21/2011 09:27	EML
COD	EPA410.4/R2.0	11.7 mg/L		10	10/24/2011 11:00	10/24/2011 11:00	JPV
Nitrate	Calc.	0.8 mg/L		0.1	10/24/2011 14:58	10/24/2011 14:58	JPV
Nitrate+Nitrite	SM18/4500-NO3 F	0.85 mg/L		0.1	10/24/2011 14:58	10/24/2011 14:58	JPV
Nitrite	SM18/4500-NO2 B	< 0.05 mg/L		0.05	10/24/2011 00:00	10/24/2011 00:00	JPV
Oil and Grease	EPA1664A	< 5 mg/L		5	10/26/2011 10:00	10/26/2011 10:00	NMK
Phosphorus, Total	SM18/4500-P E	0.06 mg/L		0.01	10/26/2011 11:20	10/26/2011 11:20	JPV
TKN	EPA351.2/R2.0	0.3 mg/L		0.2	10/26/2011 17:36	10/26/2011 17:36	JPV
TSS	SM18/2540D	1.6 mg/L		1	10/25/2011 11:22	10/25/2011 11:22	EML/JPV

flow proportional

102720111706

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Accreditation # 460021

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2109A North Hamilton Street • Richmond, Virginia 23230 • Tel: (804) 358-8295 Fax: (804) 358-8297

Certificate of Analysis

Final Report

Laboratory Order ID 11100360

Client Name:	Draper Aden 8090 Villa Park Dr. Richmond, VA 23228	Date Received: Date Issued:	October 20, 2011 October 27, 2011
Submitted To:	Leonard Ford Jr.	Project Number:	NA
Client Site I.D.:	Greif Bros Form 2F Stormwater	Purchase Order:	NA

Analytical Results

Sample I.D.: Outfall 005 Laboratory Sample I.D.: 11100360-003

Date/Time Sampled (Start/Stop): 10/18/11 23:58 to 10/19/11 23:58

Parameter	Method	Sample Results	Qual	Rep Limit	Samp Prep Date/Time	Analysis Date/Time	Analyst
Iron	EPA200.7/R4.4	0.7220 mg/L		0.01	10/21/2011 16:55	10/24/2011 13:38	MWL
ADMI Color pH as received	SM18/2120E	63.6 ADMI Units		25	10/21/2011 16:30	10/21/2011 16:30	JPV
ADMI Color pH = 7.6	SM18/2120E	61.0 ADMI Units		25	10/21/2011 16:30	10/21/2011 16:30	JPV
Ammonia	EPA350.1/R2.0	< 0.1 mg/L		0.1	10/25/2011 14:50	10/25/2011 14:50	JPV
BOD	SM18/5210B	< 2 mg/L		2	10/21/2011 09:32	10/21/2011 09:32	EML
COD	EPA410.4/R2.0	30.4 mg/L		10	10/24/2011 11:00	10/24/2011 11:00	JPV
Nitrate	Calc.	2.2 mg/L		0.1	10/24/2011 15:01	10/24/2011 15:01	JPV
Nitrate+Nitrite	SM18/4500-NO3 F	2.16 mg/L		0.1	10/24/2011 15:01	10/24/2011 15:01	JPV
Nitrite	SM18/4500-NO2 B	< 0.05 mg/L		0.05	10/24/2011 00:00	10/24/2011 00:00	JPV
Oil and Grease	EPA1664A	< 5 mg/L		5	10/26/2011 10:00	10/26/2011 10:00	NMK
Phosphorus, Total	SM18/4500-P E	0.05 mg/L		0.01	10/26/2011 11:20	10/26/2011 11:20	JPV
TKN	EPA351.2/R2.0	0.8 mg/L		0.2	10/26/2011 17:38	10/26/2011 17:38	JPV
TSS	SM18/2540D	5.1 mg/L		1	10/25/2011 15:00	10/25/2011 15:00	JPV

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Commonwealth of Virginia
Accreditation # 460021

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2109A North Hamilton Street • Richmond, Virginia 23230 • Tel: (804) 358-8295 Fax: (804) 358-8297

Certificate of Analysis

Final Report

Laboratory Order ID 11100360

Client Name:	Draper Aden 8090 Villa Park Dr. Richmond, VA 23228	Date Received: Date Issued:	October 20, 2011 October 27, 2011
Submitted To:	Leonard Ford Jr.	Project Number:	NA
Client Site I.D.:	Greif Bros Form 2F Stormwater	Purchase Order:	NA

Summary of Analytical QC Batches

QC Batch ID	Method	Sample List
QC111024026	SM18/4500-NO2 B	11100360-001, -002, -003
QC111024029	SM18/2120E	11100360-001, -002, -003
QC111024031	EPA200.7/R4.4	11100360-001, -002, -003
QC111024042	SM18/4500-NO3 F	11100360-001, -002, -003
QC111025023	EPA410.4/R2.0	11100360-001
QC111025024	EPA410.4/R2.0	11100360-002, -003
QC111026002	SM18/2540D	11100360-001, -002
QC111026043	SM18/4500-P E	11100360-001, -002, -003
QC111026048	EPA350.1/R2.0	11100360-001, -002, -003
QC111027005	SM18/5210B	11100360-001, -002, -003
QC111027006	EPA1664A	11100360-001, -002, -003
QC111027024	SM18/2540D	11100360-003
QC111027026	EPA351.2/R2.0	11100360-001, -002, -003

AIR WATER & SOIL LABORATORIES, INC.

2109A NORTH HAMILTON STREET
RICHMOND, VIRGINIA 23230
(804) 358-8295 PHONE
(804)358-8297 FAX

CHAIN OF CUSTODY

PAGE ____ OF ____

COMPANY NAME: Draper Aden Associates	INVOICE TO: Draper Aden Associates	PROJECT NAME/Quote #: Form 2F Stormwater
CONTACT: Leonard Ford	INVOICE CONTACT: Leonard Ford	SITE NAME: Greif
ADDRESS: 8090 Villa Park Dr Richmond VA	INVOICE ADDRESS: 8090 Villa Park Dr Rich VA	PROJECT NUMBER:
PHONE #: 804 264 2228	INVOICE PHONE #: 804 264 2228	P.O. #:
FAX #: 804 264 8773 / EMAIL:		Pretreatment Program:
Is sample for compliance reporting? (YES) NO	Is sample from a chlorinated supply? YES (NO)	PWS I.D. #:
SAMPLER NAME (PRINT): Matt Wilkerson	SAMPLER SIGNATURE: [signature]	Turn Around Time: Day(s)

Matrix Codes: WW=Water Water GW=Ground Water DW=Drinking Water S=Soil/Solids OR=Organic A=Air WP=Wipe OT=Other STORMWATER

CLIENT SAMPLE I.D.	Grab	Composite	Field Filtered (Dissolved Metals)	Composite Start Date	Composite Start Time	Grab Date or Composite Stop Date	Grab Time or Composite Stop Time	Time Preserved	Matrix (See Codes)	Number of Containers	Oil + Grease (C)	BOD	Ammonia / COD (S)	TSS	Iron (FE-Total Rec) (N)	Color / Nitrite	Nitrate / TKN (S)	Total Phosphorus	COMMENTS
1) Outfall 002				10/18/11	2330	10/19/11	2330	2340	OT	9	X	X	X	X	X	X	X	X	
2) Outfall 003				10/18/11	2345	10/19/11	2345	2355	OT	9	X	X	X	X	X	X	X	X	
3) Outfall 005				10/18/11	2358	10/19/11	2359	0020	OT	9	X	X	X	X	X	X	X	X	
4)																			
5)																			
6)																			
7)																			
8)																			
9)																			
10)																			

ANALYSIS / (PRESERVATIVE)

Preservative Codes: N=Nitric Acid C=Hydrochloric Acid S=Sulfuric Acid H=Sodium Hydroxide A=Ascorbic Acid Z=Zinc Acetate T=Sodium Thiosulfate M=Methanol

PLEASE NOTE PRESERVATIVE(S), INTERFERENCE CHECKS or PUMP RATE (L/min)

RELINQUISHED:	DATE / TIME	RECEIVED:	DATE / TIME
[signature]	10/20/11 0830	[signature]	10/20/11 0830
[signature]	10/20/11 1450	[signature]	10/20/11 1450

QC Data Package
- Level I ☐
- Level II ☐
- Level III ☐
- Level IV ☐

LAB USE ONLY

COOLER TEMP 3.8 °C

DA

11100360

Greif Bros Form 2F Stormwate

DUE: 10 Days

Recd: 10/20/11

TERMS & CONDITIONS

Where a purchaser (Client) places an order for laboratory, consulting or sampling services from Air Water & Soil Laboratories, Inc., a Virginia corporation (referred to as "Air Water & Soil"), Air Water & Soil shall provide the ordered services pursuant to these Terms and Conditions, and the related Quotation or Price Schedule, or as agreed in a negotiated contract. In the absence of a written agreement to the contrary, the Order constitutes an acceptance by the Client of Air Water & Soil's offer to do business under these Terms and Conditions, and an agreement to be bound by these Terms and Conditions. No contrary or additional terms and conditions expressed in a Client's document shall be deemed to become a part of the contract created upon acceptance of these Terms and Conditions, unless accepted by Air Water & Soil in writing.

1. ORDERS AND RECEIPT OF SAMPLES

1.1 The Client may place the Order (i.e., specify a Scope of Work) either by submitting a purchase order to Air Water & Soil in writing or by telephone subsequently confirmed in writing, or by negotiated contract (i.e. Chain of Custody). Whichever option the Client selects for placing the Order, the Order shall not be valid unless it contains sufficient specification to enable Air Water & Soil to carry out the Client's requirements. In particular, samples must be accompanied by: a) adequate instruction on type of analysis requested, and b) complete written disclosure of the known or suspected presence of any hazardous substances, as defined by applicable federal or state law. Where any samples which were not accompanied by the required disclosure, cause interruptions in the lab's ability to process work due to contamination of instruments or work areas, the Client will be responsible for the costs of clean up and recovery.

1.2 The Client shall provide one week's advance notice of the sample delivery schedule, or any changes to the schedule, whenever possible. Upon timely delivery of samples, Air Water & Soil will use its best efforts to meet mutually agreed turnaround times. All turnaround times are based on business days and will be calculated from the point in time when Air Water & Soil has determined that it can proceed with defined work following receipt, inspection of samples, and resolution of any discrepancies in Chain-of-Custody forms and project guidance regarding work to be done (Sample Delivery Acceptance). In the event of any changes in the sample delivery schedule by the Client, prior to Sample Delivery Acceptance, Air Water & Soil reserves the right to modify its turnaround time commitment, to change the date upon which Air Water & Soil will accept samples, or refuse Sample Delivery Acceptance for the affected samples.

1.2.1 Turn around times are defined as follows: Any sample group requiring a turnaround time of less than five(5) business days will be considered a "Rush Turn Around Time". Rush Turnaround samples received after 3:00pm will be considered as received on the next business day.

1.2.2 Air Water & Soil defines "standard turnaround" as Five (5) business days with exception made for Full TCLP analyses.

1.3 Air Water & Soil reserves the right, exercisable at any time, to refuse or revoke Sample Delivery Acceptance for any sample which in the sole judgment of Air Water & Soil : a) is of unsuitable volume; b) may pose a risk or become unsuitable for handling, transport, or processing for any health, safety, environmental or other reason, whether or not due to the presence in the sample of any hazardous substance and whether or not such presence has been disclosed to Air Water & Soil by the Client; or c) holding times cannot be met, due to passage of more than 48 hours from the time of sampling or 1/2 the holding time for the requested test, whichever is less.

1.4 Prior to Sample Delivery Acceptance, the entire risk of loss or damage to samples remains with the Client, except where Air Water & Soil provides courier services. In no event will Air Water & Soil have any responsibility or liability for the action or inaction of any carrier shipping or delivering any sample to or from Air Water & Soil 's premises. Client is responsible to assure that any sample containing any hazardous substance which is to be delivered to Air Water & Soil 's premises will be packaged, labeled, transported and delivered properly and in accordance with applicable laws.

2. PAYMENT TERMS

2.1 Services performed by Air Water & Soil will be in accordance with prices quoted and later confirmed in writing or as stated in the Price Schedule. Quoted prices do not include sales tax. Applicable sales tax will be added to invoices where required by law. An Environmental Management Fee of 5% of the invoice value will also be applied, at Air Water & Soil's discretion.

2.2 Invoices may be submitted to Client upon completion of any sample delivery group. Billing corrections must be requested within 30 days of invoice date. Payment in advance is required for all Clients except those whose credit has been established with Air Water & Soil. For Clients with approved credit, payment terms are net 30 days from the date of invoice by Air Water & Soil. All overdue payments are subject to an additional interest and service charge of one and one half percent (1.5%) (or the maximum rate permissible by law, whichever is lesser) per month or portion thereof from the due date until the date of payment. All fees are charged or billed directly to the Client. The billing of a third party will not be accepted without a statement, signed by the third party, that acknowledges and accepts payment responsibility.

2.3 Air Water & Soil may suspend work and withhold delivery of data under this order at any time in the event Client fails to make timely payment of its invoices. Client shall be responsible for all costs and expenses of collection including reasonable attorney's fees. Air Water & Soil reserves the right to refuse to proceed with work at any time based upon an unfavorable Client credit report.

3. CHANGE ORDERS, TERMINATION

3.1 Changes to the Scope of Work, price, or result delivery date may be initiated by Air Water & Soil after Sample Delivery Acceptance due to any condition which conflicts with analytical, QA or other protocols warranted in these Terms and Conditions. Air Water & Soil will not proceed with such changes until an agreement with the Client is reached on the amount of any cost, schedule change or technical change to the Scope of Work, and such agreement is documented. Email communications are acceptable, telephone conversations however must be followed up with written documentation.

3.2 Changes to the Scope of Work, including but not limited to increasing or decreasing the work, changing test and analysis specification, or acceleration in the performance of the work may be initiated by the Client after sample delivery acceptance. Such a change will be documented in writing and may result in a change in cost and turnaround time commitment. Air Water & Soil's acceptance of such changes is contingent upon technical feasibility and operational capacity.

3.3 Suspension or termination of all or any part of the work may be initiated by the Client. Air Water & Soil will be compensated consistent with Section 2 of these Terms and Conditions. Air Water & Soil will complete all work in progress and be paid in full for all work completed.

4. WARRANTIES AND LIABILITY

4.1 Where applicable, Air Water & Soil will use analytical methodologies which are in substantial conformity with published test methods. Air Water & Soil has implemented these methods in its Laboratory Quality Manual and referenced Standard Operating Procedures and where the nature or composition of the sample requires it, Air Water & Soil reserves the right to deviate from these methodologies as necessary or appropriate, based on the reasonable judgment of Air Water & Soil , which deviations, if any, will be made on a basis consistent with recognized standards of the industry and/or Air Water & Soil 's Laboratory Quality Manuals. Client may request that Air Water & Soil perform according to a mutually agreed Quality Assurance Project Plan (QAPP). In the event that samples arrive prior to agreement on a QAPP, Air Water & Soil will proceed with analyses under its standard Quality Manuals then in effect, and Air Water & Soil will not be responsible for any re-sampling or other charges if work must be repeated to comply with a subsequently finalized QAPP.

4.2 Air Water & Soil shall start preparation and/or analysis within holding times provided that Sample Delivery Acceptance occurs within 48 hours of sampling or 1/2 of the holding time for the test, whichever is less. Where resolution of inconsistencies leading to Sample Delivery Acceptance does not occur within this period, Air Water & Soil will use its best efforts to meet holding times and will proceed with the work provided that, in Air Water & Soil 's judgment, the chain-of-custody or definition of the Scope of Work provide sufficient guidance. Reanalysis of samples to comply with Air Water & Soil 's Quality Manuals will be deemed to have met holding times provided the initial analysis was performed within the applicable holding time. Where reanalysis demonstrates that sample matrix interference is the cause of failure to meet any Quality Manual requirements, the warranty will be deemed to have been met.

4.3 Air Water & Soil warrants that it possesses and maintains all licenses and certifications which are required to perform services under these Terms and Conditions provided that such requirements are specified in writing to Air Water & Soil prior to Sample Delivery Acceptance.

4.4 The warranty obligations set forth in Sections 4.1, 4.2 and 4.3 are the sole and exclusive warranties given by Air Water & Soil in connection with any services performed by Air Water & Soil or any Results generated from such services, and Air Water & Soil gives and makes NO OTHER REPRESENTATION OR WARRANTY OF ANY KIND, EXPRESS OR IMPLIED. No representative of Air Water & Soil is authorized to give or make any other representation or warranty or modify this warranty in any way.

4.5 Client's sole and exclusive remedy for the breach of warranty in connection with any services performed by Air Water & Soil , will be limited to repeating any services performed, contingent on the Client's providing, at the request of Air Water & Soil and at the Client's expense, additional sample(s) if necessary. Any reanalysis requested by the Client generating Results consistent with the original Results will be at the Client's expense. If re-sampling is necessary, Air Water & Soil 's liability for re-sampling costs will be limited to actual cost or one hundred and fifty dollars ($150) per sample, whichever is less.

4.6 Air Water & Soil 's liability for any and all causes of action arising hereunder, whether based in contract, tort, warranty, negligence or otherwise, shall be limited to the lesser amount of compensation for the services performed or $100,000. All claims, including those for negligence, shall be deemed waived unless suit thereon is filed within one year after Air Water & Soil's completion of the services. Under no circumstances, whether arising in contract, tort (including negligence), or otherwise, shall Air Water &Soil be responsible for loss of use, loss of profits, or for any special, indirect, incidental or consequential damages occasioned by the services performed or by application or use of the reports prepared.

4.7 In no event shall Air Water & Soil have any responsibility or liability to the Client for any failure or delay in performance by Air Water & Soil which results, directly or indirectly, in whole or in part, from any cause or circumstance beyond the reasonable control of Air Water & Soil. Such causes and circumstances shall include, but not be limited to, acts of God, acts of Client, acts or orders of any governmental authority, strikes or other labor disputes, natural disasters, accidents, wars, civil disturbances, equipment breakdown, matrix interference or unknown highly contaminated samples that impact instrument operation, unavailability of supplies from usual suppliers, difficulties or delays in transportation, mail or delivery services, or any other cause beyond Air Water & Soil 's reasonable control.

5. RESULTS, WORK PRODUCT

5.1 Data or information provided to Air Water & Soil or generated by services performed under this agreement shall only become the property of the Client upon receipt in full by Air Water & Soil of payment for the whole Order. Ownership of any analytical method, QA/QC protocols, software programs or equipment developed by Air Water & Soil for performance of work will be retained by Air Water & Soil, and Client shall not disclose such information to any third party.

5.2 Data and sample materials provided by Client or at Client's request, and the result obtained by Air Water & Soil shall be held in confidence (unless such information is generally available to the public or is in the public domain or Client has failed to pay Air Water & Soil for all services rendered or is otherwise in breach of these Terms and Conditions), subject to any disclosure required by law or legal process.

5.3 Should the Results delivered by Air Water & Soil be used by the Client or Client's client, even though subsequently determined not to meet the warranties described in these Terms and Conditions, then the compensation will be adjusted based upon mutual agreement. In no case shall the Client unreasonably withhold Air Water & Soil's right to independently defend its data.

5.4 Air Water & Soil reserves the right to subcontract services ordered by the Client to another laboratory or laboratories, if, in Air Water & Soil's sole judgment, it is reasonably necessary, appropriate or advisable to do so. Air Water & Soil will in no way be liable for any subcontracted services except for work performed at laboratories which have been audited and approved by Air Water & Soil.

5.5 Air Water & Soil shall dispose of the Client's samples 30 days after receipt of samples; 15 days after receipt of samples for BOD, CBOD and TSS analyses, unless instructed to store them for an alternate period of time or to return such samples to the Client, in a manner consistent with U.S. Environmental Protection Agency regulations or other applicable federal, state or local requirements. Any samples for projects that are canceled or not accepted, or for which return was requested, will be returned to the Client at his own expense. Air Water & Soil reserves the right to return to the Client any sample or unused portion of a sample that is not within Air Water & Soil's permitted capability or the capabilities of Air Water & Soil's designated waste disposal vendor(s). 5.6 Unless a different time period is agreed to in any order under these Terms and Conditions, Air Water & Soil agrees to retain all records for five (5) years.

5.7 In the event that Air Water & Soil is required to respond to legal process related to services for Client, Client agrees to reimburse Air Water & Soil for hourly charges for personnel involved in the response and attorney fees reasonably incurred in obtaining advice concerning the response, preparation to testify, and appearances related to the legal process, travel and all reasonable expenses associated with the litigation.

6. INSURANCE

6.1 Air Water & Soil shall maintain in force during the performance of services under these Terms and Conditions, Workers' Compensation and Employer's Liability Insurance in accordance with the laws of the states having jurisdiction over Air Water & Soil's employees who are engaged in the performance of the work. Air Water & Soil shall also maintain during such period, Comprehensive General and Contractual Liability (limit of $1,000,000 per occurrence/ $2,000,000 aggregate), Comprehensive Automobile Liability, owned and hired, ($1,000,000 combined single limit), and Professional/Pollution Liability Insurance (limit of $1,000,000 per occurrence/aggregate).

7. AUDIT

7.1 Upon prior notice to Air Water & Soil, the Client may audit and inspect Air Water & Soil's records and accounts covering reimbursable costs related to work done for the Client, for a period of two (2) years after completion of the work. The purpose of any such audit shall be only for verification of such costs, and Air Water & Soil shall not be required to provide access to cost records where prices are expressed as fixed fees or published unit prices.

8. MISCELLANEOUS PROVISIONS

8.1 These Terms and Conditions, together with any additions or revisions which may be agreed to in writing by Air Water & Soil , embody the whole agreement of the parties and provide the only remedies available. There are no promises, terms, conditions, understandings, obligations or agreements other than those contained herein, and these Terms and Conditions shall supersede all previous communications, representations, or agreements, either verbal or written, between the Client and Air Water & Soil . These Terms and Conditions, and any transactions or agreements to which they apply, shall be governed both as to interpretation and performance by the laws of the state where Air Water & Soil's services are performed.

8.2 The invalidity or unenforceability, in whole or in part of any provision, term or condition hereof shall not affect in any way the validity or enforceability of the remainder to these Terms and Conditions, the intent of the parties being that the provisions be severable. The section headings of these Terms and Conditions are intended solely for convenient reference and shall not define, limit or affect in any way these Terms and Conditions or their interpretations. No waiver by either party of any provision, term or condition hereof or of any obligation of the other party hereunder shall constitute a waiver of any subsequent breach or other obligation.

8.3 The obligations, liabilities, and remedies of the parties, as provided herein, are exclusive and in lieu of any others available at law or in equity. Indemnifications, releases from liability and limitations of liability shall apply, notwithstanding the fault, negligence or strict liability of the party to be indemnified, released, or whose liability is limited, the extent of sole negligence or willful misconduct.

AIR WATER SOIL

2109A North Hamilton Street • Richmond, Virginia 23230 • Tel : (80

DA

11100360

Greif Bros Form 2F Stormwate

DUE: 10 Days
Recd: 10/20/11

Sample Conditions Checkli

Opened by: (Initials) AKLB **Lab ID No.:** _____

Date Cooler Opened: 10-20-11

		YES	NO	N/A
1.	How were samples received? Fed Ex ☐ UPS ☐ Courier ☐ Walk In ☑			
2.	Were custody seals used?	☐	☑	☐
3.	If yes, are custody seals unbroken and intact at the date and time of arrival?	☐	☐	☑
4.	Are the custody papers filled out completely and correctly?	☑	☐	☐
5.	Do all bottle labels agree with custody papers?	☑	☐	☐
6.	Are the samples received on ice?	☑	☐	☐
7.	Is the temperature blank or representative sample within acceptable limits? (above freezing to 6°C)	☑	☐	☐
8.	Are all samples within holding time for requested laboratory tests?	☑	☐	☐
9	Is a sufficient amount of sample provided to perform the tests indicated?	☑	☐	☐
10	Are all samples in proper containers for the analyses requested?	☑	☐	☐
11	Are all samples appropriately preserved for the analyses requested?	☑	☐	☐
12	Are all volatile organic containers free of headspace?	☐	☐	☑

COMMENTS

AIR WATER & SOIL LABORATORIES, INC.

pH Preservation Log

pH Log
Form #: F1301
Effective: August 2, 2010
Page 1 of 1

Order ID 11100360

Date Performed: 10-2011

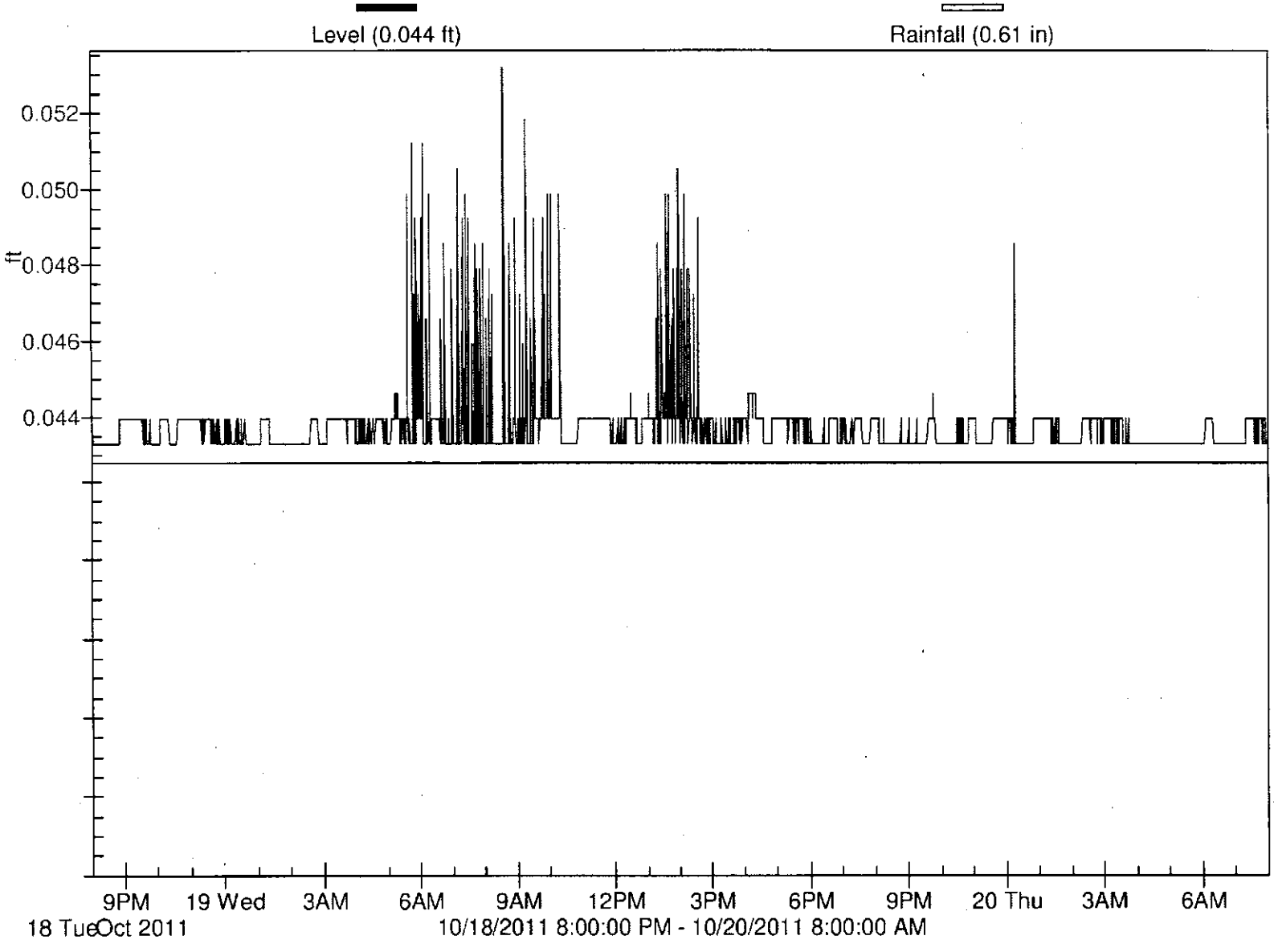
Analyst Performing Check: ACWB

Sample ID	Container ID	Metals			Cyanide			Sulfide			Ammonia			TKN			Phos, Tot			NO3+NO2			DRO			COD					
		pH as Received		Final pH (If adjust.)	pH as Received		Final pH (If adjust.)	pH as Received		Final pH (If adjust.)	pH as Received		Final pH (If adjust.)	pH as Received		Final pH (If adjust.)	pH as Received		Final pH (If adjust.)	pH as Received		Final pH (If adjust.)	pH as Received		Final pH (If adjust.)	pH as Received		Final pH (If adjust.)	pH as Received		Final pH (If adjust.)
		< 2	Other		> 12	Other		> 9	Other		< 2	Other		< 2	Other		< 2	Other		< 2	Other		< 2	Other		< 2	Other			Other	
001	01	✓																													
001	07										✓															✓					
001	08													✓						✓											
001	09																✓														
002	01	✓																													
002	07										✓															✓					
002	08													✓						✓											
002	09																✓														
003	01	✓																													
003	07										✓															✓					
003	08													✓						✓											
003	09																✓														

OUTFALL 002

Outfall 002

Greif Packaging - Form 2F Storm Water



Outfall 002

Greif Packaging - Form 2F Storm Water

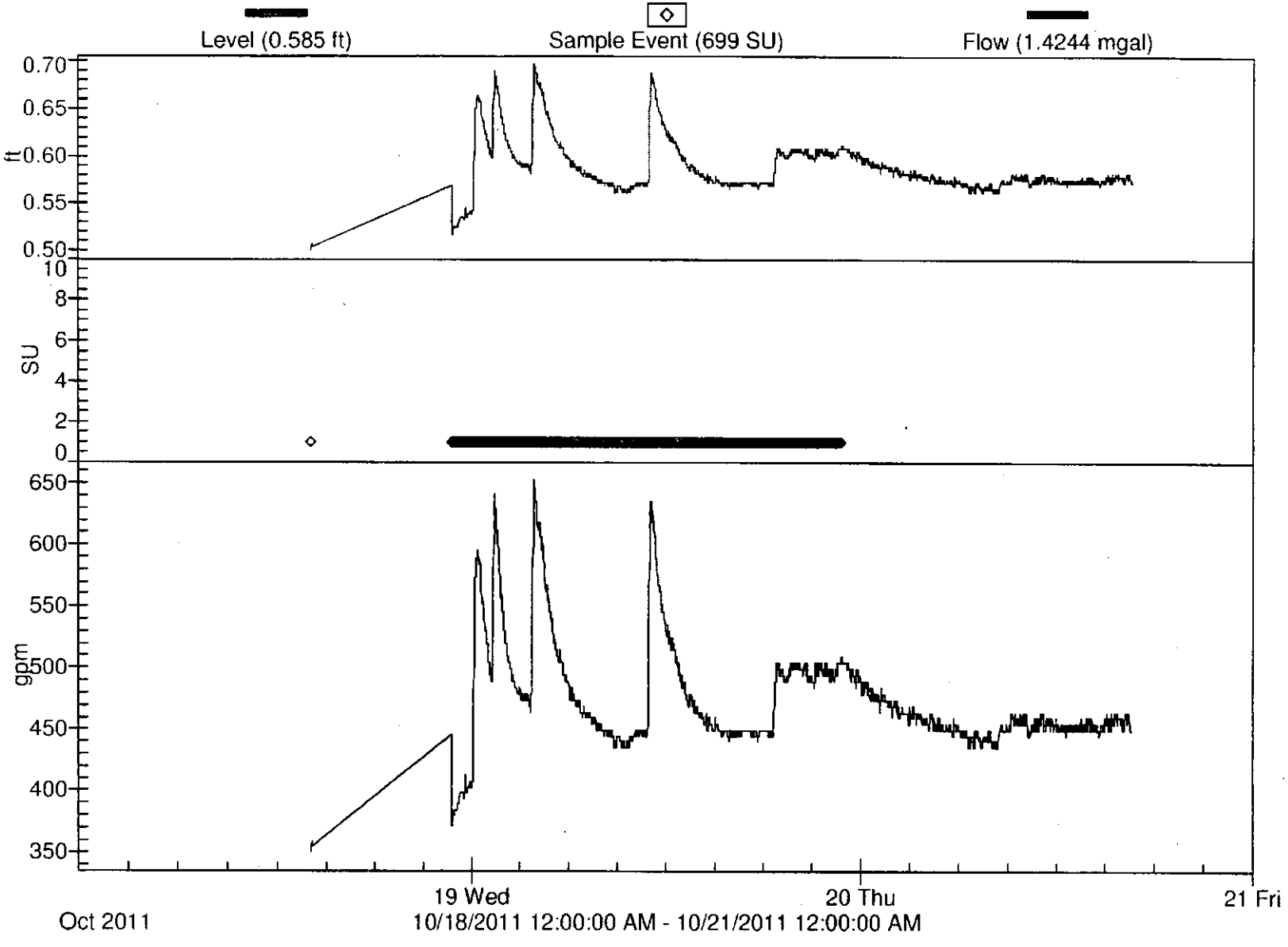
Date/Time	Average Level (ft)	Summary Rainfall (in)	Average Flow rate (gpm)
10/18/2011 8:00:00 PM	0.043	0.00	43.74
10/18/2011 9:00:00 PM	0.044	0.00	43.21
10/18/2011 10:00:00 PM	0.044	0.00	43.28
10/18/2011 11:00:00 PM	0.044	0.14	43.25
10/19/2011 12:00:00 AM	0.043	0.12	42.65
10/19/2011 1:00:00 AM	0.043	0.07	42.70
10/19/2011 2:00:00 AM	0.043	0.00	42.70
10/19/2011 3:00:00 AM	0.044	0.06	43.58
10/19/2011 4:00:00 AM	0.044	0.04	43.21
10/19/2011 5:00:00 AM	0.044	0.00	44.47
10/19/2011 6:00:00 AM	0.044	0.00	44.27
10/19/2011 7:00:00 AM	0.044	0.00	44.46
10/19/2011 8:00:00 AM	0.044	0.00	43.78
10/19/2011 9:00:00 AM	0.044	0.00	44.74
10/19/2011 10:00:00 AM	0.044	0.05	43.50
10/19/2011 11:00:00 AM	0.044	0.04	43.56
10/19/2011 12:00:00 PM	0.044	0.00	43.14
10/19/2011 1:00:00 PM	0.045	0.00	45.12
10/19/2011 2:00:00 PM	0.044	0.00	44.32
10/19/2011 3:00:00 PM	0.044	0.01	42.84
10/19/2011 4:00:00 PM	0.044	0.00	43.68
10/19/2011 5:00:00 PM	0.044	0.00	43.46
10/19/2011 6:00:00 PM	0.044	0.02	42.81
10/19/2011 7:00:00 PM	0.044	0.01	43.07
10/19/2011 8:00:00 PM	0.043	0.02	42.51
10/19/2011 9:00:00 PM	0.044	0.01	42.79
10/19/2011 10:00:00 PM	0.044	0.02	42.77
10/19/2011 11:00:00 PM	0.044	0.00	43.04
10/20/2011 12:00:00 AM	0.044	0.00	42.99
10/20/2011 1:00:00 AM	0.044	0.00	43.04
10/20/2011 2:00:00 AM	0.044	0.00	43.16
10/20/2011 3:00:00 AM	0.044	0.00	43.02
10/20/2011 4:00:00 AM	0.043	0.00	42.35
10/20/2011 5:00:00 AM	0.043	0.00	42.35
10/20/2011 6:00:00 AM	0.043	0.00	42.70
10/20/2011 7:00:00 AM	0.044	0.00	43.04

Date/Time	Average Level (ft)	Summary Rainfall (in)	Average Flow rate (gpm)
	Average Level (ft)	Average Rainfall (in)	Average Flow rate (gpm)
	0.044	0.02	43.31
		Total	Total
		0.61 in	0.093557 mgal

OUTFALL 003

OUTFALL003

Greif Packaging - Form 2F Storm Water



OUTFALL003

Greif Packaging - Form 2F Storm Water

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/18/2011 2:03:00 PM	0.498		350.98
10/18/2011 2:04:00 PM	0.501		355.23
10/18/2011 2:05:00 PM	0.501	0	354.80
10/18/2011 2:06:00 PM	0.501		355.23
10/18/2011 2:07:00 PM	0.500		354.37
10/18/2011 2:08:00 PM	0.503		358.22
10/18/2011 2:09:00 PM	0.500		353.95
10/18/2011 2:10:00 PM	0.500		353.95
10/18/2011 10:49:00 PM	0.566	0	445.33
10/18/2011 10:50:00 PM	0.513		371.18
10/18/2011 10:51:00 PM	0.513	0	371.18
10/18/2011 10:52:00 PM	0.513		371.18
10/18/2011 10:53:00 PM	0.516		375.55
10/18/2011 10:54:00 PM	0.516	0	375.55
10/18/2011 10:55:00 PM	0.520		379.95
10/18/2011 10:56:00 PM	0.523		384.38
10/18/2011 10:57:00 PM	0.520	0	379.95
10/18/2011 10:58:00 PM	0.523		384.38
10/18/2011 10:59:00 PM	0.523	0	384.38
10/18/2011 11:00:00 PM	0.523		384.38
10/18/2011 11:01:00 PM	0.523		384.38
10/18/2011 11:02:00 PM	0.523	0	384.38
10/18/2011 11:03:00 PM	0.523		384.38
10/18/2011 11:04:00 PM	0.523		384.38
10/18/2011 11:05:00 PM	0.523	0	384.38
10/18/2011 11:06:00 PM	0.523		384.38
10/18/2011 11:07:00 PM	0.523	0	384.38
10/18/2011 11:08:00 PM	0.523		384.38
10/18/2011 11:09:00 PM	0.526		388.83
10/18/2011 11:10:00 PM	0.526	0	388.83
10/18/2011 11:11:00 PM	0.526		388.83
10/18/2011 11:12:00 PM	0.526	0	388.83
10/18/2011 11:13:00 PM	0.526		388.83
10/18/2011 11:14:00 PM	0.526		388.83
10/18/2011 11:15:00 PM	0.526	0	388.83
10/18/2011 11:16:00 PM	0.530		393.31
10/18/2011 11:17:00 PM	0.530		393.31
10/18/2011 11:18:00 PM	0.530	0	393.31
10/18/2011 11:19:00 PM	0.530		393.31
10/18/2011 11:20:00 PM	0.533	0	397.82

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/18/2011 11:21:00 PM	0.533		397.82
10/18/2011 11:22:00 PM	0.533		397.82
10/18/2011 11:23:00 PM	0.533	0	397.82
10/18/2011 11:24:00 PM	0.533		397.82
10/18/2011 11:25:00 PM	0.533	0	397.82
10/18/2011 11:26:00 PM	0.533		397.82
10/18/2011 11:27:00 PM	0.533		397.82
10/18/2011 11:28:00 PM	0.533	0	397.82
10/18/2011 11:29:00 PM	0.533		397.82
10/18/2011 11:30:00 PM	0.533	0	397.82
10/18/2011 11:31:00 PM	0.533		397.82
10/18/2011 11:32:00 PM	0.533		397.82
10/18/2011 11:33:00 PM	0.533	0	397.82
10/18/2011 11:34:00 PM	0.530		393.31
10/18/2011 11:35:00 PM	0.533	0	397.82
10/18/2011 11:36:00 PM	0.533		397.82
10/18/2011 11:37:00 PM	0.533		397.82
10/18/2011 11:38:00 PM	0.533	0	397.82
10/18/2011 11:39:00 PM	0.533		397.82
10/18/2011 11:40:00 PM	0.543	0	411.50
10/18/2011 11:41:00 PM	0.533		397.82
10/18/2011 11:42:00 PM	0.533		397.82
10/18/2011 11:43:00 PM	0.533	0	397.82
10/18/2011 11:44:00 PM	0.536		402.35
10/18/2011 11:45:00 PM	0.533	0	397.82
10/18/2011 11:46:00 PM	0.536		402.35
10/18/2011 11:47:00 PM	0.536		402.35
10/18/2011 11:48:00 PM	0.536	0	402.35
10/18/2011 11:49:00 PM	0.536		402.35
10/18/2011 11:50:00 PM	0.536	0	402.35
10/18/2011 11:51:00 PM	0.536		402.35
10/18/2011 11:52:00 PM	0.536		402.35
10/18/2011 11:53:00 PM	0.536	0	402.35
10/18/2011 11:54:00 PM	0.536		402.35
10/18/2011 11:55:00 PM	0.539	0	406.91
10/18/2011 11:56:00 PM	0.536		402.35
10/18/2011 11:57:00 PM	0.536		402.35
10/18/2011 11:58:00 PM	0.536	0	402.35
10/18/2011 11:59:00 PM	0.536		402.35
10/19/2011 12:00:00 AM	0.536	0	402.35
10/19/2011 12:01:00 AM	0.539		406.91
10/19/2011 12:02:00 AM	0.539		406.91
10/19/2011 12:03:00 AM	0.539	0	406.91

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 12:04:00 AM	0.539		406.91
10/19/2011 12:05:00 AM	0.539	0	406.91
10/19/2011 12:06:00 AM	0.539		406.91
10/19/2011 12:07:00 AM	0.543	0	411.50
10/19/2011 12:08:00 AM	0.546		416.11
10/19/2011 12:09:00 AM	0.559		434.84
10/19/2011 12:10:00 AM	0.569	0	449.17
10/19/2011 12:11:00 AM	0.589		478.57
10/19/2011 12:12:00 AM	0.605	0	503.83
10/19/2011 12:13:00 AM	0.618		524.53
10/19/2011 12:14:00 AM	0.628	0	540.35
10/19/2011 12:15:00 AM	0.635		551.04
10/19/2011 12:16:00 AM	0.644	0	567.29
10/19/2011 12:17:00 AM	0.648		572.76
10/19/2011 12:18:00 AM	0.648	0	572.76
10/19/2011 12:19:00 AM	0.651	0	578.26
10/19/2011 12:20:00 AM	0.657		589.34
10/19/2011 12:21:00 AM	0.657	0	589.34
10/19/2011 12:22:00 AM	0.657		589.34
10/19/2011 12:23:00 AM	0.657	0	589.34
10/19/2011 12:24:00 AM	0.657	0	589.34
10/19/2011 12:25:00 AM	0.657		589.34
10/19/2011 12:26:00 AM	0.661	0	594.93
10/19/2011 12:27:00 AM	0.657		589.34
10/19/2011 12:28:00 AM	0.657	0	589.34
10/19/2011 12:29:00 AM	0.657	0	589.34
10/19/2011 12:30:00 AM	0.654		583.79
10/19/2011 12:31:00 AM	0.657	0	589.34
10/19/2011 12:32:00 AM	0.657		589.34
10/19/2011 12:33:00 AM	0.654	0	583.79
10/19/2011 12:34:00 AM	0.657		589.34
10/19/2011 12:35:00 AM	0.654	0	583.79
10/19/2011 12:36:00 AM	0.651	0	578.26
10/19/2011 12:37:00 AM	0.648		572.76
10/19/2011 12:38:00 AM	0.644	0	567.29
10/19/2011 12:39:00 AM	0.641		561.84
10/19/2011 12:40:00 AM	0.641	0	561.84
10/19/2011 12:41:00 AM	0.638		556.43
10/19/2011 12:42:00 AM	0.638	0	556.43
10/19/2011 12:43:00 AM	0.638	0	556.43
10/19/2011 12:44:00 AM	0.635		551.04
10/19/2011 12:45:00 AM	0.638	0	556.43
10/19/2011 12:46:00 AM	0.638		556.43

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 12:47:00 AM	0.635	0	551.04
10/19/2011 12:48:00 AM	0.631		545.68
10/19/2011 12:49:00 AM	0.631	0	545.68
10/19/2011 12:50:00 AM	0.628		540.35
10/19/2011 12:51:00 AM	0.628	0	540.35
10/19/2011 12:52:00 AM	0.628	0	540.35
10/19/2011 12:53:00 AM	0.625		535.05
10/19/2011 12:54:00 AM	0.625	0	535.05
10/19/2011 12:55:00 AM	0.625		535.05
10/19/2011 12:56:00 AM	0.621	0	529.78
10/19/2011 12:57:00 AM	0.621		529.78
10/19/2011 12:58:00 AM	0.621	0	529.78
10/19/2011 12:59:00 AM	0.621		529.78
10/19/2011 1:00:00 AM	0.621	0	529.78
10/19/2011 1:01:00 AM	0.618		524.53
10/19/2011 1:02:00 AM	0.615	0	519.31
10/19/2011 1:03:00 AM	0.615		519.31
10/19/2011 1:04:00 AM	0.615	0	519.31
10/19/2011 1:05:00 AM	0.612		514.12
10/19/2011 1:06:00 AM	0.608	0	508.96
10/19/2011 1:07:00 AM	0.608		508.96
10/19/2011 1:08:00 AM	0.608	0	508.96
10/19/2011 1:09:00 AM	0.605		503.83
10/19/2011 1:10:00 AM	0.605	0	503.83
10/19/2011 1:11:00 AM	0.605		503.83
10/19/2011 1:12:00 AM	0.602	0	498.72
10/19/2011 1:13:00 AM	0.602		498.72
10/19/2011 1:14:00 AM	0.598	0	493.64
10/19/2011 1:15:00 AM	0.598		493.64
10/19/2011 1:16:00 AM	0.602	0	498.72
10/19/2011 1:17:00 AM	0.602		498.72
10/19/2011 1:18:00 AM	0.602	0	498.72
10/19/2011 1:19:00 AM	0.598		493.64
10/19/2011 1:20:00 AM	0.598	0	493.64
10/19/2011 1:21:00 AM	0.595		488.59
10/19/2011 1:22:00 AM	0.595	0	488.59
10/19/2011 1:23:00 AM	0.598		493.64
10/19/2011 1:24:00 AM	0.602	0	498.72
10/19/2011 1:25:00 AM	0.615		519.31
10/19/2011 1:26:00 AM	0.635	0	551.04
10/19/2011 1:27:00 AM	0.651		578.26
10/19/2011 1:28:00 AM	0.667	0	606.18
10/19/2011 1:29:00 AM	0.674	0	617.55

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 1:30:00 AM	0.684		634.82
10/19/2011 1:31:00 AM	0.687	0	640.64
10/19/2011 1:32:00 AM	0.677	0	623.28
10/19/2011 1:33:00 AM	0.674		617.55
10/19/2011 1:34:00 AM	0.677	0	623.28
10/19/2011 1:35:00 AM	0.680		629.04
10/19/2011 1:36:00 AM	0.674	0	617.55
10/19/2011 1:37:00 AM	0.677	0	623.28
10/19/2011 1:38:00 AM	0.671		611.85
10/19/2011 1:39:00 AM	0.667	0	606.18
10/19/2011 1:40:00 AM	0.671	0	611.85
10/19/2011 1:41:00 AM	0.667		606.18
10/19/2011 1:42:00 AM	0.664	0	600.54
10/19/2011 1:43:00 AM	0.664		600.54
10/19/2011 1:44:00 AM	0.664	0	600.54
10/19/2011 1:45:00 AM	0.661	0	594.93
10/19/2011 1:46:00 AM	0.657		589.34
10/19/2011 1:47:00 AM	0.654	0	583.79
10/19/2011 1:48:00 AM	0.654		583.79
10/19/2011 1:49:00 AM	0.651	0	578.26
10/19/2011 1:50:00 AM	0.651		578.26
10/19/2011 1:51:00 AM	0.648	0	572.76
10/19/2011 1:52:00 AM	0.648	0	572.76
10/19/2011 1:53:00 AM	0.644		567.29
10/19/2011 1:54:00 AM	0.644	0	567.29
10/19/2011 1:55:00 AM	0.638		556.43
10/19/2011 1:56:00 AM	0.641	0	561.84
10/19/2011 1:57:00 AM	0.638		556.43
10/19/2011 1:58:00 AM	0.638	0	556.43
10/19/2011 1:59:00 AM	0.635	0	551.04
10/19/2011 2:00:00 AM	0.631		545.68
10/19/2011 2:01:00 AM	0.631	0	545.68
10/19/2011 2:02:00 AM	0.631		545.68
10/19/2011 2:03:00 AM	0.631	0	545.68
10/19/2011 2:04:00 AM	0.625		535.05
10/19/2011 2:05:00 AM	0.625	0	535.05
10/19/2011 2:06:00 AM	0.625		535.05
10/19/2011 2:07:00 AM	0.621	0	529.78
10/19/2011 2:08:00 AM	0.621		529.78
10/19/2011 2:09:00 AM	0.621	0	529.78
10/19/2011 2:10:00 AM	0.618		524.53
10/19/2011 2:11:00 AM	0.615	0	519.31
10/19/2011 2:12:00 AM	0.615		519.31

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 2:13:00 AM	0.615	0	519.31
10/19/2011 2:14:00 AM	0.615	0	519.31
10/19/2011 2:15:00 AM	0.615		519.31
10/19/2011 2:16:00 AM	0.612	0	514.12
10/19/2011 2:17:00 AM	0.612		514.12
10/19/2011 2:18:00 AM	0.612	0	514.12
10/19/2011 2:19:00 AM	0.608		508.96
10/19/2011 2:20:00 AM	0.608	0	508.96
10/19/2011 2:21:00 AM	0.608		508.96
10/19/2011 2:22:00 AM	0.608	0	508.96
10/19/2011 2:23:00 AM	0.605		503.83
10/19/2011 2:24:00 AM	0.605	0	503.83
10/19/2011 2:25:00 AM	0.605		503.83
10/19/2011 2:26:00 AM	0.605	0	503.83
10/19/2011 2:27:00 AM	0.605		503.83
10/19/2011 2:28:00 AM	0.605	0	503.83
10/19/2011 2:29:00 AM	0.602		498.72
10/19/2011 2:30:00 AM	0.602	0	498.72
10/19/2011 2:31:00 AM	0.602		498.72
10/19/2011 2:32:00 AM	0.602	0	498.72
10/19/2011 2:33:00 AM	0.602		498.72
10/19/2011 2:34:00 AM	0.598	0	493.64
10/19/2011 2:35:00 AM	0.598		493.64
10/19/2011 2:36:00 AM	0.595	0	488.59
10/19/2011 2:37:00 AM	0.595		488.59
10/19/2011 2:38:00 AM	0.598	0	493.64
10/19/2011 2:39:00 AM	0.595		488.59
10/19/2011 2:40:00 AM	0.595	0	488.59
10/19/2011 2:41:00 AM	0.595		488.59
10/19/2011 2:42:00 AM	0.595	0	488.59
10/19/2011 2:43:00 AM	0.595		488.59
10/19/2011 2:44:00 AM	0.592	0	483.57
10/19/2011 2:45:00 AM	0.592		483.57
10/19/2011 2:46:00 AM	0.595	0	488.59
10/19/2011 2:47:00 AM	0.592		483.57
10/19/2011 2:48:00 AM	0.592		483.57
10/19/2011 2:49:00 AM	0.592	0	483.57
10/19/2011 2:50:00 AM	0.592		483.57
10/19/2011 2:51:00 AM	0.592	0	483.57
10/19/2011 2:52:00 AM	0.592		483.57
10/19/2011 2:53:00 AM	0.592	0	483.57
10/19/2011 2:54:00 AM	0.592		483.57
10/19/2011 2:55:00 AM	0.589	0	478.57

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 2:56:00 AM	0.589		478.57
10/19/2011 2:57:00 AM	0.589	0	478.57
10/19/2011 2:58:00 AM	0.589		478.57
10/19/2011 2:59:00 AM	0.589	0	478.57
10/19/2011 3:00:00 AM	0.589		478.57
10/19/2011 3:01:00 AM	0.589	0	478.57
10/19/2011 3:02:00 AM	0.592		483.57
10/19/2011 3:03:00 AM	0.589	0	478.57
10/19/2011 3:04:00 AM	0.589		478.57
10/19/2011 3:05:00 AM	0.592	0	483.57
10/19/2011 3:06:00 AM	0.589		478.57
10/19/2011 3:07:00 AM	0.589	0	478.57
10/19/2011 3:08:00 AM	0.589		478.57
10/19/2011 3:09:00 AM	0.589	0	478.57
10/19/2011 3:10:00 AM	0.585		473.60
10/19/2011 3:11:00 AM	0.589	0	478.57
10/19/2011 3:12:00 AM	0.585		473.60
10/19/2011 3:13:00 AM	0.585		473.60
10/19/2011 3:14:00 AM	0.585	0	473.60
10/19/2011 3:15:00 AM	0.589		478.57
10/19/2011 3:16:00 AM	0.589	0	478.57
10/19/2011 3:17:00 AM	0.589		478.57
10/19/2011 3:18:00 AM	0.585	0	473.60
10/19/2011 3:19:00 AM	0.589		478.57
10/19/2011 3:20:00 AM	0.585	0	473.60
10/19/2011 3:21:00 AM	0.589		478.57
10/19/2011 3:22:00 AM	0.589	0	478.57
10/19/2011 3:23:00 AM	0.589		478.57
10/19/2011 3:24:00 AM	0.589	0	478.57
10/19/2011 3:25:00 AM	0.589		478.57
10/19/2011 3:26:00 AM	0.585	0	473.60
10/19/2011 3:27:00 AM	0.585		473.60
10/19/2011 3:28:00 AM	0.589	0	478.57
10/19/2011 3:29:00 AM	0.589		478.57
10/19/2011 3:30:00 AM	0.589	0	478.57
10/19/2011 3:31:00 AM	0.589		478.57
10/19/2011 3:32:00 AM	0.585	0	473.60
10/19/2011 3:33:00 AM	0.585		473.60
10/19/2011 3:34:00 AM	0.589		478.57
10/19/2011 3:35:00 AM	0.585	0	473.60
10/19/2011 3:36:00 AM	0.585		473.60
10/19/2011 3:37:00 AM	0.582	0	468.66
10/19/2011 3:38:00 AM	0.582		468.66

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 3:39:00 AM	0.582	0	468.66
10/19/2011 3:40:00 AM	0.582		468.66
10/19/2011 3:41:00 AM	0.582	0	468.66
10/19/2011 3:42:00 AM	0.582		468.66
10/19/2011 3:43:00 AM	0.579	0	463.75
10/19/2011 3:44:00 AM	0.585		473.60
10/19/2011 3:45:00 AM	0.579	0	463.75
10/19/2011 3:46:00 AM	0.589		478.57
10/19/2011 3:47:00 AM	0.589	0	478.57
10/19/2011 3:48:00 AM	0.595		488.59
10/19/2011 3:49:00 AM	0.602	0	498.72
10/19/2011 3:50:00 AM	0.618		524.53
10/19/2011 3:51:00 AM	0.631	0	545.68
10/19/2011 3:52:00 AM	0.651		578.26
10/19/2011 3:53:00 AM	0.664	0	600.54
10/19/2011 3:54:00 AM	0.677	.	623.28
10/19/2011 3:55:00 AM	0.680	0	629.04
10/19/2011 3:56:00 AM	0.684	0	634.82
10/19/2011 3:57:00 AM	0.694		652.35
10/19/2011 3:58:00 AM	0.687	0	640.64
10/19/2011 3:59:00 AM	0.690	0	646.48
10/19/2011 4:00:00 AM	0.690		646.48
10/19/2011 4:01:00 AM	0.690	0	646.48
10/19/2011 4:02:00 AM	0.687	0	640.64
10/19/2011 4:03:00 AM	0.684		634.82
10/19/2011 4:04:00 AM	0.684	0	634.82
10/19/2011 4:05:00 AM	0.680		629.04
10/19/2011 4:06:00 AM	0.680	0	629.04
10/19/2011 4:07:00 AM	0.677	0	623.28
10/19/2011 4:08:00 AM	0.674		617.55
10/19/2011 4:09:00 AM	0.674	0	617.55
10/19/2011 4:10:00 AM	0.671	0	611.85
10/19/2011 4:11:00 AM	0.671		611.85
10/19/2011 4:12:00 AM	0.671	0	611.85
10/19/2011 4:13:00 AM	0.674		617.55
10/19/2011 4:14:00 AM	0.671	0	611.85
10/19/2011 4:15:00 AM	0.671	0	611.85
10/19/2011 4:16:00 AM	0.674		617.55
10/19/2011 4:17:00 AM	0.671	0	611.85
10/19/2011 4:18:00 AM	0.671		611.85
10/19/2011 4:19:00 AM	0.671	0	611.85
10/19/2011 4:20:00 AM	0.667	0	606.18
10/19/2011 4:21:00 AM	0.667		606.18

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 4:22:00 AM	0.667	0	606.18
10/19/2011 4:23:00 AM	0.667		606.18
10/19/2011 4:24:00 AM	0.667	0	606.18
10/19/2011 4:25:00 AM	0.667	0	606.18
10/19/2011 4:26:00 AM	0.664		600.54
10/19/2011 4:27:00 AM	0.661	0	594.93
10/19/2011 4:28:00 AM	0.664		600.54
10/19/2011 4:29:00 AM	0.657	0	589.34
10/19/2011 4:30:00 AM	0.657	0	589.34
10/19/2011 4:31:00 AM	0.657		589.34
10/19/2011 4:32:00 AM	0.657	0	589.34
10/19/2011 4:33:00 AM	0.654		583.79
10/19/2011 4:34:00 AM	0.651	0	578.26
10/19/2011 4:35:00 AM	0.651	0	578.26
10/19/2011 4:36:00 AM	0.654		583.79
10/19/2011 4:37:00 AM	0.648	0	572.76
10/19/2011 4:38:00 AM	0.648		572.76
10/19/2011 4:39:00 AM	0.641	0	561.84
10/19/2011 4:40:00 AM	0.644		567.29
10/19/2011 4:41:00 AM	0.644	0	567.29
10/19/2011 4:42:00 AM	0.641	0	561.84
10/19/2011 4:43:00 AM	0.641		561.84
10/19/2011 4:44:00 AM	0.641	0	561.84
10/19/2011 4:45:00 AM	0.641		561.84
10/19/2011 4:46:00 AM	0.644	0	567.29
10/19/2011 4:47:00 AM	0.641		561.84
10/19/2011 4:48:00 AM	0.641	0	561.84
10/19/2011 4:49:00 AM	0.641	0	561.84
10/19/2011 4:50:00 AM	0.638		556.43
10/19/2011 4:51:00 AM	0.635	0	551.04
10/19/2011 4:52:00 AM	0.638		556.43
10/19/2011 4:53:00 AM	0.638	0	556.43
10/19/2011 4:54:00 AM	0.635		551.04
10/19/2011 4:55:00 AM	0.631	0	545.68
10/19/2011 4:56:00 AM	0.635		551.04
10/19/2011 4:57:00 AM	0.628	0	540.35
10/19/2011 4:58:00 AM	0.631		545.68
10/19/2011 4:59:00 AM	0.631	0	545.68
10/19/2011 5:00:00 AM	0.631	0	545.68
10/19/2011 5:01:00 AM	0.628		540.35
10/19/2011 5:02:00 AM	0.625	0	535.05
10/19/2011 5:03:00 AM	0.628		540.35
10/19/2011 5:04:00 AM	0.625	0	535.05

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 5:05:00 AM	0.621		529.78
10/19/2011 5:06:00 AM	0.621	0	529.78
10/19/2011 5:07:00 AM	0.621		529.78
10/19/2011 5:08:00 AM	0.618	0	524.53
10/19/2011 5:09:00 AM	0.618		524.53
10/19/2011 5:10:00 AM	0.618	0	524.53
10/19/2011 5:11:00 AM	0.618		524.53
10/19/2011 5:12:00 AM	0.615	0	519.31
10/19/2011 5:13:00 AM	0.618		524.53
10/19/2011 5:14:00 AM	0.615	0	519.31
10/19/2011 5:15:00 AM	0.612	0	514.12
10/19/2011 5:16:00 AM	0.615		519.31
10/19/2011 5:17:00 AM	0.612	0	514.12
10/19/2011 5:18:00 AM	0.612		514.12
10/19/2011 5:19:00 AM	0.612	0	514.12
10/19/2011 5:20:00 AM	0.612		514.12
10/19/2011 5:21:00 AM	0.612	0	514.12
10/19/2011 5:22:00 AM	0.608		508.96
10/19/2011 5:23:00 AM	0.612	0	514.12
10/19/2011 5:24:00 AM	0.608		508.96
10/19/2011 5:25:00 AM	0.608	0	508.96
10/19/2011 5:26:00 AM	0.608		508.96
10/19/2011 5:27:00 AM	0.608	0	508.96
10/19/2011 5:28:00 AM	0.605		503.83
10/19/2011 5:29:00 AM	0.605	0	503.83
10/19/2011 5:30:00 AM	0.605		503.83
10/19/2011 5:31:00 AM	0.612	0	514.12
10/19/2011 5:32:00 AM	0.612		514.12
10/19/2011 5:33:00 AM	0.608	0	508.96
10/19/2011 5:34:00 AM	0.605		503.83
10/19/2011 5:35:00 AM	0.605	0	503.83
10/19/2011 5:36:00 AM	0.608		508.96
10/19/2011 5:37:00 AM	0.605	0	503.83
10/19/2011 5:38:00 AM	0.605		503.83
10/19/2011 5:39:00 AM	0.605	0	503.83
10/19/2011 5:40:00 AM	0.605		503.83
10/19/2011 5:41:00 AM	0.605	0	503.83
10/19/2011 5:42:00 AM	0.605		503.83
10/19/2011 5:43:00 AM	0.605	0	503.83
10/19/2011 5:44:00 AM	0.605		503.83
10/19/2011 5:45:00 AM	0.605	0	503.83
10/19/2011 5:46:00 AM	0.602		498.72
10/19/2011 5:47:00 AM	0.598	0	493.64

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 5:48:00 AM	0.598		493.64
10/19/2011 5:49:00 AM	0.598	0	493.64
10/19/2011 5:50:00 AM	0.598		493.64
10/19/2011 5:51:00 AM	0.595	0	488.59
10/19/2011 5:52:00 AM	0.598		493.64
10/19/2011 5:53:00 AM	0.598	0	493.64
10/19/2011 5:54:00 AM	0.598		493.64
10/19/2011 5:55:00 AM	0.595	0	488.59
10/19/2011 5:56:00 AM	0.595		488.59
10/19/2011 5:57:00 AM	0.598	0	493.64
10/19/2011 5:58:00 AM	0.595		488.59
10/19/2011 5:59:00 AM	0.595	0	488.59
10/19/2011 6:00:00 AM	0.595		488.59
10/19/2011 6:01:00 AM	0.595	0	488.59
10/19/2011 6:02:00 AM	0.595		488.59
10/19/2011 6:03:00 AM	0.595	0	488.59
10/19/2011 6:04:00 AM	0.595		488.59
10/19/2011 6:05:00 AM	0.595	0	488.59
10/19/2011 6:06:00 AM	0.592		483.57
10/19/2011 6:07:00 AM	0.589	0	478.57
10/19/2011 6:08:00 AM	0.592		483.57
10/19/2011 6:09:00 AM	0.585	0	473.60
10/19/2011 6:10:00 AM	0.589		478.57
10/19/2011 6:11:00 AM	0.589		478.57
10/19/2011 6:12:00 AM	0.585	0	473.60
10/19/2011 6:13:00 AM	0.589		478.57
10/19/2011 6:14:00 AM	0.592	0	483.57
10/19/2011 6:15:00 AM	0.589		478.57
10/19/2011 6:16:00 AM	0.592	0	483.57
10/19/2011 6:17:00 AM	0.592		483.57
10/19/2011 6:18:00 AM	0.592	0	483.57
10/19/2011 6:19:00 AM	0.589		478.57
10/19/2011 6:20:00 AM	0.589	0	478.57
10/19/2011 6:21:00 AM	0.589		478.57
10/19/2011 6:22:00 AM	0.585	0	473.60
10/19/2011 6:23:00 AM	0.585		473.60
10/19/2011 6:24:00 AM	0.589	0	478.57
10/19/2011 6:25:00 AM	0.589		478.57
10/19/2011 6:26:00 AM	0.585	0	473.60
10/19/2011 6:27:00 AM	0.585		473.60
10/19/2011 6:28:00 AM	0.585	0	473.60
10/19/2011 6:29:00 AM	0.585		473.60
10/19/2011 6:30:00 AM	0.585	0	473.60

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 6:31:00 AM	0.585		473.60
10/19/2011 6:32:00 AM	0.585		473.60
10/19/2011 6:33:00 AM	0.582	0	468.66
10/19/2011 6:34:00 AM	0.585		473.60
10/19/2011 6:35:00 AM	0.582	0	468.66
10/19/2011 6:36:00 AM	0.585	.	473.60
10/19/2011 6:37:00 AM	0.582	0	468.66
10/19/2011 6:38:00 AM	0.582		468.66
10/19/2011 6:39:00 AM	0.582	0	468.66
10/19/2011 6:40:00 AM	0.582		468.66
10/19/2011 6:41:00 AM	0.582	0	468.66
10/19/2011 6:42:00 AM	0.582		468.66
10/19/2011 6:43:00 AM	0.582	0	468.66
10/19/2011 6:44:00 AM	0.582		468.66
10/19/2011 6:45:00 AM	0.582	0	468.66
10/19/2011 6:46:00 AM	0.585		473.60
10/19/2011 6:47:00 AM	0.585	0	473.60
10/19/2011 6:48:00 AM	0.585		473.60
10/19/2011 6:49:00 AM	0.582		468.66
10/19/2011 6:50:00 AM	0.582	0	468.66
10/19/2011 6:51:00 AM	0.582		468.66
10/19/2011 6:52:00 AM	0.579	0	463.75
10/19/2011 6:53:00 AM	0.579		463.75
10/19/2011 6:54:00 AM	0.579	0	463.75
10/19/2011 6:55:00 AM	0.579		463.75
10/19/2011 6:56:00 AM	0.575	0	458.86
10/19/2011 6:57:00 AM	0.579		463.75
10/19/2011 6:58:00 AM	0.579	0	463.75
10/19/2011 6:59:00 AM	0.579		463.75
10/19/2011 7:00:00 AM	0.582	0	468.66
10/19/2011 7:01:00 AM	0.582		468.66
10/19/2011 7:02:00 AM	0.582	0	468.66
10/19/2011 7:03:00 AM	0.579		463.75
10/19/2011 7:04:00 AM	0.579		463.75
10/19/2011 7:05:00 AM	0.579	0	463.75
10/19/2011 7:06:00 AM	0.579		463.75
10/19/2011 7:07:00 AM	0.579	0	463.75
10/19/2011 7:08:00 AM	0.575		458.86
10/19/2011 7:09:00 AM	0.575	0	458.86
10/19/2011 7:10:00 AM	0.579		463.75
10/19/2011 7:11:00 AM	0.579	0	463.75
10/19/2011 7:12:00 AM	0.579		463.75
10/19/2011 7:13:00 AM	0.579	0	463.75

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 7:14:00 AM	0.575		458.86
10/19/2011 7:15:00 AM	0.579	0	463.75
10/19/2011 7:16:00 AM	0.579		463.75
10/19/2011 7:17:00 AM	0.579		463.75
10/19/2011 7:18:00 AM	0.579	0	463.75
10/19/2011 7:19:00 AM	0.575		458.86
10/19/2011 7:20:00 AM	0.575	0	458.86
10/19/2011 7:21:00 AM	0.575		458.86
10/19/2011 7:22:00 AM	0.579	0	463.75
10/19/2011 7:23:00 AM	0.575		458.86
10/19/2011 7:24:00 AM	0.575	0	458.86
10/19/2011 7:25:00 AM	0.575		458.86
10/19/2011 7:26:00 AM	0.575	0	458.86
10/19/2011 7:27:00 AM	0.575		458.86
10/19/2011 7:28:00 AM	0.575	0	458.86
10/19/2011 7:29:00 AM	0.575		458.86
10/19/2011 7:30:00 AM	0.572		454.00
10/19/2011 7:31:00 AM	0.575	0	458.86
10/19/2011 7:32:00 AM	0.572		454.00
10/19/2011 7:33:00 AM	0.575	0	458.86
10/19/2011 7:34:00 AM	0.572		454.00
10/19/2011 7:35:00 AM	0.575	0	458.86
10/19/2011 7:36:00 AM	0.572		454.00
10/19/2011 7:37:00 AM	0.572	0	454.00
10/19/2011 7:38:00 AM	0.575		458.86
10/19/2011 7:39:00 AM	0.572	0	454.00
10/19/2011 7:40:00 AM	0.575		458.86
10/19/2011 7:41:00 AM	0.572		454.00
10/19/2011 7:42:00 AM	0.572	0	454.00
10/19/2011 7:43:00 AM	0.572		454.00
10/19/2011 7:44:00 AM	0.575	0	458.86
10/19/2011 7:45:00 AM	0.572		454.00
10/19/2011 7:46:00 AM	0.572	0	454.00
10/19/2011 7:47:00 AM	0.569		449.17
10/19/2011 7:48:00 AM	0.572	0	454.00
10/19/2011 7:49:00 AM	0.572		454.00
10/19/2011 7:50:00 AM	0.569	0	449.17
10/19/2011 7:51:00 AM	0.569		449.17
10/19/2011 7:52:00 AM	0.572		454.00
10/19/2011 7:53:00 AM	0.569	0	449.17
10/19/2011 7:54:00 AM	0.572		454.00
10/19/2011 7:55:00 AM	0.572	0	454.00
10/19/2011 7:56:00 AM	0.572		454.00

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 7:57:00 AM	0.572	0	454.00
10/19/2011 7:58:00 AM	0.569		449.17
10/19/2011 7:59:00 AM	0.572	0	454.00
10/19/2011 8:00:00 AM	0.569		449.17
10/19/2011 8:01:00 AM	0.572	0	454.00
10/19/2011 8:02:00 AM	0.569		449.17
10/19/2011 8:03:00 AM	0.572		454.00
10/19/2011 8:04:00 AM	0.569	0	449.17
10/19/2011 8:05:00 AM	0.569		449.17
10/19/2011 8:06:00 AM	0.569	0	449.17
10/19/2011 8:07:00 AM	0.569		449.17
10/19/2011 8:08:00 AM	0.569	0	449.17
10/19/2011 8:09:00 AM	0.569		449.17
10/19/2011 8:10:00 AM	0.569	0	449.17
10/19/2011 8:11:00 AM	0.569		449.17
10/19/2011 8:12:00 AM	0.569		449.17
10/19/2011 8:13:00 AM	0.569	0	449.17
10/19/2011 8:14:00 AM	0.569		449.17
10/19/2011 8:15:00 AM	0.566	0	444.37
10/19/2011 8:16:00 AM	0.569		449.17
10/19/2011 8:17:00 AM	0.569	0	449.17
10/19/2011 8:18:00 AM	0.569		449.17
10/19/2011 8:19:00 AM	0.569	0	449.17
10/19/2011 8:20:00 AM	0.569		449.17
10/19/2011 8:21:00 AM	0.569	0	449.17
10/19/2011 8:22:00 AM	0.569		449.17
10/19/2011 8:23:00 AM	0.569		449.17
10/19/2011 8:24:00 AM	0.569	0	449.17
10/19/2011 8:25:00 AM	0.569		449.17
10/19/2011 8:26:00 AM	0.569	0	449.17
10/19/2011 8:27:00 AM	0.566		444.37
10/19/2011 8:28:00 AM	0.569	0	449.17
10/19/2011 8:29:00 AM	0.569		449.17
10/19/2011 8:30:00 AM	0.566	0	444.37
10/19/2011 8:31:00 AM	0.569		449.17
10/19/2011 8:32:00 AM	0.569		449.17
10/19/2011 8:33:00 AM	0.569	0	449.17
10/19/2011 8:34:00 AM	0.566		444.37
10/19/2011 8:35:00 AM	0.569	0	449.17
10/19/2011 8:36:00 AM	0.566		444.37
10/19/2011 8:37:00 AM	0.569	0	449.17
10/19/2011 8:38:00 AM	0.566		444.37
10/19/2011 8:39:00 AM	0.566	0	444.37

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 8:40:00 AM	0.569		449.17
10/19/2011 8:41:00 AM	0.566		444.37
10/19/2011 8:42:00 AM	0.566	0	444.37
10/19/2011 8:43:00 AM	0.566		444.37
10/19/2011 8:44:00 AM	0.566	0	444.37
10/19/2011 8:45:00 AM	0.569		449.17
10/19/2011 8:46:00 AM	0.566	0	444.37
10/19/2011 8:47:00 AM	0.566		444.37
10/19/2011 8:48:00 AM	0.566	0	444.37
10/19/2011 8:49:00 AM	0.566		444.37
10/19/2011 8:50:00 AM	0.566		444.37
10/19/2011 8:51:00 AM	0.566	0	444.37
10/19/2011 8:52:00 AM	0.562		439.59
10/19/2011 8:53:00 AM	0.559	0	434.84
10/19/2011 8:54:00 AM	0.559		434.84
10/19/2011 8:55:00 AM	0.559	0	434.84
10/19/2011 8:56:00 AM	0.562		439.59
10/19/2011 8:57:00 AM	0.559	0	434.84
10/19/2011 8:58:00 AM	0.562		439.59
10/19/2011 8:59:00 AM	0.562		439.59
10/19/2011 9:00:00 AM	0.559	0	434.84
10/19/2011 9:01:00 AM	0.566		444.37
10/19/2011 9:02:00 AM	0.566	0	444.37
10/19/2011 9:03:00 AM	0.566		444.37
10/19/2011 9:04:00 AM	0.566	0	444.37
10/19/2011 9:05:00 AM	0.566		444.37
10/19/2011 9:06:00 AM	0.566	0	444.37
10/19/2011 9:07:00 AM	0.566		444.37
10/19/2011 9:08:00 AM	0.566		444.37
10/19/2011 9:09:00 AM	0.566	0	444.37
10/19/2011 9:10:00 AM	0.566		444.37
10/19/2011 9:11:00 AM	0.566	0	444.37
10/19/2011 9:12:00 AM	0.566		444.37
10/19/2011 9:13:00 AM	0.562	0	439.59
10/19/2011 9:14:00 AM	0.562		439.59
10/19/2011 9:15:00 AM	0.562	0	439.59
10/19/2011 9:16:00 AM	0.562		439.59
10/19/2011 9:17:00 AM	0.562		439.59
10/19/2011 9:18:00 AM	0.562	0	439.59
10/19/2011 9:19:00 AM	0.562		439.59
10/19/2011 9:20:00 AM	0.562	0	439.59
10/19/2011 9:21:00 AM	0.559		434.84
10/19/2011 9:22:00 AM	0.562	0	439.59

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 9:23:00 AM	0.559		434.84
10/19/2011 9:24:00 AM	0.559		434.84
10/19/2011 9:25:00 AM	0.562	0	439.59
10/19/2011 9:26:00 AM	0.559		434.84
10/19/2011 9:27:00 AM	0.559	0	434.84
10/19/2011 9:28:00 AM	0.562		439.59
10/19/2011 9:29:00 AM	0.562	0	439.59
10/19/2011 9:30:00 AM	0.559		434.84
10/19/2011 9:31:00 AM	0.562	0	439.59
10/19/2011 9:32:00 AM	0.559		434.84
10/19/2011 9:33:00 AM	0.559		434.84
10/19/2011 9:34:00 AM	0.559	0	434.84
10/19/2011 9:35:00 AM	0.559		434.84
10/19/2011 9:36:00 AM	0.559	0	434.84
10/19/2011 9:37:00 AM	0.559		434.84
10/19/2011 9:38:00 AM	0.562	0	439.59
10/19/2011 9:39:00 AM	0.559		434.84
10/19/2011 9:40:00 AM	0.559		434.84
10/19/2011 9:41:00 AM	0.559	0	434.84
10/19/2011 9:42:00 AM	0.559		434.84
10/19/2011 9:43:00 AM	0.559	0	434.84
10/19/2011 9:44:00 AM	0.559		434.84
10/19/2011 9:45:00 AM	0.559	0	434.84
10/19/2011 9:46:00 AM	0.562		439.59
10/19/2011 9:47:00 AM	0.559		434.84
10/19/2011 9:48:00 AM	0.562	0	439.59
10/19/2011 9:49:00 AM	0.562		439.59
10/19/2011 9:50:00 AM	0.562	0	439.59
10/19/2011 9:51:00 AM	0.562		439.59
10/19/2011 9:52:00 AM	0.566	0	444.37
10/19/2011 9:53:00 AM	0.562		439.59
10/19/2011 9:54:00 AM	0.562	0	439.59
10/19/2011 9:55:00 AM	0.562		439.59
10/19/2011 9:56:00 AM	0.562		439.59
10/19/2011 9:57:00 AM	0.562	0	439.59
10/19/2011 9:58:00 AM	0.566		444.37
10/19/2011 9:59:00 AM	0.566	0	444.37
10/19/2011 10:00:00 AM	0.566		444.37
10/19/2011 10:01:00 AM	0.566	0	444.37
10/19/2011 10:02:00 AM	0.562		439.59
10/19/2011 10:03:00 AM	0.566	0	444.37
10/19/2011 10:04:00 AM	0.566		444.37
10/19/2011 10:05:00 AM	0.566		444.37

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 10:06:00 AM	0.566	0	444.37
10/19/2011 10:07:00 AM	0.566		444.37
10/19/2011 10:08:00 AM	0.566	0	444.37
10/19/2011 10:09:00 AM	0.566		444.37
10/19/2011 10:10:00 AM	0.569	0	449.17
10/19/2011 10:11:00 AM	0.566		444.37
10/19/2011 10:12:00 AM	0.566	0	444.37
10/19/2011 10:13:00 AM	0.569		449.17
10/19/2011 10:14:00 AM	0.566		444.37
10/19/2011 10:15:00 AM	0.569	0	449.17
10/19/2011 10:16:00 AM	0.569		449.17
10/19/2011 10:17:00 AM	0.569	0	449.17
10/19/2011 10:18:00 AM	0.566		444.37
10/19/2011 10:19:00 AM	0.566	0	444.37
10/19/2011 10:20:00 AM	0.569		449.17
10/19/2011 10:21:00 AM	0.569	0	449.17
10/19/2011 10:22:00 AM	0.566		444.37
10/19/2011 10:23:00 AM	0.566		444.37
10/19/2011 10:24:00 AM	0.569	0	449.17
10/19/2011 10:25:00 AM	0.569		449.17
10/19/2011 10:26:00 AM	0.569	0	449.17
10/19/2011 10:27:00 AM	0.566		444.37
10/19/2011 10:28:00 AM	0.569	0	449.17
10/19/2011 10:29:00 AM	0.569		449.17
10/19/2011 10:30:00 AM	0.569	0	449.17
10/19/2011 10:31:00 AM	0.569		449.17
10/19/2011 10:32:00 AM	0.569		449.17
10/19/2011 10:33:00 AM	0.569	0	449.17
10/19/2011 10:34:00 AM	0.566		444.37
10/19/2011 10:35:00 AM	0.569	0	449.17
10/19/2011 10:36:00 AM	0.566		444.37
10/19/2011 10:37:00 AM	0.569	0	449.17
10/19/2011 10:38:00 AM	0.569		449.17
10/19/2011 10:39:00 AM	0.566	0	444.37
10/19/2011 10:40:00 AM	0.566		444.37
10/19/2011 10:41:00 AM	0.569	0	449.17
10/19/2011 10:42:00 AM	0.566		444.37
10/19/2011 10:43:00 AM	0.569		449.17
10/19/2011 10:44:00 AM	0.566	0	444.37
10/19/2011 10:45:00 AM	0.569		449.17
10/19/2011 10:46:00 AM	0.569	0	449.17
10/19/2011 10:47:00 AM	0.569		449.17
10/19/2011 10:48:00 AM	0.569	0	449.17

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 10:49:00 AM	0.566		444.37
10/19/2011 10:50:00 AM	0.566	0	444.37
10/19/2011 10:51:00 AM	0.566		444.37
10/19/2011 10:52:00 AM	0.566	.	444.37
10/19/2011 10:53:00 AM	0.569	0	449.17
10/19/2011 10:54:00 AM	0.569		449.17
10/19/2011 10:55:00 AM	0.566	0	444.37
10/19/2011 10:56:00 AM	0.569		449.17
10/19/2011 10:57:00 AM	0.572	0	454.00
10/19/2011 10:58:00 AM	0.582		468.66
10/19/2011 10:59:00 AM	0.595	0	488.59
10/19/2011 11:00:00 AM	0.618		524.53
10/19/2011 11:01:00 AM	0.644	0	567.29
10/19/2011 11:02:00 AM	0.657		589.34
10/19/2011 11:03:00 AM	0.671	0	611.85
10/19/2011 11:04:00 AM	0.674		617.55
10/19/2011 11:05:00 AM	0.677	0	623.28
10/19/2011 11:06:00 AM	0.680	0	629.04
10/19/2011 11:07:00 AM	0.684		634.82
10/19/2011 11:08:00 AM	0.680	0	629.04
10/19/2011 11:09:00 AM	0.684	0	634.82
10/19/2011 11:10:00 AM	0.684		634.82
10/19/2011 11:11:00 AM	0.677	0	623.28
10/19/2011 11:12:00 AM	0.674		617.55
10/19/2011 11:13:00 AM	0.680	0	629.04
10/19/2011 11:14:00 AM	0.674	0	617.55
10/19/2011 11:15:00 AM	0.674		617.55
10/19/2011 11:16:00 AM	0.674	0	617.55
10/19/2011 11:17:00 AM	0.671	0	611.85
10/19/2011 11:18:00 AM	0.674	.	617.55
10/19/2011 11:19:00 AM	0.671	0	611.85
10/19/2011 11:20:00 AM	0.667		606.18
10/19/2011 11:21:00 AM	0.667	0	606.18
10/19/2011 11:22:00 AM	0.664	0	600.54
10/19/2011 11:23:00 AM	0.661		594.93
10/19/2011 11:24:00 AM	0.661	0	594.93
10/19/2011 11:25:00 AM	0.657		589.34
10/19/2011 11:26:00 AM	0.657	0	589.34
10/19/2011 11:27:00 AM	0.654	0	583.79
10/19/2011 11:28:00 AM	0.651		578.26
10/19/2011 11:29:00 AM	0.651	0	578.26
10/19/2011 11:30:00 AM	0.651		578.26
10/19/2011 11:31:00 AM	0.648	0	572.76

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 11:32:00 AM	0.648		572.76
10/19/2011 11:33:00 AM	0.648	0	572.76
10/19/2011 11:34:00 AM	0.648	0	572.76
10/19/2011 11:35:00 AM	0.648		572.76
10/19/2011 11:36:00 AM	0.644	0	567.29
10/19/2011 11:37:00 AM	0.644		567.29
10/19/2011 11:38:00 AM	0.641	0	561.84
10/19/2011 11:39:00 AM	0.644		567.29
10/19/2011 11:40:00 AM	0.641	0	561.84
10/19/2011 11:41:00 AM	0.641	0	561.84
10/19/2011 11:42:00 AM	0.641		561.84
10/19/2011 11:43:00 AM	0.641	0	561.84
10/19/2011 11:44:00 AM	0.641		561.84
10/19/2011 11:45:00 AM	0.638	0	556.43
10/19/2011 11:46:00 AM	0.631		545.68
10/19/2011 11:47:00 AM	0.635	0	551.04
10/19/2011 11:48:00 AM	0.631		545.68
10/19/2011 11:49:00 AM	0.635	0	551.04
10/19/2011 11:50:00 AM	0.631	0	545.68
10/19/2011 11:51:00 AM	0.631		545.68
10/19/2011 11:52:00 AM	0.631	0	545.68
10/19/2011 11:53:00 AM	0.631		545.68
10/19/2011 11:54:00 AM	0.631	0	545.68
10/19/2011 11:55:00 AM	0.631		545.68
10/19/2011 11:56:00 AM	0.628	0	540.35
10/19/2011 11:57:00 AM	0.628		540.35
10/19/2011 11:58:00 AM	0.628	0	540.35
10/19/2011 11:59:00 AM	0.628		540.35
10/19/2011 12:00:00 PM	0.625	0	535.05
10/19/2011 12:01:00 PM	0.625	0	535.05
10/19/2011 12:02:00 PM	0.621		529.78
10/19/2011 12:03:00 PM	0.621	0	529.78
10/19/2011 12:04:00 PM	0.621		529.78
10/19/2011 12:05:00 PM	0.621	0	529.78
10/19/2011 12:06:00 PM	0.618		524.53
10/19/2011 12:07:00 PM	0.625	0	535.05
10/19/2011 12:08:00 PM	0.618		524.53
10/19/2011 12:09:00 PM	0.621	0	529.78
10/19/2011 12:10:00 PM	0.621		529.78
10/19/2011 12:11:00 PM	0.621	0	529.78
10/19/2011 12:12:00 PM	0.621		529.78
10/19/2011 12:13:00 PM	0.621	0	529.78
10/19/2011 12:14:00 PM	0.618		524.53

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 12:15:00 PM	0.618	0	524.53
10/19/2011 12:16:00 PM	0.618		524.53
10/19/2011 12:17:00 PM	0.615	0	519.31
10/19/2011 12:18:00 PM	0.615	0	519.31
10/19/2011 12:19:00 PM	0.612		514.12
10/19/2011 12:20:00 PM	0.615	0	519.31
10/19/2011 12:21:00 PM	0.612		514.12
10/19/2011 12:22:00 PM	0.618	0	524.53
10/19/2011 12:23:00 PM	0.615		519.31
10/19/2011 12:24:00 PM	0.615	0	519.31
10/19/2011 12:25:00 PM	0.618		524.53
10/19/2011 12:26:00 PM	0.615	0	519.31
10/19/2011 12:27:00 PM	0.615		519.31
10/19/2011 12:28:00 PM	0.612	0	514.12
10/19/2011 12:29:00 PM	0.612		514.12
10/19/2011 12:30:00 PM	0.612	0	514.12
10/19/2011 12:31:00 PM	0.615		519.31
10/19/2011 12:32:00 PM	0.612	0	514.12
10/19/2011 12:33:00 PM	0.612		514.12
10/19/2011 12:34:00 PM	0.612	0	514.12
10/19/2011 12:35:00 PM	0.612		514.12
10/19/2011 12:36:00 PM	0.608	0	508.96
10/19/2011 12:37:00 PM	0.608		508.96
10/19/2011 12:38:00 PM	0.608	0	508.96
10/19/2011 12:39:00 PM	0.608		508.96
10/19/2011 12:40:00 PM	0.605	0	503.83
10/19/2011 12:41:00 PM	0.608		508.96
10/19/2011 12:42:00 PM	0.605	0	503.83
10/19/2011 12:43:00 PM	0.608		508.96
10/19/2011 12:44:00 PM	0.608	0	508.96
10/19/2011 12:45:00 PM	0.605		503.83
10/19/2011 12:46:00 PM	0.605	0	503.83
10/19/2011 12:47:00 PM	0.602		498.72
10/19/2011 12:48:00 PM	0.602	0	498.72
10/19/2011 12:49:00 PM	0.605		503.83
10/19/2011 12:50:00 PM	0.602	0	498.72
10/19/2011 12:51:00 PM	0.598		493.64
10/19/2011 12:52:00 PM	0.602	0	498.72
10/19/2011 12:53:00 PM	0.598		493.64
10/19/2011 12:54:00 PM	0.598	0	493.64
10/19/2011 12:55:00 PM	0.598		493.64
10/19/2011 12:56:00 PM	0.598	0	493.64
10/19/2011 12:57:00 PM	0.598		493.64

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 12:58:00 PM	0.595	0	488.59
10/19/2011 12:59:00 PM	0.595		488.59
10/19/2011 1:00:00 PM	0.598	0	493.64
10/19/2011 1:01:00 PM	0.595		488.59
10/19/2011 1:02:00 PM	0.595	0	488.59
10/19/2011 1:03:00 PM	0.592		483.57
10/19/2011 1:04:00 PM	0.595	0	488.59
10/19/2011 1:05:00 PM	0.595		488.59
10/19/2011 1:06:00 PM	0.595	0	488.59
10/19/2011 1:07:00 PM	0.595		488.59
10/19/2011 1:08:00 PM	0.592	0	483.57
10/19/2011 1:09:00 PM	0.592		483.57
10/19/2011 1:10:00 PM	0.595	0	488.59
10/19/2011 1:11:00 PM	0.592		483.57
10/19/2011 1:12:00 PM	0.592	0	483.57
10/19/2011 1:13:00 PM	0.592		483.57
10/19/2011 1:14:00 PM	0.592	0	483.57
10/19/2011 1:15:00 PM	0.589		478.57
10/19/2011 1:16:00 PM	0.589	0	478.57
10/19/2011 1:17:00 PM	0.589		478.57
10/19/2011 1:18:00 PM	0.585	0	473.60
10/19/2011 1:19:00 PM	0.585		473.60
10/19/2011 1:20:00 PM	0.585		473.60
10/19/2011 1:21:00 PM	0.585	0	473.60
10/19/2011 1:22:00 PM	0.585		473.60
10/19/2011 1:23:00 PM	0.585	0	473.60
10/19/2011 1:24:00 PM	0.585		473.60
10/19/2011 1:25:00 PM	0.582	0	468.66
10/19/2011 1:26:00 PM	0.585		473.60
10/19/2011 1:27:00 PM	0.582	0	468.66
10/19/2011 1:28:00 PM	0.582		468.66
10/19/2011 1:29:00 PM	0.582	0	468.66
10/19/2011 1:30:00 PM	0.582		468.66
10/19/2011 1:31:00 PM	0.589	0	478.57
10/19/2011 1:32:00 PM	0.589		478.57
10/19/2011 1:33:00 PM	0.589	0	478.57
10/19/2011 1:34:00 PM	0.585		473.60
10/19/2011 1:35:00 PM	0.589	0	478.57
10/19/2011 1:36:00 PM	0.585		473.60
10/19/2011 1:37:00 PM	0.585	0	473.60
10/19/2011 1:38:00 PM	0.589		478.57
10/19/2011 1:39:00 PM	0.585		473.60
10/19/2011 1:40:00 PM	0.585	0	473.60

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 1:41:00 PM	0.585		473.60
10/19/2011 1:42:00 PM	0.585	0	473.60
10/19/2011 1:43:00 PM	0.582		468.66
10/19/2011 1:44:00 PM	0.585	0	473.60
10/19/2011 1:45:00 PM	0.585		473.60
10/19/2011 1:46:00 PM	0.582	0	468.66
10/19/2011 1:47:00 PM	0.582		468.66
10/19/2011 1:48:00 PM	0.579	0	463.75
10/19/2011 1:49:00 PM	0.582		468.66
10/19/2011 1:50:00 PM	0.579	0	463.75
10/19/2011 1:51:00 PM	0.579		463.75
10/19/2011 1:52:00 PM	0.579	0	463.75
10/19/2011 1:53:00 PM	0.579		463.75
10/19/2011 1:54:00 PM	0.582	0	468.66
10/19/2011 1:55:00 PM	0.582		468.66
10/19/2011 1:56:00 PM	0.579		463.75
10/19/2011 1:57:00 PM	0.579	0	463.75
10/19/2011 1:58:00 PM	0.579		463.75
10/19/2011 1:59:00 PM	0.582	0	468.66
10/19/2011 2:00:00 PM	0.579		463.75
10/19/2011 2:01:00 PM	0.579	0	463.75
10/19/2011 2:02:00 PM	0.579		463.75
10/19/2011 2:03:00 PM	0.575	0	458.86
10/19/2011 2:04:00 PM	0.579		463.75
10/19/2011 2:05:00 PM	0.579	0	463.75
10/19/2011 2:06:00 PM	0.575		458.86
10/19/2011 2:07:00 PM	0.579	0	463.75
10/19/2011 2:08:00 PM	0.579		463.75
10/19/2011 2:09:00 PM	0.575		458.86
10/19/2011 2:10:00 PM	0.575	0	458.86
10/19/2011 2:11:00 PM	0.575		458.86
10/19/2011 2:12:00 PM	0.575	0	458.86
10/19/2011 2:13:00 PM	0.575		458.86
10/19/2011 2:14:00 PM	0.575	0	458.86
10/19/2011 2:15:00 PM	0.575		458.86
10/19/2011 2:16:00 PM	0.579	0	463.75
10/19/2011 2:17:00 PM	0.579		463.75
10/19/2011 2:18:00 PM	0.575	0	458.86
10/19/2011 2:19:00 PM	0.575		458.86
10/19/2011 2:20:00 PM	0.575	0	458.86
10/19/2011 2:21:00 PM	0.575		458.86
10/19/2011 2:22:00 PM	0.575		458.86
10/19/2011 2:23:00 PM	0.575	0	458.86

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 2:24:00 PM	0.572		454.00
10/19/2011 2:25:00 PM	0.572	0	454.00
10/19/2011 2:26:00 PM	0.572		454.00
10/19/2011 2:27:00 PM	0.572	0	454.00
10/19/2011 2:28:00 PM	0.572		454.00
10/19/2011 2:29:00 PM	0.572	0	454.00
10/19/2011 2:30:00 PM	0.572		454.00
10/19/2011 2:31:00 PM	0.579	0	463.75
10/19/2011 2:32:00 PM	0.575		458.86
10/19/2011 2:33:00 PM	0.575		458.86
10/19/2011 2:34:00 PM	0.572	0	454.00
10/19/2011 2:35:00 PM	0.572		454.00
10/19/2011 2:36:00 PM	0.569	0	449.17
10/19/2011 2:37:00 PM	0.572		454.00
10/19/2011 2:38:00 PM	0.569	0	449.17
10/19/2011 2:39:00 PM	0.575		458.86
10/19/2011 2:40:00 PM	0.572	0	454.00
10/19/2011 2:41:00 PM	0.572		454.00
10/19/2011 2:42:00 PM	0.575	0	458.86
10/19/2011 2:43:00 PM	0.575		458.86
10/19/2011 2:44:00 PM	0.575		458.86
10/19/2011 2:45:00 PM	0.575	0	458.86
10/19/2011 2:46:00 PM	0.572		454.00
10/19/2011 2:47:00 PM	0.572	0	454.00
10/19/2011 2:48:00 PM	0.572		454.00
10/19/2011 2:49:00 PM	0.572	0	454.00
10/19/2011 2:50:00 PM	0.572		454.00
10/19/2011 2:51:00 PM	0.572	0	454.00
10/19/2011 2:52:00 PM	0.569		449.17
10/19/2011 2:53:00 PM	0.569	0	449.17
10/19/2011 2:54:00 PM	0.569		449.17
10/19/2011 2:55:00 PM	0.569		449.17
10/19/2011 2:56:00 PM	0.569	0	449.17
10/19/2011 2:57:00 PM	0.569		449.17
10/19/2011 2:58:00 PM	0.569	0	449.17
10/19/2011 2:59:00 PM	0.569		449.17
10/19/2011 3:00:00 PM	0.569	0	449.17
10/19/2011 3:01:00 PM	0.575		458.86
10/19/2011 3:02:00 PM	0.572	0	454.00
10/19/2011 3:03:00 PM	0.572		454.00
10/19/2011 3:04:00 PM	0.572	0	454.00
10/19/2011 3:05:00 PM	0.572		454.00
10/19/2011 3:06:00 PM	0.572		454.00

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 3:07:00 PM	0.572	0	454.00
10/19/2011 3:08:00 PM	0.572		454.00
10/19/2011 3:09:00 PM	0.572	0	454.00
10/19/2011 3:10:00 PM	0.572		454.00
10/19/2011 3:11:00 PM	0.572	0	454.00
10/19/2011 3:12:00 PM	0.569		449.17
10/19/2011 3:13:00 PM	0.572	0	454.00
10/19/2011 3:14:00 PM	0.572		454.00
10/19/2011 3:15:00 PM	0.572	0	454.00
10/19/2011 3:16:00 PM	0.569		449.17
10/19/2011 3:17:00 PM	0.569		449.17
10/19/2011 3:18:00 PM	0.569	0	449.17
10/19/2011 3:19:00 PM	0.569		449.17
10/19/2011 3:20:00 PM	0.569	0	449.17
10/19/2011 3:21:00 PM	0.569		449.17
10/19/2011 3:22:00 PM	0.569	0	449.17
10/19/2011 3:23:00 PM	0.569		449.17
10/19/2011 3:24:00 PM	0.569	0	449.17
10/19/2011 3:25:00 PM	0.569		449.17
10/19/2011 3:26:00 PM	0.569		449.17
10/19/2011 3:27:00 PM	0.566	0	444.37
10/19/2011 3:28:00 PM	0.569		449.17
10/19/2011 3:29:00 PM	0.569	0	449.17
10/19/2011 3:30:00 PM	0.569		449.17
10/19/2011 3:31:00 PM	0.569	0	449.17
10/19/2011 3:32:00 PM	0.569		449.17
10/19/2011 3:33:00 PM	0.569	0	449.17
10/19/2011 3:34:00 PM	0.566		444.37
10/19/2011 3:35:00 PM	0.569		449.17
10/19/2011 3:36:00 PM	0.569	0	449.17
10/19/2011 3:37:00 PM	0.569		449.17
10/19/2011 3:38:00 PM	0.569	0	449.17
10/19/2011 3:39:00 PM	0.569		449.17
10/19/2011 3:40:00 PM	0.569	0	449.17
10/19/2011 3:41:00 PM	0.569		449.17
10/19/2011 3:42:00 PM	0.569	0	449.17
10/19/2011 3:43:00 PM	0.569		449.17
10/19/2011 3:44:00 PM	0.569	0	449.17
10/19/2011 3:45:00 PM	0.569		449.17
10/19/2011 3:46:00 PM	0.569		449.17
10/19/2011 3:47:00 PM	0.569	0	449.17
10/19/2011 3:48:00 PM	0.569		449.17
10/19/2011 3:49:00 PM	0.569	0	449.17

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 3:50:00 PM	0.569		449.17
10/19/2011 3:51:00 PM	0.566	0	444.37
10/19/2011 3:52:00 PM	0.566		444.37
10/19/2011 3:53:00 PM	0.566	0	444.37
10/19/2011 3:54:00 PM	0.566		444.37
10/19/2011 3:55:00 PM	0.566		444.37
10/19/2011 3:56:00 PM	0.562	0	439.59
10/19/2011 3:57:00 PM	0.562		439.59
10/19/2011 3:58:00 PM	0.569	0	449.17
10/19/2011 3:59:00 PM	0.569		449.17
10/19/2011 4:00:00 PM	0.566	0	444.37
10/19/2011 4:01:00 PM	0.569		449.17
10/19/2011 4:02:00 PM	0.569	0	449.17
10/19/2011 4:03:00 PM	0.566		444.37
10/19/2011 4:04:00 PM	0.566		444.37
10/19/2011 4:05:00 PM	0.566	0	444.37
10/19/2011 4:06:00 PM	0.566		444.37
10/19/2011 4:07:00 PM	0.569	0	449.17
10/19/2011 4:08:00 PM	0.569		449.17
10/19/2011 4:09:00 PM	0.566	0	444.37
10/19/2011 4:10:00 PM	0.566		444.37
10/19/2011 4:11:00 PM	0.566	0	444.37
10/19/2011 4:12:00 PM	0.566		444.37
10/19/2011 4:13:00 PM	0.566		444.37
10/19/2011 4:14:00 PM	0.566	0	444.37
10/19/2011 4:15:00 PM	0.569		449.17
10/19/2011 4:16:00 PM	0.569	0	449.17
10/19/2011 4:17:00 PM	0.566		444.37
10/19/2011 4:18:00 PM	0.569	0	449.17
10/19/2011 4:19:00 PM	0.566		444.37
10/19/2011 4:20:00 PM	0.569	0	449.17
10/19/2011 4:21:00 PM	0.569		449.17
10/19/2011 4:22:00 PM	0.566		444.37
10/19/2011 4:23:00 PM	0.569	0	449.17
10/19/2011 4:24:00 PM	0.569		449.17
10/19/2011 4:25:00 PM	0.569	0	449.17
10/19/2011 4:26:00 PM	0.566		444.37
10/19/2011 4:27:00 PM	0.569	0	449.17
10/19/2011 4:28:00 PM	0.566		444.37
10/19/2011 4:29:00 PM	0.569	0	449.17
10/19/2011 4:30:00 PM	0.566		444.37
10/19/2011 4:31:00 PM	0.569	0	449.17
10/19/2011 4:32:00 PM	0.569		449.17

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 4:33:00 PM	0.566		444.37
10/19/2011 4:34:00 PM	0.569	0	449.17
10/19/2011 4:35:00 PM	0.569		449.17
10/19/2011 4:36:00 PM	0.569	0	449.17
10/19/2011 4:37:00 PM	0.569		449.17
10/19/2011 4:38:00 PM	0.569	0	449.17
10/19/2011 4:39:00 PM	0.566		444.37
10/19/2011 4:40:00 PM	0.566	0	444.37
10/19/2011 4:41:00 PM	0.566		444.37
10/19/2011 4:42:00 PM	0.569		449.17
10/19/2011 4:43:00 PM	0.566	0	444.37
10/19/2011 4:44:00 PM	0.569		449.17
10/19/2011 4:45:00 PM	0.569	0	449.17
10/19/2011 4:46:00 PM	0.569		449.17
10/19/2011 4:47:00 PM	0.569	0	449.17
10/19/2011 4:48:00 PM	0.569		449.17
10/19/2011 4:49:00 PM	0.569	0	449.17
10/19/2011 4:50:00 PM	0.569		449.17
10/19/2011 4:51:00 PM	0.569		449.17
10/19/2011 4:52:00 PM	0.569	0	449.17
10/19/2011 4:53:00 PM	0.569		449.17
10/19/2011 4:54:00 PM	0.569	0	449.17
10/19/2011 4:55:00 PM	0.569		449.17
10/19/2011 4:56:00 PM	0.569	0	449.17
10/19/2011 4:57:00 PM	0.569		449.17
10/19/2011 4:58:00 PM	0.569	0	449.17
10/19/2011 4:59:00 PM	0.569		449.17
10/19/2011 5:00:00 PM	0.569	0	449.17
10/19/2011 5:01:00 PM	0.569		449.17
10/19/2011 5:02:00 PM	0.569		449.17
10/19/2011 5:03:00 PM	0.569	0	449.17
10/19/2011 5:04:00 PM	0.569		449.17
10/19/2011 5:05:00 PM	0.569	0	449.17
10/19/2011 5:06:00 PM	0.569		449.17
10/19/2011 5:07:00 PM	0.569	0	449.17
10/19/2011 5:08:00 PM	0.569		449.17
10/19/2011 5:09:00 PM	0.569	0	449.17
10/19/2011 5:10:00 PM	0.569		449.17
10/19/2011 5:11:00 PM	0.569		449.17
10/19/2011 5:12:00 PM	0.569	0	449.17
10/19/2011 5:13:00 PM	0.569		449.17
10/19/2011 5:14:00 PM	0.569	0	449.17
10/19/2011 5:15:00 PM	0.566		444.37

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 5:16:00 PM	0.569	0	449.17
10/19/2011 5:17:00 PM	0.569		449.17
10/19/2011 5:18:00 PM	0.566	0	444.37
10/19/2011 5:19:00 PM	0.569		449.17
10/19/2011 5:20:00 PM	0.569		449.17
10/19/2011 5:21:00 PM	0.569	0	449.17
10/19/2011 5:22:00 PM	0.566		444.37
10/19/2011 5:23:00 PM	0.569	0	449.17
10/19/2011 5:24:00 PM	0.566		444.37
10/19/2011 5:25:00 PM	0.569	0	449.17
10/19/2011 5:26:00 PM	0.566		444.37
10/19/2011 5:27:00 PM	0.569	0	449.17
10/19/2011 5:28:00 PM	0.566		444.37
10/19/2011 5:29:00 PM	0.569	0	449.17
10/19/2011 5:30:00 PM	0.569		449.17
10/19/2011 5:31:00 PM	0.569		449.17
10/19/2011 5:32:00 PM	0.569	0	449.17
10/19/2011 5:33:00 PM	0.569		449.17
10/19/2011 5:34:00 PM	0.566	0	444.37
10/19/2011 5:35:00 PM	0.569		449.17
10/19/2011 5:36:00 PM	0.569	0	449.17
10/19/2011 5:37:00 PM	0.566		444.37
10/19/2011 5:38:00 PM	0.562	0	439.59
10/19/2011 5:39:00 PM	0.566		444.37
10/19/2011 5:40:00 PM	0.566		444.37
10/19/2011 5:41:00 PM	0.566	0	444.37
10/19/2011 5:42:00 PM	0.566		444.37
10/19/2011 5:43:00 PM	0.566	0	444.37
10/19/2011 5:44:00 PM	0.566		444.37
10/19/2011 5:45:00 PM	0.566	0	444.37
10/19/2011 5:46:00 PM	0.569		449.17
10/19/2011 5:47:00 PM	0.569	0	449.17
10/19/2011 5:48:00 PM	0.569		449.17
10/19/2011 5:49:00 PM	0.569		449.17
10/19/2011 5:50:00 PM	0.569	0	449.17
10/19/2011 5:51:00 PM	0.569		449.17
10/19/2011 5:52:00 PM	0.569	0	449.17
10/19/2011 5:53:00 PM	0.569		449.17
10/19/2011 5:54:00 PM	0.569	0	449.17
10/19/2011 5:55:00 PM	0.569		449.17
10/19/2011 5:56:00 PM	0.569	0	449.17
10/19/2011 5:57:00 PM	0.569		449.17
10/19/2011 5:58:00 PM	0.569		449.17

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 5:59:00 PM	0.569	0	449.17
10/19/2011 6:00:00 PM	0.569		449.17
10/19/2011 6:01:00 PM	0.569	0	449.17
10/19/2011 6:02:00 PM	0.569		449.17
10/19/2011 6:03:00 PM	0.569	0	449.17
10/19/2011 6:04:00 PM	0.569		449.17
10/19/2011 6:05:00 PM	0.569	0	449.17
10/19/2011 6:06:00 PM	0.569		449.17
10/19/2011 6:07:00 PM	0.569	0	449.17
10/19/2011 6:08:00 PM	0.569		449.17
10/19/2011 6:09:00 PM	0.569		449.17
10/19/2011 6:10:00 PM	0.569	0	449.17
10/19/2011 6:11:00 PM	0.569		449.17
10/19/2011 6:12:00 PM	0.569	0	449.17
10/19/2011 6:13:00 PM	0.569		449.17
10/19/2011 6:14:00 PM	0.569	0	449.17
10/19/2011 6:15:00 PM	0.569		449.17
10/19/2011 6:16:00 PM	0.569	0	449.17
10/19/2011 6:17:00 PM	0.569		449.17
10/19/2011 6:18:00 PM	0.569		449.17
10/19/2011 6:19:00 PM	0.569	0	449.17
10/19/2011 6:20:00 PM	0.569		449.17
10/19/2011 6:21:00 PM	0.569	0	449.17
10/19/2011 6:22:00 PM	0.569		449.17
10/19/2011 6:23:00 PM	0.566	0	444.37
10/19/2011 6:24:00 PM	0.569		449.17
10/19/2011 6:25:00 PM	0.569	0	449.17
10/19/2011 6:26:00 PM	0.569		449.17
10/19/2011 6:27:00 PM	0.566	0	444.37
10/19/2011 6:28:00 PM	0.569		449.17
10/19/2011 6:29:00 PM	0.569		449.17
10/19/2011 6:30:00 PM	0.569	0	449.17
10/19/2011 6:31:00 PM	0.566		444.37
10/19/2011 6:32:00 PM	0.566	0	444.37
10/19/2011 6:33:00 PM	0.566		444.37
10/19/2011 6:34:00 PM	0.569	0	449.17
10/19/2011 6:35:00 PM	0.569		449.17
10/19/2011 6:36:00 PM	0.566	0	444.37
10/19/2011 6:37:00 PM	0.572		454.00
10/19/2011 6:38:00 PM	0.575		458.86
10/19/2011 6:39:00 PM	0.575	0	458.86
10/19/2011 6:40:00 PM	0.579		463.75
10/19/2011 6:41:00 PM	0.582	0	468.66

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 6:42:00 PM	0.582		468.66
10/19/2011 6:43:00 PM	0.585	0	473.60
10/19/2011 6:44:00 PM	0.585		473.60
10/19/2011 6:45:00 PM	0.589	0	478.57
10/19/2011 6:46:00 PM	0.595		488.59
10/19/2011 6:47:00 PM	0.595	0	488.59
10/19/2011 6:48:00 PM	0.595		488.59
10/19/2011 6:49:00 PM	0.598	0	493.64
10/19/2011 6:50:00 PM	0.598		493.64
10/19/2011 6:51:00 PM	0.598	0	493.64
10/19/2011 6:52:00 PM	0.605		503.83
10/19/2011 6:53:00 PM	0.602	0	498.72
10/19/2011 6:54:00 PM	0.602		498.72
10/19/2011 6:55:00 PM	0.602	0	498.72
10/19/2011 6:56:00 PM	0.602		498.72
10/19/2011 6:57:00 PM	0.605	0	503.83
10/19/2011 6:58:00 PM	0.605		503.83
10/19/2011 6:59:00 PM	0.602	0	498.72
10/19/2011 7:00:00 PM	0.602		498.72
10/19/2011 7:01:00 PM	0.605	0	503.83
10/19/2011 7:02:00 PM	0.605		503.83
10/19/2011 7:03:00 PM	0.598	0	493.64
10/19/2011 7:04:00 PM	0.602		498.72
10/19/2011 7:05:00 PM	0.602	0	498.72
10/19/2011 7:06:00 PM	0.602		498.72
10/19/2011 7:07:00 PM	0.598	0	493.64
10/19/2011 7:08:00 PM	0.602		498.72
10/19/2011 7:09:00 PM	0.602	0	498.72
10/19/2011 7:10:00 PM	0.602		498.72
10/19/2011 7:11:00 PM	0.598	0	493.64
10/19/2011 7:12:00 PM	0.598		493.64
10/19/2011 7:13:00 PM	0.602	0	498.72
10/19/2011 7:14:00 PM	0.602		498.72
10/19/2011 7:15:00 PM	0.598	0	493.64
10/19/2011 7:16:00 PM	0.598		493.64
10/19/2011 7:17:00 PM	0.598	0	493.64
10/19/2011 7:18:00 PM	0.598		493.64
10/19/2011 7:19:00 PM	0.595	0	488.59
10/19/2011 7:20:00 PM	0.595		488.59
10/19/2011 7:21:00 PM	0.595	0	488.59
10/19/2011 7:22:00 PM	0.595		488.59
10/19/2011 7:23:00 PM	0.595	0	488.59
10/19/2011 7:24:00 PM	0.595		488.59

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 7:25:00 PM	0.595	0	488.59
10/19/2011 7:26:00 PM	0.595		488.59
10/19/2011 7:27:00 PM	0.595	0	488.59
10/19/2011 7:28:00 PM	0.598		493.64
10/19/2011 7:29:00 PM	0.598		493.64
10/19/2011 7:30:00 PM	0.595	0	488.59
10/19/2011 7:31:00 PM	0.595		488.59
10/19/2011 7:32:00 PM	0.595	0	488.59
10/19/2011 7:33:00 PM	0.598		493.64
10/19/2011 7:34:00 PM	0.598	0	493.64
10/19/2011 7:35:00 PM	0.602		498.72
10/19/2011 7:36:00 PM	0.598	0	493.64
10/19/2011 7:37:00 PM	0.602		498.72
10/19/2011 7:38:00 PM	0.598	0	493.64
10/19/2011 7:39:00 PM	0.602		498.72
10/19/2011 7:40:00 PM	0.598	0	493.64
10/19/2011 7:41:00 PM	0.598		493.64
10/19/2011 7:42:00 PM	0.602	0	498.72
10/19/2011 7:43:00 PM	0.605		503.83
10/19/2011 7:44:00 PM	0.602	0	498.72
10/19/2011 7:45:00 PM	0.602		498.72
10/19/2011 7:46:00 PM	0.602	0	498.72
10/19/2011 7:47:00 PM	0.605		503.83
10/19/2011 7:48:00 PM	0.605	0	503.83
10/19/2011 7:49:00 PM	0.605		503.83
10/19/2011 7:50:00 PM	0.605	0	503.83
10/19/2011 7:51:00 PM	0.602		498.72
10/19/2011 7:52:00 PM	0.605	0	503.83
10/19/2011 7:53:00 PM	0.605		503.83
10/19/2011 7:54:00 PM	0.605	0	503.83
10/19/2011 7:55:00 PM	0.602		498.72
10/19/2011 7:56:00 PM	0.605	0	503.83
10/19/2011 7:57:00 PM	0.605		503.83
10/19/2011 7:58:00 PM	0.605	0	503.83
10/19/2011 7:59:00 PM	0.602		498.72
10/19/2011 8:00:00 PM	0.602	0	498.72
10/19/2011 8:01:00 PM	0.605		503.83
10/19/2011 8:02:00 PM	0.605	0	503.83
10/19/2011 8:03:00 PM	0.605		503.83
10/19/2011 8:04:00 PM	0.602	0	498.72
10/19/2011 8:05:00 PM	0.605		503.83
10/19/2011 8:06:00 PM	0.605	0	503.83
10/19/2011 8:07:00 PM	0.605		503.83

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 8:08:00 PM	0.605	0	503.83
10/19/2011 8:09:00 PM	0.602		498.72
10/19/2011 8:10:00 PM	0.602	0	498.72
10/19/2011 8:11:00 PM	0.602		498.72
10/19/2011 8:12:00 PM	0.602	0	498.72
10/19/2011 8:13:00 PM	0.605		503.83
10/19/2011 8:14:00 PM	0.602	0	498.72
10/19/2011 8:15:00 PM	0.605		503.83
10/19/2011 8:16:00 PM	0.602	0	498.72
10/19/2011 8:17:00 PM	0.602		498.72
10/19/2011 8:18:00 PM	0.602	0	498.72
10/19/2011 8:19:00 PM	0.602		498.72
10/19/2011 8:20:00 PM	0.602	0	498.72
10/19/2011 8:21:00 PM	0.602		498.72
10/19/2011 8:22:00 PM	0.602	0	498.72
10/19/2011 8:23:00 PM	0.602		498.72
10/19/2011 8:24:00 PM	0.602	0	498.72
10/19/2011 8:25:00 PM	0.602		498.72
10/19/2011 8:26:00 PM	0.602	0	498.72
10/19/2011 8:27:00 PM	0.602		498.72
10/19/2011 8:28:00 PM	0.598	0	493.64
10/19/2011 8:29:00 PM	0.598		493.64
10/19/2011 8:30:00 PM	0.598	0	493.64
10/19/2011 8:31:00 PM	0.605		503.83
10/19/2011 8:32:00 PM	0.605	0	503.83
10/19/2011 8:33:00 PM	0.605		503.83
10/19/2011 8:34:00 PM	0.605	0	503.83
10/19/2011 8:35:00 PM	0.602		498.72
10/19/2011 8:36:00 PM	0.605	0	503.83
10/19/2011 8:37:00 PM	0.605		503.83
10/19/2011 8:38:00 PM	0.602	0	498.72
10/19/2011 8:39:00 PM	0.605		503.83
10/19/2011 8:40:00 PM	0.602	0	498.72
10/19/2011 8:41:00 PM	0.602		498.72
10/19/2011 8:42:00 PM	0.598	0	493.64
10/19/2011 8:43:00 PM	0.605		503.83
10/19/2011 8:44:00 PM	0.602	0	498.72
10/19/2011 8:45:00 PM	0.602		498.72
10/19/2011 8:46:00 PM	0.598	0	493.64
10/19/2011 8:47:00 PM	0.602		498.72
10/19/2011 8:48:00 PM	0.595	0	488.59
10/19/2011 8:49:00 PM	0.598		493.64
10/19/2011 8:50:00 PM	0.598	0	493.64

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 8:51:00 PM	0.595		488.59
10/19/2011 8:52:00 PM	0.598	0	493.64
10/19/2011 8:53:00 PM	0.595		488.59
10/19/2011 8:54:00 PM	0.598	0	493.64
10/19/2011 8:55:00 PM	0.598		493.64
10/19/2011 8:56:00 PM	0.595	0	488.59
10/19/2011 8:57:00 PM	0.598		493.64
10/19/2011 8:58:00 PM	0.595	0	488.59
10/19/2011 8:59:00 PM	0.595		488.59
10/19/2011 9:00:00 PM	0.595	0	488.59
10/19/2011 9:01:00 PM	0.595		488.59
10/19/2011 9:02:00 PM	0.598	0	493.64
10/19/2011 9:03:00 PM	0.598		493.64
10/19/2011 9:04:00 PM	0.595	0	488.59
10/19/2011 9:05:00 PM	0.595		488.59
10/19/2011 9:06:00 PM	0.595	0	488.59
10/19/2011 9:07:00 PM	0.595		488.59
10/19/2011 9:08:00 PM	0.592	0	483.57
10/19/2011 9:09:00 PM	0.595		488.59
10/19/2011 9:10:00 PM	0.595	0	488.59
10/19/2011 9:11:00 PM	0.595		488.59
10/19/2011 9:12:00 PM	0.595	0	488.59
10/19/2011 9:13:00 PM	0.598		493.64
10/19/2011 9:14:00 PM	0.598	0	493.64
10/19/2011 9:15:00 PM	0.602		498.72
10/19/2011 9:16:00 PM	0.605	0	503.83
10/19/2011 9:17:00 PM	0.602		498.72
10/19/2011 9:18:00 PM	0.602	0	498.72
10/19/2011 9:19:00 PM	0.602		498.72
10/19/2011 9:20:00 PM	0.602	0	498.72
10/19/2011 9:21:00 PM	0.605		503.83
10/19/2011 9:22:00 PM	0.598	0	493.64
10/19/2011 9:23:00 PM	0.598		493.64
10/19/2011 9:24:00 PM	0.598	0	493.64
10/19/2011 9:25:00 PM	0.598		493.64
10/19/2011 9:26:00 PM	0.598	0	493.64
10/19/2011 9:27:00 PM	0.602		498.72
10/19/2011 9:28:00 PM	0.605	0	503.83
10/19/2011 9:29:00 PM	0.602		498.72
10/19/2011 9:30:00 PM	0.605	0	503.83
10/19/2011 9:31:00 PM	0.605		503.83
10/19/2011 9:32:00 PM	0.602	0	498.72
10/19/2011 9:33:00 PM	0.602		498.72

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 9:34:00 PM	0.602	0	498.72
10/19/2011 9:35:00 PM	0.605		503.83
10/19/2011 9:36:00 PM	0.605	0	503.83
10/19/2011 9:37:00 PM	0.605		503.83
10/19/2011 9:38:00 PM	0.602	0	498.72
10/19/2011 9:39:00 PM	0.605		503.83
10/19/2011 9:40:00 PM	0.602	0	498.72
10/19/2011 9:41:00 PM	0.598		493.64
10/19/2011 9:42:00 PM	0.602	0	498.72
10/19/2011 9:43:00 PM	0.598		493.64
10/19/2011 9:44:00 PM	0.602	0	498.72
10/19/2011 9:45:00 PM	0.602		498.72
10/19/2011 9:46:00 PM	0.602	0	498.72
10/19/2011 9:47:00 PM	0.598		493.64
10/19/2011 9:48:00 PM	0.602	0	498.72
10/19/2011 9:49:00 PM	0.598		493.64
10/19/2011 9:50:00 PM	0.598	0	493.64
10/19/2011 9:51:00 PM	0.605		503.83
10/19/2011 9:52:00 PM	0.598	0	493.64
10/19/2011 9:53:00 PM	0.605		503.83
10/19/2011 9:54:00 PM	0.598	0	493.64
10/19/2011 9:55:00 PM	0.598		493.64
10/19/2011 9:56:00 PM	0.602	0	498.72
10/19/2011 9:57:00 PM	0.598		493.64
10/19/2011 9:58:00 PM	0.602	0	498.72
10/19/2011 9:59:00 PM	0.602		498.72
10/19/2011 10:00:00 PM	0.602	0	498.72
10/19/2011 10:01:00 PM	0.602		498.72
10/19/2011 10:02:00 PM	0.598	0	493.64
10/19/2011 10:03:00 PM	0.598		493.64
10/19/2011 10:04:00 PM	0.598	0	493.64
10/19/2011 10:05:00 PM	0.598		493.64
10/19/2011 10:06:00 PM	0.595	0	488.59
10/19/2011 10:07:00 PM	0.602		498.72
10/19/2011 10:08:00 PM	0.602	0	498.72
10/19/2011 10:09:00 PM	0.602		498.72
10/19/2011 10:10:00 PM	0.598	0	493.64
10/19/2011 10:11:00 PM	0.598		493.64
10/19/2011 10:12:00 PM	0.602	0	498.72
10/19/2011 10:13:00 PM	0.602		498.72
10/19/2011 10:14:00 PM	0.598	0	493.64
10/19/2011 10:15:00 PM	0.595		488.59
10/19/2011 10:16:00 PM	0.602	0	498.72

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 10:17:00 PM	0.602		498.72
10/19/2011 10:18:00 PM	0.598	0	493.64
10/19/2011 10:19:00 PM	0.598		493.64
10/19/2011 10:20:00 PM	0.598	0	493.64
10/19/2011 10:21:00 PM	0.598		493.64
10/19/2011 10:22:00 PM	0.595		488.59
10/19/2011 10:23:00 PM	0.595	0	488.59
10/19/2011 10:24:00 PM	0.595		488.59
10/19/2011 10:25:00 PM	0.595	0	488.59
10/19/2011 10:26:00 PM	0.595		488.59
10/19/2011 10:27:00 PM	0.595	0	488.59
10/19/2011 10:28:00 PM	0.602		498.72
10/19/2011 10:29:00 PM	0.602	0	498.72
10/19/2011 10:30:00 PM	0.602		498.72
10/19/2011 10:31:00 PM	0.598	0	493.64
10/19/2011 10:32:00 PM	0.598		493.64
10/19/2011 10:33:00 PM	0.602	0	498.72
10/19/2011 10:34:00 PM	0.598		493.64
10/19/2011 10:35:00 PM	0.602	0	498.72
10/19/2011 10:36:00 PM	0.598		493.64
10/19/2011 10:37:00 PM	0.605	0	503.83
10/19/2011 10:38:00 PM	0.605		503.83
10/19/2011 10:39:00 PM	0.605	0	503.83
10/19/2011 10:40:00 PM	0.605		503.83
10/19/2011 10:41:00 PM	0.605	0	503.83
10/19/2011 10:42:00 PM	0.605		503.83
10/19/2011 10:43:00 PM	0.605	0	503.83
10/19/2011 10:44:00 PM	0.605		503.83
10/19/2011 10:45:00 PM	0.605	0	503.83
10/19/2011 10:46:00 PM	0.608		508.96
10/19/2011 10:47:00 PM	0.605		503.83
10/19/2011 10:48:00 PM	0.605		503.83
10/19/2011 10:49:00 PM	0.605		503.83
10/19/2011 10:50:00 PM	0.605		503.83
10/19/2011 10:51:00 PM	0.608		508.96
10/19/2011 10:52:00 PM	0.605		503.83
10/19/2011 10:53:00 PM	0.605		503.83
10/19/2011 10:54:00 PM	0.605		503.83
10/19/2011 10:55:00 PM	0.605		503.83
10/19/2011 10:56:00 PM	0.605		503.83
10/19/2011 10:57:00 PM	0.605		503.83
10/19/2011 10:58:00 PM	0.605		503.83
10/19/2011 10:59:00 PM	0.605		503.83

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 11:00:00 PM	0.605		503.83
10/19/2011 11:01:00 PM	0.605		503.83
10/19/2011 11:02:00 PM	0.605		503.83
10/19/2011 11:03:00 PM	0.605		503.83
10/19/2011 11:04:00 PM	0.605		503.83
10/19/2011 11:05:00 PM	0.605		503.83
10/19/2011 11:06:00 PM	0.605		503.83
10/19/2011 11:07:00 PM	0.605		503.83
10/19/2011 11:08:00 PM	0.605		503.83
10/19/2011 11:09:00 PM	0.605		503.83
10/19/2011 11:10:00 PM	0.605		503.83
10/19/2011 11:11:00 PM	0.605		503.83
10/19/2011 11:12:00 PM	0.602		498.72
10/19/2011 11:13:00 PM	0.602		498.72
10/19/2011 11:14:00 PM	0.605		503.83
10/19/2011 11:15:00 PM	0.605		503.83
10/19/2011 11:16:00 PM	0.605		503.83
10/19/2011 11:17:00 PM	0.605		503.83
10/19/2011 11:18:00 PM	0.602		498.72
10/19/2011 11:19:00 PM	0.602		498.72
10/19/2011 11:20:00 PM	0.602		498.72
10/19/2011 11:21:00 PM	0.602		498.72
10/19/2011 11:22:00 PM	0.602		498.72
10/19/2011 11:23:00 PM	0.602		498.72
10/19/2011 11:24:00 PM	0.598		493.64
10/19/2011 11:25:00 PM	0.598		493.64
10/19/2011 11:26:00 PM	0.595		488.59
10/19/2011 11:27:00 PM	0.598		493.64
10/19/2011 11:28:00 PM	0.602		498.72
10/19/2011 11:29:00 PM	0.598		493.64
10/19/2011 11:30:00 PM	0.602		498.72
10/19/2011 11:31:00 PM	0.602		498.72
10/19/2011 11:32:00 PM	0.598		493.64
10/19/2011 11:33:00 PM	0.602		498.72
10/19/2011 11:34:00 PM	0.602		498.72
10/19/2011 11:35:00 PM	0.598		493.64
10/19/2011 11:36:00 PM	0.598		493.64
10/19/2011 11:37:00 PM	0.598		493.64
10/19/2011 11:38:00 PM	0.595		488.59
10/19/2011 11:39:00 PM	0.598		493.64
10/19/2011 11:40:00 PM	0.598		493.64
10/19/2011 11:41:00 PM	0.595		488.59
10/19/2011 11:42:00 PM	0.595		488.59

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 11:43:00 PM	0.595		488.59
10/19/2011 11:44:00 PM	0.595		488.59
10/19/2011 11:45:00 PM	0.592		483.57
10/19/2011 11:46:00 PM	0.602		498.72
10/19/2011 11:47:00 PM	0.598		493.64
10/19/2011 11:48:00 PM	0.598		493.64
10/19/2011 11:49:00 PM	0.602		498.72
10/19/2011 11:50:00 PM	0.602		498.72
10/19/2011 11:51:00 PM	0.595		488.59
10/19/2011 11:52:00 PM	0.598		493.64
10/19/2011 11:53:00 PM	0.602		498.72
10/19/2011 11:54:00 PM	0.598		493.64
10/19/2011 11:55:00 PM	0.598		493.64
10/19/2011 11:56:00 PM	0.598		493.64
10/19/2011 11:57:00 PM	0.595		488.59
10/19/2011 11:58:00 PM	0.595		488.59
10/19/2011 11:59:00 PM	0.598		493.64
10/20/2011 12:00:00 AM	0.595		488.59
10/20/2011 12:01:00 AM	0.595		488.59
10/20/2011 12:02:00 AM	0.595		488.59
10/20/2011 12:03:00 AM	0.595		488.59
10/20/2011 12:04:00 AM	0.589		478.57
10/20/2011 12:05:00 AM	0.589		478.57
10/20/2011 12:06:00 AM	0.589		478.57
10/20/2011 12:07:00 AM	0.595		488.59
10/20/2011 12:08:00 AM	0.592		483.57
10/20/2011 12:09:00 AM	0.595		488.59
10/20/2011 12:10:00 AM	0.592		483.57
10/20/2011 12:11:00 AM	0.592		483.57
10/20/2011 12:12:00 AM	0.589		478.57
10/20/2011 12:13:00 AM	0.592		483.57
10/20/2011 12:14:00 AM	0.592		483.57
10/20/2011 12:15:00 AM	0.592		483.57
10/20/2011 12:16:00 AM	0.595		488.59
10/20/2011 12:17:00 AM	0.592		483.57
10/20/2011 12:18:00 AM	0.595		488.59
10/20/2011 12:19:00 AM	0.592		483.57
10/20/2011 12:20:00 AM	0.592		483.57
10/20/2011 12:21:00 AM	0.592		483.57
10/20/2011 12:22:00 AM	0.592		483.57
10/20/2011 12:23:00 AM	0.595		488.59
10/20/2011 12:24:00 AM	0.592		483.57
10/20/2011 12:25:00 AM	0.592		483.57

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/20/2011 12:26:00 AM	0.592		483.57
10/20/2011 12:27:00 AM	0.589		478.57
10/20/2011 12:28:00 AM	0.595		488.59
10/20/2011 12:29:00 AM	0.592		483.57
10/20/2011 12:30:00 AM	0.589		478.57
10/20/2011 12:31:00 AM	0.592		483.57
10/20/2011 12:32:00 AM	0.592		483.57
10/20/2011 12:33:00 AM	0.589		478.57
10/20/2011 12:34:00 AM	0.589		478.57
10/20/2011 12:35:00 AM	0.585		473.60
10/20/2011 12:36:00 AM	0.585		473.60
10/20/2011 12:37:00 AM	0.592		483.57
10/20/2011 12:38:00 AM	0.589		478.57
10/20/2011 12:39:00 AM	0.589		478.57
10/20/2011 12:40:00 AM	0.589		478.57
10/20/2011 12:41:00 AM	0.589		478.57
10/20/2011 12:42:00 AM	0.592		483.57
10/20/2011 12:43:00 AM	0.592		483.57
10/20/2011 12:44:00 AM	0.585		473.60
10/20/2011 12:45:00 AM	0.585		473.60
10/20/2011 12:46:00 AM	0.592		483.57
10/20/2011 12:47:00 AM	0.589		478.57
10/20/2011 12:48:00 AM	0.589		478.57
10/20/2011 12:49:00 AM	0.589		478.57
10/20/2011 12:50:00 AM	0.589		478.57
10/20/2011 12:51:00 AM	0.585		473.60
10/20/2011 12:52:00 AM	0.585		473.60
10/20/2011 12:53:00 AM	0.585		473.60
10/20/2011 12:54:00 AM	0.585		473.60
10/20/2011 12:55:00 AM	0.585		473.60
10/20/2011 12:56:00 AM	0.585		473.60
10/20/2011 12:57:00 AM	0.585		473.60
10/20/2011 12:58:00 AM	0.589		478.57
10/20/2011 12:59:00 AM	0.589		478.57
10/20/2011 1:00:00 AM	0.585		473.60
10/20/2011 1:01:00 AM	0.585		473.60
10/20/2011 1:02:00 AM	0.589		478.57
10/20/2011 1:03:00 AM	0.585		473.60
10/20/2011 1:04:00 AM	0.585		473.60
10/20/2011 1:05:00 AM	0.585		473.60
10/20/2011 1:06:00 AM	0.585		473.60
10/20/2011 1:07:00 AM	0.589		478.57
10/20/2011 1:08:00 AM	0.585		473.60

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/20/2011 1:09:00 AM	0.585		473.60
10/20/2011 1:10:00 AM	0.585		473.60
10/20/2011 1:11:00 AM	0.585		473.60
10/20/2011 1:12:00 AM	0.585		473.60
10/20/2011 1:13:00 AM	0.582		468.66
10/20/2011 1:14:00 AM	0.579		463.75
10/20/2011 1:15:00 AM	0.582		468.66
10/20/2011 1:16:00 AM	0.589		478.57
10/20/2011 1:17:00 AM	0.592		483.57
10/20/2011 1:18:00 AM	0.585		473.60
10/20/2011 1:19:00 AM	0.585		473.60
10/20/2011 1:20:00 AM	0.589		478.57
10/20/2011 1:21:00 AM	0.585		473.60
10/20/2011 1:22:00 AM	0.589		478.57
10/20/2011 1:23:00 AM	0.589		478.57
10/20/2011 1:24:00 AM	0.585		473.60
10/20/2011 1:25:00 AM	0.585		473.60
10/20/2011 1:26:00 AM	0.585		473.60
10/20/2011 1:27:00 AM	0.585		473.60
10/20/2011 1:28:00 AM	0.585		473.60
10/20/2011 1:29:00 AM	0.589		478.57
10/20/2011 1:30:00 AM	0.585		473.60
10/20/2011 1:31:00 AM	0.589		478.57
10/20/2011 1:32:00 AM	0.585		473.60
10/20/2011 1:33:00 AM	0.585		473.60
10/20/2011 1:34:00 AM	0.585		473.60
10/20/2011 1:35:00 AM	0.585		473.60
10/20/2011 1:36:00 AM	0.585		473.60
10/20/2011 1:37:00 AM	0.585		473.60
10/20/2011 1:38:00 AM	0.585		473.60
10/20/2011 1:39:00 AM	0.585		473.60
10/20/2011 1:40:00 AM	0.585		473.60
10/20/2011 1:41:00 AM	0.582		468.66
10/20/2011 1:42:00 AM	0.582		468.66
10/20/2011 1:43:00 AM	0.582		468.66
10/20/2011 1:44:00 AM	0.585		473.60
10/20/2011 1:45:00 AM	0.582		468.66
10/20/2011 1:46:00 AM	0.585		473.60
10/20/2011 1:47:00 AM	0.585		473.60
10/20/2011 1:48:00 AM	0.585		473.60
10/20/2011 1:49:00 AM	0.582		468.66
10/20/2011 1:50:00 AM	0.582		468.66
10/20/2011 1:51:00 AM	0.585		473.60

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/20/2011 1:52:00 AM	0.582		468.66
10/20/2011 1:53:00 AM	0.585		473.60
10/20/2011 1:54:00 AM	0.585		473.60
10/20/2011 1:55:00 AM	0.582		468.66
10/20/2011 1:56:00 AM	0.582		468.66
10/20/2011 1:57:00 AM	0.582		468.66
10/20/2011 1:58:00 AM	0.579		463.75
10/20/2011 1:59:00 AM	0.579		463.75
10/20/2011 2:00:00 AM	0.575		458.86
10/20/2011 2:01:00 AM	0.582		468.66
10/20/2011 2:02:00 AM	0.582		468.66
10/20/2011 2:03:00 AM	0.582		468.66
10/20/2011 2:04:00 AM	0.582		468.66
10/20/2011 2:05:00 AM	0.582		468.66
10/20/2011 2:06:00 AM	0.585		473.60
10/20/2011 2:07:00 AM	0.585		473.60
10/20/2011 2:08:00 AM	0.582		468.66
10/20/2011 2:09:00 AM	0.585		473.60
10/20/2011 2:10:00 AM	0.585		473.60
10/20/2011 2:11:00 AM	0.582		468.66
10/20/2011 2:12:00 AM	0.585		473.60
10/20/2011 2:13:00 AM	0.582		468.66
10/20/2011 2:14:00 AM	0.585		473.60
10/20/2011 2:15:00 AM	0.585		473.60
10/20/2011 2:16:00 AM	0.582		468.66
10/20/2011 2:17:00 AM	0.582		468.66
10/20/2011 2:18:00 AM	0.579		463.75
10/20/2011 2:19:00 AM	0.582		468.66
10/20/2011 2:20:00 AM	0.579		463.75
10/20/2011 2:21:00 AM	0.582		468.66
10/20/2011 2:22:00 AM	0.575		458.86
10/20/2011 2:23:00 AM	0.579		463.75
10/20/2011 2:24:00 AM	0.579		463.75
10/20/2011 2:25:00 AM	0.575		458.86
10/20/2011 2:26:00 AM	0.575		458.86
10/20/2011 2:27:00 AM	0.575		458.86
10/20/2011 2:28:00 AM	0.579		463.75
10/20/2011 2:29:00 AM	0.579		463.75
10/20/2011 2:30:00 AM	0.579		463.75
10/20/2011 2:31:00 AM	0.579		463.75
10/20/2011 2:32:00 AM	0.579		463.75
10/20/2011 2:33:00 AM	0.582		468.66
10/20/2011 2:34:00 AM	0.579		463.75

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/20/2011 2:35:00 AM	0.579		463.75
10/20/2011 2:36:00 AM	0.579		463.75
10/20/2011 2:37:00 AM	0.579		463.75
10/20/2011 2:38:00 AM	0.579		463.75
10/20/2011 2:39:00 AM	0.579		463.75
10/20/2011 2:40:00 AM	0.579		463.75
10/20/2011 2:41:00 AM	0.579		463.75
10/20/2011 2:42:00 AM	0.579		463.75
10/20/2011 2:43:00 AM	0.579		463.75
10/20/2011 2:44:00 AM	0.579		463.75
10/20/2011 2:45:00 AM	0.579		463.75
10/20/2011 2:46:00 AM	0.579		463.75
10/20/2011 2:47:00 AM	0.579		463.75
10/20/2011 2:48:00 AM	0.579		463.75
10/20/2011 2:49:00 AM	0.579		463.75
10/20/2011 2:50:00 AM	0.579		463.75
10/20/2011 2:51:00 AM	0.579		463.75
10/20/2011 2:52:00 AM	0.579		463.75
10/20/2011 2:53:00 AM	0.579		463.75
10/20/2011 2:54:00 AM	0.579		463.75
10/20/2011 2:55:00 AM	0.579		463.75
10/20/2011 2:56:00 AM	0.575		458.86
10/20/2011 2:57:00 AM	0.579		463.75
10/20/2011 2:58:00 AM	0.575		458.86
10/20/2011 2:59:00 AM	0.572		454.00
10/20/2011 3:00:00 AM	0.572		454.00
10/20/2011 3:01:00 AM	0.582		468.66
10/20/2011 3:02:00 AM	0.582		468.66
10/20/2011 3:03:00 AM	0.579		463.75
10/20/2011 3:04:00 AM	0.579		463.75
10/20/2011 3:05:00 AM	0.579		463.75
10/20/2011 3:06:00 AM	0.579		463.75
10/20/2011 3:07:00 AM	0.579		463.75
10/20/2011 3:08:00 AM	0.575		458.86
10/20/2011 3:09:00 AM	0.579		463.75
10/20/2011 3:10:00 AM	0.575		458.86
10/20/2011 3:11:00 AM	0.575		458.86
10/20/2011 3:12:00 AM	0.575		458.86
10/20/2011 3:13:00 AM	0.575		458.86
10/20/2011 3:14:00 AM	0.579		463.75
10/20/2011 3:15:00 AM	0.575		458.86
10/20/2011 3:16:00 AM	0.582		468.66
10/20/2011 3:17:00 AM	0.582		468.66

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/20/2011 3:18:00 AM	0.579		463.75
10/20/2011 3:19:00 AM	0.579		463.75
10/20/2011 3:20:00 AM	0.579		463.75
10/20/2011 3:21:00 AM	0.575		458.86
10/20/2011 3:22:00 AM	0.582		468.66
10/20/2011 3:23:00 AM	0.579		463.75
10/20/2011 3:24:00 AM	0.579		463.75
10/20/2011 3:25:00 AM	0.579		463.75
10/20/2011 3:26:00 AM	0.579		463.75
10/20/2011 3:27:00 AM	0.579		463.75
10/20/2011 3:28:00 AM	0.572		454.00
10/20/2011 3:29:00 AM	0.575		458.86
10/20/2011 3:30:00 AM	0.575		458.86
10/20/2011 3:31:00 AM	0.579		463.75
10/20/2011 3:32:00 AM	0.579		463.75
10/20/2011 3:33:00 AM	0.579		463.75
10/20/2011 3:34:00 AM	0.579		463.75
10/20/2011 3:35:00 AM	0.579		463.75
10/20/2011 3:36:00 AM	0.579		463.75
10/20/2011 3:37:00 AM	0.579		463.75
10/20/2011 3:38:00 AM	0.579		463.75
10/20/2011 3:39:00 AM	0.575		458.86
10/20/2011 3:40:00 AM	0.579		463.75
10/20/2011 3:41:00 AM	0.575		458.86
10/20/2011 3:42:00 AM	0.579		463.75
10/20/2011 3:43:00 AM	0.579		463.75
10/20/2011 3:44:00 AM	0.579		463.75
10/20/2011 3:45:00 AM	0.579		463.75
10/20/2011 3:46:00 AM	0.575		458.86
10/20/2011 3:47:00 AM	0.572		454.00
10/20/2011 3:48:00 AM	0.572		454.00
10/20/2011 3:49:00 AM	0.575		458.86
10/20/2011 3:50:00 AM	0.575		458.86
10/20/2011 3:51:00 AM	0.572		454.00
10/20/2011 3:52:00 AM	0.575		458.86
10/20/2011 3:53:00 AM	0.572		454.00
10/20/2011 3:54:00 AM	0.572		454.00
10/20/2011 3:55:00 AM	0.572		454.00
10/20/2011 3:56:00 AM	0.572		454.00
10/20/2011 3:57:00 AM	0.572		454.00
10/20/2011 3:58:00 AM	0.575		458.86
10/20/2011 3:59:00 AM	0.575		458.86
10/20/2011 4:00:00 AM	0.572		454.00

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/20/2011 4:44:00 AM	0.569		449.17
10/20/2011 4:45:00 AM	0.569		449.17
10/20/2011 4:46:00 AM	0.575		458.86
10/20/2011 4:47:00 AM	0.572		454.00
10/20/2011 4:48:00 AM	0.575		458.86
10/20/2011 4:49:00 AM	0.572		454.00
10/20/2011 4:50:00 AM	0.572		454.00
10/20/2011 4:51:00 AM	0.575		458.86
10/20/2011 4:52:00 AM	0.575		458.86
10/20/2011 4:53:00 AM	0.572		454.00
10/20/2011 4:54:00 AM	0.569		449.17
10/20/2011 4:55:00 AM	0.572		454.00
10/20/2011 4:56:00 AM	0.569		449.17
10/20/2011 4:57:00 AM	0.569		449.17
10/20/2011 4:58:00 AM	0.572		454.00
10/20/2011 4:59:00 AM	0.569		449.17
10/20/2011 5:00:00 AM	0.572		454.00
10/20/2011 5:01:00 AM	0.572		454.00
10/20/2011 5:02:00 AM	0.569		449.17
10/20/2011 5:03:00 AM	0.572		454.00
10/20/2011 5:04:00 AM	0.569		449.17
10/20/2011 5:05:00 AM	0.569		449.17
10/20/2011 5:06:00 AM	0.569		449.17
10/20/2011 5:07:00 AM	0.569		449.17
10/20/2011 5:08:00 AM	0.569		449.17
10/20/2011 5:09:00 AM	0.569		449.17
10/20/2011 5:10:00 AM	0.569		449.17
10/20/2011 5:11:00 AM	0.569		449.17
10/20/2011 5:12:00 AM	0.569		449.17
10/20/2011 5:13:00 AM	0.569		449.17
10/20/2011 5:14:00 AM	0.569		449.17
10/20/2011 5:15:00 AM	0.569		449.17
10/20/2011 5:16:00 AM	0.572		454.00
10/20/2011 5:17:00 AM	0.569		449.17
10/20/2011 5:18:00 AM	0.572		454.00
10/20/2011 5:19:00 AM	0.572		454.00
10/20/2011 5:20:00 AM	0.569		449.17
10/20/2011 5:21:00 AM	0.569		449.17
10/20/2011 5:22:00 AM	0.569		449.17
10/20/2011 5:23:00 AM	0.569		449.17
10/20/2011 5:24:00 AM	0.569		449.17
10/20/2011 5:25:00 AM	0.569		449.17
10/20/2011 5:26:00 AM	0.569		449.17

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/20/2011 5:27:00 AM	0.569		449.17
10/20/2011 5:28:00 AM	0.572		454.00
10/20/2011 5:29:00 AM	0.569		449.17
10/20/2011 5:30:00 AM	0.569		449.17
10/20/2011 5:31:00 AM	0.569		449.17
10/20/2011 5:32:00 AM	0.572		454.00
10/20/2011 5:33:00 AM	0.569		449.17
10/20/2011 5:34:00 AM	0.569		449.17
10/20/2011 5:35:00 AM	0.569		449.17
10/20/2011 5:36:00 AM	0.569		449.17
10/20/2011 5:37:00 AM	0.569		449.17
10/20/2011 5:38:00 AM	0.569		449.17
10/20/2011 5:39:00 AM	0.569		449.17
10/20/2011 5:40:00 AM	0.569		449.17
10/20/2011 5:41:00 AM	0.569		449.17
10/20/2011 5:42:00 AM	0.566		444.37
10/20/2011 5:43:00 AM	0.566		444.37
10/20/2011 5:44:00 AM	0.566		444.37
10/20/2011 5:45:00 AM	0.566		444.37
10/20/2011 5:46:00 AM	0.572		454.00
10/20/2011 5:47:00 AM	0.575		458.86
10/20/2011 5:48:00 AM	0.572		454.00
10/20/2011 5:49:00 AM	0.572		454.00
10/20/2011 5:50:00 AM	0.572		454.00
10/20/2011 5:51:00 AM	0.572		454.00
10/20/2011 5:52:00 AM	0.569		449.17
10/20/2011 5:53:00 AM	0.569		449.17
10/20/2011 5:54:00 AM	0.569		449.17
10/20/2011 5:55:00 AM	0.569		449.17
10/20/2011 5:56:00 AM	0.569		449.17
10/20/2011 5:57:00 AM	0.569		449.17
10/20/2011 5:58:00 AM	0.569		449.17
10/20/2011 5:59:00 AM	0.569		449.17
10/20/2011 6:00:00 AM	0.572		454.00
10/20/2011 6:01:00 AM	0.569		449.17
10/20/2011 6:02:00 AM	0.569		449.17
10/20/2011 6:03:00 AM	0.569		449.17
10/20/2011 6:04:00 AM	0.569		449.17
10/20/2011 6:05:00 AM	0.569		449.17
10/20/2011 6:06:00 AM	0.569		449.17
10/20/2011 6:07:00 AM	0.566		444.37
10/20/2011 6:08:00 AM	0.569		449.17
10/20/2011 6:09:00 AM	0.569		449.17

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/20/2011 6:10:00 AM	0.569		449.17
10/20/2011 6:11:00 AM	0.569		449.17
10/20/2011 6:12:00 AM	0.566		444.37
10/20/2011 6:13:00 AM	0.569		449.17
10/20/2011 6:14:00 AM	0.569		449.17
10/20/2011 6:15:00 AM	0.569		449.17
10/20/2011 6:16:00 AM	0.569		449.17
10/20/2011 6:17:00 AM	0.566		444.37
10/20/2011 6:18:00 AM	0.566		444.37
10/20/2011 6:19:00 AM	0.566		444.37
10/20/2011 6:20:00 AM	0.569		449.17
10/20/2011 6:21:00 AM	0.569		449.17
10/20/2011 6:22:00 AM	0.566		444.37
10/20/2011 6:23:00 AM	0.569		449.17
10/20/2011 6:24:00 AM	0.566		444.37
10/20/2011 6:25:00 AM	0.569		449.17
10/20/2011 6:26:00 AM	0.566		444.37
10/20/2011 6:27:00 AM	0.569		449.17
10/20/2011 6:28:00 AM	0.569		449.17
10/20/2011 6:29:00 AM	0.566		444.37
10/20/2011 6:30:00 AM	0.566		444.37
10/20/2011 6:31:00 AM	0.569		449.17
10/20/2011 6:32:00 AM	0.566		444.37
10/20/2011 6:33:00 AM	0.566		444.37
10/20/2011 6:34:00 AM	0.566		444.37
10/20/2011 6:35:00 AM	0.566		444.37
10/20/2011 6:36:00 AM	0.566		444.37
10/20/2011 6:37:00 AM	0.559		434.84
10/20/2011 6:38:00 AM	0.562		439.59
10/20/2011 6:39:00 AM	0.559		434.84
10/20/2011 6:40:00 AM	0.562		439.59
10/20/2011 6:41:00 AM	0.559		434.84
10/20/2011 6:42:00 AM	0.562		439.59
10/20/2011 6:43:00 AM	0.562		439.59
10/20/2011 6:44:00 AM	0.566		444.37
10/20/2011 6:45:00 AM	0.566		444.37
10/20/2011 6:46:00 AM	0.566		444.37
10/20/2011 6:47:00 AM	0.566		444.37
10/20/2011 6:48:00 AM	0.562		439.59
10/20/2011 6:49:00 AM	0.562		439.59
10/20/2011 6:50:00 AM	0.562		439.59
10/20/2011 6:51:00 AM	0.562		439.59
10/20/2011 6:52:00 AM	0.562		439.59

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/20/2011 6:53:00 AM	0.562		439.59
10/20/2011 6:54:00 AM	0.566		444.37
10/20/2011 6:55:00 AM	0.562		439.59
10/20/2011 6:56:00 AM	0.562		439.59
10/20/2011 6:57:00 AM	0.559		434.84
10/20/2011 6:58:00 AM	0.559		434.84
10/20/2011 6:59:00 AM	0.562		439.59
10/20/2011 7:00:00 AM	0.559		434.84
10/20/2011 7:01:00 AM	0.569		449.17
10/20/2011 7:02:00 AM	0.569		449.17
10/20/2011 7:03:00 AM	0.569		449.17
10/20/2011 7:04:00 AM	0.569		449.17
10/20/2011 7:05:00 AM	0.569		449.17
10/20/2011 7:06:00 AM	0.569		449.17
10/20/2011 7:07:00 AM	0.569		449.17
10/20/2011 7:08:00 AM	0.569		449.17
10/20/2011 7:09:00 AM	0.566		444.37
10/20/2011 7:10:00 AM	0.566		444.37
10/20/2011 7:11:00 AM	0.569		449.17
10/20/2011 7:12:00 AM	0.566		444.37
10/20/2011 7:13:00 AM	0.569		449.17
10/20/2011 7:14:00 AM	0.569		449.17
10/20/2011 7:15:00 AM	0.566		444.37
10/20/2011 7:16:00 AM	0.562		439.59
10/20/2011 7:17:00 AM	0.562		439.59
10/20/2011 7:18:00 AM	0.566		444.37
10/20/2011 7:19:00 AM	0.566		444.37
10/20/2011 7:20:00 AM	0.566		444.37
10/20/2011 7:21:00 AM	0.566		444.37
10/20/2011 7:22:00 AM	0.562		439.59
10/20/2011 7:23:00 AM	0.562		439.59
10/20/2011 7:24:00 AM	0.562		439.59
10/20/2011 7:25:00 AM	0.562		439.59
10/20/2011 7:26:00 AM	0.562		439.59
10/20/2011 7:27:00 AM	0.559		434.84
10/20/2011 7:28:00 AM	0.562		439.59
10/20/2011 7:29:00 AM	0.559		434.84
10/20/2011 7:30:00 AM	0.562		439.59
10/20/2011 7:31:00 AM	0.562		439.59
10/20/2011 7:32:00 AM	0.562		439.59
10/20/2011 7:33:00 AM	0.566		444.37
10/20/2011 7:34:00 AM	0.562		439.59
10/20/2011 7:35:00 AM	0.566		444.37

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/20/2011 7:36:00 AM	0.566		444.37
10/20/2011 7:37:00 AM	0.566		444.37
10/20/2011 7:38:00 AM	0.566		444.37
10/20/2011 7:39:00 AM	0.562		439.59
10/20/2011 7:40:00 AM	0.562		439.59
10/20/2011 7:41:00 AM	0.562		439.59
10/20/2011 7:42:00 AM	0.566		444.37
10/20/2011 7:43:00 AM	0.566		444.37
10/20/2011 7:44:00 AM	0.562		439.59
10/20/2011 7:45:00 AM	0.566		444.37
10/20/2011 7:46:00 AM	0.566		444.37
10/20/2011 7:47:00 AM	0.566		444.37
10/20/2011 7:48:00 AM	0.562		439.59
10/20/2011 7:49:00 AM	0.562		439.59
10/20/2011 7:50:00 AM	0.562		439.59
10/20/2011 7:51:00 AM	0.562		439.59
10/20/2011 7:52:00 AM	0.569		449.17
10/20/2011 7:53:00 AM	0.569		449.17
10/20/2011 7:54:00 AM	0.566		444.37
10/20/2011 7:55:00 AM	0.566		444.37
10/20/2011 7:56:00 AM	0.566		444.37
10/20/2011 7:57:00 AM	0.569		449.17
10/20/2011 7:58:00 AM	0.566		444.37
10/20/2011 7:59:00 AM	0.569		449.17
10/20/2011 8:00:00 AM	0.566		444.37
10/20/2011 8:01:00 AM	0.562		439.59
10/20/2011 8:02:00 AM	0.562		439.59
10/20/2011 8:03:00 AM	0.562		439.59
10/20/2011 8:04:00 AM	0.559		434.84
10/20/2011 8:05:00 AM	0.559		434.84
10/20/2011 8:06:00 AM	0.559		434.84
10/20/2011 8:07:00 AM	0.562		439.59
10/20/2011 8:08:00 AM	0.559		434.84
10/20/2011 8:09:00 AM	0.559		434.84
10/20/2011 8:10:00 AM	0.559		434.84
10/20/2011 8:11:00 AM	0.559		434.84
10/20/2011 8:12:00 AM	0.559		434.84
10/20/2011 8:13:00 AM	0.562		439.59
10/20/2011 8:14:00 AM	0.562		439.59
10/20/2011 8:15:00 AM	0.562		439.59
10/20/2011 8:16:00 AM	0.562		439.59
10/20/2011 8:17:00 AM	0.562		439.59
10/20/2011 8:18:00 AM	0.562		439.59

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/20/2011 8:19:00 AM	0.559		434.84
10/20/2011 8:20:00 AM	0.559		434.84
10/20/2011 8:21:00 AM	0.559		434.84
10/20/2011 8:22:00 AM	0.562		439.59
10/20/2011 8:23:00 AM	0.559		434.84
10/20/2011 8:24:00 AM	0.559		434.84
10/20/2011 8:25:00 AM	0.559		434.84
10/20/2011 8:26:00 AM	0.559		434.84
10/20/2011 8:27:00 AM	0.559		434.84
10/20/2011 8:28:00 AM	0.562		439.59
10/20/2011 8:29:00 AM	0.559		434.84
10/20/2011 8:30:00 AM	0.562		439.59
10/20/2011 8:31:00 AM	0.569		449.17
10/20/2011 8:32:00 AM	0.569		449.17
10/20/2011 8:33:00 AM	0.569		449.17
10/20/2011 8:34:00 AM	0.569		449.17
10/20/2011 8:35:00 AM	0.569		449.17
10/20/2011 8:36:00 AM	0.569		449.17
10/20/2011 8:37:00 AM	0.572		454.00
10/20/2011 8:38:00 AM	0.572		454.00
10/20/2011 8:39:00 AM	0.569		449.17
10/20/2011 8:40:00 AM	0.572		454.00
10/20/2011 8:41:00 AM	0.569		449.17
10/20/2011 8:42:00 AM	0.569		449.17
10/20/2011 8:43:00 AM	0.569		449.17
10/20/2011 8:44:00 AM	0.572		454.00
10/20/2011 8:45:00 AM	0.569		449.17
10/20/2011 8:46:00 AM	0.569		449.17
10/20/2011 8:47:00 AM	0.569		449.17
10/20/2011 8:48:00 AM	0.569		449.17
10/20/2011 8:49:00 AM	0.569		449.17
10/20/2011 8:50:00 AM	0.569		449.17
10/20/2011 8:51:00 AM	0.569		449.17
10/20/2011 8:52:00 AM	0.569		449.17
10/20/2011 8:53:00 AM	0.569		449.17
10/20/2011 8:54:00 AM	0.569		449.17
10/20/2011 8:55:00 AM	0.569		449.17
10/20/2011 8:56:00 AM	0.569		449.17
10/20/2011 8:57:00 AM	0.569		449.17
10/20/2011 8:58:00 AM	0.572		454.00
10/20/2011 8:59:00 AM	0.572		454.00
10/20/2011 9:00:00 AM	0.569		449.17
10/20/2011 9:01:00 AM	0.569		449.17

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/20/2011 9:02:00 AM	0.569		449.17
10/20/2011 9:03:00 AM	0.569		449.17
10/20/2011 9:04:00 AM	0.569		449.17
10/20/2011 9:05:00 AM	0.569		449.17
10/20/2011 9:06:00 AM	0.569		449.17
10/20/2011 9:07:00 AM	0.572		454.00
10/20/2011 9:08:00 AM	0.569		449.17
10/20/2011 9:09:00 AM	0.569		449.17
10/20/2011 9:10:00 AM	0.572		454.00
10/20/2011 9:11:00 AM	0.569		449.17
10/20/2011 9:12:00 AM	0.569		449.17
10/20/2011 9:13:00 AM	0.569		449.17
10/20/2011 9:14:00 AM	0.569		449.17
10/20/2011 9:15:00 AM	0.569		449.17
10/20/2011 9:16:00 AM	0.575		458.86
10/20/2011 9:17:00 AM	0.579		463.75
10/20/2011 9:18:00 AM	0.575		458.86
10/20/2011 9:19:00 AM	0.575		458.86
10/20/2011 9:20:00 AM	0.575		458.86
10/20/2011 9:21:00 AM	0.579		463.75
10/20/2011 9:22:00 AM	0.575		458.86
10/20/2011 9:23:00 AM	0.575		458.86
10/20/2011 9:24:00 AM	0.575		458.86
10/20/2011 9:25:00 AM	0.575		458.86
10/20/2011 9:26:00 AM	0.575		458.86
10/20/2011 9:27:00 AM	0.572		454.00
10/20/2011 9:28:00 AM	0.575		458.86
10/20/2011 9:29:00 AM	0.575		458.86
10/20/2011 9:30:00 AM	0.579		463.75
10/20/2011 9:31:00 AM	0.575		458.86
10/20/2011 9:32:00 AM	0.572		454.00
10/20/2011 9:33:00 AM	0.572		454.00
10/20/2011 9:34:00 AM	0.575		458.86
10/20/2011 9:35:00 AM	0.575		458.86
10/20/2011 9:36:00 AM	0.572		454.00
10/20/2011 9:37:00 AM	0.575		458.86
10/20/2011 9:38:00 AM	0.575		458.86
10/20/2011 9:39:00 AM	0.575		458.86
10/20/2011 9:40:00 AM	0.572		454.00
10/20/2011 9:41:00 AM	0.572		454.00
10/20/2011 9:42:00 AM	0.572		454.00
10/20/2011 9:43:00 AM	0.572		454.00
10/20/2011 9:44:00 AM	0.572		454.00

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/20/2011 9:45:00 AM	0.575		458.86
10/20/2011 9:46:00 AM	0.575		458.86
10/20/2011 9:47:00 AM	0.572		454.00
10/20/2011 9:48:00 AM	0.575		458.86
10/20/2011 9:49:00 AM	0.572		454.00
10/20/2011 9:50:00 AM	0.572		454.00
10/20/2011 9:51:00 AM	0.572		454.00
10/20/2011 9:52:00 AM	0.579		463.75
10/20/2011 9:53:00 AM	0.575		458.86
10/20/2011 9:54:00 AM	0.575		458.86
10/20/2011 9:55:00 AM	0.575		458.86
10/20/2011 9:56:00 AM	0.572		454.00
10/20/2011 9:57:00 AM	0.575		458.86
10/20/2011 9:58:00 AM	0.572		454.00
10/20/2011 9:59:00 AM	0.572		454.00
10/20/2011 10:00:00 AM	0.572		454.00
10/20/2011 10:01:00 AM	0.575		458.86
10/20/2011 10:02:00 AM	0.579		463.75
10/20/2011 10:03:00 AM	0.579		463.75
10/20/2011 10:04:00 AM	0.575		458.86
10/20/2011 10:05:00 AM	0.575		458.86
10/20/2011 10:06:00 AM	0.572		454.00
10/20/2011 10:07:00 AM	0.575		458.86
10/20/2011 10:08:00 AM	0.575		458.86
10/20/2011 10:09:00 AM	0.579		463.75
10/20/2011 10:10:00 AM	0.575		458.86
10/20/2011 10:11:00 AM	0.575		458.86
10/20/2011 10:12:00 AM	0.572		454.00
10/20/2011 10:13:00 AM	0.579		463.75
10/20/2011 10:14:00 AM	0.575		458.86
10/20/2011 10:15:00 AM	0.575		458.86
10/20/2011 10:16:00 AM	0.569		449.17
10/20/2011 10:17:00 AM	0.566		444.37
10/20/2011 10:18:00 AM	0.569		449.17
10/20/2011 10:19:00 AM	0.569		449.17
10/20/2011 10:20:00 AM	0.569		449.17
10/20/2011 10:21:00 AM	0.569		449.17
10/20/2011 10:22:00 AM	0.569		449.17
10/20/2011 10:23:00 AM	0.569		449.17
10/20/2011 10:24:00 AM	0.569		449.17
10/20/2011 10:25:00 AM	0.569		449.17
10/20/2011 10:26:00 AM	0.569		449.17
10/20/2011 10:27:00 AM	0.566		444.37

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/20/2011 10:28:00 AM	0.569		449.17
10/20/2011 10:29:00 AM	0.569		449.17
10/20/2011 10:30:00 AM	0.569		449.17
10/20/2011 10:31:00 AM	0.572		454.00
10/20/2011 10:32:00 AM	0.569		449.17
10/20/2011 10:33:00 AM	0.572		454.00
10/20/2011 10:34:00 AM	0.569		449.17
10/20/2011 10:35:00 AM	0.572		454.00
10/20/2011 10:36:00 AM	0.569		449.17
10/20/2011 10:37:00 AM	0.569		449.17
10/20/2011 10:38:00 AM	0.572		454.00
10/20/2011 10:39:00 AM	0.569		449.17
10/20/2011 10:40:00 AM	0.569		449.17
10/20/2011 10:41:00 AM	0.569		449.17
10/20/2011 10:42:00 AM	0.575		458.86
10/20/2011 10:43:00 AM	0.569		449.17
10/20/2011 10:44:00 AM	0.572		454.00
10/20/2011 10:45:00 AM	0.569		449.17
10/20/2011 10:46:00 AM	0.575		458.86
10/20/2011 10:47:00 AM	0.572		454.00
10/20/2011 10:48:00 AM	0.575		458.86
10/20/2011 10:49:00 AM	0.575		458.86
10/20/2011 10:50:00 AM	0.575		458.86
10/20/2011 10:51:00 AM	0.575		458.86
10/20/2011 10:52:00 AM	0.572		454.00
10/20/2011 10:53:00 AM	0.569		449.17
10/20/2011 10:54:00 AM	0.569		449.17
10/20/2011 10:55:00 AM	0.569		449.17
10/20/2011 10:56:00 AM	0.572		454.00
10/20/2011 10:57:00 AM	0.575		458.86
10/20/2011 10:58:00 AM	0.569		449.17
10/20/2011 10:59:00 AM	0.572		454.00
10/20/2011 11:00:00 AM	0.572		454.00
10/20/2011 11:01:00 AM	0.575		458.86
10/20/2011 11:02:00 AM	0.575		458.86
10/20/2011 11:03:00 AM	0.575		458.86
10/20/2011 11:04:00 AM	0.575		458.86
10/20/2011 11:05:00 AM	0.575		458.86
10/20/2011 11:06:00 AM	0.572		454.00
10/20/2011 11:07:00 AM	0.579		463.75
10/20/2011 11:08:00 AM	0.579		463.75
10/20/2011 11:09:00 AM	0.575		458.86
10/20/2011 11:10:00 AM	0.575		458.86

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/20/2011 11:11:00 AM	0.575		458.86
10/20/2011 11:12:00 AM	0.575		458.86
10/20/2011 11:13:00 AM	0.575		458.86
10/20/2011 11:14:00 AM	0.579		463.75
10/20/2011 11:15:00 AM	0.575		458.86
10/20/2011 11:16:00 AM	0.575		458.86
10/20/2011 11:17:00 AM	0.569		449.17
10/20/2011 11:18:00 AM	0.572		454.00
10/20/2011 11:19:00 AM	0.572		454.00
10/20/2011 11:20:00 AM	0.572		454.00
10/20/2011 11:21:00 AM	0.572		454.00
10/20/2011 11:22:00 AM	0.569		449.17
10/20/2011 11:23:00 AM	0.572		454.00
10/20/2011 11:24:00 AM	0.569		449.17
10/20/2011 11:25:00 AM	0.572		454.00
10/20/2011 11:26:00 AM	0.575		458.86
10/20/2011 11:27:00 AM	0.572		454.00
10/20/2011 11:28:00 AM	0.572		454.00
10/20/2011 11:29:00 AM	0.575		458.86
10/20/2011 11:30:00 AM	0.572		454.00
10/20/2011 11:31:00 AM	0.575		458.86
10/20/2011 11:32:00 AM	0.575		458.86
10/20/2011 11:33:00 AM	0.575		458.86
10/20/2011 11:34:00 AM	0.572		454.00
10/20/2011 11:35:00 AM	0.572		454.00
10/20/2011 11:36:00 AM	0.575		458.86
10/20/2011 11:37:00 AM	0.572		454.00
10/20/2011 11:38:00 AM	0.572		454.00
10/20/2011 11:39:00 AM	0.572		454.00
10/20/2011 11:40:00 AM	0.569		449.17
10/20/2011 11:41:00 AM	0.572		454.00
10/20/2011 11:42:00 AM	0.575		458.86
10/20/2011 11:43:00 AM	0.575		458.86
10/20/2011 11:44:00 AM	0.572		454.00
10/20/2011 11:45:00 AM	0.572		454.00
10/20/2011 11:46:00 AM	0.572		454.00
10/20/2011 11:47:00 AM	0.572		454.00
10/20/2011 11:48:00 AM	0.575		458.86
10/20/2011 11:49:00 AM	0.572		454.00
10/20/2011 11:50:00 AM	0.572		454.00
10/20/2011 11:51:00 AM	0.572		454.00
10/20/2011 11:52:00 AM	0.572		454.00
10/20/2011 11:53:00 AM	0.572		454.00

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/20/2011 11:54:00 AM	0.569		449.17
10/20/2011 11:55:00 AM	0.572		454.00
10/20/2011 11:56:00 AM	0.572		454.00
10/20/2011 11:57:00 AM	0.572		454.00
10/20/2011 11:58:00 AM	0.572		454.00
10/20/2011 11:59:00 AM	0.572		454.00
10/20/2011 12:00:00 PM	0.572		454.00
10/20/2011 12:01:00 PM	0.572		454.00
10/20/2011 12:02:00 PM	0.569		449.17
10/20/2011 12:03:00 PM	0.575		458.86
10/20/2011 12:04:00 PM	0.569		449.17
10/20/2011 12:05:00 PM	0.569		449.17
10/20/2011 12:06:00 PM	0.572		454.00
10/20/2011 12:07:00 PM	0.569		449.17
10/20/2011 12:08:00 PM	0.572		454.00
10/20/2011 12:09:00 PM	0.569		449.17
10/20/2011 12:10:00 PM	0.569		449.17
10/20/2011 12:11:00 PM	0.569		449.17
10/20/2011 12:12:00 PM	0.569		449.17
10/20/2011 12:13:00 PM	0.569		449.17
10/20/2011 12:14:00 PM	0.569		449.17
10/20/2011 12:15:00 PM	0.569		449.17
10/20/2011 12:16:00 PM	0.569		449.17
10/20/2011 12:17:00 PM	0.569		449.17
10/20/2011 12:18:00 PM	0.572		454.00
10/20/2011 12:19:00 PM	0.569		449.17
10/20/2011 12:20:00 PM	0.569		449.17
10/20/2011 12:21:00 PM	0.569		449.17
10/20/2011 12:22:00 PM	0.569		449.17
10/20/2011 12:23:00 PM	0.572		454.00
10/20/2011 12:24:00 PM	0.569		449.17
10/20/2011 12:25:00 PM	0.569		449.17
10/20/2011 12:26:00 PM	0.569		449.17
10/20/2011 12:27:00 PM	0.569		449.17
10/20/2011 12:28:00 PM	0.569		449.17
10/20/2011 12:29:00 PM	0.572		454.00
10/20/2011 12:30:00 PM	0.572		454.00
10/20/2011 12:31:00 PM	0.569		449.17
10/20/2011 12:32:00 PM	0.572		454.00
10/20/2011 12:33:00 PM	0.572		454.00
10/20/2011 12:34:00 PM	0.569		449.17
10/20/2011 12:35:00 PM	0.569		449.17
10/20/2011 12:36:00 PM	0.572		454.00

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/20/2011 12:37:00 PM	0.566		444.37
10/20/2011 12:38:00 PM	0.566		444.37
10/20/2011 12:39:00 PM	0.566		444.37
10/20/2011 12:40:00 PM	0.569		449.17
10/20/2011 12:41:00 PM	0.569		449.17
10/20/2011 12:42:00 PM	0.569		449.17
10/20/2011 12:43:00 PM	0.569		449.17
10/20/2011 12:44:00 PM	0.572		454.00
10/20/2011 12:45:00 PM	0.569		449.17
10/20/2011 12:46:00 PM	0.572		454.00
10/20/2011 12:47:00 PM	0.572		454.00
10/20/2011 12:48:00 PM	0.572		454.00
10/20/2011 12:49:00 PM	0.569		449.17
10/20/2011 12:50:00 PM	0.569		449.17
10/20/2011 12:51:00 PM	0.569		449.17
10/20/2011 12:52:00 PM	0.569		449.17
10/20/2011 12:53:00 PM	0.572		454.00
10/20/2011 12:54:00 PM	0.569		449.17
10/20/2011 12:55:00 PM	0.572		454.00
10/20/2011 12:56:00 PM	0.569		449.17
10/20/2011 12:57:00 PM	0.572		454.00
10/20/2011 12:58:00 PM	0.572		454.00
10/20/2011 12:59:00 PM	0.572		454.00
10/20/2011 1:00:00 PM	0.572		454.00
10/20/2011 1:01:00 PM	0.572		454.00
10/20/2011 1:02:00 PM	0.572		454.00
10/20/2011 1:03:00 PM	0.569		449.17
10/20/2011 1:04:00 PM	0.569		449.17
10/20/2011 1:05:00 PM	0.569		449.17
10/20/2011 1:06:00 PM	0.569		449.17
10/20/2011 1:07:00 PM	0.572		454.00
10/20/2011 1:08:00 PM	0.572		454.00
10/20/2011 1:09:00 PM	0.569		449.17
10/20/2011 1:10:00 PM	0.572		454.00
10/20/2011 1:11:00 PM	0.569		449.17
10/20/2011 1:12:00 PM	0.569		449.17
10/20/2011 1:13:00 PM	0.569		449.17
10/20/2011 1:14:00 PM	0.572		454.00
10/20/2011 1:15:00 PM	0.569		449.17
10/20/2011 1:16:00 PM	0.572		454.00
10/20/2011 1:17:00 PM	0.572		454.00
10/20/2011 1:18:00 PM	0.569		449.17
10/20/2011 1:19:00 PM	0.569		449.17

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/20/2011 1:20:00 PM	0.569		449.17
10/20/2011 1:21:00 PM	0.572		454.00
10/20/2011 1:22:00 PM	0.569		449.17
10/20/2011 1:23:00 PM	0.569		449.17
10/20/2011 1:24:00 PM	0.569		449.17
10/20/2011 1:25:00 PM	0.569		449.17
10/20/2011 1:26:00 PM	0.569		449.17
10/20/2011 1:27:00 PM	0.572		454.00
10/20/2011 1:28:00 PM	0.572		454.00
10/20/2011 1:29:00 PM	0.572		454.00
10/20/2011 1:30:00 PM	0.569		449.17
10/20/2011 1:31:00 PM	0.572		454.00
10/20/2011 1:32:00 PM	0.572		454.00
10/20/2011 1:33:00 PM	0.575		458.86
10/20/2011 1:34:00 PM	0.572		454.00
10/20/2011 1:35:00 PM	0.572		454.00
10/20/2011 1:36:00 PM	0.569		449.17
10/20/2011 1:37:00 PM	0.572		454.00
10/20/2011 1:38:00 PM	0.569		449.17
10/20/2011 1:39:00 PM	0.569		449.17
10/20/2011 1:40:00 PM	0.572		454.00
10/20/2011 1:41:00 PM	0.572		454.00
10/20/2011 1:42:00 PM	0.572		454.00
10/20/2011 1:43:00 PM	0.572		454.00
10/20/2011 1:44:00 PM	0.572		454.00
10/20/2011 1:45:00 PM	0.569		449.17
10/20/2011 1:46:00 PM	0.572		454.00
10/20/2011 1:47:00 PM	0.572		454.00
10/20/2011 1:48:00 PM	0.572		454.00
10/20/2011 1:49:00 PM	0.572		454.00
10/20/2011 1:50:00 PM	0.572		454.00
10/20/2011 1:51:00 PM	0.569		449.17
10/20/2011 1:52:00 PM	0.572		454.00
10/20/2011 1:53:00 PM	0.575		458.86
10/20/2011 1:54:00 PM	0.572		454.00
10/20/2011 1:55:00 PM	0.572		454.00
10/20/2011 1:56:00 PM	0.572		454.00
10/20/2011 1:57:00 PM	0.569		449.17
10/20/2011 1:58:00 PM	0.575		458.86
10/20/2011 1:59:00 PM	0.572		454.00
10/20/2011 2:00:00 PM	0.572		454.00
10/20/2011 2:01:00 PM	0.572		454.00
10/20/2011 2:02:00 PM	0.575		458.86

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/20/2011 2:03:00 PM	0.572		454.00
10/20/2011 2:04:00 PM	0.575		458.86
10/20/2011 2:05:00 PM	0.572		454.00
10/20/2011 2:06:00 PM	0.575		458.86
10/20/2011 2:07:00 PM	0.569		449.17
10/20/2011 2:08:00 PM	0.569		449.17
10/20/2011 2:09:00 PM	0.572		454.00
10/20/2011 2:10:00 PM	0.569		449.17
10/20/2011 2:11:00 PM	0.569		449.17
10/20/2011 2:12:00 PM	0.572		454.00
10/20/2011 2:13:00 PM	0.575		458.86
10/20/2011 2:14:00 PM	0.572		454.00
10/20/2011 2:15:00 PM	0.572		454.00
10/20/2011 2:16:00 PM	0.572		454.00
10/20/2011 2:17:00 PM	0.569		449.17
10/20/2011 2:18:00 PM	0.572		454.00
10/20/2011 2:19:00 PM	0.572		454.00
10/20/2011 2:20:00 PM	0.572		454.00
10/20/2011 2:21:00 PM	0.569		449.17
10/20/2011 2:22:00 PM	0.572		454.00
10/20/2011 2:23:00 PM	0.572		454.00
10/20/2011 2:24:00 PM	0.572		454.00
10/20/2011 2:25:00 PM	0.572		454.00
10/20/2011 2:26:00 PM	0.569		449.17
10/20/2011 2:27:00 PM	0.572		454.00
10/20/2011 2:28:00 PM	0.569		449.17
10/20/2011 2:29:00 PM	0.572		454.00
10/20/2011 2:30:00 PM	0.569		449.17
10/20/2011 2:31:00 PM	0.569		449.17
10/20/2011 2:32:00 PM	0.572		454.00
10/20/2011 2:33:00 PM	0.572		454.00
10/20/2011 2:34:00 PM	0.572		454.00
10/20/2011 2:35:00 PM	0.569		449.17
10/20/2011 2:36:00 PM	0.569		449.17
10/20/2011 2:37:00 PM	0.569		449.17
10/20/2011 2:38:00 PM	0.569		449.17
10/20/2011 2:39:00 PM	0.569		449.17
10/20/2011 2:40:00 PM	0.569		449.17
10/20/2011 2:41:00 PM	0.566		444.37
10/20/2011 2:42:00 PM	0.566		444.37
10/20/2011 2:43:00 PM	0.569		449.17
10/20/2011 2:44:00 PM	0.569		449.17
10/20/2011 2:45:00 PM	0.569		449.17

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/20/2011 2:46:00 PM	0.572		454.00
10/20/2011 2:47:00 PM	0.569		449.17
10/20/2011 2:48:00 PM	0.572		454.00
10/20/2011 2:49:00 PM	0.572		454.00
10/20/2011 2:50:00 PM	0.569		449.17
10/20/2011 2:51:00 PM	0.569		449.17
10/20/2011 2:52:00 PM	0.572		454.00
10/20/2011 2:53:00 PM	0.572		454.00
10/20/2011 2:54:00 PM	0.569		449.17
10/20/2011 2:55:00 PM	0.572		454.00
10/20/2011 2:56:00 PM	0.572		454.00
10/20/2011 2:57:00 PM	0.572		454.00
10/20/2011 2:58:00 PM	0.569		449.17
10/20/2011 2:59:00 PM	0.569		449.17
10/20/2011 3:00:00 PM	0.569		449.17
10/20/2011 3:01:00 PM	0.575		458.86
10/20/2011 3:02:00 PM	0.575		458.86
10/20/2011 3:03:00 PM	0.575		458.86
10/20/2011 3:04:00 PM	0.572		454.00
10/20/2011 3:05:00 PM	0.575		458.86
10/20/2011 3:06:00 PM	0.572		454.00
10/20/2011 3:07:00 PM	0.579		463.75
10/20/2011 3:08:00 PM	0.572		454.00
10/20/2011 3:09:00 PM	0.575		458.86
10/20/2011 3:10:00 PM	0.575		458.86
10/20/2011 3:11:00 PM	0.575		458.86
10/20/2011 3:12:00 PM	0.575		458.86
10/20/2011 3:13:00 PM	0.572		454.00
10/20/2011 3:14:00 PM	0.572		454.00
10/20/2011 3:15:00 PM	0.569		449.17
10/20/2011 3:16:00 PM	0.575		458.86
10/20/2011 3:17:00 PM	0.575		458.86
10/20/2011 3:18:00 PM	0.575		458.86
10/20/2011 3:19:00 PM	0.575		458.86
10/20/2011 3:20:00 PM	0.572		454.00
10/20/2011 3:21:00 PM	0.575		458.86
10/20/2011 3:22:00 PM	0.569		449.17
10/20/2011 3:23:00 PM	0.572		454.00
10/20/2011 3:24:00 PM	0.569		449.17
10/20/2011 3:25:00 PM	0.572		454.00
10/20/2011 3:26:00 PM	0.572		454.00
10/20/2011 3:27:00 PM	0.572		454.00
10/20/2011 3:28:00 PM	0.579		463.75

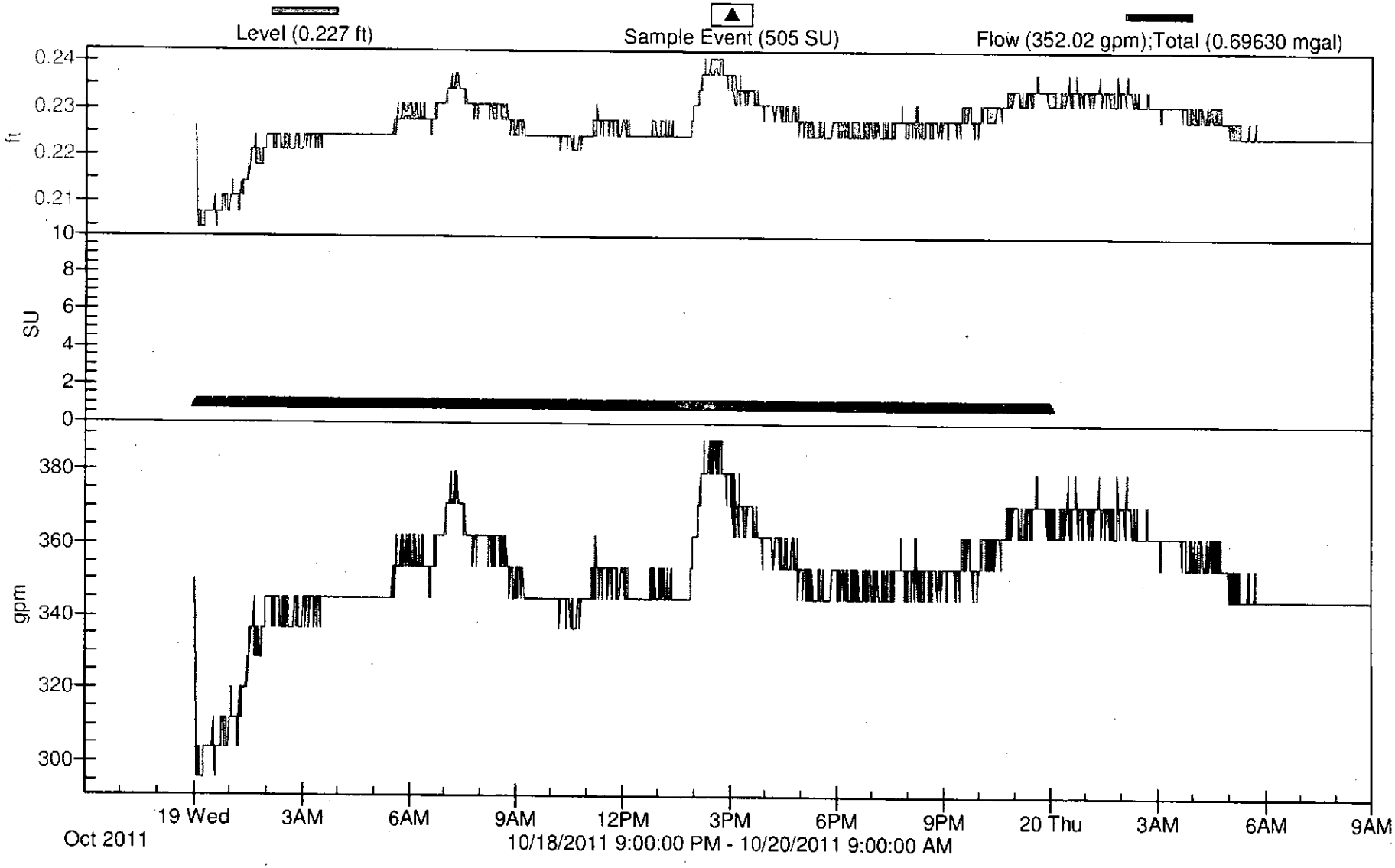
Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/20/2011 3:29:00 PM	0.575		458.86
10/20/2011 3:30:00 PM	0.575		458.86
10/20/2011 3:31:00 PM	0.572		454.00
10/20/2011 3:32:00 PM	0.572		454.00
10/20/2011 3:33:00 PM	0.572		454.00
10/20/2011 3:34:00 PM	0.572		454.00
10/20/2011 3:35:00 PM	0.572		454.00
10/20/2011 3:36:00 PM	0.572		454.00
10/20/2011 3:37:00 PM	0.575		458.86
10/20/2011 3:38:00 PM	0.579		463.75
10/20/2011 3:39:00 PM	0.575		458.86
10/20/2011 3:40:00 PM	0.575		458.86
10/20/2011 3:41:00 PM	0.575		458.86
10/20/2011 3:42:00 PM	0.579		463.75
10/20/2011 3:43:00 PM	0.575		458.86
10/20/2011 3:44:00 PM	0.575		458.86
10/20/2011 3:45:00 PM	0.575		458.86
10/20/2011 3:46:00 PM	0.579		463.75
10/20/2011 3:47:00 PM	0.572		454.00
10/20/2011 3:48:00 PM	0.575		458.86
10/20/2011 3:49:00 PM	0.572		454.00
10/20/2011 3:50:00 PM	0.579		463.75
10/20/2011 3:51:00 PM	0.572		454.00
10/20/2011 3:52:00 PM	0.575		458.86
10/20/2011 3:53:00 PM	0.575		458.86
10/20/2011 3:54:00 PM	0.575		458.86
10/20/2011 3:55:00 PM	0.575		458.86
10/20/2011 3:56:00 PM	0.575		458.86
10/20/2011 3:57:00 PM	0.575		458.86
10/20/2011 3:58:00 PM	0.575		458.86
10/20/2011 3:59:00 PM	0.575		458.86
10/20/2011 4:00:00 PM	0.575		458.86
10/20/2011 4:01:00 PM	0.572		454.00
10/20/2011 4:02:00 PM	0.575		458.86
10/20/2011 4:03:00 PM	0.575		458.86
10/20/2011 4:04:00 PM	0.575		458.86
10/20/2011 4:05:00 PM	0.572		454.00
10/20/2011 4:06:00 PM	0.572		454.00
10/20/2011 4:07:00 PM	0.569		449.17
10/20/2011 4:08:00 PM	0.572		454.00
10/20/2011 4:09:00 PM	0.569		449.17
10/20/2011 4:10:00 PM	0.569		449.17
10/20/2011 4:11:00 PM	0.569		449.17

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/20/2011 4:12:00 PM	0.569		449.17
10/20/2011 4:13:00 PM	0.569		449.17
10/20/2011 4:14:00 PM	0.569		449.17
10/20/2011 4:15:00 PM	0.572		454.00
10/20/2011 4:16:00 PM	0.579		463.75
10/20/2011 4:17:00 PM	0.575		458.86
10/20/2011 4:18:00 PM	0.575		458.86
10/20/2011 4:19:00 PM	0.575		458.86
10/20/2011 4:20:00 PM	0.575		458.86
10/20/2011 4:21:00 PM	0.575		458.86
10/20/2011 4:22:00 PM	0.575		458.86
10/20/2011 4:23:00 PM	0.575		458.86
10/20/2011 4:24:00 PM	0.579		463.75
10/20/2011 4:25:00 PM	0.575		458.86
10/20/2011 4:26:00 PM	0.575		458.86
10/20/2011 4:27:00 PM	0.572		454.00
10/20/2011 4:28:00 PM	0.579		463.75
10/20/2011 4:29:00 PM	0.575		458.86
10/20/2011 4:30:00 PM	0.575		458.86
10/20/2011 4:31:00 PM	0.575		458.86
10/20/2011 4:32:00 PM	0.575		458.86
10/20/2011 4:33:00 PM	0.572		454.00
10/20/2011 4:34:00 PM	0.572		454.00
10/20/2011 4:35:00 PM	0.572		454.00
10/20/2011 4:36:00 PM	0.569		449.17
10/20/2011 4:37:00 PM	0.569		449.17
10/20/2011 4:38:00 PM	0.569		449.17
10/20/2011 4:39:00 PM	0.569		449.17
10/20/2011 4:40:00 PM	0.569		449.17
10/20/2011 4:41:00 PM	0.569		449.17

Average Level (ft)	Total Sample Event (SU)	Average Flow (gpm)
0.585	699	473.67
		Total
		1.4244 mgal

Outfall 005

Greif Packaging - 2F Storm Water



Outfall 005

Greif Packaging - 2F Storm Water

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 12:02:00 AM	0.226		350.23
10/19/2011 12:03:00 AM	0.205	0	295.71
10/19/2011 12:04:00 AM	0.205		295.71
10/19/2011 12:05:00 AM	0.205		295.71
10/19/2011 12:06:00 AM	0.205	0	295.71
10/19/2011 12:07:00 AM	0.205		295.71
10/19/2011 12:08:00 AM	0.208		303.73
10/19/2011 12:09:00 AM	0.205		295.71
10/19/2011 12:10:00 AM	0.208	0	303.73
10/19/2011 12:11:00 AM	0.205		295.71
10/19/2011 12:12:00 AM	0.205		295.71
10/19/2011 12:13:00 AM	0.205	0	295.71
10/19/2011 12:14:00 AM	0.205		295.71
10/19/2011 12:15:00 AM	0.205		295.71
10/19/2011 12:16:00 AM	0.208	0	303.73
10/19/2011 12:17:00 AM	0.208		303.73
10/19/2011 12:18:00 AM	0.208		303.73
10/19/2011 12:19:00 AM	0.208		303.73
10/19/2011 12:20:00 AM	0.208	0	303.73
10/19/2011 12:21:00 AM	0.208		303.73
10/19/2011 12:22:00 AM	0.208		303.73
10/19/2011 12:23:00 AM	0.208	0	303.73
10/19/2011 12:24:00 AM	0.208		303.73
10/19/2011 12:25:00 AM	0.208		303.73
10/19/2011 12:26:00 AM	0.208	0	303.73
10/19/2011 12:27:00 AM	0.208		303.73
10/19/2011 12:28:00 AM	0.208		303.73
10/19/2011 12:29:00 AM	0.208	0	303.73
10/19/2011 12:30:00 AM	0.208		303.73
10/19/2011 12:31:00 AM	0.208		303.73
10/19/2011 12:32:00 AM	0.211		311.83
10/19/2011 12:33:00 AM	0.208	0	303.73
10/19/2011 12:34:00 AM	0.208		303.73
10/19/2011 12:35:00 AM	0.205		295.71
10/19/2011 12:36:00 AM	0.205	0	295.71
10/19/2011 12:37:00 AM	0.208		303.73
10/19/2011 12:38:00 AM	0.208		303.73
10/19/2011 12:39:00 AM	0.208	0	303.73
10/19/2011 12:40:00 AM	0.208		303.73
10/19/2011 12:41:00 AM	0.208		303.73
10/19/2011 12:42:00 AM	0.208		303.73
10/19/2011 12:43:00 AM	0.208	0	303.73
10/19/2011 12:44:00 AM	0.208		303.73
10/19/2011 12:45:00 AM	0.211		311.83
10/19/2011 12:46:00 AM	0.211	0	311.83
10/19/2011 12:47:00 AM	0.211		311.83
10/19/2011 12:48:00 AM	0.211		311.83
10/19/2011 12:49:00 AM	0.211	0	311.83
10/19/2011 12:50:00 AM	0.208		303.73
10/19/2011 12:51:00 AM	0.208		303.73
10/19/2011 12:52:00 AM	0.211	0	311.83
10/19/2011 12:53:00 AM	0.211		311.83
10/19/2011 12:54:00 AM	0.208		303.73
10/19/2011 12:55:00 AM	0.208		303.73
10/19/2011 12:56:00 AM	0.208	0	303.73
10/19/2011 12:57:00 AM	0.208		303.73

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 12:58:00 AM	0.208		303.73
10/19/2011 12:59:00 AM	0.211	0	311.83
10/19/2011 1:00:00 AM	0.211		311.83
10/19/2011 1:01:00 AM	0.211		311.83
10/19/2011 1:02:00 AM	0.215	0	320.02
10/19/2011 1:03:00 AM	0.211		311.83
10/19/2011 1:04:00 AM	0.211		311.83
10/19/2011 1:05:00 AM	0.211	0	311.83
10/19/2011 1:06:00 AM	0.211		311.83
10/19/2011 1:07:00 AM	0.211		311.83
10/19/2011 1:08:00 AM	0.211	0	311.83
10/19/2011 1:09:00 AM	0.211		311.83
10/19/2011 1:10:00 AM	0.211		311.83
10/19/2011 1:11:00 AM	0.211		311.83
10/19/2011 1:12:00 AM	0.208	0	303.73
10/19/2011 1:13:00 AM	0.208		303.73
10/19/2011 1:14:00 AM	0.211		311.83
10/19/2011 1:15:00 AM	0.211	0	311.83
10/19/2011 1:16:00 AM	0.215		320.02
10/19/2011 1:17:00 AM	0.211		311.83
10/19/2011 1:18:00 AM	0.215	0	320.02
10/19/2011 1:19:00 AM	0.211		311.83
10/19/2011 1:20:00 AM	0.211		311.83
10/19/2011 1:21:00 AM	0.215	0	320.02
10/19/2011 1:22:00 AM	0.215		320.02
10/19/2011 1:23:00 AM	0.215		320.02
10/19/2011 1:24:00 AM	0.215	0	320.02
10/19/2011 1:25:00 AM	0.215		320.02
10/19/2011 1:26:00 AM	0.215		320.02
10/19/2011 1:27:00 AM	0.215		320.02
10/19/2011 1:28:00 AM	0.218	0	328.30
10/19/2011 1:29:00 AM	0.215		320.02
10/19/2011 1:30:00 AM	0.218		328.30
10/19/2011 1:31:00 AM	0.221	0	336.66
10/19/2011 1:32:00 AM	0.218		328.30
10/19/2011 1:33:00 AM	0.221		336.66
10/19/2011 1:34:00 AM	0.221	0	336.66
10/19/2011 1:35:00 AM	0.221		336.66
10/19/2011 1:36:00 AM	0.221		336.66
10/19/2011 1:37:00 AM	0.221	0	336.66
10/19/2011 1:38:00 AM	0.221		336.66
10/19/2011 1:39:00 AM	0.224		345.12
10/19/2011 1:40:00 AM	0.218	0	328.30
10/19/2011 1:41:00 AM	0.221		336.66
10/19/2011 1:42:00 AM	0.221		336.66
10/19/2011 1:43:00 AM	0.221	0	336.66
10/19/2011 1:44:00 AM	0.218		328.30
10/19/2011 1:45:00 AM	0.221		336.66
10/19/2011 1:46:00 AM	0.218	0	328.30
10/19/2011 1:47:00 AM	0.221		336.66
10/19/2011 1:48:00 AM	0.218		328.30
10/19/2011 1:49:00 AM	0.218	0	328.30
10/19/2011 1:50:00 AM	0.218		328.30
10/19/2011 1:51:00 AM	0.218		328.30
10/19/2011 1:52:00 AM	0.221	0	336.66
10/19/2011 1:53:00 AM	0.221		336.66
10/19/2011 1:54:00 AM	0.221		336.66
10/19/2011 1:55:00 AM	0.221	0	336.66
10/19/2011 1:56:00 AM	0.221		336.66
10/19/2011 1:57:00 AM	0.221		336.66

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 1:58:00 AM	0.221	0	336.66
10/19/2011 1:59:00 AM	0.224		345.12
10/19/2011 2:00:00 AM	0.224	0	345.12
10/19/2011 2:01:00 AM	0.224		345.12
10/19/2011 2:02:00 AM	0.224		345.12
10/19/2011 2:03:00 AM	0.224	0	345.12
10/19/2011 2:04:00 AM	0.224		345.12
10/19/2011 2:05:00 AM	0.224		345.12
10/19/2011 2:06:00 AM	0.224	0	345.12
10/19/2011 2:07:00 AM	0.224		345.12
10/19/2011 2:08:00 AM	0.224		345.12
10/19/2011 2:09:00 AM	0.221	0	336.66
10/19/2011 2:10:00 AM	0.224		345.12
10/19/2011 2:11:00 AM	0.221		336.66
10/19/2011 2:12:00 AM	0.221	0	336.66
10/19/2011 2:13:00 AM	0.224		345.12
10/19/2011 2:14:00 AM	0.221		336.66
10/19/2011 2:15:00 AM	0.221	0	336.66
10/19/2011 2:16:00 AM	0.224		345.12
10/19/2011 2:17:00 AM	0.224		345.12
10/19/2011 2:18:00 AM	0.224	0	345.12
10/19/2011 2:19:00 AM	0.224		345.12
10/19/2011 2:20:00 AM	0.224		345.12
10/19/2011 2:21:00 AM	0.221	0	336.66
10/19/2011 2:22:00 AM	0.224		345.12
10/19/2011 2:23:00 AM	0.221		336.66
10/19/2011 2:24:00 AM	0.221	0	336.66
10/19/2011 2:25:00 AM	0.221		336.66
10/19/2011 2:26:00 AM	0.221		336.66
10/19/2011 2:27:00 AM	0.224	0	345.12
10/19/2011 2:28:00 AM	0.224		345.12
10/19/2011 2:29:00 AM	0.224		345.12
10/19/2011 2:30:00 AM	0.221	0	336.66
10/19/2011 2:31:00 AM	0.221		336.66
10/19/2011 2:32:00 AM	0.224		345.12
10/19/2011 2:33:00 AM	0.221	0	336.66
10/19/2011 2:34:00 AM	0.224		345.12
10/19/2011 2:35:00 AM	0.221		336.66
10/19/2011 2:36:00 AM	0.221	0	336.66
10/19/2011 2:37:00 AM	0.221		336.66
10/19/2011 2:38:00 AM	0.221	0	336.66
10/19/2011 2:39:00 AM	0.221		336.66
10/19/2011 2:40:00 AM	0.221		336.66
10/19/2011 2:41:00 AM	0.221	0	336.66
10/19/2011 2:42:00 AM	0.221		336.66
10/19/2011 2:43:00 AM	0.221		336.66
10/19/2011 2:44:00 AM	0.221	0	336.66
10/19/2011 2:45:00 AM	0.221		336.66
10/19/2011 2:46:00 AM	0.224		345.12
10/19/2011 2:47:00 AM	0.224	0	345.12
10/19/2011 2:48:00 AM	0.224		345.12
10/19/2011 2:49:00 AM	0.224		345.12
10/19/2011 2:50:00 AM	0.224	0	345.12
10/19/2011 2:51:00 AM	0.221		336.66
10/19/2011 2:52:00 AM	0.224		345.12
10/19/2011 2:53:00 AM	0.221	0	336.66
10/19/2011 2:54:00 AM	0.221		336.66
10/19/2011 2:55:00 AM	0.221		336.66
10/19/2011 2:56:00 AM	0.221	0	336.66
10/19/2011 2:57:00 AM	0.221		336.66

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 2:58:00 AM	0.221		336.66
10/19/2011 2:59:00 AM	0.221	0	336.66
10/19/2011 3:00:00 AM	0.224		345.12
10/19/2011 3:01:00 AM	0.224		345.12
10/19/2011 3:02:00 AM	0.224	0	345.12
10/19/2011 3:03:00 AM	0.224		345.12
10/19/2011 3:04:00 AM	0.224		345.12
10/19/2011 3:05:00 AM	0.221	0	336.66
10/19/2011 3:06:00 AM	0.224		345.12
10/19/2011 3:07:00 AM	0.224		345.12
10/19/2011 3:08:00 AM	0.224	0	345.12
10/19/2011 3:09:00 AM	0.224		345.12
10/19/2011 3:10:00 AM	0.221		336.66
10/19/2011 3:11:00 AM	0.221	0	336.66
10/19/2011 3:12:00 AM	0.224		345.12
10/19/2011 3:13:00 AM	0.224		345.12
10/19/2011 3:14:00 AM	0.224	0	345.12
10/19/2011 3:15:00 AM	0.224		345.12
10/19/2011 3:16:00 AM	0.224		345.12
10/19/2011 3:17:00 AM	0.224	0	345.12
10/19/2011 3:18:00 AM	0.224		345.12
10/19/2011 3:19:00 AM	0.224	0	345.12
10/19/2011 3:20:00 AM	0.221		336.66
10/19/2011 3:21:00 AM	0.224		345.12
10/19/2011 3:22:00 AM	0.224	0	345.12
10/19/2011 3:23:00 AM	0.224		345.12
10/19/2011 3:24:00 AM	0.224		345.12
10/19/2011 3:25:00 AM	0.221	0	336.66
10/19/2011 3:26:00 AM	0.224		345.12
10/19/2011 3:27:00 AM	0.224		345.12
10/19/2011 3:28:00 AM	0.224	0	345.12
10/19/2011 3:29:00 AM	0.224		345.12
10/19/2011 3:30:00 AM	0.221		336.66
10/19/2011 3:31:00 AM	0.224	0	345.12
10/19/2011 3:32:00 AM	0.224		345.12
10/19/2011 3:33:00 AM	0.224		345.12
10/19/2011 3:34:00 AM	0.224	0	345.12
10/19/2011 3:35:00 AM	0.224		345.12
10/19/2011 3:36:00 AM	0.224		345.12
10/19/2011 3:37:00 AM	0.224	0	345.12
10/19/2011 3:38:00 AM	0.224		345.12
10/19/2011 3:39:00 AM	0.224		345.12
10/19/2011 3:40:00 AM	0.224	0	345.12
10/19/2011 3:41:00 AM	0.224		345.12
10/19/2011 3:42:00 AM	0.224		345.12
10/19/2011 3:43:00 AM	0.224	0	345.12
10/19/2011 3:44:00 AM	0.224		345.12
10/19/2011 3:45:00 AM	0.224		345.12
10/19/2011 3:46:00 AM	0.224	0	345.12
10/19/2011 3:47:00 AM	0.224		345.12
10/19/2011 3:48:00 AM	0.224	0	345.12
10/19/2011 3:49:00 AM	0.224		345.12
10/19/2011 3:50:00 AM	0.224		345.12
10/19/2011 3:51:00 AM	0.224	0	345.12
10/19/2011 3:52:00 AM	0.224		345.12
10/19/2011 3:53:00 AM	0.224		345.12
10/19/2011 3:54:00 AM	0.224	0	345.12
10/19/2011 3:55:00 AM	0.224		345.12
10/19/2011 3:56:00 AM	0.224		345.12
10/19/2011 3:57:00 AM	0.224	0	345.12

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 3:58:00 AM	0.224		345.12
10/19/2011 3:59:00 AM	0.224		345.12
10/19/2011 4:00:00 AM	0.224	0	345.12
10/19/2011 4:01:00 AM	0.224		345.12
10/19/2011 4:02:00 AM	0.224		345.12
10/19/2011 4:03:00 AM	0.224	0	345.12
10/19/2011 4:04:00 AM	0.224		345.12
10/19/2011 4:05:00 AM	0.224		345.12
10/19/2011 4:06:00 AM	0.224	0	345.12
10/19/2011 4:07:00 AM	0.224		345.12
10/19/2011 4:08:00 AM	0.224		345.12
10/19/2011 4:09:00 AM	0.224	0	345.12
10/19/2011 4:10:00 AM	0.224		345.12
10/19/2011 4:11:00 AM	0.224		345.12
10/19/2011 4:12:00 AM	0.224	0	345.12
10/19/2011 4:13:00 AM	0.224		345.12
10/19/2011 4:14:00 AM	0.224		345.12
10/19/2011 4:15:00 AM	0.224	0	345.12
10/19/2011 4:16:00 AM	0.224		345.12
10/19/2011 4:17:00 AM	0.224	0	345.12
10/19/2011 4:18:00 AM	0.224		345.12
10/19/2011 4:19:00 AM	0.224		345.12
10/19/2011 4:20:00 AM	0.224	0	345.12
10/19/2011 4:21:00 AM	0.224		345.12
10/19/2011 4:22:00 AM	0.224		345.12
10/19/2011 4:23:00 AM	0.224	0	345.12
10/19/2011 4:24:00 AM	0.224		345.12
10/19/2011 4:25:00 AM	0.224		345.12
10/19/2011 4:26:00 AM	0.224	0	345.12
10/19/2011 4:27:00 AM	0.224		345.12
10/19/2011 4:28:00 AM	0.224		345.12
10/19/2011 4:29:00 AM	0.224	0	345.12
10/19/2011 4:30:00 AM	0.224		345.12
10/19/2011 4:31:00 AM	0.224		345.12
10/19/2011 4:32:00 AM	0.224	0	345.12
10/19/2011 4:33:00 AM	0.224		345.12
10/19/2011 4:34:00 AM	0.224		345.12
10/19/2011 4:35:00 AM	0.224	0	345.12
10/19/2011 4:36:00 AM	0.224		345.12
10/19/2011 4:37:00 AM	0.224		345.12
10/19/2011 4:38:00 AM	0.224	0	345.12
10/19/2011 4:39:00 AM	0.224		345.12
10/19/2011 4:40:00 AM	0.224		345.12
10/19/2011 4:41:00 AM	0.224	0	345.12
10/19/2011 4:42:00 AM	0.224		345.12
10/19/2011 4:43:00 AM	0.224	0	345.12
10/19/2011 4:44:00 AM	0.224		345.12
10/19/2011 4:45:00 AM	0.224		345.12
10/19/2011 4:46:00 AM	0.224	0	345.12
10/19/2011 4:47:00 AM	0.224		345.12
10/19/2011 4:48:00 AM	0.224		345.12
10/19/2011 4:49:00 AM	0.224	0	345.12
10/19/2011 4:50:00 AM	0.224		345.12
10/19/2011 4:51:00 AM	0.224		345.12
10/19/2011 4:52:00 AM	0.224	0	345.12
10/19/2011 4:53:00 AM	0.224		345.12
10/19/2011 4:54:00 AM	0.224		345.12
10/19/2011 4:55:00 AM	0.224	0	345.12
10/19/2011 4:56:00 AM	0.224		345.12
10/19/2011 4:57:00 AM	0.224		345.12

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 4:58:00 AM	0.224	0	345.12
10/19/2011 4:59:00 AM	0.224		345.12
10/19/2011 5:00:00 AM	0.224		345.12
10/19/2011 5:01:00 AM	0.224	0	345.12
10/19/2011 5:02:00 AM	0.224		345.12
10/19/2011 5:03:00 AM	0.224		345.12
10/19/2011 5:04:00 AM	0.224	0	345.12
10/19/2011 5:05:00 AM	0.224		345.12
10/19/2011 5:06:00 AM	0.224		345.12
10/19/2011 5:07:00 AM	0.224	0	345.12
10/19/2011 5:08:00 AM	0.224		345.12
10/19/2011 5:09:00 AM	0.224		345.12
10/19/2011 5:10:00 AM	0.224	0	345.12
10/19/2011 5:11:00 AM	0.224		345.12
10/19/2011 5:12:00 AM	0.224	0	345.12
10/19/2011 5:13:00 AM	0.224		345.12
10/19/2011 5:14:00 AM	0.224		345.12
10/19/2011 5:15:00 AM	0.224	0	345.12
10/19/2011 5:16:00 AM	0.224		345.12
10/19/2011 5:17:00 AM	0.224		345.12
10/19/2011 5:18:00 AM	0.224	0	345.12
10/19/2011 5:19:00 AM	0.224		345.12
10/19/2011 5:20:00 AM	0.224		345.12
10/19/2011 5:21:00 AM	0.224	0	345.12
10/19/2011 5:22:00 AM	0.224		345.12
10/19/2011 5:23:00 AM	0.224		345.12
10/19/2011 5:24:00 AM	0.224	0	345.12
10/19/2011 5:25:00 AM	0.224		345.12
10/19/2011 5:26:00 AM	0.224		345.12
10/19/2011 5:27:00 AM	0.224	0	345.12
10/19/2011 5:28:00 AM	0.224		345.12
10/19/2011 5:29:00 AM	0.224		345.12
10/19/2011 5:30:00 AM	0.224	0	345.12
10/19/2011 5:31:00 AM	0.228		353.66
10/19/2011 5:32:00 AM	0.228		353.66
10/19/2011 5:33:00 AM	0.224	0	345.12
10/19/2011 5:34:00 AM	0.224		345.12
10/19/2011 5:35:00 AM	0.228		353.66
10/19/2011 5:36:00 AM	0.224	0	345.12
10/19/2011 5:37:00 AM	0.231		362.28
10/19/2011 5:38:00 AM	0.228	0	353.66
10/19/2011 5:39:00 AM	0.228		353.66
10/19/2011 5:40:00 AM	0.228		353.66
10/19/2011 5:41:00 AM	0.228	0	353.66
10/19/2011 5:42:00 AM	0.228		353.66
10/19/2011 5:43:00 AM	0.228		353.66
10/19/2011 5:44:00 AM	0.228	0	353.66
10/19/2011 5:45:00 AM	0.228		353.66
10/19/2011 5:46:00 AM	0.231		362.28
10/19/2011 5:47:00 AM	0.231	0	362.28
10/19/2011 5:48:00 AM	0.228		353.66
10/19/2011 5:49:00 AM	0.228		353.66
10/19/2011 5:50:00 AM	0.231	0	362.28
10/19/2011 5:51:00 AM	0.231		362.28
10/19/2011 5:52:00 AM	0.228	0	353.66
10/19/2011 5:53:00 AM	0.228		353.66
10/19/2011 5:54:00 AM	0.228		353.66
10/19/2011 5:55:00 AM	0.231	0	362.28
10/19/2011 5:56:00 AM	0.228		353.66
10/19/2011 5:57:00 AM	0.228		353.66

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 5:58:00 AM	0.231	0	362.28
10/19/2011 5:59:00 AM	0.228		353.66
10/19/2011 6:00:00 AM	0.228		353.66
10/19/2011 6:01:00 AM	0.228	0	353.66
10/19/2011 6:02:00 AM	0.231		362.28
10/19/2011 6:03:00 AM	0.228		353.66
10/19/2011 6:04:00 AM	0.228	0	353.66
10/19/2011 6:05:00 AM	0.228		353.66
10/19/2011 6:06:00 AM	0.228	0	353.66
10/19/2011 6:07:00 AM	0.231		362.28
10/19/2011 6:08:00 AM	0.231		362.28
10/19/2011 6:09:00 AM	0.231	0	362.28
10/19/2011 6:10:00 AM	0.228		353.66
10/19/2011 6:11:00 AM	0.231		362.28
10/19/2011 6:12:00 AM	0.228	0	353.66
10/19/2011 6:13:00 AM	0.228		353.66
10/19/2011 6:14:00 AM	0.228		353.66
10/19/2011 6:15:00 AM	0.228	0	353.66
10/19/2011 6:16:00 AM	0.228		353.66
10/19/2011 6:17:00 AM	0.231		362.28
10/19/2011 6:18:00 AM	0.228	0	353.66
10/19/2011 6:19:00 AM	0.228		353.66
10/19/2011 6:20:00 AM	0.228	0	353.66
10/19/2011 6:21:00 AM	0.228		353.66
10/19/2011 6:22:00 AM	0.231		362.28
10/19/2011 6:23:00 AM	0.231	0	362.28
10/19/2011 6:24:00 AM	0.228		353.66
10/19/2011 6:25:00 AM	0.231		362.28
10/19/2011 6:26:00 AM	0.228	0	353.66
10/19/2011 6:27:00 AM	0.228		353.66
10/19/2011 6:28:00 AM	0.228		353.66
10/19/2011 6:29:00 AM	0.228	0	353.66
10/19/2011 6:30:00 AM	0.228		353.66
10/19/2011 6:31:00 AM	0.228		353.66
10/19/2011 6:32:00 AM	0.228	0	353.66
10/19/2011 6:33:00 AM	0.224		345.12
10/19/2011 6:34:00 AM	0.224		345.12
10/19/2011 6:35:00 AM	0.224	0	345.12
10/19/2011 6:36:00 AM	0.228		353.66
10/19/2011 6:37:00 AM	0.228	0	353.66
10/19/2011 6:38:00 AM	0.228		353.66
10/19/2011 6:39:00 AM	0.228		353.66
10/19/2011 6:40:00 AM	0.228	0	353.66
10/19/2011 6:41:00 AM	0.228		353.66
10/19/2011 6:42:00 AM	0.231		362.28
10/19/2011 6:43:00 AM	0.231	0	362.28
10/19/2011 6:44:00 AM	0.231		362.28
10/19/2011 6:45:00 AM	0.228		353.66
10/19/2011 6:46:00 AM	0.231	0	362.28
10/19/2011 6:47:00 AM	0.231		362.28
10/19/2011 6:48:00 AM	0.231		362.28
10/19/2011 6:49:00 AM	0.231	0	362.28
10/19/2011 6:50:00 AM	0.231		362.28
10/19/2011 6:51:00 AM	0.231	0	362.28
10/19/2011 6:52:00 AM	0.231		362.28
10/19/2011 6:53:00 AM	0.231		362.28
10/19/2011 6:54:00 AM	0.231	0	362.28
10/19/2011 6:55:00 AM	0.231		362.28
10/19/2011 6:56:00 AM	0.231		362.28
10/19/2011 6:57:00 AM	0.231	0	362.28

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 6:58:00 AM	0.231		362.28
10/19/2011 6:59:00 AM	0.231		362.28
10/19/2011 7:00:00 AM	0.231	0	362.28
10/19/2011 7:01:00 AM	0.234		370.99
10/19/2011 7:02:00 AM	0.231	0	362.28
10/19/2011 7:03:00 AM	0.234		370.99
10/19/2011 7:04:00 AM	0.234		370.99
10/19/2011 7:05:00 AM	0.234	0	370.99
10/19/2011 7:06:00 AM	0.234		370.99
10/19/2011 7:07:00 AM	0.234		370.99
10/19/2011 7:08:00 AM	0.234	0	370.99
10/19/2011 7:09:00 AM	0.234		370.99
10/19/2011 7:10:00 AM	0.238	0	379.79
10/19/2011 7:11:00 AM	0.238		379.79
10/19/2011 7:12:00 AM	0.234		370.99
10/19/2011 7:13:00 AM	0.234	0	370.99
10/19/2011 7:14:00 AM	0.234		370.99
10/19/2011 7:15:00 AM	0.234		370.99
10/19/2011 7:16:00 AM	0.238	0	379.79
10/19/2011 7:17:00 AM	0.238		379.79
10/19/2011 7:18:00 AM	0.234	0	370.99
10/19/2011 7:19:00 AM	0.238		379.79
10/19/2011 7:20:00 AM	0.238		379.79
10/19/2011 7:21:00 AM	0.238	0	379.79
10/19/2011 7:22:00 AM	0.234		370.99
10/19/2011 7:23:00 AM	0.234		370.99
10/19/2011 7:24:00 AM	0.234	0	370.99
10/19/2011 7:25:00 AM	0.234		370.99
10/19/2011 7:26:00 AM	0.234	0	370.99
10/19/2011 7:27:00 AM	0.234		370.99
10/19/2011 7:28:00 AM	0.234		370.99
10/19/2011 7:29:00 AM	0.234	0	370.99
10/19/2011 7:30:00 AM	0.234		370.99
10/19/2011 7:31:00 AM	0.231		362.28
10/19/2011 7:32:00 AM	0.231	0	362.28
10/19/2011 7:33:00 AM	0.231		362.28
10/19/2011 7:34:00 AM	0.231		362.28
10/19/2011 7:35:00 AM	0.234	0	370.99
10/19/2011 7:36:00 AM	0.231		362.28
10/19/2011 7:37:00 AM	0.231	0	362.28
10/19/2011 7:38:00 AM	0.231		362.28
10/19/2011 7:39:00 AM	0.231		362.28
10/19/2011 7:40:00 AM	0.231	0	362.28
10/19/2011 7:41:00 AM	0.231		362.28
10/19/2011 7:42:00 AM	0.231		362.28
10/19/2011 7:43:00 AM	0.231	0	362.28
10/19/2011 7:44:00 AM	0.231		362.28
10/19/2011 7:45:00 AM	0.231		362.28
10/19/2011 7:46:00 AM	0.231	0	362.28
10/19/2011 7:47:00 AM	0.231		362.28
10/19/2011 7:48:00 AM	0.231	0	362.28
10/19/2011 7:49:00 AM	0.231		362.28
10/19/2011 7:50:00 AM	0.228		353.66
10/19/2011 7:51:00 AM	0.231	0	362.28
10/19/2011 7:52:00 AM	0.231		362.28
10/19/2011 7:53:00 AM	0.231		362.28
10/19/2011 7:54:00 AM	0.231	0	362.28
10/19/2011 7:55:00 AM	0.228		353.66
10/19/2011 7:56:00 AM	0.231		362.28
10/19/2011 7:57:00 AM	0.231	0	362.28

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 7:58:00 AM	0.231		362.28
10/19/2011 7:59:00 AM	0.231	0	362.28
10/19/2011 8:00:00 AM	0.231		362.28
10/19/2011 8:01:00 AM	0.231		362.28
10/19/2011 8:02:00 AM	0.231	0	362.28
10/19/2011 8:03:00 AM	0.231		362.28
10/19/2011 8:04:00 AM	0.231		362.28
10/19/2011 8:05:00 AM	0.231	0	362.28
10/19/2011 8:06:00 AM	0.231		362.28
10/19/2011 8:07:00 AM	0.231		362.28
10/19/2011 8:08:00 AM	0.231	0	362.28
10/19/2011 8:09:00 AM	0.231		362.28
10/19/2011 8:10:00 AM	0.231	0	362.28
10/19/2011 8:11:00 AM	0.231		362.28
10/19/2011 8:12:00 AM	0.231		362.28
10/19/2011 8:13:00 AM	0.231	0	362.28
10/19/2011 8:14:00 AM	0.231		362.28
10/19/2011 8:15:00 AM	0.228		353.66
10/19/2011 8:16:00 AM	0.231	0	362.28
10/19/2011 8:17:00 AM	0.231		362.28
10/19/2011 8:18:00 AM	0.231		362.28
10/19/2011 8:19:00 AM	0.231	0	362.28
10/19/2011 8:20:00 AM	0.228		353.66
10/19/2011 8:21:00 AM	0.231		362.28
10/19/2011 8:22:00 AM	0.228	0	353.66
10/19/2011 8:23:00 AM	0.231		362.28
10/19/2011 8:24:00 AM	0.228	0	353.66
10/19/2011 8:25:00 AM	0.228		353.66
10/19/2011 8:26:00 AM	0.231		362.28
10/19/2011 8:27:00 AM	0.228	0	353.66
10/19/2011 8:28:00 AM	0.231		362.28
10/19/2011 8:29:00 AM	0.231		362.28
10/19/2011 8:30:00 AM	0.231	0	362.28
10/19/2011 8:31:00 AM	0.231		362.28
10/19/2011 8:32:00 AM	0.231		362.28
10/19/2011 8:33:00 AM	0.231	0	362.28
10/19/2011 8:34:00 AM	0.228		353.66
10/19/2011 8:35:00 AM	0.231	0	362.28
10/19/2011 8:36:00 AM	0.228		353.66
10/19/2011 8:37:00 AM	0.231		362.28
10/19/2011 8:38:00 AM	0.231	0	362.28
10/19/2011 8:39:00 AM	0.228		353.66
10/19/2011 8:40:00 AM	0.231		362.28
10/19/2011 8:41:00 AM	0.228	0	353.66
10/19/2011 8:42:00 AM	0.231		362.28
10/19/2011 8:43:00 AM	0.228		353.66
10/19/2011 8:44:00 AM	0.228	0	353.66
10/19/2011 8:45:00 AM	0.231		362.28
10/19/2011 8:46:00 AM	0.228		353.66
10/19/2011 8:47:00 AM	0.228	0	353.66
10/19/2011 8:48:00 AM	0.228		353.66
10/19/2011 8:49:00 AM	0.228	0	353.66
10/19/2011 8:50:00 AM	0.228		353.66
10/19/2011 8:51:00 AM	0.224		345.12
10/19/2011 8:52:00 AM	0.228	0	353.66
10/19/2011 8:53:00 AM	0.228		353.66
10/19/2011 8:54:00 AM	0.228		353.66
10/19/2011 8:55:00 AM	0.228	0	353.66
10/19/2011 8:56:00 AM	0.228		353.66
10/19/2011 8:57:00 AM	0.224		345.12

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 10:58:00 PM	0.234		370.99
10/19/2011 10:59:00 PM	0.234		370.99
10/19/2011 11:00:00 PM	0.234	0	370.99
10/19/2011 11:01:00 PM	0.234		370.99
10/19/2011 11:02:00 PM	0.234	0	370.99
10/19/2011 11:03:00 PM	0.234		370.99
10/19/2011 11:04:00 PM	0.234		370.99
10/19/2011 11:05:00 PM	0.234	0	370.99
10/19/2011 11:06:00 PM	0.231		362.28
10/19/2011 11:07:00 PM	0.234		370.99
10/19/2011 11:08:00 PM	0.231	0	362.28
10/19/2011 11:09:00 PM	0.231		362.28
10/19/2011 11:10:00 PM	0.231	0	362.28
10/19/2011 11:11:00 PM	0.231		362.28
10/19/2011 11:12:00 PM	0.234		370.99
10/19/2011 11:13:00 PM	0.231	0	362.28
10/19/2011 11:14:00 PM	0.231		362.28
10/19/2011 11:15:00 PM	0.231		362.28
10/19/2011 11:16:00 PM	0.231	0	362.28
10/19/2011 11:17:00 PM	0.234		370.99
10/19/2011 11:18:00 PM	0.234		370.99
10/19/2011 11:19:00 PM	0.231	0	362.28
10/19/2011 11:20:00 PM	0.231		362.28
10/19/2011 11:21:00 PM	0.231	0	362.28
10/19/2011 11:22:00 PM	0.234		370.99
10/19/2011 11:23:00 PM	0.234		370.99
10/19/2011 11:24:00 PM	0.234	0	370.99
10/19/2011 11:25:00 PM	0.234		370.99
10/19/2011 11:26:00 PM	0.231		362.28
10/19/2011 11:27:00 PM	0.234	0	370.99
10/19/2011 11:28:00 PM	0.234		370.99
10/19/2011 11:29:00 PM	0.231		362.28
10/19/2011 11:30:00 PM	0.234	0	370.99
10/19/2011 11:31:00 PM	0.234		370.99
10/19/2011 11:32:00 PM	0.234	0	370.99
10/19/2011 11:33:00 PM	0.234		370.99
10/19/2011 11:34:00 PM	0.234		370.99
10/19/2011 11:35:00 PM	0.238	0	379.79
10/19/2011 11:36:00 PM	0.238		379.79
10/19/2011 11:37:00 PM	0.238		379.79
10/19/2011 11:38:00 PM	0.234	0	370.99
10/19/2011 11:39:00 PM	0.234		370.99
10/19/2011 11:40:00 PM	0.234	0	370.99
10/19/2011 11:41:00 PM	0.234		370.99
10/19/2011 11:42:00 PM	0.234		370.99
10/19/2011 11:43:00 PM	0.234	0	370.99
10/19/2011 11:44:00 PM	0.234		370.99
10/19/2011 11:45:00 PM	0.234		370.99
10/19/2011 11:46:00 PM	0.234	0	370.99
10/19/2011 11:47:00 PM	0.234		370.99
10/19/2011 11:48:00 PM	0.234	0	370.99
10/19/2011 11:49:00 PM	0.234		370.99
10/19/2011 11:50:00 PM	0.234		370.99
10/19/2011 11:51:00 PM	0.234	0	370.99
10/19/2011 11:52:00 PM	0.234		370.99
10/19/2011 11:53:00 PM	0.234		370.99
10/19/2011 11:54:00 PM	0.234	0	370.99
10/19/2011 11:55:00 PM	0.231		362.28
10/19/2011 11:56:00 PM	0.234	0	370.99
10/19/2011 11:57:00 PM	0.231		362.28

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 9:58:00 PM	0.224		345.12
10/19/2011 9:59:00 PM	0.228	0	353.66
10/19/2011 10:00:00 PM	0.228		353.66
10/19/2011 10:01:00 PM	0.228		353.66
10/19/2011 10:02:00 PM	0.228	0	353.66
10/19/2011 10:03:00 PM	0.231		362.28
10/19/2011 10:04:00 PM	0.228	0	353.66
10/19/2011 10:05:00 PM	0.231		362.28
10/19/2011 10:06:00 PM	0.231		362.28
10/19/2011 10:07:00 PM	0.231	0	362.28
10/19/2011 10:08:00 PM	0.231		362.28
10/19/2011 10:09:00 PM	0.231		362.28
10/19/2011 10:10:00 PM	0.231	0	362.28
10/19/2011 10:11:00 PM	0.228		353.66
10/19/2011 10:12:00 PM	0.231		362.28
10/19/2011 10:13:00 PM	0.231	0	362.28
10/19/2011 10:14:00 PM	0.228		353.66
10/19/2011 10:15:00 PM	0.228		353.66
10/19/2011 10:16:00 PM	0.231	0	362.28
10/19/2011 10:17:00 PM	0.228		353.66
10/19/2011 10:18:00 PM	0.231	0	362.28
10/19/2011 10:19:00 PM	0.231		362.28
10/19/2011 10:20:00 PM	0.228		353.66
10/19/2011 10:21:00 PM	0.231	0	362.28
10/19/2011 10:22:00 PM	0.231		362.28
10/19/2011 10:23:00 PM	0.231		362.28
10/19/2011 10:24:00 PM	0.228	0	353.66
10/19/2011 10:25:00 PM	0.231		362.28
10/19/2011 10:26:00 PM	0.231		362.28
10/19/2011 10:27:00 PM	0.228	0	353.66
10/19/2011 10:28:00 PM	0.231		362.28
10/19/2011 10:29:00 PM	0.231	0	362.28
10/19/2011 10:30:00 PM	0.231		362.28
10/19/2011 10:31:00 PM	0.231		362.28
10/19/2011 10:32:00 PM	0.231	0	362.28
10/19/2011 10:33:00 PM	0.231		362.28
10/19/2011 10:34:00 PM	0.231		362.28
10/19/2011 10:35:00 PM	0.231	0	362.28
10/19/2011 10:36:00 PM	0.228		353.66
10/19/2011 10:37:00 PM	0.231		362.28
10/19/2011 10:38:00 PM	0.231	0	362.28
10/19/2011 10:39:00 PM	0.231		362.28
10/19/2011 10:40:00 PM	0.231	0	362.28
10/19/2011 10:41:00 PM	0.231		362.28
10/19/2011 10:42:00 PM	0.231		362.28
10/19/2011 10:43:00 PM	0.231	0	362.28
10/19/2011 10:44:00 PM	0.231		362.28
10/19/2011 10:45:00 PM	0.231		362.28
10/19/2011 10:46:00 PM	0.234	0	370.99
10/19/2011 10:47:00 PM	0.234		370.99
10/19/2011 10:48:00 PM	0.231		362.28
10/19/2011 10:49:00 PM	0.234	0	370.99
10/19/2011 10:50:00 PM	0.231		362.28
10/19/2011 10:51:00 PM	0.234	0	370.99
10/19/2011 10:52:00 PM	0.234		370.99
10/19/2011 10:53:00 PM	0.231		362.28
10/19/2011 10:54:00 PM	0.234	0	370.99
10/19/2011 10:55:00 PM	0.231		362.28
10/19/2011 10:56:00 PM	0.231		362.28
10/19/2011 10:57:00 PM	0.234	0	370.99

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 8:58:00 PM	0.228		353.66
10/19/2011 8:59:00 PM	0.228	0	353.66
10/19/2011 9:00:00 PM	0.228		353.66
10/19/2011 9:01:00 PM	0.228		353.66
10/19/2011 9:02:00 PM	0.228	0	353.66
10/19/2011 9:03:00 PM	0.228		353.66
10/19/2011 9:04:00 PM	0.228		353.66
10/19/2011 9:05:00 PM	0.224	0	345.12
10/19/2011 9:06:00 PM	0.224		345.12
10/19/2011 9:07:00 PM	0.224		345.12
10/19/2011 9:08:00 PM	0.228	0	353.66
10/19/2011 9:09:00 PM	0.228		353.66
10/19/2011 9:10:00 PM	0.228		353.66
10/19/2011 9:11:00 PM	0.228	0	353.66
10/19/2011 9:12:00 PM	0.228		353.66
10/19/2011 9:13:00 PM	0.228		353.66
10/19/2011 9:14:00 PM	0.228	0	353.66
10/19/2011 9:15:00 PM	0.228		353.66
10/19/2011 9:16:00 PM	0.228		353.66
10/19/2011 9:17:00 PM	0.228	0	353.66
10/19/2011 9:18:00 PM	0.228		353.66
10/19/2011 9:19:00 PM	0.228	0	353.66
10/19/2011 9:20:00 PM	0.228		353.66
10/19/2011 9:21:00 PM	0.224		345.12
10/19/2011 9:22:00 PM	0.228	0	353.66
10/19/2011 9:23:00 PM	0.228		353.66
10/19/2011 9:24:00 PM	0.228		353.66
10/19/2011 9:25:00 PM	0.228	0	353.66
10/19/2011 9:26:00 PM	0.228		353.66
10/19/2011 9:27:00 PM	0.224		345.12
10/19/2011 9:28:00 PM	0.228	0	353.66
10/19/2011 9:29:00 PM	0.228		353.66
10/19/2011 9:30:00 PM	0.228		353.66
10/19/2011 9:31:00 PM	0.231	0	362.28
10/19/2011 9:32:00 PM	0.231		362.28
10/19/2011 9:33:00 PM	0.228	0	353.66
10/19/2011 9:34:00 PM	0.228		353.66
10/19/2011 9:35:00 PM	0.228		353.66
10/19/2011 9:36:00 PM	0.231	0	362.28
10/19/2011 9:37:00 PM	0.231		362.28
10/19/2011 9:38:00 PM	0.228		353.66
10/19/2011 9:39:00 PM	0.231	0	362.28
10/19/2011 9:40:00 PM	0.228		353.66
10/19/2011 9:41:00 PM	0.231		362.28
10/19/2011 9:42:00 PM	0.231	0	362.28
10/19/2011 9:43:00 PM	0.231		362.28
10/19/2011 9:44:00 PM	0.231		362.28
10/19/2011 9:45:00 PM	0.231	0	362.28
10/19/2011 9:46:00 PM	0.228		353.66
10/19/2011 9:47:00 PM	0.228	0	353.66
10/19/2011 9:48:00 PM	0.228		353.66
10/19/2011 9:49:00 PM	0.228		353.66
10/19/2011 9:50:00 PM	0.224	0	345.12
10/19/2011 9:51:00 PM	0.224		345.12
10/19/2011 9:52:00 PM	0.228		353.66
10/19/2011 9:53:00 PM	0.228	0	353.66
10/19/2011 9:54:00 PM	0.228		353.66
10/19/2011 9:55:00 PM	0.228		353.66
10/19/2011 9:56:00 PM	0.228	0	353.66
10/19/2011 9:57:00 PM	0.224		345.12

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 7:58:00 PM	0.224		345.12
10/19/2011 7:59:00 PM	0.224		345.12
10/19/2011 8:00:00 PM	0.224	0	345.12
10/19/2011 8:01:00 PM	0.228		353.66
10/19/2011 8:02:00 PM	0.228		353.66
10/19/2011 8:03:00 PM	0.228	0	353.66
10/19/2011 8:04:00 PM	0.228		353.66
10/19/2011 8:05:00 PM	0.228	0	353.66
10/19/2011 8:06:00 PM	0.224		345.12
10/19/2011 8:07:00 PM	0.228		353.66
10/19/2011 8:08:00 PM	0.228	0	353.66
10/19/2011 8:09:00 PM	0.228		353.66
10/19/2011 8:10:00 PM	0.228		353.66
10/19/2011 8:11:00 PM	0.224	0	345.12
10/19/2011 8:12:00 PM	0.228		353.66
10/19/2011 8:13:00 PM	0.231		362.28
10/19/2011 8:14:00 PM	0.228	0	353.66
10/19/2011 8:15:00 PM	0.231		362.28
10/19/2011 8:16:00 PM	0.228		353.66
10/19/2011 8:17:00 PM	0.224	0	345.12
10/19/2011 8:18:00 PM	0.228		353.66
10/19/2011 8:19:00 PM	0.228		353.66
10/19/2011 8:20:00 PM	0.224	0	345.12
10/19/2011 8:21:00 PM	0.228		353.66
10/19/2011 8:22:00 PM	0.228	0	353.66
10/19/2011 8:23:00 PM	0.228		353.66
10/19/2011 8:24:00 PM	0.224		345.12
10/19/2011 8:25:00 PM	0.224	0	345.12
10/19/2011 8:26:00 PM	0.224		345.12
10/19/2011 8:27:00 PM	0.224		345.12
10/19/2011 8:28:00 PM	0.228	0	353.66
10/19/2011 8:29:00 PM	0.224		345.12
10/19/2011 8:30:00 PM	0.228		353.66
10/19/2011 8:31:00 PM	0.228	0	353.66
10/19/2011 8:32:00 PM	0.228		353.66
10/19/2011 8:33:00 PM	0.228		353.66
10/19/2011 8:34:00 PM	0.228	0	353.66
10/19/2011 8:35:00 PM	0.224		345.12
10/19/2011 8:36:00 PM	0.224		345.12
10/19/2011 8:37:00 PM	0.228	0	353.66
10/19/2011 8:38:00 PM	0.228		353.66
10/19/2011 8:39:00 PM	0.224		345.12
10/19/2011 8:40:00 PM	0.228	0	353.66
10/19/2011 8:41:00 PM	0.224		345.12
10/19/2011 8:42:00 PM	0.228	0	353.66
10/19/2011 8:43:00 PM	0.228		353.66
10/19/2011 8:44:00 PM	0.228		353.66
10/19/2011 8:45:00 PM	0.228	0	353.66
10/19/2011 8:46:00 PM	0.228		353.66
10/19/2011 8:47:00 PM	0.228		353.66
10/19/2011 8:48:00 PM	0.228	0	353.66
10/19/2011 8:49:00 PM	0.224		345.12
10/19/2011 8:50:00 PM	0.224		345.12
10/19/2011 8:51:00 PM	0.224	0	345.12
10/19/2011 8:52:00 PM	0.228		353.66
10/19/2011 8:53:00 PM	0.228		353.66
10/19/2011 8:54:00 PM	0.228	0	353.66
10/19/2011 8:55:00 PM	0.224		345.12
10/19/2011 8:56:00 PM	0.228		353.66
10/19/2011 8:57:00 PM	0.224	0	345.12

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 6:58:00 PM	0.228		353.66
10/19/2011 6:59:00 PM	0.224		345.12
10/19/2011 7:00:00 PM	0.224	0	345.12
10/19/2011 7:01:00 PM	0.224		345.12
10/19/2011 7:02:00 PM	0.224		345.12
10/19/2011 7:03:00 PM	0.228	0	353.66
10/19/2011 7:04:00 PM	0.224		345.12
10/19/2011 7:05:00 PM	0.228	0	353.66
10/19/2011 7:06:00 PM	0.224		345.12
10/19/2011 7:07:00 PM	0.228		353.66
10/19/2011 7:08:00 PM	0.228	0	353.66
10/19/2011 7:09:00 PM	0.228		353.66
10/19/2011 7:10:00 PM	0.224		345.12
10/19/2011 7:11:00 PM	0.224	0	345.12
10/19/2011 7:12:00 PM	0.224		345.12
10/19/2011 7:13:00 PM	0.224		345.12
10/19/2011 7:14:00 PM	0.224	0	345.12
10/19/2011 7:15:00 PM	0.224		345.12
10/19/2011 7:16:00 PM	0.224		345.12
10/19/2011 7:17:00 PM	0.228	0	353.66
10/19/2011 7:18:00 PM	0.224		345.12
10/19/2011 7:19:00 PM	0.224		345.12
10/19/2011 7:20:00 PM	0.224	0	345.12
10/19/2011 7:21:00 PM	0.228		353.66
10/19/2011 7:22:00 PM	0.224		345.12
10/19/2011 7:23:00 PM	0.224	0	345.12
10/19/2011 7:24:00 PM	0.224		345.12
10/19/2011 7:25:00 PM	0.228		353.66
10/19/2011 7:26:00 PM	0.224	0	345.12
10/19/2011 7:27:00 PM	0.224		345.12
10/19/2011 7:28:00 PM	0.224	0	345.12
10/19/2011 7:29:00 PM	0.224		345.12
10/19/2011 7:30:00 PM	0.224		345.12
10/19/2011 7:31:00 PM	0.228	0	353.66
10/19/2011 7:32:00 PM	0.224		345.12
10/19/2011 7:33:00 PM	0.224		345.12
10/19/2011 7:34:00 PM	0.228	0	353.66
10/19/2011 7:35:00 PM	0.224		345.12
10/19/2011 7:36:00 PM	0.224		345.12
10/19/2011 7:37:00 PM	0.228	0	353.66
10/19/2011 7:38:00 PM	0.228		353.66
10/19/2011 7:39:00 PM	0.228		353.66
10/19/2011 7:40:00 PM	0.228	0	353.66
10/19/2011 7:41:00 PM	0.228		353.66
10/19/2011 7:42:00 PM	0.228		353.66
10/19/2011 7:43:00 PM	0.228	0	353.66
10/19/2011 7:44:00 PM	0.228		353.66
10/19/2011 7:45:00 PM	0.228		353.66
10/19/2011 7:46:00 PM	0.228	0	353.66
10/19/2011 7:47:00 PM	0.228		353.66
10/19/2011 7:48:00 PM	0.228	0	353.66
10/19/2011 7:49:00 PM	0.231		362.28
10/19/2011 7:50:00 PM	0.228		353.66
10/19/2011 7:51:00 PM	0.228	0	353.66
10/19/2011 7:52:00 PM	0.228		353.66
10/19/2011 7:53:00 PM	0.228		353.66
10/19/2011 7:54:00 PM	0.228	0	353.66
10/19/2011 7:55:00 PM	0.224		345.12
10/19/2011 7:56:00 PM	0.224		345.12
10/19/2011 7:57:00 PM	0.228	0	353.66

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 5:58:00 PM	0.228		353.66
10/19/2011 5:59:00 PM	0.228		353.66
10/19/2011 6:00:00 PM	0.228	0	353.66
10/19/2011 6:01:00 PM	0.228		353.66
10/19/2011 6:02:00 PM	0.224	0	345.12
10/19/2011 6:03:00 PM	0.224		345.12
10/19/2011 6:04:00 PM	0.224		345.12
10/19/2011 6:05:00 PM	0.228	0	353.66
10/19/2011 6:06:00 PM	0.228		353.66
10/19/2011 6:07:00 PM	0.228		353.66
10/19/2011 6:08:00 PM	0.224	0	345.12
10/19/2011 6:09:00 PM	0.228		353.66
10/19/2011 6:10:00 PM	0.228		353.66
10/19/2011 6:11:00 PM	0.228	0	353.66
10/19/2011 6:12:00 PM	0.224		345.12
10/19/2011 6:13:00 PM	0.228		353.66
10/19/2011 6:14:00 PM	0.224	0	345.12
10/19/2011 6:15:00 PM	0.228		353.66
10/19/2011 6:16:00 PM	0.224		345.12
10/19/2011 6:17:00 PM	0.228	0	353.66
10/19/2011 6:18:00 PM	0.228		353.66
10/19/2011 6:19:00 PM	0.224		345.12
10/19/2011 6:20:00 PM	0.224	0	345.12
10/19/2011 6:21:00 PM	0.224		345.12
10/19/2011 6:22:00 PM	0.224	0	345.12
10/19/2011 6:23:00 PM	0.224		345.12
10/19/2011 6:24:00 PM	0.224		345.12
10/19/2011 6:25:00 PM	0.228	0	353.66
10/19/2011 6:26:00 PM	0.224		345.12
10/19/2011 6:27:00 PM	0.228		353.66
10/19/2011 6:28:00 PM	0.224	0	345.12
10/19/2011 6:29:00 PM	0.224		345.12
10/19/2011 6:30:00 PM	0.224		345.12
10/19/2011 6:31:00 PM	0.228	0	353.66
10/19/2011 6:32:00 PM	0.224		345.12
10/19/2011 6:33:00 PM	0.228		353.66
10/19/2011 6:34:00 PM	0.224	0	345.12
10/19/2011 6:35:00 PM	0.224		345.12
10/19/2011 6:36:00 PM	0.228		353.66
10/19/2011 6:37:00 PM	0.228	0	353.66
10/19/2011 6:38:00 PM	0.224		345.12
10/19/2011 6:39:00 PM	0.224		345.12
10/19/2011 6:40:00 PM	0.224	0	345.12
10/19/2011 6:41:00 PM	0.224		345.12
10/19/2011 6:42:00 PM	0.224		345.12
10/19/2011 6:43:00 PM	0.224	0	345.12
10/19/2011 6:44:00 PM	0.224		345.12
10/19/2011 6:45:00 PM	0.224	0	345.12
10/19/2011 6:46:00 PM	0.228		353.66
10/19/2011 6:47:00 PM	0.224		345.12
10/19/2011 6:48:00 PM	0.224	0	345.12
10/19/2011 6:49:00 PM	0.228		353.66
10/19/2011 6:50:00 PM	0.224		345.12
10/19/2011 6:51:00 PM	0.228	0	353.66
10/19/2011 6:52:00 PM	0.228		353.66
10/19/2011 6:53:00 PM	0.224		345.12
10/19/2011 6:54:00 PM	0.224	0	345.12
10/19/2011 6:55:00 PM	0.228		353.66
10/19/2011 6:56:00 PM	0.228		353.66
10/19/2011 6:57:00 PM	0.228	0	353.66

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 4:58:00 PM	0.228		353.66
10/19/2011 4:59:00 PM	0.228	0	353.66
10/19/2011 5:00:00 PM	0.228		353.66
10/19/2011 5:01:00 PM	0.228		353.66
10/19/2011 5:02:00 PM	0.228	0	353.66
10/19/2011 5:03:00 PM	0.228		353.66
10/19/2011 5:04:00 PM	0.224		345.12
10/19/2011 5:05:00 PM	0.228	0	353.66
10/19/2011 5:06:00 PM	0.228		353.66
10/19/2011 5:07:00 PM	0.228		353.66
10/19/2011 5:08:00 PM	0.228	0	353.66
10/19/2011 5:09:00 PM	0.224		345.12
10/19/2011 5:10:00 PM	0.224		345.12
10/19/2011 5:11:00 PM	0.224	0	345.12
10/19/2011 5:12:00 PM	0.228		353.66
10/19/2011 5:13:00 PM	0.228		353.66
10/19/2011 5:14:00 PM	0.228	0	353.66
10/19/2011 5:15:00 PM	0.228		353.66
10/19/2011 5:16:00 PM	0.224	0	345.12
10/19/2011 5:17:00 PM	0.224		345.12
10/19/2011 5:18:00 PM	0.224		345.12
10/19/2011 5:19:00 PM	0.228	0	353.66
10/19/2011 5:20:00 PM	0.224		345.12
10/19/2011 5:21:00 PM	0.224		345.12
10/19/2011 5:22:00 PM	0.224	0	345.12
10/19/2011 5:23:00 PM	0.224		345.12
10/19/2011 5:24:00 PM	0.224		345.12
10/19/2011 5:25:00 PM	0.224	0	345.12
10/19/2011 5:26:00 PM	0.224		345.12
10/19/2011 5:27:00 PM	0.224		345.12
10/19/2011 5:28:00 PM	0.224	0	345.12
10/19/2011 5:29:00 PM	0.224		345.12
10/19/2011 5:30:00 PM	0.228		353.66
10/19/2011 5:31:00 PM	0.228	0	353.66
10/19/2011 5:32:00 PM	0.228		353.66
10/19/2011 5:33:00 PM	0.224		345.12
10/19/2011 5:34:00 PM	0.224	0	345.12
10/19/2011 5:35:00 PM	0.224		345.12
10/19/2011 5:36:00 PM	0.224		345.12
10/19/2011 5:37:00 PM	0.228	0	353.66
10/19/2011 5:38:00 PM	0.224		345.12
10/19/2011 5:39:00 PM	0.224	0	345.12
10/19/2011 5:40:00 PM	0.224		345.12
10/19/2011 5:41:00 PM	0.224		345.12
10/19/2011 5:42:00 PM	0.224	0	345.12
10/19/2011 5:43:00 PM	0.224		345.12
10/19/2011 5:44:00 PM	0.224		345.12
10/19/2011 5:45:00 PM	0.224	0	345.12
10/19/2011 5:46:00 PM	0.224		345.12
10/19/2011 5:47:00 PM	0.224		345.12
10/19/2011 5:48:00 PM	0.224	0	345.12
10/19/2011 5:49:00 PM	0.224		345.12
10/19/2011 5:50:00 PM	0.224		345.12
10/19/2011 5:51:00 PM	0.224	0	345.12
10/19/2011 5:52:00 PM	0.228		353.66
10/19/2011 5:53:00 PM	0.228		353.66
10/19/2011 5:54:00 PM	0.228	0	353.66
10/19/2011 5:55:00 PM	0.228		353.66
10/19/2011 5:56:00 PM	0.228		353.66
10/19/2011 5:57:00 PM	0.228	0	353.66

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 2:58:00 PM	0.238	0	379.79
10/19/2011 2:59:00 PM	0.238		379.79
10/19/2011 3:00:00 PM	0.238		379.79
10/19/2011 3:01:00 PM	0.238	0	379.79
10/19/2011 3:02:00 PM	0.234		370.99
10/19/2011 3:03:00 PM	0.234		370.99
10/19/2011 3:04:00 PM	0.238	0	379.79
10/19/2011 3:05:00 PM	0.234		370.99
10/19/2011 3:06:00 PM	0.231	0	362.28
10/19/2011 3:07:00 PM	0.234		370.99
10/19/2011 3:08:00 PM	0.238		379.79
10/19/2011 3:09:00 PM	0.234	0	370.99
10/19/2011 3:10:00 PM	0.231		362.28
10/19/2011 3:11:00 PM	0.234		370.99
10/19/2011 3:12:00 PM	0.234	0	370.99
10/19/2011 3:13:00 PM	0.234		370.99
10/19/2011 3:14:00 PM	0.234		370.99
10/19/2011 3:15:00 PM	0.231	0	362.28
10/19/2011 3:16:00 PM	0.238		379.79
10/19/2011 3:17:00 PM	0.234	0	370.99
10/19/2011 3:18:00 PM	0.234		370.99
10/19/2011 3:19:00 PM	0.234		370.99
10/19/2011 3:20:00 PM	0.234	0	370.99
10/19/2011 3:21:00 PM	0.234		370.99
10/19/2011 3:22:00 PM	0.234		370.99
10/19/2011 3:23:00 PM	0.234	0	370.99
10/19/2011 3:24:00 PM	0.231		362.28
10/19/2011 3:25:00 PM	0.234	0	370.99
10/19/2011 3:26:00 PM	0.234		370.99
10/19/2011 3:27:00 PM	0.234		370.99
10/19/2011 3:28:00 PM	0.234	0	370.99
10/19/2011 3:29:00 PM	0.231		362.28
10/19/2011 3:30:00 PM	0.234		370.99
10/19/2011 3:31:00 PM	0.234	0	370.99
10/19/2011 3:32:00 PM	0.234		370.99
10/19/2011 3:33:00 PM	0.234	0	370.99
10/19/2011 3:34:00 PM	0.234		370.99
10/19/2011 3:35:00 PM	0.234		370.99
10/19/2011 3:36:00 PM	0.234	0	370.99
10/19/2011 3:37:00 PM	0.234		370.99
10/19/2011 3:38:00 PM	0.234		370.99
10/19/2011 3:39:00 PM	0.231	0	362.28
10/19/2011 3:40:00 PM	0.234		370.99
10/19/2011 3:41:00 PM	0.231		362.28
10/19/2011 3:42:00 PM	0.231	0	362.28
10/19/2011 3:43:00 PM	0.231		362.28
10/19/2011 3:44:00 PM	0.231	0	362.28
10/19/2011 3:45:00 PM	0.231		362.28
10/19/2011 3:46:00 PM	0.234		370.99
10/19/2011 3:47:00 PM	0.231	0	362.28
10/19/2011 3:48:00 PM	0.231		362.28
10/19/2011 3:49:00 PM	0.231		362.28
10/19/2011 3:50:00 PM	0.231	0	362.28
10/19/2011 3:51:00 PM	0.231		362.28
10/19/2011 3:52:00 PM	0.231		362.28
10/19/2011 3:53:00 PM	0.231	0	362.28
10/19/2011 3:54:00 PM	0.231		362.28
10/19/2011 3:55:00 PM	0.231	0	362.28
10/19/2011 3:56:00 PM	0.228		353.66
10/19/2011 3:57:00 PM	0.231		362.28

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 1:58:00 PM	0.228	0	353.66
10/19/2011 1:59:00 PM	0.231		362.28
10/19/2011 2:00:00 PM	0.231	0	362.28
10/19/2011 2:01:00 PM	0.231		362.28
10/19/2011 2:02:00 PM	0.231		362.28
10/19/2011 2:03:00 PM	0.231	0	362.28
10/19/2011 2:04:00 PM	0.231		362.28
10/19/2011 2:05:00 PM	0.231		362.28
10/19/2011 2:06:00 PM	0.234	0	370.99
10/19/2011 2:07:00 PM	0.234		370.99
10/19/2011 2:08:00 PM	0.234		370.99
10/19/2011 2:09:00 PM	0.234	0	370.99
10/19/2011 2:10:00 PM	0.234		370.99
10/19/2011 2:11:00 PM	0.238	0	379.79
10/19/2011 2:12:00 PM	0.234		370.99
10/19/2011 2:13:00 PM	0.238		379.79
10/19/2011 2:14:00 PM	0.238	0	379.79
10/19/2011 2:15:00 PM	0.238		379.79
10/19/2011 2:16:00 PM	0.238		379.79
10/19/2011 2:17:00 PM	0.238	0	379.79
10/19/2011 2:18:00 PM	0.241		388.68
10/19/2011 2:19:00 PM	0.238	0	379.79
10/19/2011 2:20:00 PM	0.238		379.79
10/19/2011 2:21:00 PM	0.238		379.79
10/19/2011 2:22:00 PM	0.238	0	379.79
10/19/2011 2:23:00 PM	0.238		379.79
10/19/2011 2:24:00 PM	0.238		379.79
10/19/2011 2:25:00 PM	0.238	0	379.79
10/19/2011 2:26:00 PM	0.241		388.68
10/19/2011 2:27:00 PM	0.238	0	379.79
10/19/2011 2:28:00 PM	0.238		379.79
10/19/2011 2:29:00 PM	0.238		379.79
10/19/2011 2:30:00 PM	0.241	0	388.68
10/19/2011 2:31:00 PM	0.238		379.79
10/19/2011 2:32:00 PM	0.241	0	388.68
10/19/2011 2:33:00 PM	0.238		379.79
10/19/2011 2:34:00 PM	0.241		388.68
10/19/2011 2:35:00 PM	0.241	0	388.68
10/19/2011 2:36:00 PM	0.241		388.68
10/19/2011 2:37:00 PM	0.238		379.79
10/19/2011 2:38:00 PM	0.241	0	388.68
10/19/2011 2:39:00 PM	0.241		388.68
10/19/2011 2:40:00 PM	0.241	0	388.68
10/19/2011 2:41:00 PM	0.238		379.79
10/19/2011 2:42:00 PM	0.238		379.79
10/19/2011 2:43:00 PM	0.241	0	388.68
10/19/2011 2:44:00 PM	0.241		388.68
10/19/2011 2:45:00 PM	0.241	0	388.68
10/19/2011 2:46:00 PM	0.241		388.68
10/19/2011 2:47:00 PM	0.241		388.68
10/19/2011 2:48:00 PM	0.238	0	379.79
10/19/2011 2:49:00 PM	0.238		379.79
10/19/2011 2:50:00 PM	0.238	0	379.79
10/19/2011 2:51:00 PM	0.238		379.79
10/19/2011 2:52:00 PM	0.238		379.79
10/19/2011 2:53:00 PM	0.238	0	379.79
10/19/2011 2:54:00 PM	0.238		379.79
10/19/2011 2:55:00 PM	0.234		370.99
10/19/2011 2:56:00 PM	0.234	0	370.99
10/19/2011 2:57:00 PM	0.238		379.79

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 12:58:00 PM	0.224		345.12
10/19/2011 12:59:00 PM	0.224		345.12
10/19/2011 1:00:00 PM	0.224	0	345.12
10/19/2011 1:01:00 PM	0.224		345.12
10/19/2011 1:02:00 PM	0.228		353.66
10/19/2011 1:03:00 PM	0.228	0	353.66
10/19/2011 1:04:00 PM	0.228		353.66
10/19/2011 1:05:00 PM	0.224		345.12
10/19/2011 1:06:00 PM	0.224	0	345.12
10/19/2011 1:07:00 PM	0.228		353.66
10/19/2011 1:08:00 PM	0.224		345.12
10/19/2011 1:09:00 PM	0.224	0	345.12
10/19/2011 1:10:00 PM	0.228		353.66
10/19/2011 1:11:00 PM	0.224	0	345.12
10/19/2011 1:12:00 PM	0.224		345.12
10/19/2011 1:13:00 PM	0.224		345.12
10/19/2011 1:14:00 PM	0.224	0	345.12
10/19/2011 1:15:00 PM	0.224		345.12
10/19/2011 1:16:00 PM	0.228		353.66
10/19/2011 1:17:00 PM	0.228	0	353.66
10/19/2011 1:18:00 PM	0.224		345.12
10/19/2011 1:19:00 PM	0.224		345.12
10/19/2011 1:20:00 PM	0.224	0	345.12
10/19/2011 1:21:00 PM	0.224		345.12
10/19/2011 1:22:00 PM	0.228		353.66
10/19/2011 1:23:00 PM	0.224	0	345.12
10/19/2011 1:24:00 PM	0.224		345.12
10/19/2011 1:25:00 PM	0.224		345.12
10/19/2011 1:26:00 PM	0.224	0	345.12
10/19/2011 1:27:00 PM	0.224		345.12
10/19/2011 1:28:00 PM	0.224		345.12
10/19/2011 1:29:00 PM	0.224	0	345.12
10/19/2011 1:30:00 PM	0.224		345.12
10/19/2011 1:31:00 PM	0.224		345.12
10/19/2011 1:32:00 PM	0.224	0	345.12
10/19/2011 1:33:00 PM	0.224		345.12
10/19/2011 1:34:00 PM	0.224		345.12
10/19/2011 1:35:00 PM	0.224	0	345.12
10/19/2011 1:36:00 PM	0.224		345.12
10/19/2011 1:37:00 PM	0.224	0	345.12
10/19/2011 1:38:00 PM	0.224		345.12
10/19/2011 1:39:00 PM	0.224		345.12
10/19/2011 1:40:00 PM	0.224	0	345.12
10/19/2011 1:41:00 PM	0.224		345.12
10/19/2011 1:42:00 PM	0.224		345.12
10/19/2011 1:43:00 PM	0.224	0	345.12
10/19/2011 1:44:00 PM	0.224		345.12
10/19/2011 1:45:00 PM	0.224		345.12
10/19/2011 1:46:00 PM	0.224	0	345.12
10/19/2011 1:47:00 PM	0.224		345.12
10/19/2011 1:48:00 PM	0.224		345.12
10/19/2011 1:49:00 PM	0.224	0	345.12
10/19/2011 1:50:00 PM	0.224		345.12
10/19/2011 1:51:00 PM	0.224		345.12
10/19/2011 1:52:00 PM	0.224	0	345.12
10/19/2011 1:53:00 PM	0.224		345.12
10/19/2011 1:54:00 PM	0.224		345.12
10/19/2011 1:55:00 PM	0.228	0	353.66
10/19/2011 1:56:00 PM	0.228		353.66
10/19/2011 1:57:00 PM	0.228		353.66

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 11:58:00 AM	0.228		353.66
10/19/2011 11:59:00 AM	0.228	0	353.66
10/19/2011 12:00:00 PM	0.228		353.66
10/19/2011 12:01:00 PM	0.228		353.66
10/19/2011 12:02:00 PM	0.228	0	353.66
10/19/2011 12:03:00 PM	0.224		345.12
10/19/2011 12:04:00 PM	0.224		345.12
10/19/2011 12:05:00 PM	0.228	0	353.66
10/19/2011 12:06:00 PM	0.224		345.12
10/19/2011 12:07:00 PM	0.228		353.66
10/19/2011 12:08:00 PM	0.224	0	345.12
10/19/2011 12:09:00 PM	0.224		345.12
10/19/2011 12:10:00 PM	0.228		353.66
10/19/2011 12:11:00 PM	0.224	0	345.12
10/19/2011 12:12:00 PM	0.224		345.12
10/19/2011 12:13:00 PM	0.224		345.12
10/19/2011 12:14:00 PM	0.224	0	345.12
10/19/2011 12:15:00 PM	0.224		345.12
10/19/2011 12:16:00 PM	0.224		345.12
10/19/2011 12:17:00 PM	0.224	0	345.12
10/19/2011 12:18:00 PM	0.224		345.12
10/19/2011 12:19:00 PM	0.224		345.12
10/19/2011 12:20:00 PM	0.224	0	345.12
10/19/2011 12:21:00 PM	0.224		345.12
10/19/2011 12:22:00 PM	0.224	0	345.12
10/19/2011 12:23:00 PM	0.224		345.12
10/19/2011 12:24:00 PM	0.224		345.12
10/19/2011 12:25:00 PM	0.224	0	345.12
10/19/2011 12:26:00 PM	0.224		345.12
10/19/2011 12:27:00 PM	0.224		345.12
10/19/2011 12:28:00 PM	0.224	0	345.12
10/19/2011 12:29:00 PM	0.224		345.12
10/19/2011 12:30:00 PM	0.224		345.12
10/19/2011 12:31:00 PM	0.224	0	345.12
10/19/2011 12:32:00 PM	0.224		345.12
10/19/2011 12:33:00 PM	0.224		345.12
10/19/2011 12:34:00 PM	0.224	0	345.12
10/19/2011 12:35:00 PM	0.224		345.12
10/19/2011 12:36:00 PM	0.224		345.12
10/19/2011 12:37:00 PM	0.224	0	345.12
10/19/2011 12:38:00 PM	0.224		345.12
10/19/2011 12:39:00 PM	0.224		345.12
10/19/2011 12:40:00 PM	0.224	0	345.12
10/19/2011 12:41:00 PM	0.224		345.12
10/19/2011 12:42:00 PM	0.224		345.12
10/19/2011 12:43:00 PM	0.224	0	345.12
10/19/2011 12:44:00 PM	0.224		345.12
10/19/2011 12:45:00 PM	0.224		345.12
10/19/2011 12:46:00 PM	0.224	0	345.12
10/19/2011 12:47:00 PM	0.224		345.12
10/19/2011 12:48:00 PM	0.228		353.66
10/19/2011 12:49:00 PM	0.224	0	345.12
10/19/2011 12:50:00 PM	0.224		345.12
10/19/2011 12:51:00 PM	0.224	0	345.12
10/19/2011 12:52:00 PM	0.228		353.66
10/19/2011 12:53:00 PM	0.224		345.12
10/19/2011 12:54:00 PM	0.224	0	345.12
10/19/2011 12:55:00 PM	0.228		353.66
10/19/2011 12:56:00 PM	0.224		345.12
10/19/2011 12:57:00 PM	0.224	0	345.12

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 10:58:00 AM	0.224		345.12
10/19/2011 10:59:00 AM	0.224		345.12
10/19/2011 11:00:00 AM	0.224	0	345.12
10/19/2011 11:01:00 AM	0.224		345.12
10/19/2011 11:02:00 AM	0.224	0	345.12
10/19/2011 11:03:00 AM	0.224		345.12
10/19/2011 11:04:00 AM	0.224		345.12
10/19/2011 11:05:00 AM	0.224	0	345.12
10/19/2011 11:06:00 AM	0.224		345.12
10/19/2011 11:07:00 AM	0.224		345.12
10/19/2011 11:08:00 AM	0.224	0	345.12
10/19/2011 11:09:00 AM	0.224		345.12
10/19/2011 11:10:00 AM	0.228		353.66
10/19/2011 11:11:00 AM	0.224	0	345.12
10/19/2011 11:12:00 AM	0.224		345.12
10/19/2011 11:13:00 AM	0.228		353.66
10/19/2011 11:14:00 AM	0.224	0	345.12
10/19/2011 11:15:00 AM	0.224		345.12
10/19/2011 11:16:00 AM	0.231		362.28
10/19/2011 11:17:00 AM	0.228	0	353.66
10/19/2011 11:18:00 AM	0.228		353.66
10/19/2011 11:19:00 AM	0.228		353.66
10/19/2011 11:20:00 AM	0.228	0	353.66
10/19/2011 11:21:00 AM	0.224		345.12
10/19/2011 11:22:00 AM	0.224		345.12
10/19/2011 11:23:00 AM	0.228	0	353.66
10/19/2011 11:24:00 AM	0.228		353.66
10/19/2011 11:25:00 AM	0.228	0	353.66
10/19/2011 11:26:00 AM	0.228		353.66
10/19/2011 11:27:00 AM	0.224		345.12
10/19/2011 11:28:00 AM	0.228	0	353.66
10/19/2011 11:29:00 AM	0.228		353.66
10/19/2011 11:30:00 AM	0.228		353.66
10/19/2011 11:31:00 AM	0.228	0	353.66
10/19/2011 11:32:00 AM	0.228		353.66
10/19/2011 11:33:00 AM	0.228		353.66
10/19/2011 11:34:00 AM	0.228	0	353.66
10/19/2011 11:35:00 AM	0.228		353.66
10/19/2011 11:36:00 AM	0.224		345.12
10/19/2011 11:37:00 AM	0.228	0	353.66
10/19/2011 11:38:00 AM	0.228		353.66
10/19/2011 11:39:00 AM	0.228		353.66
10/19/2011 11:40:00 AM	0.228	0	353.66
10/19/2011 11:41:00 AM	0.228		353.66
10/19/2011 11:42:00 AM	0.228	0	353.66
10/19/2011 11:43:00 AM	0.224		345.12
10/19/2011 11:44:00 AM	0.228		353.66
10/19/2011 11:45:00 AM	0.228	0	353.66
10/19/2011 11:46:00 AM	0.228		353.66
10/19/2011 11:47:00 AM	0.228		353.66
10/19/2011 11:48:00 AM	0.228	0	353.66
10/19/2011 11:49:00 AM	0.228		353.66
10/19/2011 11:50:00 AM	0.224		345.12
10/19/2011 11:51:00 AM	0.228	0	353.66
10/19/2011 11:52:00 AM	0.228		353.66
10/19/2011 11:53:00 AM	0.228		353.66
10/19/2011 11:54:00 AM	0.224	0	345.12
10/19/2011 11:55:00 AM	0.224		345.12
10/19/2011 11:56:00 AM	0.224		345.12
10/19/2011 11:57:00 AM	0.224	0	345.12

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 9:58:00 AM	0.224	0	345.12
10/19/2011 9:59:00 AM	0.224		345.12
10/19/2011 10:00:00 AM	0.224		345.12
10/19/2011 10:01:00 AM	0.224	0	345.12
10/19/2011 10:02:00 AM	0.224		345.12
10/19/2011 10:03:00 AM	0.224		345.12
10/19/2011 10:04:00 AM	0.224	0	345.12
10/19/2011 10:05:00 AM	0.224		345.12
10/19/2011 10:06:00 AM	0.224		345.12
10/19/2011 10:07:00 AM	0.224	0	345.12
10/19/2011 10:08:00 AM	0.224		345.12
10/19/2011 10:09:00 AM	0.224		345.12
10/19/2011 10:10:00 AM	0.224	0	345.12
10/19/2011 10:11:00 AM	0.224		345.12
10/19/2011 10:12:00 AM	0.224		345.12
10/19/2011 10:13:00 AM	0.224	0	345.12
10/19/2011 10:14:00 AM	0.224		345.12
10/19/2011 10:15:00 AM	0.221		336.66
10/19/2011 10:16:00 AM	0.224	0	345.12
10/19/2011 10:17:00 AM	0.224		345.12
10/19/2011 10:18:00 AM	0.224		345.12
10/19/2011 10:19:00 AM	0.224	0	345.12
10/19/2011 10:20:00 AM	0.224		345.12
10/19/2011 10:21:00 AM	0.224		345.12
10/19/2011 10:22:00 AM	0.224	0	345.12
10/19/2011 10:23:00 AM	0.224		345.12
10/19/2011 10:24:00 AM	0.224		345.12
10/19/2011 10:25:00 AM	0.224	0	345.12
10/19/2011 10:26:00 AM	0.221		336.66
10/19/2011 10:27:00 AM	0.224	0	345.12
10/19/2011 10:28:00 AM	0.224		345.12
10/19/2011 10:29:00 AM	0.224		345.12
10/19/2011 10:30:00 AM	0.224	0	345.12
10/19/2011 10:31:00 AM	0.224		345.12
10/19/2011 10:32:00 AM	0.224		345.12
10/19/2011 10:33:00 AM	0.221	0	336.66
10/19/2011 10:34:00 AM	0.221		336.66
10/19/2011 10:35:00 AM	0.221		336.66
10/19/2011 10:36:00 AM	0.224	0	345.12
10/19/2011 10:37:00 AM	0.221		336.66
10/19/2011 10:38:00 AM	0.221		336.66
10/19/2011 10:39:00 AM	0.221	0	336.66
10/19/2011 10:40:00 AM	0.221		336.66
10/19/2011 10:41:00 AM	0.221		336.66
10/19/2011 10:42:00 AM	0.221	0	336.66
10/19/2011 10:43:00 AM	0.221		336.66
10/19/2011 10:44:00 AM	0.221		336.66
10/19/2011 10:45:00 AM	0.224	0	345.12
10/19/2011 10:46:00 AM	0.224		345.12
10/19/2011 10:47:00 AM	0.224		345.12
10/19/2011 10:48:00 AM	0.224	0	345.12
10/19/2011 10:49:00 AM	0.224		345.12
10/19/2011 10:50:00 AM	0.221		336.66
10/19/2011 10:51:00 AM	0.224	0	345.12
10/19/2011 10:52:00 AM	0.224		345.12
10/19/2011 10:53:00 AM	0.224		345.12
10/19/2011 10:54:00 AM	0.224	0	345.12
10/19/2011 10:55:00 AM	0.224		345.12
10/19/2011 10:56:00 AM	0.224		345.12
10/19/2011 10:57:00 AM	0.224	0	345.12

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 8:58:00 AM	0.224	0	345.12
10/19/2011 8:59:00 AM	0.224		345.12
10/19/2011 9:00:00 AM	0.228		353.66
10/19/2011 9:01:00 AM	0.224	0	345.12
10/19/2011 9:02:00 AM	0.228		353.66
10/19/2011 9:03:00 AM	0.228		353.66
10/19/2011 9:04:00 AM	0.224	0	345.12
10/19/2011 9:05:00 AM	0.228		353.66
10/19/2011 9:06:00 AM	0.228		353.66
10/19/2011 9:07:00 AM	0.228	0	353.66
10/19/2011 9:08:00 AM	0.228		353.66
10/19/2011 9:09:00 AM	0.224	0	345.12
10/19/2011 9:10:00 AM	0.228		353.66
10/19/2011 9:11:00 AM	0.224		345.12
10/19/2011 9:12:00 AM	0.228	0	353.66
10/19/2011 9:13:00 AM	0.228		353.66
10/19/2011 9:14:00 AM	0.228		353.66
10/19/2011 9:15:00 AM	0.224	0	345.12
10/19/2011 9:16:00 AM	0.224		345.12
10/19/2011 9:17:00 AM	0.224		345.12
10/19/2011 9:18:00 AM	0.224	0	345.12
10/19/2011 9:19:00 AM	0.224		345.12
10/19/2011 9:20:00 AM	0.224		345.12
10/19/2011 9:21:00 AM	0.224	0	345.12
10/19/2011 9:22:00 AM	0.224		345.12
10/19/2011 9:23:00 AM	0.224		345.12
10/19/2011 9:24:00 AM	0.224	0	345.12
10/19/2011 9:25:00 AM	0.224		345.12
10/19/2011 9:26:00 AM	0.224		345.12
10/19/2011 9:27:00 AM	0.224	0	345.12
10/19/2011 9:28:00 AM	0.224		345.12
10/19/2011 9:29:00 AM	0.224		345.12
10/19/2011 9:30:00 AM	0.224	0	345.12
10/19/2011 9:31:00 AM	0.224		345.12
10/19/2011 9:32:00 AM	0.224	0	345.12
10/19/2011 9:33:00 AM	0.224		345.12
10/19/2011 9:34:00 AM	0.224		345.12
10/19/2011 9:35:00 AM	0.224	0	345.12
10/19/2011 9:36:00 AM	0.224		345.12
10/19/2011 9:37:00 AM	0.224		345.12
10/19/2011 9:38:00 AM	0.224	0	345.12
10/19/2011 9:39:00 AM	0.224		345.12
10/19/2011 9:40:00 AM	0.224		345.12
10/19/2011 9:41:00 AM	0.224	0	345.12
10/19/2011 9:42:00 AM	0.224		345.12
10/19/2011 9:43:00 AM	0.224		345.12
10/19/2011 9:44:00 AM	0.224	0	345.12
10/19/2011 9:45:00 AM	0.224		345.12
10/19/2011 9:46:00 AM	0.224		345.12
10/19/2011 9:47:00 AM	0.224	0	345.12
10/19/2011 9:48:00 AM	0.224		345.12
10/19/2011 9:49:00 AM	0.224		345.12
10/19/2011 9:50:00 AM	0.224	0	345.12
10/19/2011 9:51:00 AM	0.224		345.12
10/19/2011 9:52:00 AM	0.224		345.12
10/19/2011 9:53:00 AM	0.224	0	345.12
10/19/2011 9:54:00 AM	0.224		345.12
10/19/2011 9:55:00 AM	0.224		345.12
10/19/2011 9:56:00 AM	0.224	0	345.12
10/19/2011 9:57:00 AM	0.224		345.12

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/19/2011 11:58:00 PM	0.234		370.99
10/19/2011 11:59:00 PM	0.231	0	362.28
10/20/2011 12:00:00 AM	0.231		362.28
10/20/2011 12:01:00 AM	0.234		370.99
10/20/2011 12:02:00 AM	0.234		370.99
10/20/2011 12:03:00 AM	0.234		370.99
10/20/2011 12:04:00 AM	0.231		362.28
10/20/2011 12:05:00 AM	0.231		362.28
10/20/2011 12:06:00 AM	0.234		370.99
10/20/2011 12:07:00 AM	0.231		362.28
10/20/2011 12:08:00 AM	0.231		362.28
10/20/2011 12:09:00 AM	0.231		362.28
10/20/2011 12:10:00 AM	0.231		362.28
10/20/2011 12:11:00 AM	0.231		362.28
10/20/2011 12:12:00 AM	0.231		362.28
10/20/2011 12:13:00 AM	0.231		362.28
10/20/2011 12:14:00 AM	0.231		362.28
10/20/2011 12:15:00 AM	0.231		362.28
10/20/2011 12:16:00 AM	0.234		370.99
10/20/2011 12:17:00 AM	0.234		370.99
10/20/2011 12:18:00 AM	0.231		362.28
10/20/2011 12:19:00 AM	0.234		370.99
10/20/2011 12:20:00 AM	0.234		370.99
10/20/2011 12:21:00 AM	0.231		362.28
10/20/2011 12:22:00 AM	0.234		370.99
10/20/2011 12:23:00 AM	0.231		362.28
10/20/2011 12:24:00 AM	0.234		370.99
10/20/2011 12:25:00 AM	0.231		362.28
10/20/2011 12:26:00 AM	0.231		362.28
10/20/2011 12:27:00 AM	0.234		370.99
10/20/2011 12:28:00 AM	0.234		370.99
10/20/2011 12:29:00 AM	0.234		370.99
10/20/2011 12:30:00 AM	0.238		379.79
10/20/2011 12:31:00 AM	0.234		370.99
10/20/2011 12:32:00 AM	0.231		362.28
10/20/2011 12:33:00 AM	0.234		370.99
10/20/2011 12:34:00 AM	0.231		362.28
10/20/2011 12:35:00 AM	0.234		370.99
10/20/2011 12:36:00 AM	0.231		362.28
10/20/2011 12:37:00 AM	0.234		370.99
10/20/2011 12:38:00 AM	0.234		370.99
10/20/2011 12:39:00 AM	0.234		370.99
10/20/2011 12:40:00 AM	0.234		370.99
10/20/2011 12:41:00 AM	0.234		370.99
10/20/2011 12:42:00 AM	0.234		370.99
10/20/2011 12:43:00 AM	0.238		379.79
10/20/2011 12:44:00 AM	0.234		370.99
10/20/2011 12:45:00 AM	0.234		370.99
10/20/2011 12:46:00 AM	0.234		370.99
10/20/2011 12:47:00 AM	0.231		362.28
10/20/2011 12:48:00 AM	0.234		370.99
10/20/2011 12:49:00 AM	0.234		370.99
10/20/2011 12:50:00 AM	0.234		370.99
10/20/2011 12:51:00 AM	0.234		370.99
10/20/2011 12:52:00 AM	0.234		370.99
10/20/2011 12:53:00 AM	0.231		362.28
10/20/2011 12:54:00 AM	0.234		370.99
10/20/2011 12:55:00 AM	0.234		370.99
10/20/2011 12:56:00 AM	0.234		370.99
10/20/2011 12:57:00 AM	0.231		362.28

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/20/2011 12:58:00 AM	0.234		370.99
10/20/2011 12:59:00 AM	0.234		370.99
10/20/2011 1:00:00 AM	0.234		370.99
10/20/2011 1:01:00 AM	0.234		370.99
10/20/2011 1:02:00 AM	0.234		370.99
10/20/2011 1:03:00 AM	0.234		370.99
10/20/2011 1:04:00 AM	0.231		362.28
10/20/2011 1:05:00 AM	0.234		370.99
10/20/2011 1:06:00 AM	0.231		362.28
10/20/2011 1:07:00 AM	0.234		370.99
10/20/2011 1:08:00 AM	0.234		370.99
10/20/2011 1:09:00 AM	0.234		370.99
10/20/2011 1:10:00 AM	0.234		370.99
10/20/2011 1:11:00 AM	0.231		362.28
10/20/2011 1:12:00 AM	0.231		362.28
10/20/2011 1:13:00 AM	0.234		370.99
10/20/2011 1:14:00 AM	0.234		370.99
10/20/2011 1:15:00 AM	0.234		370.99
10/20/2011 1:16:00 AM	0.234		370.99
10/20/2011 1:17:00 AM	0.234		370.99
10/20/2011 1:18:00 AM	0.234		370.99
10/20/2011 1:19:00 AM	0.234		370.99
10/20/2011 1:20:00 AM	0.234		370.99
10/20/2011 1:21:00 AM	0.234		370.99
10/20/2011 1:22:00 AM	0.238		379.79
10/20/2011 1:23:00 AM	0.234		370.99
10/20/2011 1:24:00 AM	0.234		370.99
10/20/2011 1:25:00 AM	0.234		370.99
10/20/2011 1:26:00 AM	0.234		370.99
10/20/2011 1:27:00 AM	0.231		362.28
10/20/2011 1:28:00 AM	0.234		370.99
10/20/2011 1:29:00 AM	0.234		370.99
10/20/2011 1:30:00 AM	0.234		370.99
10/20/2011 1:31:00 AM	0.234		370.99
10/20/2011 1:32:00 AM	0.231		362.28
10/20/2011 1:33:00 AM	0.234		370.99
10/20/2011 1:34:00 AM	0.234		370.99
10/20/2011 1:35:00 AM	0.234		370.99
10/20/2011 1:36:00 AM	0.234		370.99
10/20/2011 1:37:00 AM	0.234		370.99
10/20/2011 1:38:00 AM	0.234		370.99
10/20/2011 1:39:00 AM	0.231		362.28
10/20/2011 1:40:00 AM	0.234		370.99
10/20/2011 1:41:00 AM	0.234		370.99
10/20/2011 1:42:00 AM	0.234		370.99
10/20/2011 1:43:00 AM	0.234		370.99
10/20/2011 1:44:00 AM	0.231		362.28
10/20/2011 1:45:00 AM	0.234		370.99
10/20/2011 1:46:00 AM	0.234		370.99
10/20/2011 1:47:00 AM	0.231		362.28
10/20/2011 1:48:00 AM	0.231		362.28
10/20/2011 1:49:00 AM	0.231		362.28
10/20/2011 1:50:00 AM	0.231		362.28
10/20/2011 1:51:00 AM	0.231		362.28
10/20/2011 1:52:00 AM	0.234		370.99
10/20/2011 1:53:00 AM	0.238		379.79
10/20/2011 1:54:00 AM	0.234		370.99
10/20/2011 1:55:00 AM	0.234		370.99
10/20/2011 1:56:00 AM	0.234		370.99
10/20/2011 1:57:00 AM	0.231		362.28

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/20/2011 1:58:00 AM	0.234		370.99
10/20/2011 1:59:00 AM	0.234		370.99
10/20/2011 2:00:00 AM	0.234		370.99
10/20/2011 2:01:00 AM	0.234		370.99
10/20/2011 2:02:00 AM	0.234		370.99
10/20/2011 2:03:00 AM	0.234		370.99
10/20/2011 2:04:00 AM	0.234		370.99
10/20/2011 2:05:00 AM	0.231		362.28
10/20/2011 2:06:00 AM	0.234		370.99
10/20/2011 2:07:00 AM	0.234		370.99
10/20/2011 2:08:00 AM	0.238		379.79
10/20/2011 2:09:00 AM	0.234		370.99
10/20/2011 2:10:00 AM	0.234		370.99
10/20/2011 2:11:00 AM	0.234		370.99
10/20/2011 2:12:00 AM	0.234		370.99
10/20/2011 2:13:00 AM	0.234		370.99
10/20/2011 2:14:00 AM	0.234		370.99
10/20/2011 2:15:00 AM	0.234		370.99
10/20/2011 2:16:00 AM	0.234		370.99
10/20/2011 2:17:00 AM	0.231		362.28
10/20/2011 2:18:00 AM	0.231		362.28
10/20/2011 2:19:00 AM	0.231		362.28
10/20/2011 2:20:00 AM	0.231		362.28
10/20/2011 2:21:00 AM	0.231		362.28
10/20/2011 2:22:00 AM	0.234		370.99
10/20/2011 2:23:00 AM	0.231		362.28
10/20/2011 2:24:00 AM	0.231		362.28
10/20/2011 2:25:00 AM	0.231		362.28
10/20/2011 2:26:00 AM	0.231		362.28
10/20/2011 2:27:00 AM	0.234		370.99
10/20/2011 2:28:00 AM	0.231		362.28
10/20/2011 2:29:00 AM	0.231		362.28
10/20/2011 2:30:00 AM	0.231		362.28
10/20/2011 2:31:00 AM	0.231		362.28
10/20/2011 2:32:00 AM	0.231		362.28
10/20/2011 2:33:00 AM	0.231		362.28
10/20/2011 2:34:00 AM	0.231		362.28
10/20/2011 2:35:00 AM	0.231		362.28
10/20/2011 2:36:00 AM	0.231		362.28
10/20/2011 2:37:00 AM	0.231		362.28
10/20/2011 2:38:00 AM	0.231		362.28
10/20/2011 2:39:00 AM	0.231		362.28
10/20/2011 2:40:00 AM	0.231		362.28
10/20/2011 2:41:00 AM	0.231		362.28
10/20/2011 2:42:00 AM	0.234		370.99
10/20/2011 2:43:00 AM	0.231		362.28
10/20/2011 2:44:00 AM	0.234		370.99
10/20/2011 2:45:00 AM	0.231		362.28
10/20/2011 2:46:00 AM	0.231		362.28
10/20/2011 2:47:00 AM	0.231		362.28
10/20/2011 2:48:00 AM	0.231		362.28
10/20/2011 2:49:00 AM	0.231		362.28
10/20/2011 2:50:00 AM	0.231		362.28
10/20/2011 2:51:00 AM	0.231		362.28
10/20/2011 2:52:00 AM	0.231		362.28
10/20/2011 2:53:00 AM	0.231		362.28
10/20/2011 2:54:00 AM	0.231		362.28
10/20/2011 2:55:00 AM	0.231		362.28
10/20/2011 2:56:00 AM	0.231		362.28
10/20/2011 2:57:00 AM	0.231		362.28

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/20/2011 2:58:00 AM	0.231		362.28
10/20/2011 2:59:00 AM	0.231		362.28
10/20/2011 3:00:00 AM	0.231		362.28
10/20/2011 3:01:00 AM	0.231		362.28
10/20/2011 3:02:00 AM	0.231		362.28
10/20/2011 3:03:00 AM	0.231		362.28
10/20/2011 3:04:00 AM	0.231		362.28
10/20/2011 3:05:00 AM	0.228		353.66
10/20/2011 3:06:00 AM	0.231		362.28
10/20/2011 3:07:00 AM	0.228		353.66
10/20/2011 3:08:00 AM	0.231		362.28
10/20/2011 3:09:00 AM	0.231		362.28
10/20/2011 3:10:00 AM	0.231		362.28
10/20/2011 3:11:00 AM	0.231		362.28
10/20/2011 3:12:00 AM	0.231		362.28
10/20/2011 3:13:00 AM	0.231		362.28
10/20/2011 3:14:00 AM	0.231		362.28
10/20/2011 3:15:00 AM	0.231		362.28
10/20/2011 3:16:00 AM	0.231		362.28
10/20/2011 3:17:00 AM	0.231		362.28
10/20/2011 3:18:00 AM	0.231		362.28
10/20/2011 3:19:00 AM	0.231		362.28
10/20/2011 3:20:00 AM	0.231		362.28
10/20/2011 3:21:00 AM	0.231		362.28
10/20/2011 3:22:00 AM	0.231		362.28
10/20/2011 3:23:00 AM	0.231		362.28
10/20/2011 3:24:00 AM	0.231		362.28
10/20/2011 3:25:00 AM	0.231		362.28
10/20/2011 3:26:00 AM	0.231		362.28
10/20/2011 3:27:00 AM	0.231		362.28
10/20/2011 3:28:00 AM	0.231		362.28
10/20/2011 3:29:00 AM	0.231		362.28
10/20/2011 3:30:00 AM	0.231		362.28
10/20/2011 3:31:00 AM	0.231		362.28
10/20/2011 3:32:00 AM	0.231		362.28
10/20/2011 3:33:00 AM	0.231		362.28
10/20/2011 3:34:00 AM	0.231		362.28
10/20/2011 3:35:00 AM	0.231		362.28
10/20/2011 3:36:00 AM	0.231		362.28
10/20/2011 3:37:00 AM	0.231		362.28
10/20/2011 3:38:00 AM	0.231		362.28
10/20/2011 3:39:00 AM	0.231		362.28
10/20/2011 3:40:00 AM	0.231		362.28
10/20/2011 3:41:00 AM	0.228		353.66
10/20/2011 3:42:00 AM	0.231		362.28
10/20/2011 3:43:00 AM	0.231		362.28
10/20/2011 3:44:00 AM	0.231		362.28
10/20/2011 3:45:00 AM	0.231		362.28
10/20/2011 3:46:00 AM	0.231		362.28
10/20/2011 3:47:00 AM	0.231		362.28
10/20/2011 3:48:00 AM	0.231		362.28
10/20/2011 3:49:00 AM	0.228		353.66
10/20/2011 3:50:00 AM	0.228		353.66
10/20/2011 3:51:00 AM	0.228		353.66
10/20/2011 3:52:00 AM	0.228		353.66
10/20/2011 3:53:00 AM	0.228		353.66
10/20/2011 3:54:00 AM	0.231		362.28
10/20/2011 3:55:00 AM	0.231		362.28
10/20/2011 3:56:00 AM	0.231		362.28
10/20/2011 3:57:00 AM	0.228		353.66

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/20/2011 3:58:00 AM	0.231		362.28
10/20/2011 3:59:00 AM	0.228		353.66
10/20/2011 4:00:00 AM	0.228		353.66
10/20/2011 4:01:00 AM	0.231		362.28
10/20/2011 4:02:00 AM	0.231		362.28
10/20/2011 4:03:00 AM	0.228		353.66
10/20/2011 4:04:00 AM	0.228		353.66
10/20/2011 4:05:00 AM	0.228		353.66
10/20/2011 4:06:00 AM	0.228		353.66
10/20/2011 4:07:00 AM	0.231		362.28
10/20/2011 4:08:00 AM	0.228		353.66
10/20/2011 4:09:00 AM	0.231		362.28
10/20/2011 4:10:00 AM	0.231		362.28
10/20/2011 4:11:00 AM	0.228		353.66
10/20/2011 4:12:00 AM	0.228		353.66
10/20/2011 4:13:00 AM	0.231		362.28
10/20/2011 4:14:00 AM	0.231		362.28
10/20/2011 4:15:00 AM	0.231		362.28
10/20/2011 4:16:00 AM	0.228		353.66
10/20/2011 4:17:00 AM	0.228		353.66
10/20/2011 4:18:00 AM	0.228		353.66
10/20/2011 4:19:00 AM	0.228		353.66
10/20/2011 4:20:00 AM	0.228		353.66
10/20/2011 4:21:00 AM	0.228		353.66
10/20/2011 4:22:00 AM	0.231		362.28
10/20/2011 4:23:00 AM	0.228		353.66
10/20/2011 4:24:00 AM	0.231		362.28
10/20/2011 4:25:00 AM	0.228		353.66
10/20/2011 4:26:00 AM	0.228		353.66
10/20/2011 4:27:00 AM	0.228		353.66
10/20/2011 4:28:00 AM	0.231		362.28
10/20/2011 4:29:00 AM	0.231		362.28
10/20/2011 4:30:00 AM	0.228		353.66
10/20/2011 4:31:00 AM	0.231		362.28
10/20/2011 4:32:00 AM	0.231		362.28
10/20/2011 4:33:00 AM	0.231		362.28
10/20/2011 4:34:00 AM	0.231		362.28
10/20/2011 4:35:00 AM	0.228		353.66
10/20/2011 4:36:00 AM	0.228		353.66
10/20/2011 4:37:00 AM	0.228		353.66
10/20/2011 4:38:00 AM	0.231		362.28
10/20/2011 4:39:00 AM	0.231		362.28
10/20/2011 4:40:00 AM	0.231		362.28
10/20/2011 4:41:00 AM	0.228		353.66
10/20/2011 4:42:00 AM	0.228		353.66
10/20/2011 4:43:00 AM	0.231		362.28
10/20/2011 4:44:00 AM	0.231		362.28
10/20/2011 4:45:00 AM	0.231		362.28
10/20/2011 4:46:00 AM	0.228		353.66
10/20/2011 4:47:00 AM	0.228		353.66
10/20/2011 4:48:00 AM	0.228		353.66
10/20/2011 4:49:00 AM	0.228		353.66
10/20/2011 4:50:00 AM	0.228		353.66
10/20/2011 4:51:00 AM	0.228		353.66
10/20/2011 4:52:00 AM	0.228		353.66
10/20/2011 4:53:00 AM	0.228		353.66
10/20/2011 4:54:00 AM	0.228		353.66
10/20/2011 4:55:00 AM	0.228		353.66
10/20/2011 4:56:00 AM	0.228		353.66
10/20/2011 4:57:00 AM	0.228		353.66

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/20/2011 4:58:00 AM	0.228		353.66
10/20/2011 4:59:00 AM	0.228		353.66
10/20/2011 5:00:00 AM	0.224		345.12
10/20/2011 5:01:00 AM	0.228		353.66
10/20/2011 5:02:00 AM	0.228		353.66
10/20/2011 5:03:00 AM	0.224		345.12
10/20/2011 5:04:00 AM	0.228		353.66
10/20/2011 5:05:00 AM	0.228		353.66
10/20/2011 5:06:00 AM	0.224		345.12
10/20/2011 5:07:00 AM	0.228		353.66
10/20/2011 5:08:00 AM	0.228		353.66
10/20/2011 5:09:00 AM	0.224		345.12
10/20/2011 5:10:00 AM	0.224		345.12
10/20/2011 5:11:00 AM	0.224		345.12
10/20/2011 5:12:00 AM	0.224		345.12
10/20/2011 5:13:00 AM	0.228		353.66
10/20/2011 5:14:00 AM	0.228		353.66
10/20/2011 5:15:00 AM	0.224		345.12
10/20/2011 5:16:00 AM	0.228		353.66
10/20/2011 5:17:00 AM	0.228		353.66
10/20/2011 5:18:00 AM	0.224		345.12
10/20/2011 5:19:00 AM	0.224		345.12
10/20/2011 5:20:00 AM	0.224		345.12
10/20/2011 5:21:00 AM	0.224		345.12
10/20/2011 5:22:00 AM	0.224		345.12
10/20/2011 5:23:00 AM	0.224		345.12
10/20/2011 5:24:00 AM	0.224		345.12
10/20/2011 5:25:00 AM	0.224		345.12
10/20/2011 5:26:00 AM	0.224		345.12
10/20/2011 5:27:00 AM	0.224		345.12
10/20/2011 5:28:00 AM	0.224		345.12
10/20/2011 5:29:00 AM	0.224		345.12
10/20/2011 5:30:00 AM	0.224		345.12
10/20/2011 5:31:00 AM	0.228		353.66
10/20/2011 5:32:00 AM	0.224		345.12
10/20/2011 5:33:00 AM	0.224		345.12
10/20/2011 5:34:00 AM	0.224		345.12
10/20/2011 5:35:00 AM	0.224		345.12
10/20/2011 5:36:00 AM	0.224		345.12
10/20/2011 5:37:00 AM	0.224		345.12
10/20/2011 5:38:00 AM	0.224		345.12
10/20/2011 5:39:00 AM	0.224		345.12
10/20/2011 5:40:00 AM	0.224		345.12
10/20/2011 5:41:00 AM	0.224		345.12
10/20/2011 5:42:00 AM	0.224		345.12
10/20/2011 5:43:00 AM	0.228		353.66
10/20/2011 5:44:00 AM	0.224		345.12
10/20/2011 5:45:00 AM	0.224		345.12
10/20/2011 5:46:00 AM	0.224		345.12
10/20/2011 5:47:00 AM	0.224		345.12
10/20/2011 5:48:00 AM	0.224		345.12
10/20/2011 5:49:00 AM	0.224		345.12
10/20/2011 5:50:00 AM	0.224		345.12
10/20/2011 5:51:00 AM	0.224		345.12
10/20/2011 5:52:00 AM	0.224		345.12
10/20/2011 5:53:00 AM	0.224		345.12
10/20/2011 5:54:00 AM	0.224		345.12
10/20/2011 5:55:00 AM	0.224		345.12
10/20/2011 5:56:00 AM	0.224		345.12
10/20/2011 5:57:00 AM	0.224		345.12

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/20/2011 5:58:00 AM	0.224		345.12
10/20/2011 5:59:00 AM	0.224		345.12
10/20/2011 6:00:00 AM	0.224		345.12
10/20/2011 6:01:00 AM	0.224		345.12
10/20/2011 6:02:00 AM	0.224		345.12
10/20/2011 6:03:00 AM	0.224		345.12
10/20/2011 6:04:00 AM	0.224		345.12
10/20/2011 6:05:00 AM	0.224		345.12
10/20/2011 6:06:00 AM	0.224		345.12
10/20/2011 6:07:00 AM	0.224		345.12
10/20/2011 6:08:00 AM	0.224		345.12
10/20/2011 6:09:00 AM	0.224		345.12
10/20/2011 6:10:00 AM	0.224		345.12
10/20/2011 6:11:00 AM	0.224		345.12
10/20/2011 6:12:00 AM	0.224		345.12
10/20/2011 6:13:00 AM	0.224		345.12
10/20/2011 6:14:00 AM	0.224		345.12
10/20/2011 6:15:00 AM	0.224		345.12
10/20/2011 6:16:00 AM	0.224		345.12
10/20/2011 6:17:00 AM	0.224		345.12
10/20/2011 6:18:00 AM	0.224		345.12
10/20/2011 6:19:00 AM	0.224		345.12
10/20/2011 6:20:00 AM	0.224		345.12
10/20/2011 6:21:00 AM	0.224		345.12
10/20/2011 6:22:00 AM	0.224		345.12
10/20/2011 6:23:00 AM	0.224		345.12
10/20/2011 6:24:00 AM	0.224		345.12
10/20/2011 6:25:00 AM	0.224		345.12
10/20/2011 6:26:00 AM	0.224		345.12
10/20/2011 6:27:00 AM	0.224		345.12
10/20/2011 6:28:00 AM	0.224		345.12
10/20/2011 6:29:00 AM	0.224		345.12
10/20/2011 6:30:00 AM	0.224		345.12
10/20/2011 6:31:00 AM	0.224		345.12
10/20/2011 6:32:00 AM	0.224		345.12
10/20/2011 6:33:00 AM	0.224		345.12
10/20/2011 6:34:00 AM	0.224		345.12
10/20/2011 6:35:00 AM	0.224		345.12
10/20/2011 6:36:00 AM	0.224		345.12
10/20/2011 6:37:00 AM	0.224		345.12
10/20/2011 6:38:00 AM	0.224		345.12
10/20/2011 6:39:00 AM	0.224		345.12
10/20/2011 6:40:00 AM	0.224		345.12
10/20/2011 6:41:00 AM	0.224		345.12
10/20/2011 6:42:00 AM	0.224		345.12
10/20/2011 6:43:00 AM	0.224		345.12
10/20/2011 6:44:00 AM	0.224		345.12
10/20/2011 6:45:00 AM	0.224		345.12
10/20/2011 6:46:00 AM	0.224		345.12
10/20/2011 6:47:00 AM	0.224		345.12
10/20/2011 6:48:00 AM	0.224		345.12
10/20/2011 6:49:00 AM	0.224		345.12
10/20/2011 6:50:00 AM	0.224		345.12
10/20/2011 6:51:00 AM	0.224		345.12
10/20/2011 6:52:00 AM	0.224		345.12
10/20/2011 6:53:00 AM	0.224		345.12
10/20/2011 6:54:00 AM	0.224		345.12
10/20/2011 6:55:00 AM	0.224		345.12
10/20/2011 6:56:00 AM	0.224		345.12
10/20/2011 6:57:00 AM	0.224		345.12

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/20/2011 6:58:00 AM	0.224		345.12
10/20/2011 6:59:00 AM	0.224		345.12
10/20/2011 7:00:00 AM	0.224		345.12
10/20/2011 7:01:00 AM	0.224		345.12
10/20/2011 7:02:00 AM	0.224		345.12
10/20/2011 7:03:00 AM	0.224		345.12
10/20/2011 7:04:00 AM	0.224		345.12
10/20/2011 7:05:00 AM	0.224		345.12
10/20/2011 7:06:00 AM	0.224		345.12
10/20/2011 7:07:00 AM	0.224		345.12
10/20/2011 7:08:00 AM	0.224		345.12
10/20/2011 7:09:00 AM	0.224		345.12
10/20/2011 7:10:00 AM	0.224		345.12
10/20/2011 7:11:00 AM	0.224		345.12
10/20/2011 7:12:00 AM	0.224		345.12
10/20/2011 7:13:00 AM	0.224		345.12
10/20/2011 7:14:00 AM	0.224		345.12
10/20/2011 7:15:00 AM	0.224		345.12
10/20/2011 7:16:00 AM	0.224		345.12
10/20/2011 7:17:00 AM	0.224		345.12
10/20/2011 7:18:00 AM	0.224		345.12
10/20/2011 7:19:00 AM	0.224		345.12
10/20/2011 7:20:00 AM	0.224		345.12
10/20/2011 7:21:00 AM	0.224		345.12
10/20/2011 7:22:00 AM	0.224		345.12
10/20/2011 7:23:00 AM	0.224		345.12
10/20/2011 7:24:00 AM	0.224		345.12
10/20/2011 7:25:00 AM	0.224		345.12
10/20/2011 7:26:00 AM	0.224		345.12
10/20/2011 7:27:00 AM	0.224		345.12
10/20/2011 7:28:00 AM	0.224		345.12
10/20/2011 7:29:00 AM	0.224		345.12
10/20/2011 7:30:00 AM	0.224		345.12
10/20/2011 7:31:00 AM	0.224		345.12
10/20/2011 7:32:00 AM	0.224		345.12
10/20/2011 7:33:00 AM	0.224		345.12
10/20/2011 7:34:00 AM	0.224		345.12
10/20/2011 7:35:00 AM	0.224		345.12
10/20/2011 7:36:00 AM	0.224		345.12
10/20/2011 7:37:00 AM	0.224		345.12
10/20/2011 7:38:00 AM	0.224		345.12
10/20/2011 7:39:00 AM	0.224		345.12
10/20/2011 7:40:00 AM	0.224		345.12
10/20/2011 7:41:00 AM	0.224		345.12
10/20/2011 7:42:00 AM	0.224		345.12
10/20/2011 7:43:00 AM	0.224		345.12
10/20/2011 7:44:00 AM	0.224		345.12
10/20/2011 7:45:00 AM	0.224		345.12
10/20/2011 7:46:00 AM	0.224		345.12
10/20/2011 7:47:00 AM	0.224		345.12
10/20/2011 7:48:00 AM	0.224		345.12
10/20/2011 7:49:00 AM	0.224		345.12
10/20/2011 7:50:00 AM	0.224		345.12
10/20/2011 7:51:00 AM	0.224		345.12
10/20/2011 7:52:00 AM	0.224		345.12
10/20/2011 7:53:00 AM	0.224		345.12
10/20/2011 7:54:00 AM	0.224		345.12
10/20/2011 7:55:00 AM	0.224		345.12
10/20/2011 7:56:00 AM	0.224		345.12
10/20/2011 7:57:00 AM	0.224		345.12

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/20/2011 7:58:00 AM	0.224		345.12
10/20/2011 7:59:00 AM	0.224		345.12
10/20/2011 8:00:00 AM	0.224		345.12
10/20/2011 8:01:00 AM	0.224		345.12
10/20/2011 8:02:00 AM	0.224		345.12
10/20/2011 8:03:00 AM	0.224		345.12
10/20/2011 8:04:00 AM	0.224		345.12
10/20/2011 8:05:00 AM	0.224		345.12
10/20/2011 8:06:00 AM	0.224		345.12
10/20/2011 8:07:00 AM	0.224		345.12
10/20/2011 8:08:00 AM	0.224		345.12
10/20/2011 8:09:00 AM	0.224		345.12
10/20/2011 8:10:00 AM	0.224		345.12
10/20/2011 8:11:00 AM	0.224		345.12
10/20/2011 8:12:00 AM	0.224		345.12
10/20/2011 8:13:00 AM	0.224		345.12
10/20/2011 8:14:00 AM	0.224		345.12
10/20/2011 8:15:00 AM	0.224		345.12
10/20/2011 8:16:00 AM	0.224		345.12
10/20/2011 8:17:00 AM	0.224		345.12
10/20/2011 8:18:00 AM	0.224		345.12
10/20/2011 8:19:00 AM	0.224		345.12
10/20/2011 8:20:00 AM	0.224		345.12
10/20/2011 8:21:00 AM	0.224		345.12
10/20/2011 8:22:00 AM	0.224		345.12
10/20/2011 8:23:00 AM	0.224		345.12
10/20/2011 8:24:00 AM	0.224		345.12
10/20/2011 8:25:00 AM	0.224		345.12
10/20/2011 8:26:00 AM	0.224		345.12
10/20/2011 8:27:00 AM	0.224		345.12
10/20/2011 8:28:00 AM	0.224		345.12
10/20/2011 8:29:00 AM	0.224		345.12
10/20/2011 8:30:00 AM	0.224		345.12
10/20/2011 8:31:00 AM	0.224		345.12
10/20/2011 8:32:00 AM	0.224		345.12
10/20/2011 8:33:00 AM	0.224		345.12
10/20/2011 8:34:00 AM	0.224		345.12
10/20/2011 8:35:00 AM	0.224		345.12
10/20/2011 8:36:00 AM	0.224		345.12
10/20/2011 8:37:00 AM	0.224		345.12
10/20/2011 8:38:00 AM	0.224		345.12
10/20/2011 8:39:00 AM	0.224		345.12
10/20/2011 8:40:00 AM	0.224		345.12
10/20/2011 8:41:00 AM	0.224		345.12
10/20/2011 8:42:00 AM	0.224		345.12
10/20/2011 8:43:00 AM	0.224		345.12
10/20/2011 8:44:00 AM	0.224		345.12
10/20/2011 8:45:00 AM	0.224		345.12
10/20/2011 8:46:00 AM	0.224		345.12
10/20/2011 8:47:00 AM	0.224		345.12
10/20/2011 8:48:00 AM	0.224		345.12
10/20/2011 8:49:00 AM	0.224		345.12
10/20/2011 8:50:00 AM	0.224		345.12
10/20/2011 8:51:00 AM	0.224		345.12
10/20/2011 8:52:00 AM	0.224		345.12
10/20/2011 8:53:00 AM	0.224		345.12
10/20/2011 8:54:00 AM	0.224		345.12
10/20/2011 8:55:00 AM	0.224		345.12
10/20/2011 8:56:00 AM	0.224		345.12
10/20/2011 8:57:00 AM	0.224		345.12

Date/Time	Level (ft)	Bottle # Sample Event (SU)	Flow (gpm)
10/20/2011 8:58:00 AM	0.224		345.12
10/20/2011 8:59:00 AM	0.224		345.12
10/20/2011 9:00:00 AM	0.224		345.12

	Average Level (ft)	Total Sample Event (SU)	Average Flow (gpm)
	0.227	505	352.02
			Total
			0.69630 mgal

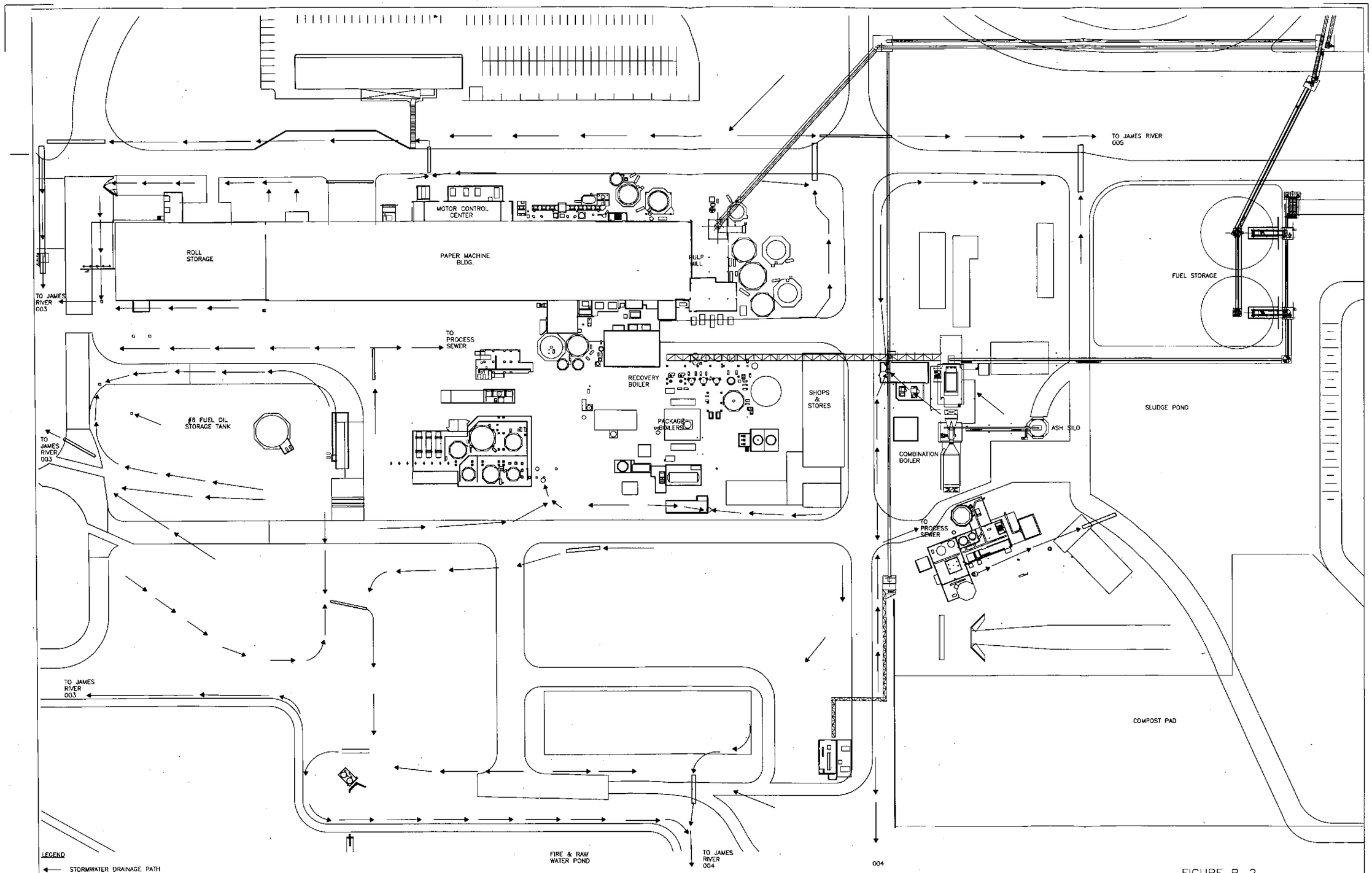


FIGURE B-2

NO.	DATE	BY	REVISION	APP'D
4	10/28/05	KRM	SPCC PLAN UPDATE /RENUM FM 10-C-66	JJP
3	02/11/03	KRW	SPCC PLAN UPDATE	MVH
2	11/13/00	TNP	SPCC PLAN UPDATE	MVH
1	04/27/97	LAC	SPCC PLAN UPDATE	MVH
0	09/93	KRM	SPCC PLAN UPDATE	MVH

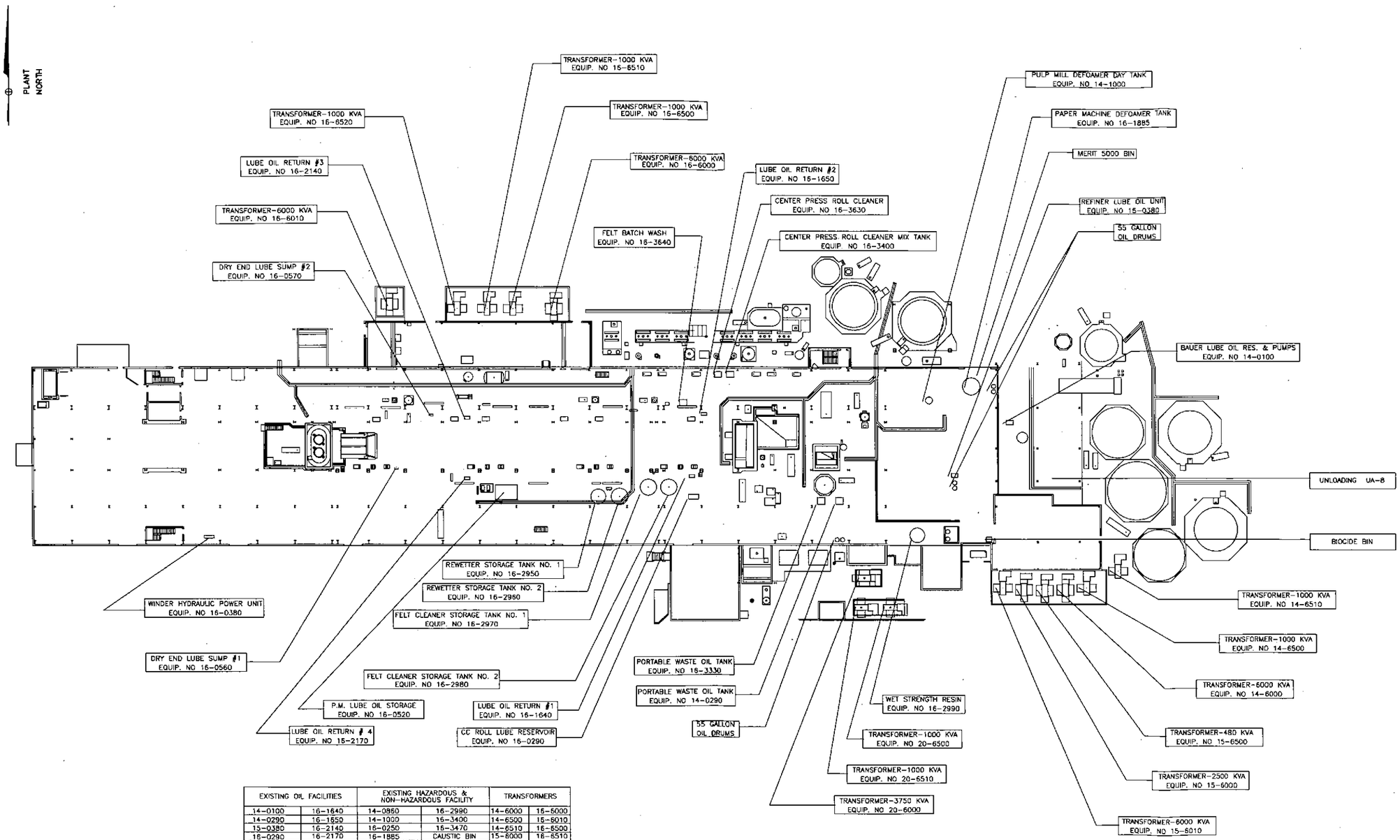
10/07/2005 REV. BORDER | STD. NO. | STANDARD TITLE | ENGL. NO. | REFERENCE DRAWING | NO. | DATE | BY | REVISION | APP'D

GREIF

RIVERVILLE VA.

TITLE: MILLWIDE SPCC STORM DRAINAGE PLAN

SHEET	CREATED BY	CHECKED BY	DRAWING NUMBER	REVISION
1 OF 1	KRM	MVH	10-FC005	4
	ENGINEER MVH	SCALE 1"=40'		
	LAST EDIT BY PSD	DATE OF LAST EDIT 03/20/09	CURRENT PROJECT NUMBER 01-0042	DATE OF ISSUE 03/24/03



EXISTING OIL FACILITIES		EXISTING HAZARDOUS & NON-HAZARDOUS FACILITY		TRANSFORMERS	
14-0100	16-1640	14-0850	16-2990	14-6000	15-6000
14-0290	16-1650	14-1000	16-3400	14-6500	15-6010
15-0380	16-2140	16-0250	16-3470	14-6510	16-6500
15-0290	16-2170	16-1885	CAUSTIC BIN	15-6000	16-6510
16-0380	16-3330	16-2950	DARASPERSE BIN	15-6010	16-6520
15-0520		16-2960	UA-7	15-6500	20-6000
15-0560		16-2970	UA-8		20-6500
15-0570		16-2980			20-6510

FIGURE A – 1

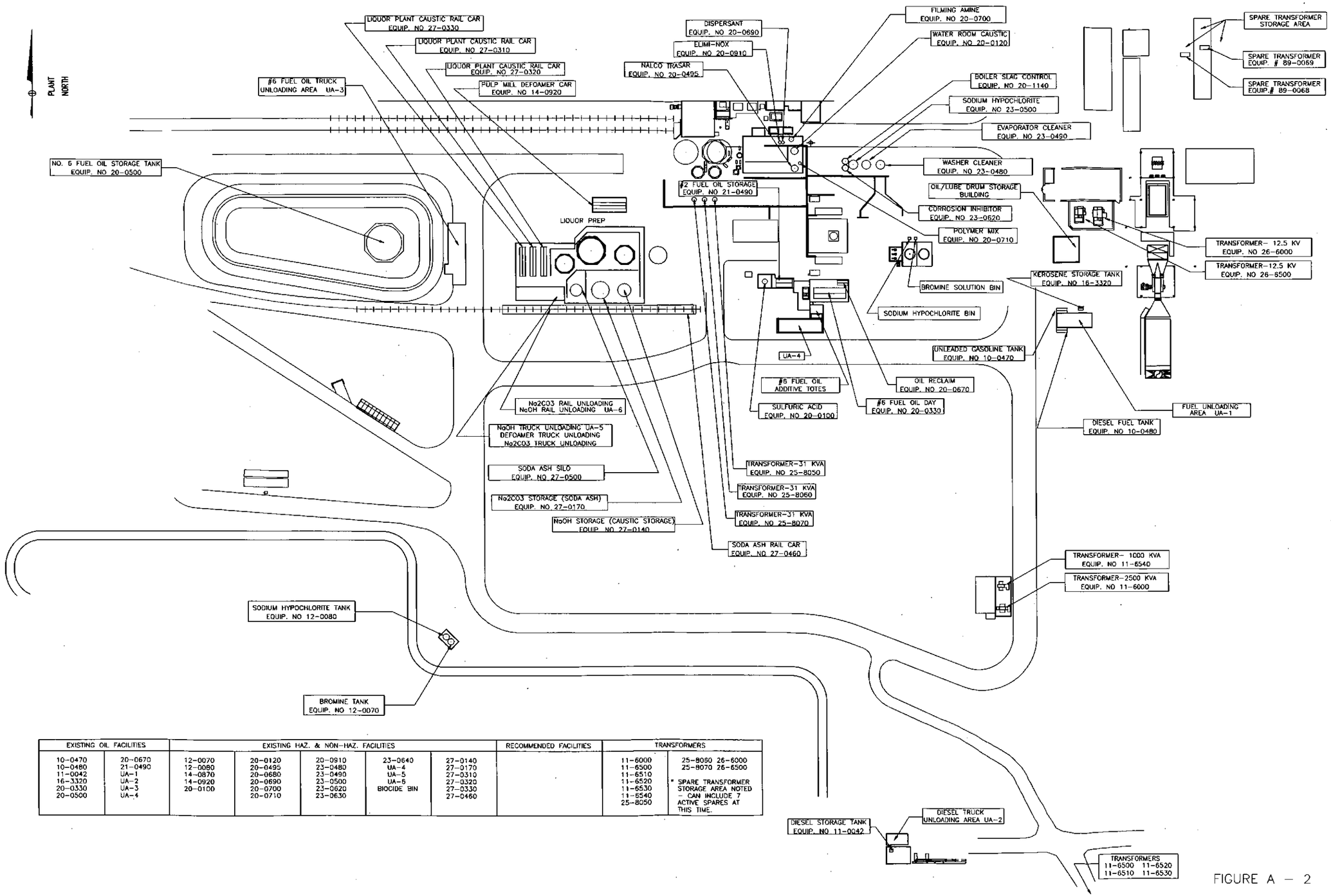
NO.	DATE	BY	REVISION	APP'D
8	10/11/05	TNP	SPCC PLAN UPDATE	JP
7	02/12/04	KRW	SPCC PLAN UPDATE	JP
6	02/11/03	TNP	SPCC PLAN UPDATE	MVH
5	02/07/01	KRW	SPCC PLAN UPDATE	JP
4	04/28/97	TNP	SPCC PLAN UPDATE	MVH
3	09/93	KRM	SPCC PLAN UPDATE	MVH

03/15/2000 | STD. NO. | STANDARD TITLE | DWG. NO. | REFERENCE DRAWING | NO. | DATE | BY | REVISION | APP'D

GREIF BROS. CORPORATION

TITLE: MACHINE #1/ PULP MILL AREAS SPCC GENERAL ARRANGMENT

SHEET	CREATED BY	CHECKED BY	DRAWING NUMBER	REVISION
1 OF 1	LAC	MVH	10-C-058	8
	DRAWNBY MVH	SCALE 1"=40'		
	LAST EDIT BY PSD	DATE OF LAST EDIT 01/15/09	CURRENT PROJECT NUMBER 10-0041	DATE OF ISSUE 12/05/97



EXISTING OIL FACILITIES		EXISTING HAZ. & NON-HAZ. FACILITIES					RECOMMENDED FACILITIES	TRANSFORMERS	
10-0470 10-0480 11-0042 16-3320 20-0330 20-0500	20-0670 21-0490 UA-1 UA-2 UA-3 UA-4	12-0070 12-0080 14-0870 14-0920 20-0100	20-0120 20-0495 20-0680 20-0690 20-0700 20-0710	20-0910 23-0480 23-0490 23-0500 23-0620 23-0630	23-0640 UA-4 UA-5 UA-6 BIOCIDE BIN	27-0140 27-0170 27-0310 27-0320 27-0330 27-0460		11-6000 11-6500 11-6510 11-6520 11-6530 11-6540 25-8050	25-8050 26-6000 25-8070 26-6500 * SPARE TRANSFORMER STORAGE AREA NOTED - CAN INCLUDE 7 ACTIVE SPARES AT THIS TIME.

FIGURE A – 2

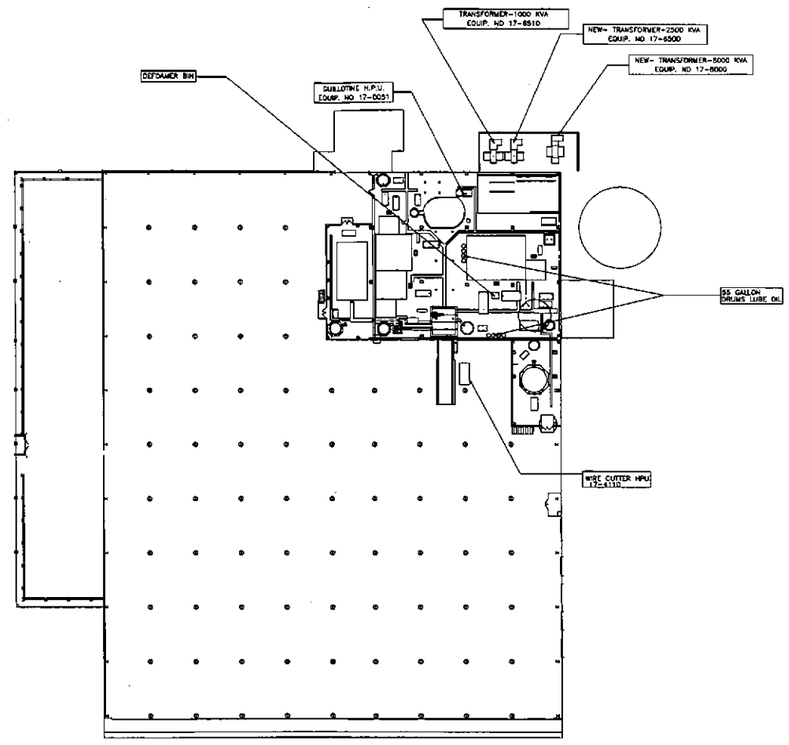
NO.	DATE	BY	REVISION	APP'D
12	11/14/01	PSD	SPCC PLAN UPDATE	JP
11	10/30/01	MEH	SPCC PLAN UPDATE	MVH
10	02/12/00	TNP	SPCC PLAN UPDATE	JP
9	02/12/00	KRW	SPCC PLAN UPDATE	JP
8	02/12/00	TNP	SPCC PLAN UPDATE	MVH
7	02/10/99	KRW	SPCC PLAN UPDATE	JP
6	03/30/98	TNP	SPCC PLAN UPDATE	MVH
5	02/05/98	TBD	UPDATED EQ. 12-0070 & 12-0080	MVH
4	04/28/97	TNP	SPCC PLAN UPDATE	MVH
3	04/23/97	KRW	SPCC PLAN UPDATE	MVH

03/15/2000

GREIF BROS. CORPORATION

TITLE: POWERHOUSE/LIQ. PREP./MAINT. AREAS SPCC GENERAL ARRANGEMENT

SHEET	CREATED BY	CHECKED BY	DRAWING NUMBER	REVISION
1 OF 1	TNP	MVH	10-C-059	12
	ENGINEER MVH	SCALE 1"=40'		
	LAST EDIT BY TNP	DATE OF LAST EDIT 02/17/06	CURRENT PROJECT NUMBER 01-0042	DATE OF ORIG. 12/05/97



EXISTING OIL FACILITIES	EXISTING HAZ. & NON-HAZ. MATERIALS	TRANSFORMERS
17-0051	17-0730	17-6000
55 GAL. DRUMS	DEFOAMER BIN	17-6500
		17-6510

FIGURE A-3

NO.	DATE	BY	REVISION	APP'D
6	10/08/10	MEH	ADDED WIRE CUTTER HPU	MVH
5	02/17/10	TNP	SPCC PLAN UPDATE	JP
4	02/12/10	TNP	SPCC PLAN UPDATE	MVH
3	05/05/11	TNP	SPCC PLAN UPDATE	MVH

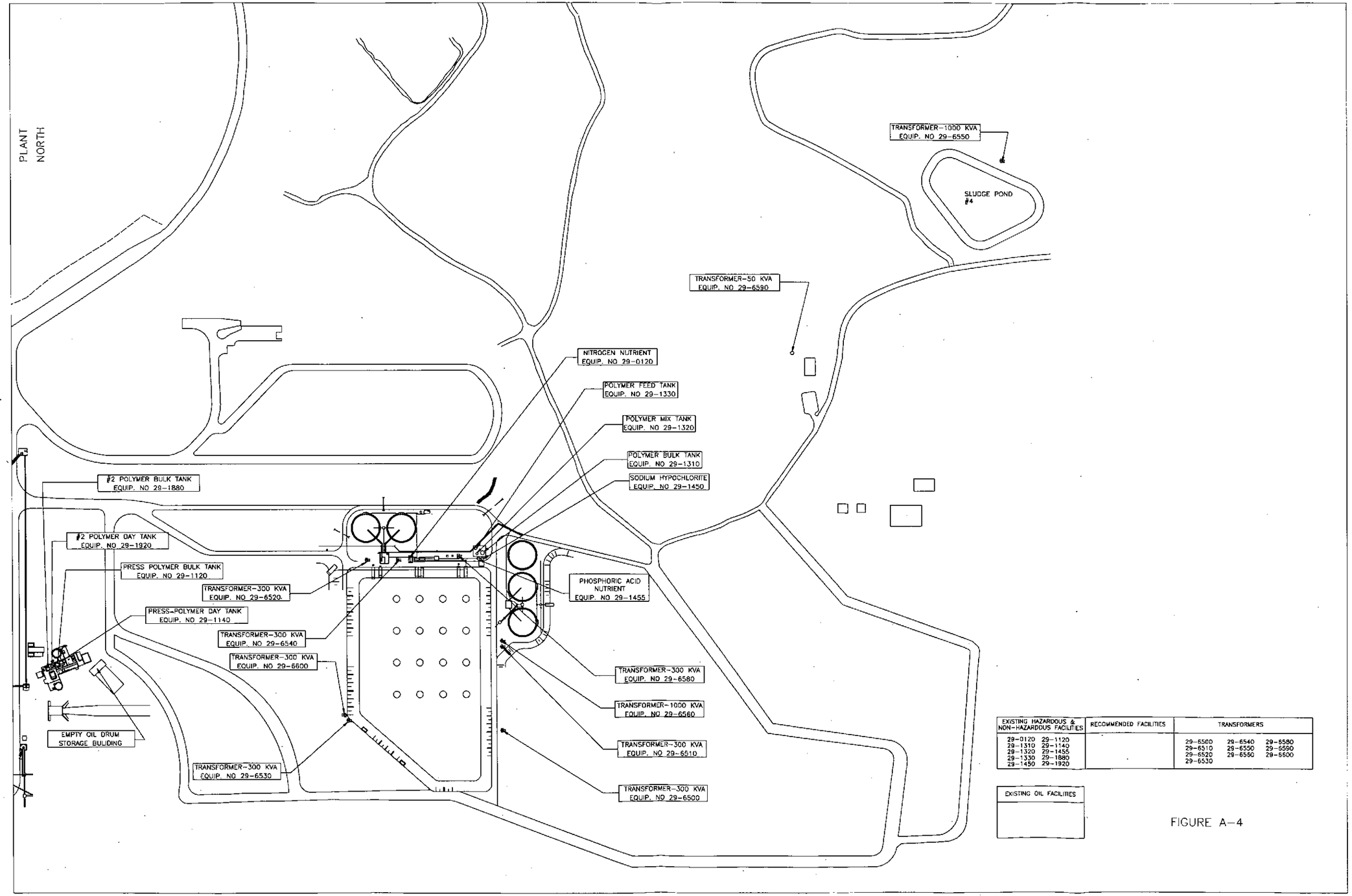
GREIF BROS. CORPORATION

TITLE: O.C.C. AREA SPCC GENERAL ARRANGEMENT

SHEET	CREATED BY	CHECKED BY	DRAWING NUMBER	REVISION
1 OF 1	KRM	MVH	10-C-060	6
	ENGINEER: MVH	SCALE: 1"=30'		
	LAST EDIT BY: KRM	DATE OF LAST EDIT: 02/03/11	CURRENT PROJECT NUMBER: 10-0041	DATE OF ISSUE: 12/05/97

03/15/2000

STD. NO.	STANDARD TITLE	DWG. NO.	REFERENCE DRAWING



EXISTING HAZARDOUS & NON-HAZARDOUS FACILITIES	RECOMMENDED FACILITIES	TRANSFORMERS
29-0120 29-1120 29-1310 29-1140 29-1320 29-1455 29-1330 29-1880 29-1450 29-1920		29-6500 29-6540 29-6580 29-6510 29-6550 29-6590 29-6520 29-6560 29-6600 29-6530

EXISTING OIL FACILITIES

FIGURE A-4

STD. NO.	STANDARD TITLE	DWG. NO.	REFERENCE DRAWING

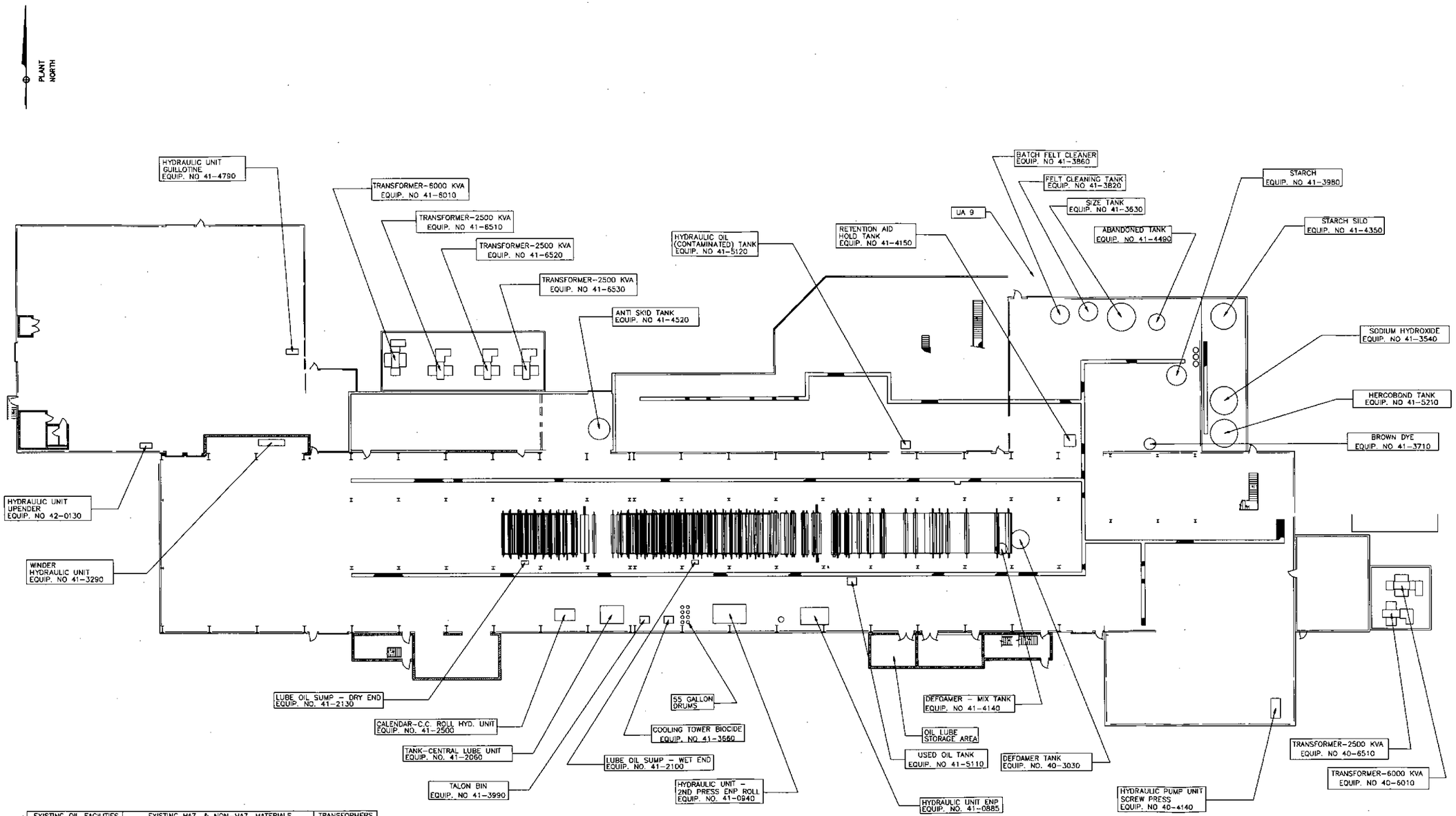
NO.	DATE	BY	REVISION	APP'D
12	11/14/01	PSD	SPCC PLAN UPDATE	JJP
11	09/18/01	MEH	GENERAL REVISION	JJP
10	02/17/06	TNP	SPCC PLAN UPDATE	JP
9	02/12/04	KRW	SPCC PLAN UPDATE	JP
8	02/18/03	KRM	SPCC PLAN UPDATE	JJP
7	02/12/03	TNP	SPCC PLAN UPDATE	MVH
6	02/07/01	KRW	SPCC PLAN UPDATE	JP
5	03/31/00	TNP	SPCC PLAN UPDATE	MVH
4	04/29/97	TNP	SPCC PLAN UPDATE	MVH
3	09/93	KRM	SPCC PLAN UPDATE	MVH

03/15/2000

GREIF BROS. CORPORATION
RIVERVILLE VA.

TITLE
WASTEWATER TREATMENT
SPCC
GENERAL ARRANGEMENT

SHEET	CREATED BY	CHECKED BY	DRAWING NUMBER	REVISION
1 OF 1	KRM	MVH	10-C-061	12
	ENGINEER MVH	SCALE 1"=100'		
	LAST EDIT BY TNP	DATE OF LAST EDIT 02/17/06	CURRENT PROJECT NUMBER 01-0042	DATE OF ISSUE 12/5/97



EXISTING OIL FACILITIES		EXISTING HAZ. & NON-HAZ. MATERIALS				TRANSFORMERS
40-4140	41-2060	41-3540	41-3860	41-4150	UA-9	41-6010
41-0885	41-2130	41-3630	41-3950	41-4160		41-6510
41-0940	41-2500	41-3740	41-3660	41-4190		41-6520
41-2100	41-3290	41-3500	41-3990	41-4490		41-6530
41-5120	41-4790	41-3710	41-3980	41-4520		40-6010
41-5110	42-0130	41-3820	41-4140	41-5210		40-6510

FIGURE A - 5

NO.	DATE	BY	REVISION	APP'D
5	02/17/98	TNP	SPCC PLAN UPDATE	JP
4	02/05/98	KJR	DEFOAMER TANK NO. WAS 41-3950	JP
3	02/12/96	KRW	SPCC PLAN UPDATE	JP
2	02/12/93	TNP	SPCC PLAN UPDATE	MVH
1	02/07/91	KRW	ADD. STARCH SILO SPCC PLAN UPDATE	JP
0	06/26/87	TNP	SPCC PLAN UPDATE	MVH

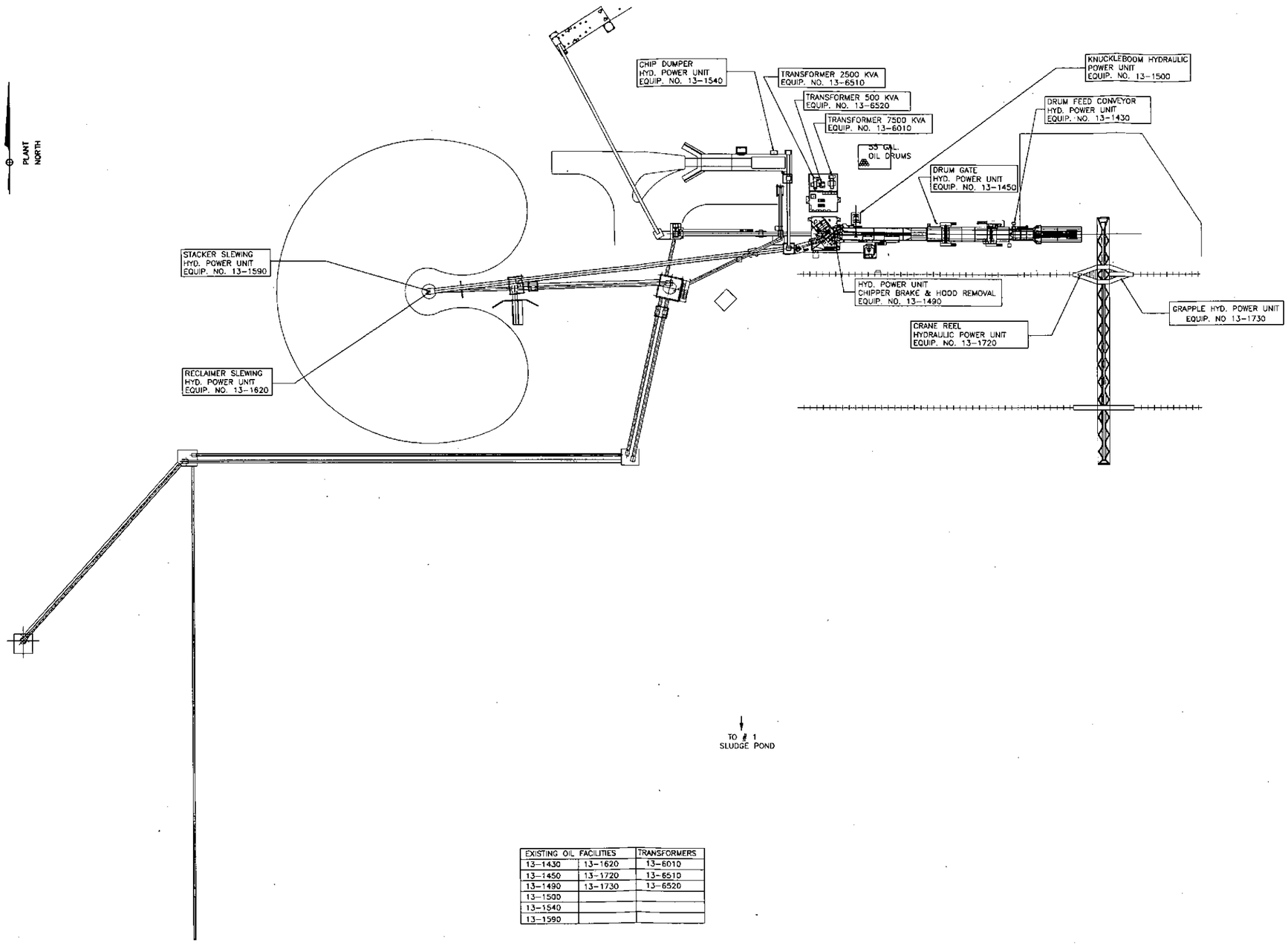
03/15/2000

STD. NO. | STANDARD TITLE | DWG. NO. | REFERENCE DRAWING | NO. | DATE | BY | REVISION | APP'D

GREIF BROS. CORPORATION
RIVERVILLE VA.

TITLE: NO.2 PAPER MACHINE AREA SPCC GENERAL ARRANGEMENT

SHEET	CREATED BY	CHECKED BY	DRAWING NUMBER	REVISION
1 OF 1	LAC	MVH	40-MG006	5
	ENGINEER MVH	SCALE 1/16"=1'		
	LAST EDIT BY PSD	DATE OF LAST EDIT 09/05/08	CURRENT PROJECT NUMBER 10-0041	DATE OF ISSUE 12/05/97



EXISTING OIL FACILITIES		TRANSFORMERS
13-1430	13-1620	13-6010
13-1450	13-1720	13-6510
13-1490	13-1730	13-6520
13-1500		
13-1540		
13-1590		

FIGURE A - 6

NO.	DATE	BY	REVISION	APP'D
2	09/02/08	MEH	GENERAL REVISION	MVH
1	02/11/03	TNP	SPCC PLAN UPDATE	MVH
0	04/23/97	TNP	SPCC PLAN UPDATE	MVH

GREIF BROS. CORPORATION
RIVERVILLE VA.

TITLE: NEW WOODYARD AREA SPCC GENERAL ARRANGMENT

SHEET	DRAWN BY	CHECKED BY	DRAWING NUMBER	REVISION
1 OF 1	LAC	NONE	13-MG014	2
	DESIGNER MVH	SCALE 1" = 50'		
	LAST EDIT BY PSD	DATE OF LAST EDIT 09/02/08	CURRENT PROJECT NUMBER 13-0070	DATE OF ORIGIN 12/05/97

03/15/2000 STD. NO. STANDARD TITLE DWG. NO. REFERENCE DRAWING NO. DATE BY REVISIONS APP'D

Greif IP VA0006408 Data

Outfall No	Due Date	Received Date	Parameter Code	Parameter Description	Concentration Minimum	Concentration Average	Concentration Maximum
002	10-Jul-07	10-May-07	002	PH	7.49	NULL	7.49
002	10-Jan-08	9-Nov-07	002	PH	7.14	NULL	7.14
002	10-Jan-12	12-Dec-11	002	PH	7.5	NULL	7.5
002	10-Jul-11	8-Apr-11	002	PH	8.0	NULL	8.0
002	10-Jan-11	9-Nov-10	002	PH	7.8	NULL	7.8
002	10-Jul-08	10-Mar-08	002	PH	7.70	NULL	7.70
002	10-Jan-10	10-Nov-09	002	PH	7.9	NULL	7.9
002	10-Jul-09	9-Jun-09	002	PH	7.54	NULL	7.54
002	10-Jan-09	9-Oct-08	002	PH	6.83	NULL	6.83
002	10-Jan-07	13-Nov-06	002	PH	6.48	NULL	6.48
002	10-Jul-10	9-Jun-10	002	PH	7.4	NULL	7.4
002	10-Jan-08	9-Nov-07	003	BOD5	NULL	NULL	4
002	10-Jul-09	9-Jun-09	003	BOD5	NULL	NULL	4
002	10-Jan-10	10-Nov-09	003	BOD5	NULL	NULL	<2.0
002	10-Jul-10	9-Jun-10	003	BOD5	NULL	NULL	<2.0
002	10-Jan-11	9-Nov-10	003	BOD5	NULL	NULL	5
002	10-Jul-11	8-Apr-11	003	BOD5	NULL	NULL	<2.0
002	10-Jan-12	12-Dec-11	003	BOD5	NULL	NULL	<2.0
002	10-Jul-08	10-Mar-08	003	BOD5	NULL	NULL	<4
002	10-Jan-09	9-Oct-08	003	BOD5	NULL	NULL	14
002	10-Jan-07	13-Nov-06	003	BOD5	NULL	NULL	<2
002	10-Jul-07	10-May-07	003	BOD5	NULL	NULL	<2
002	10-Jan-07	13-Nov-06	004	TSS	NULL	NULL	355
002	10-Jan-08	9-Nov-07	004	TSS	NULL	NULL	20
002	10-Jul-08	10-Mar-08	004	TSS	NULL	NULL	332
002	10-Jan-09	9-Oct-08	004	TSS	NULL	NULL	26
002	10-Jul-09	9-Jun-09	004	TSS	NULL	NULL	27
002	10-Jan-10	10-Nov-09	004	TSS	NULL	NULL	6
002	10-Jul-10	9-Jun-10	004	TSS	NULL	NULL	4
002	10-Jan-11	9-Nov-10	004	TSS	NULL	NULL	8
002	10-Jul-11	8-Apr-11	004	TSS	NULL	NULL	14
002	10-Jan-12	12-Dec-11	004	TSS	NULL	NULL	12

002	10-Jul-07	10-May-07	004	TSS	NULL	NULL	20
002	10-Jul-07	10-May-07	361	IRON, TOTAL RECOVERABLE	NULL	NULL	2240
002	10-Jan-12	12-Dec-11	361	IRON, TOTAL RECOVERABLE	NULL	NULL	751
002	10-Jul-11	8-Apr-11	361	IRON, TOTAL RECOVERABLE	NULL	NULL	979
002	10-Jan-11	9-Nov-10	361	IRON, TOTAL RECOVERABLE	NULL	NULL	1640
002	10-Jul-10	9-Jun-10	361	IRON, TOTAL RECOVERABLE	NULL	NULL	2210
002	10-Jan-07	13-Nov-06	361	IRON, TOTAL RECOVERABLE	NULL	NULL	15200
002	10-Jul-09	9-Jun-09	361	IRON, TOTAL RECOVERABLE	NULL	NULL	2730
002	10-Jan-09	9-Oct-08	361	IRON, TOTAL RECOVERABLE	NULL	NULL	1150
002	10-Jul-08	10-Mar-08	361	IRON, TOTAL RECOVERABLE	NULL	NULL	30900
002	10-Jan-08	9-Nov-07	361	IRON, TOTAL RECOVERABLE	NULL	NULL	1400
002	10-Jan-10	10-Nov-09	361	IRON, TOTAL RECOVERABLE	NULL	NULL	290
003	10-Jan-08	9-Nov-07	002	PH	7.64	NULL	7.64
003	10-Jul-08	10-Mar-08	002	PH	7.80	NULL	7.80
003	10-Jan-09	9-Oct-08	002	PH	6.95	NULL	6.95
003	10-Jul-09	9-Jun-09	002	PH	7.60	NULL	7.60
003	10-Jan-10	10-Nov-09	002	PH	7.8	NULL	7.8
003	10-Jan-07	13-Nov-06	002	PH	6.81	NULL	6.81
003	10-Jan-11	9-Nov-10	002	PH	7.8	NULL	7.8
003	10-Jul-11	8-Apr-11	002	PH	7.9	NULL	7.9
003	10-Jul-07	10-May-07	002	PH	7.44	NULL	7.44
003	10-Jan-12	12-Dec-11	002	PH	7.8	NULL	7.8
003	10-Jul-10	9-Jun-10	002	PH	7.4	NULL	7.4
003	10-Jan-07	13-Nov-06	003	BOD5	NULL	NULL	<2
003	10-Jan-08	9-Nov-07	003	BOD5	NULL	NULL	2
003	10-Jul-08	10-Mar-08	003	BOD5	NULL	NULL	<2
003	10-Jan-09	9-Oct-08	003	BOD5	NULL	NULL	<2
003	10-Jul-09	9-Jun-09	003	BOD5	NULL	NULL	<2
003	10-Jan-10	10-Nov-09	003	BOD5	NULL	NULL	<2.0
003	10-Jul-10	9-Jun-10	003	BOD5	NULL	NULL	<2.0
003	10-Jan-11	9-Nov-10	003	BOD5	NULL	NULL	3
003	10-Jul-11	8-Apr-11	003	BOD5	NULL	NULL	<2.0
003	10-Jul-07	10-May-07	003	BOD5	NULL	NULL	<2
003	10-Jan-12	12-Dec-11	003	BOD5	NULL	NULL	<2.0
004	10-Jan-08	9-Nov-07	002	PH	7.14	NULL	7.14
004	10-Jul-08	10-Mar-08	002	PH	7.31	NULL	7.31
004	10-Jan-09	9-Oct-08	002	PH	6.96	NULL	6.96

004	10-Jul-09	9-Jun-09	002	PH	7.30	NULL	7.30
004	10-Jan-10	10-Nov-09	002	PH	7.7	NULL	7.7
004	10-Jan-07	13-Nov-06	002	PH	6.27	NULL	6.27
004	10-Jan-11	9-Nov-10	002	PH	7.4	NULL	7.4
004	10-Jul-11	8-Apr-11	002	PH	7.4	NULL	7.4
004	10-Jan-12	12-Dec-11	002	PH	6.9	NULL	6.9
004	10-May-07	10-May-07	002	PH	7.06	NULL	7.06
004	10-Jul-10	9-Jun-10	002	PH	7.3	NULL	7.3
004	10-Jan-07	13-Nov-06	003	BOD5	NULL	NULL	<2
004	10-Jan-08	9-Nov-07	003	BOD5	NULL	NULL	2
004	10-Jul-08	10-Mar-08	003	BOD5	NULL	NULL	<2
004	10-Jan-09	9-Oct-08	003	BOD5	NULL	NULL	<2
004	10-Jul-09	9-Jun-09	003	BOD5	NULL	NULL	<2
004	10-Jan-10	10-Nov-09	003	BOD5	NULL	NULL	<2.0
004	10-Jul-10	9-Jun-10	003	BOD5	NULL	NULL	<2.0
004	10-Jan-11	9-Nov-10	003	BOD5	NULL	NULL	<2.0
004	10-Jul-11	8-Apr-11	003	BOD5	NULL	NULL	<2.0
004	10-May-07	10-May-07	003	BOD5	NULL	NULL	<2
004	10-Jan-12	12-Dec-11	003	BOD5	NULL	NULL	<2
005	10-Jul-11	8-Apr-11	002	PH	7.7	NULL	7.7
005	10-Jan-11	9-Nov-10	002	PH	7.6	NULL	7.6
005	10-Jul-10	9-Jun-10	002	PH	7.6	NULL	7.6
005	10-Jan-10	10-Nov-09	002	PH	7.9	NULL	7.9
005	10-Jul-09	9-Jun-09	002	PH	7.74	NULL	7.74
005	10-Jan-12	12-Dec-11	002	PH	7.6	NULL	7.6
005	10-Jan-08	9-Nov-07	002	PH	7.90	NULL	7.90
005	10-Jul-08	10-Mar-08	002	PH	8.00	NULL	8.00
005	10-Jan-07	13-Nov-06	002	PH	6.19	NULL	6.19
005	10-Jul-07	10-May-07	002	PH	7.65	NULL	7.65
005	10-Jan-09	9-Oct-08	002	PH	7.96	NULL	7.96
005	10-Jan-07	13-Nov-06	003	BOD5	NULL	NULL	<2
005	10-Jul-10	9-Jun-10	003	BOD5	NULL	NULL	<2.0
005	10-Jan-08	9-Nov-07	003	BOD5	NULL	NULL	4
005	10-Jul-08	10-Mar-08	003	BOD5	NULL	NULL	5
005	10-Jan-09	9-Oct-08	003	BOD5	NULL	NULL	<2
005	10-Jul-09	9-Jun-09	003	BOD5	NULL	NULL	<2
005	10-Jan-10	10-Nov-09	003	BOD5	NULL	NULL	<2.0

005	10-Jan-11	9-Nov-10	003	BOD5	NULL	NULL	<2.0
005	10-Jan-12	12-Dec-11	003	BOD5	NULL	NULL	<2
005	10-Jul-07	10-May-07	003	BOD5	NULL	NULL	<2
005	10-Jul-11	8-Apr-11	003	BOD5	NULL	NULL	<2.0
005	10-Jan-08	9-Nov-07	004	TSS	NULL	NULL	31
005	10-Jul-08	10-Mar-08	004	TSS	NULL	NULL	29
005	10-Jan-09	9-Oct-08	004	TSS	NULL	NULL	5
005	10-Jul-09	9-Jun-09	004	TSS	NULL	NULL	9
005	10-Jan-10	10-Nov-09	004	TSS	NULL	NULL	16
005	10-Jan-07	13-Nov-06	004	TSS	NULL	NULL	16
005	10-Jan-11	9-Nov-10	004	TSS	NULL	NULL	3
005	10-Jan-12	12-Dec-11	004	TSS	NULL	NULL	20.1
005	10-Jul-07	10-May-07	004	TSS	NULL	NULL	2
005	10-Jul-11	8-Apr-11	004	TSS	NULL	NULL	5
005	10-Jul-10	9-Jun-10	004	TSS	NULL	NULL	15
005	10-Jul-07	10-May-07	361	IRON, TOTAL RECOVERABLE	NULL	NULL	261
005	10-Jan-11	9-Nov-10	361	IRON, TOTAL RECOVERABLE	NULL	NULL	239
005	10-Jul-10	9-Jun-10	361	IRON, TOTAL RECOVERABLE	NULL	NULL	34
005	10-Jan-10	10-Nov-09	361	IRON, TOTAL RECOVERABLE	NULL	NULL	360
005	10-Jul-09	9-Jun-09	361	IRON, TOTAL RECOVERABLE	NULL	NULL	833
005	10-Jan-09	9-Oct-08	361	IRON, TOTAL RECOVERABLE	NULL	NULL	225
005	10-Jul-08	10-Mar-08	361	IRON, TOTAL RECOVERABLE	NULL	NULL	2400
005	10-Jan-08	9-Nov-07	361	IRON, TOTAL RECOVERABLE	NULL	NULL	821
005	10-Jan-12	12-Dec-11	361	IRON, TOTAL RECOVERABLE	NULL	NULL	1100
005	10-Jul-11	8-Apr-11	361	IRON, TOTAL RECOVERABLE	NULL	NULL	429
005	10-Jan-07	13-Nov-06	361	IRON, TOTAL RECOVERABLE	NULL	NULL	1390
301	10-Feb-07	12-Feb-07	002	PH	8.5	NULL	8.5
301	10-Apr-07	9-Apr-07	002	PH	NULL	NULL	NULL
301	10-May-07	10-May-07	002	PH	7.3	NULL	7.3
301	10-Jul-07	10-Jul-07	002	PH	NR	NULL	NR
301	10-Jun-07	8-Jun-07	002	PH	7.8	NULL	7.8
301	10-Mar-07	9-Mar-07	002	PH	8.3	NULL	8.3
301	10-Jan-07	11-Jan-07	002	PH	8.3	NULL	8.3
301	10-Jan-08	14-Jan-08	257	PETROLEUM HYDROCARBONS, T	NULL	NULL	NULL
301	10-Dec-07	10-Dec-07	257	PETROLEUM HYDROCARBONS, T	NULL	<1.0	NULL
301	10-Nov-07	9-Nov-07	257	PETROLEUM HYDROCARBONS, T	NULL	NR	NULL
301	10-Oct-07	10-Oct-07	257	PETROLEUM HYDROCARBONS, T	NULL	NULL	NULL

301	10-Sep-07	10-Sep-07	257	PETROLEUM HYDROCARBONS, T NULL	NR	NULL
301	10-Aug-07	10-Aug-07	257	PETROLEUM HYDROCARBONS, T NULL	NR	NULL
301	10-Apr-07	9-Apr-07	257	PETROLEUM HYDROCARBONS, T NULL	NULL	NULL
301	10-Jul-07	10-Jul-07	257	PETROLEUM HYDROCARBONS, T NULL	NR	NULL
301	10-Jun-07	8-Jun-07	257	PETROLEUM HYDROCARBONS, T NULL	<1.0	NULL
301	10-May-07	10-May-07	257	PETROLEUM HYDROCARBONS, T NULL	<1.0	NULL
301	10-Mar-07	9-Mar-07	257	PETROLEUM HYDROCARBONS, T NULL	<1.0	NULL
301	10-Feb-07	12-Feb-07	257	PETROLEUM HYDROCARBONS, T NULL	<1.0	NULL
301	10-Jan-07	11-Jan-07	257	PETROLEUM HYDROCARBONS, T NULL	<1.0	NULL
301	10-Jul-08	10-Mar-08	257	PETROLEUM HYDROCARBONS, T NULL	<0.10	NULL
301	10-Jan-09	11-Aug-08	257	PETROLEUM HYDROCARBONS, T NULL	0.31	NULL
301	10-Jul-09	7-May-09	257	PETROLEUM HYDROCARBONS, T NULL	<QL	NULL
301	10-Jan-10	8-Dec-09	257	PETROLEUM HYDROCARBONS, T NULL	<QL	NULL
301	10-Jul-10	10-May-10	257	PETROLEUM HYDROCARBONS, T NULL	<QL	NULL
301	10-Jan-11	9-Nov-10	257	PETROLEUM HYDROCARBONS, T NULL	<QL	NULL
301	10-Jan-12	9-Jan-12	257	PETROLEUM HYDROCARBONS, T NULL	<QL	NULL
301	10-Jul-11	8-Apr-11	257	PETROLEUM HYDROCARBONS, T NULL	<QL	NULL

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40 C.F.R. Subpart F—Semi-Chemical Subcategory

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PART 430—THE PULP, PAPER, AND PAPERBOARD POINT SOURCE CATEGORY

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Subpart F—Semi-Chemical Subcategory

§ 430.60 Applicability; description of the semi-chemical subcategory.

The provisions of this subpart are applicable to discharges resulting from the integrated production of pulp and paper at semi-chemical mills.

§ 430.61 Specialized definitions.

For the purpose of this subpart, the general definitions, abbreviations, and methods of analysis set forth in 40 CFR part 401 and §430.01 of this part shall apply to this subpart.

§ 430.62 Effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT).

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT):

Subpart F [BPT effluent limitations for ammonia

Subpart F [BPT effluent limitations for sodium

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

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart shall achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT): The limitations shall be the same as those specified for conventional pollutants (which are defined in 40 CFR 401.16) in §430.62 of this subpart for the best practicable control technology currently available (BPT), except that non-continuous dischargers shall not be subject to the maximum day and average-of-30-consecutive-days limitations, but shall be subject to annual average effluent limitations determined by dividing the average-of-30-consecutive-days limitations for BOD5 by 1.36 and TSS by 1.36.

§ 430.64 Effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT).

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart where chlorophenolic-containing biocides are used must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT). Non-continuous dischargers shall not be subject to the maximum day mass limitations in kg/kkg (lb/1,000 lb), but shall be subject to concentration limitations. Concentration limitations are only applicable to non-continuous dischargers. Permittees not using chlorophenolic-containing biocides must certify to the permit-issuing authority that they are not using these biocides:

Subpart F----------

§ 430.65 New source performance standards (NSPS).

Any new source subject to this subpart must achieve the following new source performance standards (NSPS), except that non-continuous dischargers shall not be subject to the maximum day and average of 30 consecutive days effluent limitations for BOD5 and TSS, but shall be subject to annual average effluent limitations. Also, for non-continuous dischargers, concentration limitations (mg/l) shall apply, where provided. Concentration limitations will only apply to non-continuous dischargers. Only facilities where chlorophenolic-containing biocides are used shall be subject to pentachlorophenol and trichlorophenol limitations. Permittees not using chlorophenolic-containing biocides must certify to the permit-issuing authority that they are not using these biocides:

Subpart F [NSPS]----------

Maximum for any 1 day

§ 430.66 Pretreatment standards for existing sources (PSES).

Except as provided in 40 CFR 403.7 and 403.13, any existing source subject to this subpart that introduces pollutants into a publicly owned treatment works must: comply with 40 CFR part 403; and achieve the following pretreatment standards for existing sources (PSES) if it uses chlorophenolic-containing biocides. Permittees not using chlorophenolic-containing biocides must certify to the permit-issuing authority that they are not using these biocides. PSES must be attained on or before July 1, 1984:

Subpart F----------

§ 430.67 Pretreatment standards for new sources (PSNS).

Except as provided in 40 CFR 403.7, any new source subject to this subpart that introduces pollutants into a publicly owned treatment works must: comply with 40 CFR part 403; and achieve the following pretreatment standards for new sources (PSNS) if it uses chlorophenolic-containing biocides. Permittees not using chlorophenolic-containing biocides must certify to the permit-issuing authority that they are not using these biocides:

Subpart F----------

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(c) An indirect discharger must demonstrate compliance with the pretreatment standards in paragraphs (a)(2) or (a)(3) of this section, as applicable, by monitoring for all pollutants at the point where the wastewater containing those pollutants leaves the bleach plant.

[63 FR 18635, Apr. 15, 1998; 63 FR 42240, Aug. 7, 1998]

§430.58 Best management practices (BMPs).

The definitions and requirements set forth in 40 CFR 430.03 apply to facilities in this subpart.

Subpart F—Semi-Chemical Subcategory

§430.60 Applicability; description of the semi-chemical subcategory.

The provisions of this subpart are applicable to discharges resulting from the integrated production of pulp and paper at semi-chemical mills.

§430.61 Specialized definitions.

For the purpose of this subpart, the general definitions, abbreviations, and methods of analysis set forth in 40 CFR part 401 and §430.01 of this part shall apply to this subpart.

§430.62 Effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT).

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT):

SUBPART F

[BPT effluent limitations for ammonia base mills]

Pollutant or pollutant property	Kg/kkg (or pounds per 1,000 lb) of product	
	Maximum for any 1 day	Average of daily values for 30 consecutive days
BOD5	8.0	4.0
TSS	10.0	5.0
pH	(1)	(1)

[1] Within the range of 6.0 to 9.0 at all times.

SUBPART F

[BPT effluent limitations for sodium base mills]

Pollutant or pollutant property	Kg/kkg (or pounds per 1,000 lb) of product	
	Maximum for any 1 day	Average of daily values for 30 consecutive days
BOD5	8.7	4.35
TSS	11.0	5.5
pH	(1)	(1)

[1] Within the range of 6.0 to 9.0 at all times.

U.S. GOVERNMENT INFORMATION GPO

Subpart J—Secondary Fiber Non-Deink Subcategory

§ 430.100 Applicability; description of the secondary fiber non-deink subcategory.

The provisions of this subpart are applicable to discharges resulting from the production of: Paperboard from wastepaper; tissue paper from wastepaper without deinking at secondary fiber mills; molded products from wastepaper without deinking at secondary fiber mills; and builders' paper and roofing felt from wastepaper.

§ 430.101 Specialized definitions.

For the purpose of this subpart:

(a) Except as provided below, the general definitions, abbreviations, and methods of analysis set forth in 40 CFR part 401 and § 430.01 of this part shall apply to this subpart.

(b) Noncorrugating medium furnish subdivision mills are mills where recycled corrugating medium is not used in the production of paperboard.

(c) Corrugating medium furnish subdivision mills are mills where only recycled corrugating medium is used in the production of paperboard.

§ 430.102 Effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT).

(a) Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT):

SUBPART J

[BPT effluent limitations for secondary fiber non-deink facilities where paperboard from wastepaper is produced—noncorrugating medium finish subdivision]

Pollutant or pollutant property	Kg/kkg (or pounds per 1,000 lb) of product	
	Maximum for any 1 day	Average of daily values for 30 consecutive days
BOD5	3.0	1.5
TSS	5.0	2.5
pH	(1)	(1)

[1] 1Within the range of 6.0 to 9.0 at all times.

SUBPART J

[BPT effluent limitations for secondary fiber non-deink facilities where paperboard from wastepaper is produced—corrugating medium finish subdivision]

Pollutant or pollutant property	Kg/kkg (or pounds per 1,000 lb) of product	
	Maximum for any 1 day	Average of daily values for 30 consecutive days
BOD5	5.7	2.8
TSS	9.2	4.6
pH	(1)	(1)

[1] Within the range of 6.0 to 9.0 at all times.

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40 C.F.R. Subpart J—Secondary Fiber Non-Deink Subcategory

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PART 430—THE PULP, PAPER, AND PAPERBOARD POINT SOURCE CATEGORY

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Subpart J—Secondary Fiber Non-Deink Subcategory

§ 430.100 Applicability; description of the secondary fiber non-deink subcategory.

The provisions of this subpart are applicable to discharges resulting from the production of: Paperboard from wastepaper; tissue paper from wastepaper without deinking at secondary fiber mills; molded products from wastepaper without deinking at secondary fiber mills; and builders' paper and roofing felt from wastepaper.

§ 430.101 Specialized definitions.

For the purpose of this subpart:

(a) Except as provided below, the general definitions, abbreviations, and methods of analysis set forth in 40 CFR part 401 and §430.01 of this part shall apply to this subpart.

(b) Noncorrugating medium furnish subdivision mills are mills where recycled corrugating medium is not used in the production of paperboard.

(c) Corrugating medium furnish subdivision mills are mills where only recycled corrugating medium is used in the production of paperboard.

§ 430.102 Effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT).

(a) Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT):

Subpart J[BPT effluent limitations for secondary fiber non-deink facilities where

Subpart J[BPT effluent limitations for secondary fiber non-deink facilities where

Subpart J[BPT effluent limitations for secondary fiber non-deink facilities where

(b) Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT), except that non-continuous dischargers shall not be subject to the maximum day and average of 30 consecutive days limitations but shall be subject to annual average effluent limitations:

Subpart J [BPT effluent limitations for secondary fiber non-d

Subpart J [BPT effluent limitations for secondary fiber non-de.

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

(a) Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart shall achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT): The limitations shall be the same as those specified for conventional pollutants (which are defined in 40 CFR 401.16) in §430.102 of this subpart for the best practicable control technology currently available (BPT).

(b) For secondary fiber non-deink facilities where paperboard from wastepaper is produced, non-continuous dischargers shall not be subject to the maximum day and average-of-30-consecutive-days limitations, but shall be subject to annual average effluent limitations determined by dividing the average-of-30-consecutive-days limitations for BOD5 and TSS by 1.77 and 2.18.

(c) For secondary fiber non-deink facilities where builders' paper and roofing felt from wastepaper are produced, non-continuous dischargers shall not be subject to the maximum day and average-of-30-consecutive-days limitations, but shall be subject to annual average effluent limitations determined by dividing the average-of-30-consecutive-days limitations for BOD5 and TSS by 1.90 and 1.90.

§ 430.104 Effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT).

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart where chlorophenolic-containing biocides are used must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT). Non-continuous dischargers shall not be subject to the maximum day mass limitations in kg/kkg (lb/1000 lb) but shall be subject to concentration limitations. Concentration limitations are only applicable to non-continuous dischargers. Permittees not using chlorophenolic-containing biocides must certify to the permit-issuing authority that they are not using these biocides:

Subpart J[BAT effluent limitations for secondary fiber non-dein

Subpart J [BAT effluent limitations for secondary fiber non-dei:

Subpart J [BAT effluent limitations for secondary fiber non-d

Subpart J [BAT effluent limitations for secondary fiber non-de

§ 430.105 New source performance standards (NSPS).

Any new source subject to this subpart must achieve the following new source performance standards (NSPS), except that non-continuous dischargers shall not be subject to the maximum day and average of 30 consecutive days effluent limitations for BOD5 and TSS, but shall be subject to annual average effluent limitations. Also, for non-continuous dischargers, concentration limitations (mg/l) shall apply, where provided. Concentration limitations will only apply to non-continuous dischargers. Only facilities where chlorophenolic-containing biocides are used shall be subject to pentachlorophenol and trichlorophenol limitations. Permittees not using chlorophenolic-containing biocides must certify to the permit-issuing authority that they are not using these biocides:

Subpart J [NSPS for secondary fiber non-deink facilities wher

Maximum for any 1 day

Subpart J [NSPS for secondary fiber non-deink facilities where

Maximum for any 1 day

Subpart J [NSPS for secondary fiber non-deink facilities whe

Maximum for any 1 day

Subpart J [NSPS for secondary fiber non-deink facilities whe

Maximum for any 1 day

Subpart J [NSPS for secondary fiber non-deink facilities whe

Maximum for any 1 day

§ 430.106 Pretreatment standards for existing sources (PSES).

Except as provided in 40 CFR 403.7 and 403.13, any existing source subject to this subpart that introduces pollutants into a publicly owned treatment works must: Comply with 40 CFR part 403; and achieve the following pretreatment standards for existing sources (PSES) if it uses chlorophenolic-containing biocides. Permittees not using chlorophenolic-containing biocides must certify to the permit-issuing authority that they are not using these biocides. PSES must be attained on or before July 1, 1984:

Subpart J [PSES for secondary fiber non-deink faciliti

Subpart J [PSES for secondary fiber non-deink facilities whe

Subpart J	[PSES for secondary fiber non-deink facilities whe
Subpart J	[PSES for secondary fiber non-deink facilities whe

§ 430.107 Pretreatment standards for new sources (PSNS).

Except as provided in 40 CFR 403.7, any new source subject to this subpart that introduces pollutants into a publicly owned treatment works must: Comply with 40 CFR part 403; and achieve the following pretreatment standards for new sources (PSNS) if it uses chlorophenolic-containing biocides. Permittees not using chlorophenolic-containing biocides must certify to the permit-issuing authority that they are not using these biocides:

Subpart J	[PSNS for secondary fiber non-deink faciliti
Subpart J	[PSNS for secondary fiber non-deink facilities whe
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Subpart J	[PSNS for secondary fiber non-deink facilities whe

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40 CFR 430.00 - Applicability.

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Title 40: Protection of Environment

CHAPTER I: ENVIRONMENTAL PROTECTION AGENCY (CONTINUED)

SUBCHAPTER N: EFFLUENT GUIDELINES AND STANDARDS

PART 430: THE PULP, PAPER, AND PAPERBOARD POINT SOURCE CATEGORY

: General Provisions

430.00 - Applicability.

(a) This part applies to any pulp, paper, or paperboard mill that discharges or may discharge process wastewater pollutants to the waters of the United States, or that introduces or may introduce process wastewater pollutants into a publicly owned treatment works.

(b) The following table presents the subcategorization scheme codified in this part, with references to former subpart designations contained in the 1997 edition of 40 CFR parts 425 through 699:

Subcategorization Scheme With References to Former Subparts Contained in the July 1, 1997 Edition of 40 CFR Parts 425 Through 699
a This subpart is contained in the 40 CFR parts 425 through 699, edition revised as of July 1, 1997.

Final codified subpart	Final subcategorization scheme	Types of products covered in the subpart
A	Dissolving Kraft	Dissolving pulp at kraft mills (Fa)
B	Bleached Papergrade Kraft and Soda	Market pulp at bleached kraft mills (Ga); paperboard, coarse paper, and tissue paper at bleached kraft mills (Ha); pulp and fine papers at bleached kraft mills (Ia); and pulp and paper at soda mills (Pa).
		Pulp and paper at unbleached kraft mills including linerboard or bag paper

C	Unbleached Kraft	and other mixed products (Aa); pulp and paper using the unbleached kraft-neutral sulfite semi-chemical (cross recovery) process (Da); and pulp and paper at combined unbleached kraft and semi-chemical mills, wherein the spent semi-chemical cooking liquor is burned within the unbleached kraft chemical recovery system (Va).
D	Dissolving Sulfite	Pulp at dissolving sulfite mills for the following grades: nitration, viscose, cellophane, and acetate (Ka).
E	Papergrade Sulfite? Calcium-, Magnesium-, or Sodium-based pulps ?Ammonium-based pulps. ?Specialty grade pulps.	Pulp and paper at papergrade sulfite mills where blow pit pulp washing techniques are used (Ja) and pulp and paper at papergrade sulfite mills where vacuum or pressure drums are used to wash pulp (Ua).
F	Semi-Chemical	Pulp and paper at semi-chemical mills using an ammonia base or a sodium base (Ba).
G	Mechanical Pulp	Pulp and paper at groundwood chemi-mechanical mills (La); pulp and paper at groundwood mills through the application of the thermo-mechanical process (Ma); pulp and coarse paper, molded pulp products, and newsprint at groundwood mills (Na); and pulp and fine paper at groundwood mills (Oa).
H	Non-Wood Chemical Pulp	Pulp and paper at non-wood chemical pulp mills.
I	Secondary Fiber Deink	Pulp and paper at deink mills including fine papers, tissue papers, or newsprint (Qa).
J	Secondary Fiber Non-Deink	Paperboard from wastepaper from noncorrugating medium furnish or from corrugating medium furnish (Ea); tissue paper from wastepaper without deinking at secondary fiber mills (Ta); molded products from wastepaper without deinking (Wa); and builders' paper and roofing felt from wastepaper (40 CFR part 431, subpart A a).
K	Fine and Lightweight Papers from Purchased Pulp	Fine Papers at nonintegrated mills using wood fiber furnish or cotton fiber furnish (Ra); and lightweight papers at nonintegrated mills or lightweight electrical papers at nonintegrated mills (Xa).
L	Tissue, Filter, Non-woven, and Paperboard from Purchased Pulp	Tissue papers at nonintegrated mills (Sa); filter and non-woven papers at nonintegrated mills (Ya); and paperboard at nonintegrated mills (Za).

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40 CFR PART 430—THE PULP, PAPER, AND PAPERBOARD POINT SOURCE CATEGORY

PART 430—THE PULP, PAPER, AND PAPERBOARD POINT SOURCE CATEGORY

Authority: Sections 301, 304, 306, 307, 308, 402, and 501 of the Clean Water Act, as amended, (33 U.S.C. 1311, 1314, 1316, 1317, 1318, 1342, and 1361), and Section 112 of the Clean Air Act, as amended (42 U.S.C. 7412).

Source: 63 FR 18635, Apr. 15, 1998, unless otherwise noted.

General Provisions
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§ 430.00 Applicability.
top
(a) This part applies to any pulp, paper, or paperboard mill that discharges or may discharge process wastewater pollutants to the waters of the United States, or that introduces or may introduce process wastewater pollutants into a publicly owned treatment works.

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Subcategorization Scheme With References to Former Subparts Contained in the July 1, 1997 Edition of 40 CFR Parts 425 Through 699

Final codified subpart	Final subcategorization scheme	Types of products covered in the subpart
A	Dissolving Kraft	Dissolving pulp at kraft mills (F\a\)
B	Bleached Papergrade Kraft and Market pulp at bleached kraft mills (G\a\); Soda. paperboard, coarse paper, and tissue paper at bleached kraft mills (H\a\); pulp and fine papers at bleached kraft mills (I\a\); and pulp and paper at soda mills (P\a\).	
C	Unbleached Kraft	Pulp and paper at unbleached kraft mills including linerboard or bag paper and other mixed products (A\a\); pulp and paper using the unbleached kraft-neutral sulfite semi-chemical (cross recovery) process (D\a\); and pulp and paper at combined unbleached kraft and semi-chemical mills, wherein the spent semi-chemical cooking liquor is burned within the unbleached kraft chemical recovery system (V\a\).
D	Dissolving Sulfite	Pulp at dissolving sulfite mills for the following grades: nitration, viscose, cellophane, and acetate (K\a\).
E	Papergrade Sulfite	Pulp and paper at papergrade sulfite mills where _Calcium-, Magnesium-, or blow pit pulp washing techniques are used (J\a\) Sodium-based pulps. and pulp and paper at papergrade sulfite mills _Ammonium-based pulps where vacuum or pressure drums are used to wash _Specialty grade pulps pulp (U\a\).
F	Semi-Chemical	Pulp and paper at semi-chemical mills using an ammonia base or a sodium base (B\a\).
G	Mechanical Pulp	Pulp and paper at groundwood chemi-mechanical mills (L\a\); pulp and paper at groundwood mills through the application of the thermo-mechanical process (M\a\); pulp and coarse paper, molded pulp

products, and newsprint at groundwood mills (N\a\);
and pulp and fine paper at groundwood mills (O\a\).
H..... Non-Wood Chemical Pulp..... Pulp and paper at non-wood chemical pulp mills.
I..... Secondary Fiber Deink..... Pulp and paper at deink mills including fine papers, tissue papers, or newsprint (Q\a\).
J..... Secondary Fiber Non-Deink..... Paperboard from wastepaper from noncorrugating medium furnish or from corrugating medium furnish (E\a\); tissue paper from wastepaper without deinking at secondary fiber mills (T\a\); molded products from wastepaper without deinking (W\a\); and builders' paper and roofing felt from wastepaper (40 CFR Part 431, Subpart A \a\).
K..... Fine and Lightweight Papers Fine Papers at nonintegrated mills using wood fiber from Purchased Pulp. furnish or cotton fiber furnish (R\a\); and lightweight papers at nonintegrated mills or lightweight electrical papers at nonintegrated mills (X\a\).
L..... Tissue, Filter, Non-woven, and Tissue papers at nonintegrated mills (S\a\); filter Paperboard from Purchased and non-woven papers at nonintegrated mills (Y\a\); Pulp. and paperboard at nonintegrated mills (Z\a\).

\a\ This subpart is contained in the 40 CFR parts 425 through 699, edition revised as of July 1, 1997.

§ 430.01 General definitions.

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In addition to the definitions set forth in 40 CFR part 401 and 40 CFR 403.3, the following definitions apply to this part:

(a) Adsorbable organic halides (AOX). A bulk parameter that measures the total mass of chlorinated organic matter in water and wastewater.

(b) Annual average. The mean concentration, mass loading or production-normalized mass loading of a pollutant over a period of 365 consecutive days (or such other period of time determined by the permitting authority to be sufficiently long to encompass expected variability of the concentration, mass loading, or production-normalized mass loading at the relevant point of measurement).

(c) Bleach plant. All process equipment used for bleaching beginning with the first application of bleaching agents (e.g., chlorine, chlorine dioxide, ozone, sodium or calcium hypochlorite, or peroxide), each subsequent extraction stage, and each subsequent stage where bleaching agents are applied to the pulp. For mills in subpart E of this part producing specialty grades of pulp, the bleach plant includes process equipment used for the hydrolysis or extraction stages prior to the first application of bleaching agents. Process equipment used for oxygen delignification prior to the application of bleaching agents is not part of the bleach plant.

(d) Bleach plant effluent. The total discharge of process wastewaters from the bleach plant from each physical bleach line operated at the mill, comprising separate acid and alkaline filtrates or the combination thereof.

(e) Chemical oxygen demand (COD). A bulk parameter that measures the oxygen-consuming capacity of organic and inorganic matter present in water or wastewater. It is expressed as the amount of oxygen consumed from a chemical oxidant in a specific test.

(f) Elemental chlorine-free (ECF). Any process for bleaching pulps in the absence of elemental chlorine and hypochlorite that uses exclusively chlorine dioxide as the only chlorine-containing bleaching agent.

(g) End of the pipe. The point at which final mill effluent is discharged to waters of the United States or introduced to a POTW.

(h) Fiber line. A series of operations employed to convert wood or other fibrous raw material into pulp. If the final product is bleached pulp, the fiber line encompasses pulping, de-knotting, brownstock washing, pulp screening, centrifugal cleaning, and multiple bleaching and washing stages.

(i) Minimum level (ML). The level at which the analytical system gives recognizable signals and an acceptable calibration point. The following minimum levels apply to pollutants in this part:

Pollutant Method Minimum level

2,3,7,8-TCDD..... 1613 10 pg/L \a\
2,3,7,8-TCDF..... 1613 10 pg/L \a\
Trichlorosyringol..... 1653 2.5 ug/L \b\
3,4,5-Trichlorocatechol..... 1653 5.0 ug/L \b\
3,4,6-Trichlorocatechol..... 1653 5.0 ug/L \b\
3,4,5-Trichloroguaiacol..... 1653 2.5 ug/L \b\
3,4,6-Trichloroguaiacol..... 1653 2.5 ug/L \b\
4,5,6-Trichloroguaiacol..... 1653 2.5 ug/L \b\
2,4,5-Trichlorophenol..... 1653 2.5 ug/L \b\
2,4,6-Trichlorophenol..... 1653 2.5 ug/L \b\
Tetrachlorocatechol..... 1653 5.0 ug/L \b\
Tetrachloroguaiacol..... 1653 5.0 ug/L \b\
2,3,4,6-Tetrachlorophenol..... 1653 2.5 ug/L \b\
Pentachlorophenol..... 1653 5.0 ug/L \b\
AOX..... 1650 20 ug/L \b\

\a\ Picograms per liter.
\b\ Micrograms per liter.

(j) New source. (1) Notwithstanding the criteria codified at 40 CFR 122.29(b)(1), a source subject to subpart B or E of this part is a "new source" if it meets the definition of "new source" at 40 CFR 122.2 and:

(i) It is constructed at a site at which no other source is located; or

(ii) It totally replaces the process or production equipment that causes the discharge of pollutants at an existing source, including the total replacement of a fiber line that causes the discharge of pollutants at an existing source, except as provided in paragraph (j)(2) of this section; or

(iii) Its processes are substantially independent of an existing source at the same site. In determining whether these processes are substantially independent, the Director shall consider such factors as the extent to which the new facility is integrated with the existing plant; and the extent to which the new facility is engaged in the same general type of activity as the existing source.

(2) The following are examples of changes made by mills subject to subparts B or E of this part that alone do not cause an existing mill to become a "new source":

(i) Upgrades of existing pulping operations;

(ii) Upgrades or replacement of pulp screening and washing operations;

(iii) Installation of extended cooking and/or oxygen delignification systems or other post-digester, pre-bleaching delignification systems;

(iv) Bleach plant modifications including changes in methods or amounts of chemical applications, new chemical applications, installation of new bleaching towers to facilitate replacement of sodium or calcium hypochlorite, and installation of new pulp washing systems; or

(v) Total replacement of process or production equipment that causes the discharge of pollutants at an existing source (including a replacement fiber line), but only if such replacement is performed for the purpose of achieving limitations that have been included in the discharger's NPDES permit pursuant to §430.24(b).

(k) Non-continuous discharger. (1) Except as provided in paragraph (k)(2) of this section, a non-continuous discharger is a mill which is prohibited by the NPDES authority from discharging pollutants during specific periods of time for reasons other than treatment plant upset control, such periods being at least 24 hours in duration. A mill shall not be deemed a non-continuous discharger unless its permit, in addition to setting forth the prohibition described above, requires compliance with the effluent limitations established for non-continuous dischargers and also requires compliance with maximum day and average of 30 consecutive days effluent limitations. Such maximum day and average of 30 consecutive days effluent limitations for non-continuous dischargers shall be established by the NPDES authority in the form of concentrations which reflect wastewater treatment levels that are representative of the application of the best practicable control technology currently available, the best conventional pollutant control technology, or new source performance standards in lieu of the maximum day and average of 30 consecutive days effluent limitations for conventional pollutants set forth in each subpart.

(2) A mill is a non-continuous discharger for the purposes of determining applicable effluent limitations under subpart B or E of this part (other than conventional limits for existing sources) if, for reasons other than treatment plant upset control

(e.g., protecting receiving water quality), the mill is prohibited by the NPDES authority from discharging pollutants during specific periods of time or if it is required to release its discharge on a variable flow or pollutant loading rate basis.

(l) POTW. Publicly owned treatment works as defined at 40 CFR 403.3(o).

(m) Process wastewater. For subparts B and E only, process wastewater is any water that, during manufacturing or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, byproduct, or waste product. For purposes of subparts B and E of this part, process wastewater includes boiler blowdown; wastewaters from water treatment and other utility operations; blowdowns from high rate (e.g., greater than 98 percent) recycled non-contact cooling water systems to the extent they are mixed and co-treated with other process wastewaters; wastewater, including leachates, from landfills owned by pulp and paper mills subject to subpart B or E of this part if the wastewater is commingled with wastewater from the mill's manufacturing or processing facility; and storm waters from the immediate process areas to the extent they are mixed and co-treated with other process wastewaters. For purposes of this part, contaminated groundwaters from on-site or off-site groundwater remediation projects are not process wastewater.

(n) Production. (1) For all limitations and standards specified in this part except those pertaining to AOX and chloroform: Production shall be defined as the annual off-the-machine production (including off-the-machine coating where applicable) divided by the number of operating days during that year. Paper and paperboard production shall be measured at the off-the-machine moisture content, except for subpart C of this part (as it pertains to pulp and paperboard production at unbleached kraft mills including linerboard or bag paper and other mixed products, and to pulp and paperboard production using the unbleached kraft neutral sulfite semi-chemical (cross recovery) process), and subparts F and J of this part (as they pertain to paperboard production from wastepaper from noncorrugating medium furnish or from corrugating medium furnish) where paper and paperboard production shall be measured in air-dry-tons (10% moisture content). Market pulp shall be measured in air-dry tons (10% moisture). Production shall be determined for each mill based upon past production practices, present trends, or committed growth.

(2) For AOX and chloroform limitations and standards specified in subparts B and E of this part: Production shall be defined as the annual unbleached pulp production entering the first stage of the bleach plant divided by the number of operating days during that year. Unbleached pulp production shall be measured in air-dried-metric-tons (10% moisture) of brownstock pulp entering the bleach plant at the stage during which chlorine or chlorine-containing compounds are first applied to the pulp. In the case of bleach plants that use totally chlorine free bleaching processes, unbleached pulp production shall be measured in air-dried-metric tons (10% moisture) of brownstock pulp entering the first stage of the bleach plant from which wastewater is discharged. Production shall be determined for each mill based upon past production practices, present trends, or committed growth.

(o) TCDD. 2,3,7,8-tetrachlorodibenzo-p-dioxin.

(p) TCDF. 2,3,7,8-tetrachlorodibenzofuran.

(q) Totally chlorine-free (TCF) bleaching. Pulp bleaching operations that are performed without the use of chlorine, sodium hypochlorite, calcium hypochlorite, chlorine dioxide, chlorine monoxide, or any other chlorine-containing compound.

(r) Wet Barking. Wet barking operations shall be defined to include hydraulic barking operations and wet drum barking operations which are those drum barking operations that use substantial quantities of water in either water sprays in the barking drums or in a partial submersion of the drums in a "tub" of water.

[63 FR 18635, Apr. 15, 1998; 63 FR 42239, Aug. 7, 1998]

§ 430.02 Monitoring requirements.
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This section establishes minimum monitoring frequencies for certain pollutants. Where no monitoring frequency is specified in this section or where the duration of the minimum monitoring frequency has expired under paragraphs (b) through (e) of this section, the permit writer or pretreatment control authority shall determine the appropriate monitoring frequency in accordance with 40 CFR 122.44(i) or 40 CFR part 403, as applicable.

(a) BAT, NSPS, PSES, and PSNS monitoring frequency for chlorinated organic pollutants. The following monitoring frequencies apply to discharges subject to subpart B or subpart E of this part:

Minimum monitoring frequency
CAS number Pollutant ----------
Non-TCF \a\ TCF \b\

1198556..... Tetrachlorocatechol..... Monthly..... (\c\)

2539175..... Tetrachloroguaiacol..... Monthly..... (\c\)
2539266..... Trichlorosyringol..... Monthly..... (\c\)
2668248..... 4,5,6-trichloroguaiacol. Monthly..... (\c\)
32139723..... 3,4,6-trichlorocatechol. Monthly..... (\c\)
56961207..... 3,4,5-trichlorocatechol. Monthly..... (\c\)
57057837..... 3,4,5-trichloroguaiacol. Monthly..... (\c\)
58902..... 2,3,4,6- Monthly..... (\c\)
tetrachlorophenol.
60712449..... 3,4,6-trichloroguaiacol. Monthly..... (\c\)
87865..... Pentachlorophenol \d\... Monthly..... (\c\)
88062..... 2,4,6-trichlorophenol Monthly..... (\c\)
\d\.
95954..... 2,4,5-trichlorophenol Monthly..... (\c\)
\d\.
1746016..... 2,3,7,8-TCDD..... Monthly..... (\c\)
51207319..... 2,3,7,8-TCDF..... Monthly..... (\c\)
67663..... chloroform \e\..... Weekly..... (\c\)
59473040..... AOX \f\..... Daily..... None specified.

\a\ Non-TCF: Pertains to any fiber line that does not use exclusively TCF bleaching processes.
\b\ TCF: Pertains to any fiber line that uses exclusively TCF bleaching processes, as disclosed by the discharger in its permit application under 40 CFR 122.21(g)(3) and certified under 40 CFR 122.22 or, for indirect dischargers, as reported to the pretreatment control authority under 40 CFR 403.12 (b), (d), or (e).
\c\ This regulation does not specify a limit for this pollutant for TCF bleaching processes.
\d\ Monitoring frequency does not apply to this compound when used as a biocide. The permitting or pretreatment control authority must determine the appropriate monitoring frequency for this compound, when used as a biocide, under 40 CFR 122.44(i) or 40 CFR part 403, as applicable.
\e\ This regulation does not specify a limit for this pollutant for Subpart E mills.
\f\ This regulation does not specify a limit for this pollutant for the ammonium-based or specialty grade sulfite pulp segments of Subpart E.

(b) Duration of required monitoring for BAT, NSPS, PSES, and PSNS. The monitoring frequencies specified in paragraph (a) of this section apply for the following time periods:

(1) For direct dischargers, a duration of 5 years commencing on the date the applicable limitations or standards from subpart B or subpart E of this part are first included in the discharger's NPDES permit;

(2) For existing indirect dischargers, until April 17, 2006;

(3) For new indirect dischargers, a duration of 5 years commencing on the date the indirect discharger commences operation.

(c) Reduced monitoring frequencies for bleach plant pollutants under the Voluntary Advanced Technology Incentives Program. The following monitoring frequencies apply to mills enrolled in the Voluntary Advanced Technology Incentives Program established under subpart B of this part for a duration of 5 years commencing after achievement of the applicable BAT limitations specified in §430.24(b)(3) or NSPS specified in §430.25(c)(1) for the following pollutants, except as noted in footnote f:

Minimum monitoring frequency
CAS number Pollutant ----------
Non-ECF \a\ Advanced ECF \b,f\ TCF \c\

1198556..... Tetrachlorocatecho Monthly..... Monthly (\d\)
l.
2539175..... Tetrachloroguiacol Monthly..... Monthly (\d\)
2539266..... Trichlorosyringol. Monthly..... Monthly (\d\)
2668248..... 4,5,6- Monthly..... Monthly (\d\)
trichloroguaiacol.
32139723..... 3,4,6- Monthly..... Monthly (\d\)
trichlorocatechol.
56961207..... 3,4,5- Monthly..... Monthly (\d\)
trichlorocatechol.
57057837..... 3,4,5- Monthly..... Monthly (\d\)

trichloroguaiacol.
58902..... 2,3,4,6- Monthly..... Monthly (\d\)
tetrachlorophenol.
60712449..... 3,4,6- Monthly..... Monthly (\d\)
trichloroguaiacol.
87865..... Pentachlorophenol Monthly..... Monthly (\d\)
\e\.
88062..... 2,4,6- Monthly..... Monthly (\d\)
trichlorophenol
\e\.
95954..... 2,4,5- Monthly..... Monthly (\d\)
trichlorophenol
\e\.
1746016..... 2,3,7,8-TCDD..... Monthly..... Monthly (\d\)
51207319..... 2,3,7,8-TCDF..... Monthly..... Monthly (\d\)
67663..... Chloroform..... Weekly..... Monthly (\d\)

\a\ Non-ECF: Pertains to any fiber line that does not use exclusively ECF or TCF bleaching processes.
\b\ Advanced ECF: Pertains to any fiber line that uses exclusively Advanced ECF bleaching processes, or exclusively ECF and TCF bleaching processes as disclosed by the discharger in its permit application under 40 CFR 122.21(g)(3) and certified under 40 CFR 122.22. Advanced ECF consists of the use of extended delignification or other technologies that achieve at least the Tier I performance levels specified in § 430.24(b)(4)(i).
\c\ TCF: Pertains to any fiber line that uses exclusively TCF bleaching processes, as disclosed by the discharger in its permit application under 40 CFR 122.21(g)(3) and certified under 40 CFR 122.22.
\d\ This regulation does not specify a limit for this pollutant for TCF bleaching processes.
\e\ Monitoring frequency does not apply to this compound when used as a biocide. The permitting authority must determine the appropriate monitoring frequency for this compound, when used as a biocide, under 40 CFR 122.44(i).
\f\ Monitoring requirements for these pollutants by mills certifying as Advanced ECF in their NPDES permit application or other communication to the permitting authority will be suspended after one year of monitoring. The permitting authority must determine the appropriate monitoring frequency for these pollutants beyond that time under 40 CFR 122.44(i).

(d) Reduced monitoring frequencies for AOX under the Voluntary Advanced Technology Incentives Program (year one). The following monitoring frequencies apply to direct dischargers enrolled in the Voluntary Advanced Technology Incentives Program established under Subpart B of this part for a duration of one year after achievement of the applicable BAT limitations specified in §430.24(b)(4)(i) or NSPS specified in §430.25(c)(2):

Advanced ECF, any tier
CAS number Pollutant Non-ECF, any tier \a\ \b\ TCF, any tier \c\

59473040..... AOX..... Daily..... Weekly..... None specified.

\a\ Non-ECF: Pertains to any fiber line that does not use exclusively ECF or TCF bleaching processes.
\b\ Advanced ECF: Pertains to any fiber line that uses exclusively Advanced ECF bleaching processes or exclusively ECF and TCF bleaching processes, as disclosed by the discharger in its permit application under 40 CFR 122.21(g)(3) and certified under 40 CFR 122.22. Advanced ECF consists of the use of extended delignification or other technologies that achieve at least the Tier I performance levels specified in § 430.24(b)(4)(i).
\c\ TCF: Pertains to any fiber line that uses exclusively TCF bleaching processes, as disclosed by the discharger in its permit application under 40 CFR 122.21(g)(3) and certified under 40 CFR 122.22.

(e) Reduced monitoring frequencies for AOX under the Voluntary Advanced Technology Incentives Program (years two through five). The following monitoring frequencies apply to mills enrolled in the Voluntary Advanced Technology Incentives Program established under Subpart B of this part for a duration of four years starting one year after achievement of the applicable BAT limitations specified in §430.24(b)(4)(i) or NSPS specified in §430.25(c)(2):

Advanced ECF_tier I Advanced ECF_tier II Advanced ECF_tier

CAS number Pollutant Non-ECF any tier \a\ \b\ \b\ III \b\ TCF_ any tier \c\

59473040..... AOX..... Daily..... Monthly..... Quarterly..... Annually..... None specified.

\a\ Non-ECF: Pertains to any fiber line that does not use exclusively ECF or TCF bleaching processes.
\b\ Advanced ECF: Pertains to any fiber line that uses exclusively Advanced ECF bleaching processes or exclusively ECF and TCF bleaching processes, as
disclosed by the discharger in its permit application under 40 CFR 122.21(g)(3) and certified under 40 CFR 122.22. Advanced ECF consists of the use of
extended delignification or other technologies that achieve at least the Tier I performance levels specified in § 430.24(b)(4)(i).
\c\ TCF: Pertains to any fiber line that uses exclusively TCF bleaching processes, as disclosed by the discharger in its permit application under 40 CFR
122.21(g)(3) and certified under 40 CFR 122.22.

(f) Certification in Lieu of Monitoring for Chloroform—(1) Under what circumstances may a discharger be exempt from the minimum monitoring requirements of this section for chloroform? A discharger subject to limitations or standards for chloroform under subpart B of this part is not subject to the minimum monitoring requirements specified in this section for chloroform at a fiber line to which the limitations or standards apply if the discharger meets the requirements of this section.

(2) How do I qualify for the exemption? At the time you request an exemption from the minimum monitoring requirements of this section for chloroform from your permitting authority or pretreatment control authority for a fiber line, you must:

(i) Demonstrate, based on 104 measurements taken over a period of not less than two years of monitoring conducted in accordance with paragraph (a) of this section, that you are complying with the applicable limitations or standards for chloroform;

(ii) Certify that you will maintain a record of the maximum value for each of the following process and operating conditions for the fiber line that was recorded during the collection of each of the samples used to make the demonstration required under paragraph (f)(2)(i) of this section.

(A) The pH of the first chlorine dioxide bleaching stage;

(B) The chlorine (Cl2) content of chlorine dioxide (ClO2) used on the bleach line;

(C) The kappa factor of the first chlorine dioxide bleaching stage; and

(D) The total bleach line chlorine dioxide application rate;

(iii) Identify the chlorine-containing compound used for bleaching during the collection of samples used to make the demonstration required under paragraph (f)(2)(i) of this section; and

(iv) Certify that the fiber line does not use either elemental chlorine or hypochlorite as bleaching agents.

(3) What happens if I change the process and operating conditions on the fiber line so that one or more exceeds the maximum value recorded under paragraph (f)(2)(ii) of this section for that process and operating condition? If you wish to continue your exemption from the minimum monitoring requirements of this section for chloroform, you must:

(i) Demonstrate, based on monitoring conducted at a frequency similar to that required in paragraph (a) of this section and for a duration determined by the permitting or pretreatment control authority, that you are complying with the applicable limitations or standards for chloroform;

(ii) Certify that you will maintain a record of the maximum value for each of the following process and operating conditions for the fiber line that was recorded during the collection of each of the samples used to make the demonstration required under paragraph (f)(6)(i) of this section:

(A) The pH of the first chlorine dioxide bleaching stage;

(B) The chlorine (Cl2) content of chlorine dioxide (ClO2) used on the bleach line;

(C) The kappa factor of the first chlorine dioxide bleaching stage; and

(D) The total bleach line chlorine dioxide application rate;

(iii) Identify the chlorine-containing compound used for bleaching during the collection of each sample used to make the

demonstration required under paragraph (f)(3)(i) of this section; and

(iv) Certify that the fiber line does not use either elemental chlorine or hypochlorite as bleaching agents.

(4) What are my reporting obligations? You must certify in reports required under §122.41(l)(4) or §403.12(b) of this chapter, as appropriate, that the chlorine-containing compounds used for bleaching are unchanged from those identified under paragraph (f)(2)(iii) of this section and that the following process and operating conditions maintained on the fiber line during the reporting period have not exceeded the maximum value recorded for each such condition during the collection of the samples used to make the demonstration required under paragraphs (f)(2)(i) or (f)(3)(i) of this section:

(i) The pH of the first chlorine dioxide bleaching stage;

(ii) The chlorine (Cl2) content of chlorine dioxide (ClO2) used on the bleach line;

(iii) The kappa factor of the first chlorine dioxide bleaching stage; and

(iv) The total bleach line chlorine dioxide application rate.

(5) What happens if I fail to maintain the records described in paragraphs (f)(2)(ii) and (f)(3)(ii) of this section? You will be required to comply with the minimum monitoring requirements of this section for chloroform.

(6) What happens if I exceed the maximum value recorded under paragraphs (f)(2)(ii) or (f)(3)(ii) of this section for any of the process and operating conditions identified in that section?

(i) If for any reason (e.g., intentionally or due to process upset) you fail to maintain process and operating conditions at values equal to or less than the maximum value recorded under paragraphs (f)(2)(ii) or (f)(3)(ii) of this section for each such condition, you will be in violation of the applicable chloroform limitation or standard unless:

(A) Within 30 days, you notify your permitting or pretreatment control authority in writing of the exceedance; and

(B) You demonstrate compliance with the applicable chloroform limitation or standard by immediately monitoring the bleach plant effluent for chloroform at a frequency similar to that required in paragraph (a) of this section and for a duration determined by the permit or pretreatment control authority.

(ii) In order to continue your exemption from the minimum monitoring requirements of this section for chloroform, you must meet the requirements of paragraph (f)(6)(i) of this section and you must recertify that the fiber line process and operating conditions do not exceed the maximum value recorded under paragraphs (f)(2)(ii) or (f)(3)(ii) of this section for each of the parameters identified in those paragraphs.

(7) Definitions:

(i) Kappa factor—the ratio of available chlorine (total equivalent chlorine, as percent on oven dry pulp) to the kappa number of the pulp. Kappa number is the lignin content of pulp, as measured by a modified permanganate test corrected to 50 percent consumption of the chemical.

(ii) Total bleach line chlorine dioxide application rate—mass of chlorine dioxide applied in all stages of the bleach line per mass of unbleached pulp (i.e., lb/ton or kg/kkg).

(iii) Chlorine-containing compounds—compounds containing chlorine used in the bleach plant for bleaching, brightening, whitening, or viscosity control. These compounds include but are not limited to chlorine (Cl2), sodium hypochlorite (NaOCl), chlorine dioxide (ClO2) and chlorine monoxide (Cl2O).

[63 FR 18635, Apr. 15, 1998, as amended at 67 FR 58997, Sept. 19, 2002]

§ 430.03 Best management practices (BMPs) for spent pulping liquor, soap, and turpentine management, spill prevention, and control.

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(a) Applicability. This section applies to direct and indirect discharging pulp, paper, and paperboard mills with pulp production in subparts B (Bleached Papergrade Kraft and Soda) and E (Papergrade Sulfite).

(b) Specialized definitions—(1) Action Level: A daily pollutant loading that when exceeded triggers investigative or corrective action. Mills determine action levels by a statistical analysis of six months of daily measurements collected at the mill. For example, the lower action level may be the 75th percentile of the running seven-day averages (that value exceeded by 25 percent of the running seven-day averages) and the upper action level may be the 90th percentile of the running seven-day averages (that value exceeded by 10 percent of the running seven-day averages).

(2) Equipment Items in Spent Pulping Liquor, Soap, and Turpentine Service: Any process vessel, storage tank, pumping

system, evaporator, heat exchanger, recovery furnace or boiler, pipeline, valve, fitting, or other device that contains, processes, transports, or comes into contact with spent pulping liquor, soap, or turpentine. Sometimes referred to as "equipment items."

(3) Immediate Process Area: The location at the mill where pulping, screening, knotting, pulp washing, pulping liquor concentration, pulping liquor processing, and chemical recovery facilities are located, generally the battery limits of the aforementioned processes. "Immediate process area" includes spent pulping liquor storage and spill control tanks located at the mill, whether or not they are located in the immediate process area.

(4) Intentional Diversion: The planned removal of spent pulping liquor, soap, or turpentine from equipment items in spent pulping liquor, soap, or turpentine service by the mill for any purpose including, but not limited to, maintenance, grade changes, or process shutdowns.

(5) Mill: The owner or operator of a direct or indirect discharging pulp, paper, or paperboard manufacturing facility subject to this section.

(6) Senior Technical Manager: The person designated by the mill manager to review the BMP Plan. The senior technical manager shall be the chief engineer at the mill, the manager of pulping and chemical recovery operations, or other such responsible person designated by the mill manager who has knowledge of and responsibility for pulping and chemical recovery operations.

(7) Soap: The product of reaction between the alkali in kraft pulping liquor and fatty acid portions of the wood, which precipitate out when water is evaporated from the spent pulping liquor.

(8) Spent Pulping Liquor: For kraft and soda mills "spent pulping liquor" means black liquor that is used, generated, stored, or processed at any point in the pulping and chemical recovery processes. For sulfite mills "spent pulping liquor" means any intermediate, final, or used chemical solution that is used, generated, stored, or processed at any point in the sulfite pulping and chemical recovery processes (e.g., ammonium-, calcium-, magnesium-, or sodium-based sulfite liquors).

(9) Turpentine: A mixture of terpenes, principally pinene, obtained by the steam distillation of pine gum recovered from the condensation of digester relief gases from the cooking of softwoods by the kraft pulping process. Sometimes referred to as sulfate turpentine.

(c) Requirement to implement Best Management Practices. Each mill subject to this section must implement the Best Management Practices (BMPs) specified in paragraphs (c)(1) through (10) of this section. The primary objective of the BMPs is to prevent leaks and spills of spent pulping liquors, soap, and turpentine. The secondary objective is to contain, collect, and recover at the immediate process area, or otherwise control, those leaks, spills, and intentional diversions of spent pulping liquor, soap, and turpentine that do occur. BMPs must be developed according to best engineering practices and must be implemented in a manner that takes into account the specific circumstances at each mill. The BMPs are as follows:

(1) The mill must return spilled or diverted spent pulping liquors, soap, and turpentine to the process to the maximum extent practicable as determined by the mill, recover such materials outside the process, or discharge spilled or diverted material at a rate that does not disrupt the receiving wastewater treatment system.

(2) The mill must establish a program to identify and repair leaking equipment items. This program must include:

(i) Regular visual inspections (e.g., once per day) of process areas with equipment items in spent pulping liquor, soap, and turpentine service;

(ii) Immediate repairs of leaking equipment items, when possible. Leaking equipment items that cannot be repaired during normal operations must be identified, temporary means for mitigating the leaks must be provided, and the leaking equipment items repaired during the next maintenance outage;

(iii) Identification of conditions under which production will be curtailed or halted to repair leaking equipment items or to prevent pulping liquor, soap, and turpentine leaks and spills; and

(iv) A means for tracking repairs over time to identify those equipment items where upgrade or replacement may be warranted based on frequency and severity of leaks, spills, or failures.

(3) The mill must operate continuous, automatic monitoring systems that the mill determines are necessary to detect and control leaks, spills, and intentional diversions of spent pulping liquor, soap, and turpentine. These monitoring systems should be integrated with the mill process control system and may include, e.g., high level monitors and alarms on storage tanks; process area conductivity (or pH) monitors and alarms; and process area sewer, process wastewater, and wastewater treatment plant conductivity (or pH) monitors and alarms.

(4) The mill must establish a program of initial and refresher training of operators, maintenance personnel, and other

technical and supervisory personnel who have responsibility for operating, maintaining, or supervising the operation and maintenance of equipment items in spent pulping liquor, soap, and turpentine service. The refresher training must be conducted at least annually and the training program must be documented.

(5) The mill must prepare a brief report that evaluates each spill of spent pulping liquor, soap, or turpentine that is not contained at the immediate process area and any intentional diversion of spent pulping liquor, soap, or turpentine that is not contained at the immediate process area. The report must describe the equipment items involved, the circumstances leading to the incident, the effectiveness of the corrective actions taken to contain and recover the spill or intentional diversion, and plans to develop changes to equipment and operating and maintenance practices as necessary to prevent recurrence. Discussion of the reports must be included as part of the annual refresher training.

(6) The mill must establish a program to review any planned modifications to the pulping and chemical recovery facilities and any construction activities in the pulping and chemical recovery areas before these activities commence. The purpose of such review is to prevent leaks and spills of spent pulping liquor, soap, and turpentine during the planned modifications, and to ensure that construction and supervisory personnel are aware of possible liquor diversions and of the requirement to prevent leaks and spills of spent pulping liquors, soap, and turpentine during construction.

(7) The mill must install and maintain secondary containment (i.e., containment constructed of materials impervious to pulping liquors) for spent pulping liquor bulk storage tanks equivalent to the volume of the largest tank plus sufficient freeboard for precipitation. An annual tank integrity testing program, if coupled with other containment or diversion structures, may be substituted for secondary containment for spent pulping liquor bulk storage tanks.

(8) The mill must install and maintain secondary containment for turpentine bulk storage tanks.

(9) The mill must install and maintain curbing, diking or other means of isolating soap and turpentine processing and loading areas from the wastewater treatment facilities.

(10) The mill must conduct wastewater monitoring to detect leaks and spills, to track the effectiveness of the BMPs, and to detect trends in spent pulping liquor losses. Such monitoring must be performed in accordance with paragraph (i) of this section.

(d) Requirement to develop a BMP Plan. (1) Each mill subject to this section must prepare and implement a BMP Plan. The BMP Plan must be based on a detailed engineering review as described in paragraphs (d)(2) and (3) of this section. The BMP Plan must specify the procedures and the practices required for each mill to meet the requirements of paragraph (c) of this section, the construction the mill determines is necessary to meet those requirements including a schedule for such construction, and the monitoring program (including the statistically derived action levels) that will be used to meet the requirements of paragraph (i) of this section. The BMP Plan also must specify the period of time that the mill determines the action levels established under paragraph (h) of this section may be exceeded without triggering the responses specified in paragraph (i) of this section.

(2) Each mill subject to this section must conduct a detailed engineering review of the pulping and chemical recovery operations—including but not limited to process equipment, storage tanks, pipelines and pumping systems, loading and unloading facilities, and other appurtenant pulping and chemical recovery equipment items in spent pulping liquor, soap, and turpentine service—for the purpose of determining the magnitude and routing of potential leaks, spills, and intentional diversions of spent pulping liquors, soap, and turpentine during the following periods of operation:

(i) Process start-ups and shut downs;

(ii) Maintenance;

(iii) Production grade changes;

(iv) Storm or other weather events;

(v) Power failures; and

(vi) Normal operations.

(3) As part of the engineering review, the mill must determine whether existing spent pulping liquor containment facilities are of adequate capacity for collection and storage of anticipated intentional liquor diversions with sufficient contingency for collection and containment of spills. The engineering review must also consider:

(i) The need for continuous, automatic monitoring systems to detect and control leaks and spills of spent pulping liquor, soap, and turpentine;

(ii) The need for process wastewater diversion facilities to protect end-of-pipe wastewater treatment facilities from adverse effects of spills and diversions of spent pulping liquors, soap, and turpentine;

(iii) The potential for contamination of storm water from the immediate process areas; and

(iv) The extent to which segregation and/or collection and treatment of contaminated storm water from the immediate process areas is appropriate.

(e) Amendment of BMP Plan. (1) Each mill subject to this section must amend its BMP Plan whenever there is a change in mill design, construction, operation, or maintenance that materially affects the potential for leaks or spills of spent pulping liquor, turpentine, or soap from the immediate process areas.

(2) Each mill subject to this section must complete a review and evaluation of the BMP Plan five years after the first BMP Plan is prepared and, except as provided in paragraph (e)(1) of this section, once every five years thereafter. As a result of this review and evaluation, the mill must amend the BMP Plan within three months of the review if the mill determines that any new or modified management practices and engineered controls are necessary to reduce significantly the likelihood of spent pulping liquor, soap, and turpentine leaks, spills, or intentional diversions from the immediate process areas, including a schedule for implementation of such practices and controls. **(continued)**

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40 C.F.R. PART 430—THE PULP, PAPER, AND PAPERBOARD POINT SOURCE CATEGORY

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PART 430—THE PULP, PAPER, AND PAPERBOARD POINT SOURCE CATEGORY

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Appendix A to Part 430—Methods 1650 and 1653

Authority: Sections 301, 304, 306, 307, 308, 402, and 501 of the Clean Water Act, as amended, (33 U.S.C. 1311, 1314, 1316, 1317, 1318, 1342, and 1361), and Section 112 of the Clean Air Act, as amended (42 U.S.C. 7412).

Source: 63 FR 18635, Apr. 15, 1998, unless otherwise noted.

General Provisions

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§ 430.00 Applicability.

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(a) This part applies to any pulp, paper, or paperboard mill that discharges or may discharge process wastewater pollutants to the waters of the United States, or that introduces or may introduce process wastewater pollutants into a publicly owned treatment works.

(b) The following table presents the subcategorization scheme codified in this part, with references to former subpart designations contained in the 1997 edition of 40 CFR parts 425 through 699:

Subcategorization Scheme With References to Former Subparts Contained in the July 1, 1997 Edition of 40 CFR

§ 430.01 General definitions.

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In addition to the definitions set forth in 40 CFR part 401 and 40 CFR 403.3, the following definitions apply to this part:

(a) *Adsorbable organic halides (AOX).* A bulk parameter that measures the total mass of chlorinated organic matter in water and wastewater.

(b) *Annual average.* The mean concentration, mass loading or production-normalized mass loading of a pollutant over a period of 365 consecutive days (or such other period of time determined by the permitting authority to be sufficiently long to encompass expected variability of the concentration, mass loading, or production-normalized mass loading at the relevant point of measurement).

(c) *Bleach plant.* All process equipment used for bleaching beginning with the first application of bleaching agents (e.g., chlorine, chlorine dioxide, ozone, sodium or calcium hypochlorite, or peroxide), each subsequent extraction stage, and each subsequent stage where bleaching agents are applied to the pulp. For mills in subpart E of this part producing specialty grades of pulp, the bleach plant includes process equipment used for the hydrolysis or extraction stages prior to the first application of bleaching agents. Process equipment used for oxygen delignification prior to the application of bleaching agents is not part of the bleach plant.

(d) *Bleach plant effluent.* The total discharge of process wastewaters from the bleach plant from each physical bleach line operated at the mill, comprising separate acid and alkaline filtrates or the combination thereof.

(e) *Chemical oxygen demand (COD).* A bulk parameter that measures the oxygen-consuming capacity of organic and inorganic matter present in water or wastewater. It is expressed as the amount of oxygen consumed from a chemical oxidant in a specific test.

(f) *Elemental chlorine-free (ECF).* Any process for bleaching pulps in the absence of elemental chlorine and hypochlorite that uses exclusively chlorine dioxide as the only chlorine-containing bleaching agent.

(g) *End of the pipe.* The point at which final mill effluent is discharged to waters of the United States or introduced to a POTW.

(h) *Fiber line.* A series of operations employed to convert wood or other fibrous raw material into pulp. If the final product is bleached pulp, the fiber line encompasses pulping, de-knotting, brownstock washing, pulp screening, centrifugal cleaning, and multiple bleaching and washing stages.

(i) *Minimum level (ML).* The level at which the analytical system gives recognizable signals and an acceptable calibration point. The following minimum levels apply to pollutants in this part:

Pollutant	Meth

(j) *New source.* (1) Notwithstanding the criteria codified at 40 CFR 122.29(b)(1), a source subject to subpart B or E of this part is a "new source" if it meets the definition of "new source" at 40 CFR 122.2 and:

(i) It is constructed at a site at which no other source is located; or

(ii) It totally replaces the process or production equipment that causes the discharge of pollutants at an existing source, including the total replacement of a fiber line that causes the discharge of pollutants at an existing source, except as provided in paragraph (j)(2) of this section; or

(iii) Its processes are substantially independent of an existing source at the same site. In determining whether these processes are substantially independent, the Director shall consider such factors as the extent to which the new facility is integrated with the existing plant; and the extent to which the new facility is engaged in the same general type of activity as the existing source.

(2) The following are examples of changes made by mills subject to subparts B or E of this part that alone do not cause an existing mill to become a "new source":

(i) Upgrades of existing pulping operations;

(ii) Upgrades or replacement of pulp screening and washing operations;

(iii) Installation of extended cooking and/or oxygen delignification systems or other post-digester, pre-bleaching delignification systems;

(iv) Bleach plant modifications including changes in methods or amounts of chemical applications, new chemical applications, installation of new bleaching towers to facilitate replacement of sodium or calcium hypochlorite, and installation of new pulp washing systems; or

(v) Total replacement of process or production equipment that causes the discharge of pollutants at an existing source (including a replacement fiber line), but only if such replacement is performed for the purpose of achieving limitations that have been included in the discharger's NPDES permit pursuant to §430.24(b).

(k) *Non-continuous discharger.* (1) Except as provided in paragraph (k)(2) of this section, a non-continuous discharger is a mill which is prohibited by the NPDES authority from discharging pollutants during specific periods of time for reasons other than treatment plant upset control, such periods being at least 24 hours in duration. A mill shall not be deemed a non-continuous discharger unless its permit, in addition to setting forth the prohibition described above, requires compliance with the effluent limitations established for non-continuous dischargers and also requires compliance with maximum day and average of 30 consecutive days effluent limitations. Such maximum day and average of 30 consecutive days effluent limitations for non-continuous dischargers shall be established by the NPDES authority in the form of concentrations which reflect wastewater treatment levels that are representative of the application of the best practicable control technology currently available, the best conventional pollutant control technology, or new source performance standards in lieu of the maximum day and average of 30 consecutive days effluent limitations for conventional pollutants set forth in each subpart.

(2) A mill is a non-continuous discharger for the purposes of determining applicable effluent limitations under subpart B or E of this part (other than conventional limits for existing sources) if, for reasons other than treatment plant upset control (e.g., protecting receiving water quality), the mill is prohibited by the NPDES authority from discharging pollutants during specific periods of time or if it is required to release its discharge on a variable flow or pollutant loading rate basis.

(l) *POTW.* Publicly owned treatment works as defined at 40 CFR 403.3(o).

(m) *Process wastewater.* For subparts B and E only, process wastewater is any water that, during manufacturing or processing, comes into direct contact with or

results from the production or use of any raw material, intermediate product, finished product, byproduct, or waste product. For purposes of subparts B and E of this part, process wastewater includes boiler blowdown; wastewaters from water treatment and other utility operations; blowdowns from high rate (e.g., greater than 98 percent) recycled non-contact cooling water systems to the extent they are mixed and co-treated with other process wastewaters; wastewater, including leachates, from landfills owned by pulp and paper mills subject to subpart B or E of this part if the wastewater is commingled with wastewater from the mill's manufacturing or processing facility; and storm waters from the immediate process areas to the extent they are mixed and co-treated with other process wastewaters. For purposes of this part, contaminated groundwaters from on-site or off-site groundwater remediation projects are not process wastewater.

(n) *Production.* (1) For all limitations and standards specified in this part except those pertaining to AOX and chloroform: Production shall be defined as the annual off-the-machine production (including off-the-machine coating where applicable) divided by the number of operating days during that year. Paper and paperboard production shall be measured at the off-the-machine moisture content, except for subpart C of this part (as it pertains to pulp and paperboard production at unbleached kraft mills including linerboard or bag paper and other mixed products, and to pulp and paperboard production using the unbleached kraft neutral sulfite semi-chemical (cross recovery) process), and subparts F and J of this part (as they pertain to paperboard production from wastepaper from noncorrugating medium furnish or from corrugating medium furnish) where paper and paperboard production shall be measured in air-dry-tons (10% moisture content). Market pulp shall be measured in air-dry tons (10% moisture). Production shall be determined for each mill based upon past production practices, present trends, or committed growth.

(2) For AOX and chloroform limitations and standards specified in subparts B and E of this part: Production shall be defined as the annual unbleached pulp production entering the first stage of the bleach plant divided by the number of operating days during that year. Unbleached pulp production shall be measured in air-dried-metric-tons (10% moisture) of brownstock pulp entering the bleach plant at the stage during which chlorine or chlorine-containing compounds are first applied to the pulp. In the case of bleach plants that use totally chlorine free bleaching processes, unbleached pulp production shall be measured in air-dried-metric tons (10% moisture) of brownstock pulp entering the first stage of the bleach plant from which wastewater is discharged. Production shall be determined for each mill based upon past production practices, present trends, or committed growth.

(o) *TCDD.* 2,3,7,8-tetrachlorodibenzo-p-dioxin.

(p) *TCDF.* 2,3,7,8-tetrachlorodibenzofuran.

(q) *Totally chlorine-free (TCF) bleaching.* Pulp bleaching operations that are performed without the use of chlorine, sodium hypochlorite, calcium hypochlorite, chlorine dioxide, chlorine monoxide, or any other chlorine-containing compound.

(r) *Wet Barking.* Wet barking operations shall be defined to include hydraulic barking operations and wet drum barking operations which are those drum barking operations that use substantial quantities of water in either water sprays in the barking drums or in a partial submersion of the drums in a "tub" of water.

[63 FR 18635, Apr. 15, 1998; 63 FR 42239, Aug. 7, 1998]

§ 430.02 Monitoring requirements.

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This section establishes minimum monitoring frequencies for certain pollutants. Where no monitoring frequency is specified in this section or where the duration of

the minimum monitoring frequency has expired under paragraphs (b) through (e) of this section, the permit writer or pretreatment control authority shall determine the appropriate monitoring frequency in accordance with 40 CFR 122.44(i) or 40 CFR part 403, as applicable.

(a) *BAT, NSPS, PSES, and PSNS monitoring frequency for chlorinated organic pollutants.* The following monitoring frequencies apply to discharges subject to subpart B or subpart E of this part:

(b) *Duration of required monitoring for BAT, NSPS, PSES, and PSNS.* The monitoring frequencies specified in paragraph (a) of this section apply for the following time periods:

(1) For direct dischargers, a duration of 5 years commencing on the date the applicable limitations or standards from subpart B or subpart E of this part are first included in the discharger's NPDES permit;

(2) For existing indirect dischargers, until April 17, 2006;

(3) For new indirect dischargers, a duration of 5 years commencing on the date the indirect discharger commences operation.

(c) *Reduced monitoring frequencies for bleach plant pollutants under the Voluntary Advanced Technology Incentives Program.* The following monitoring frequencies apply to mills enrolled in the Voluntary Advanced Technology Incentives Program established under subpart B of this part for a duration of 5 years commencing after achievement of the applicable BAT limitations specified in §430.24(b)(3) or NSPS specified in §430.25(c)(1) for the following pollutants, except as noted in footnote f:

(d) *Reduced monitoring frequencies for AOX under the Voluntary Advanced Technology Incentives Program (year one).* The following monitoring frequencies apply to direct dischargers enrolled in the Voluntary Advanced Technology Incentives Program established under Subpart B of this part for a duration of one year after achievement of the applicable BAT limitations specified in §430.24(b)(4)(i) or NSPS specified in §430.25(c)(2):

(e) *Reduced monitoring frequencies for AOX under the Voluntary Advanced Technology Incentives Program (years two through five).* The following monitoring frequencies apply to mills enrolled in the Voluntary Advanced Technology Incentives Program established under Subpart B of this part for a duration of four years starting one year after achievement of the applicable BAT limitations specified in §430.24(b)(4)(i) or NSPS specified in §430.25(c)(2):

(f) *Certification in Lieu of Monitoring for Chloroform*—(1) *Under what circumstances may a discharger be exempt from the minimum monitoring requirements of this section for chloroform?* A discharger subject to limitations or standards for chloroform under subpart B of this part is not subject to the minimum monitoring requirements specified in this section for chloroform at a fiber

line to which the limitations or standards apply if the discharger meets the requirements of this section.

(2) *How do I qualify for the exemption?* At the time you request an exemption from the minimum monitoring requirements of this section for chloroform from your permitting authority or pretreatment control authority for a fiber line, you must:

(i) Demonstrate, based on 104 measurements taken over a period of not less than two years of monitoring conducted in accordance with paragraph (a) of this section, that you are complying with the applicable limitations or standards for chloroform;

(ii) Certify that you will maintain a record of the maximum value for each of the following process and operating conditions for the fiber line that was recorded during the collection of each of the samples used to make the demonstration required under paragraph (f)(2)(i) of this section.

(A) The pH of the first chlorine dioxide bleaching stage;

(B) The chlorine (Cl_2) content of chlorine dioxide (ClO_2) used on the bleach line;

(C) The kappa factor of the first chlorine dioxide bleaching stage; and

(D) The total bleach line chlorine dioxide application rate;

(iii) Identify the chlorine-containing compound used for bleaching during the collection of samples used to make the demonstration required under paragraph (f)(2)(i) of this section; and

(iv) Certify that the fiber line does not use either elemental chlorine or hypochlorite as bleaching agents.

(3) *What happens if I change the process and operating conditions on the fiber line so that one or more exceeds the maximum value recorded under paragraph (f)(2)(ii) of this section for that process and operating condition?* If you wish to continue your exemption from the minimum monitoring requirements of this section for chloroform, you must:

(i) Demonstrate, based on monitoring conducted at a frequency similar to that required in paragraph (a) of this section and for a duration determined by the permitting or pretreatment control authority, that you are complying with the applicable limitations or standards for chloroform;

(ii) Certify that you will maintain a record of the maximum value for each of the following process and operating conditions for the fiber line that was recorded during the collection of each of the samples used to make the demonstration required under paragraph (f)(6)(i) of this section:

(A) The pH of the first chlorine dioxide bleaching stage;

(B) The chlorine (Cl_2) content of chlorine dioxide (ClO_2) used on the bleach line;

(C) The kappa factor of the first chlorine dioxide bleaching stage; and

(D) The total bleach line chlorine dioxide application rate;

(iii) Identify the chlorine-containing compound used for bleaching during the collection of each sample used to make the demonstration required under paragraph (f)(3)(i) of this section; and

(iv) Certify that the fiber line does not use either elemental chlorine or hypochlorite as bleaching agents.

(4) *What are my reporting obligations?* You must certify in reports required under §122.41(l)(4) or §403.12(b) of this chapter, as appropriate, that the chlorine-

containing compounds used for bleaching are unchanged from those identified under paragraph (f)(2)(iii) of this section and that the following process and operating conditions maintained on the fiber line during the reporting period have not exceeded the maximum value recorded for each such condition during the collection of the samples used to make the demonstration required under paragraphs (f)(2)(i) or (f)(3)(i) of this section:

(i) The pH of the first chlorine dioxide bleaching stage;

(ii) The chlorine (Cl_2) content of chlorine dioxide (ClO_2) used on the bleach line;

(iii) The kappa factor of the first chlorine dioxide bleaching stage; and

(iv) The total bleach line chlorine dioxide application rate.

(5) *What happens if I fail to maintain the records described in paragraphs (f)(2)(ii) and (f)(3)(ii) of this section?* You will be required to comply with the minimum monitoring requirements of this section for chloroform.

(6) *What happens if I exceed the maximum value recorded under paragraphs (f)(2)(ii) or (f)(3)(ii) of this section for any of the process and operating conditions identified in that section?*

(i) If for any reason (e.g., intentionally or due to process upset) you fail to maintain process and operating conditions at values equal to or less than the maximum value recorded under paragraphs (f)(2)(ii) or (f)(3)(ii) of this section for each such condition, you will be in violation of the applicable chloroform limitation or standard unless:

(A) Within 30 days, you notify your permitting or pretreatment control authority in writing of the exceedance; and

(B) You demonstrate compliance with the applicable chloroform limitation or standard by immediately monitoring the bleach plant effluent for chloroform at a frequency similar to that required in paragraph (a) of this section and for a duration determined by the permit or pretreatment control authority.

(ii) In order to continue your exemption from the minimum monitoring requirements of this section for chloroform, you must meet the requirements of paragraph (f)(6)(i) of this section and you must recertify that the fiber line process and operating conditions do not exceed the maximum value recorded under paragraphs (f)(2)(ii) or (f)(3)(ii) of this section for each of the parameters identified in those paragraphs.

(7) *Definitions:*

(i) *Kappa factor*—the ratio of available chlorine (total equivalent chlorine, as percent on oven dry pulp) to the kappa number of the pulp. Kappa number is the lignin content of pulp, as measured by a modified permanganate test corrected to 50 percent consumption of the chemical.

(ii) *Total bleach line chlorine dioxide application rate*—mass of chlorine dioxide applied in all stages of the bleach line per mass of unbleached pulp (*i.e.,* lb/ton or kg/kkg).

(iii) *Chlorine-containing compounds*—compounds containing chlorine used in the bleach plant for bleaching, brightening, whitening, or viscosity control. These compounds include but are not limited to chlorine (Cl_2), sodium hypochlorite ($NaOCl$), chlorine dioxide (ClO_2) and chlorine monoxide (Cl_2O).

[63 FR 18635, Apr. 15, 1998, as amended at 67 FR 58997, Sept. 19, 2002]

§ 430.03 Best management practices (BMPs) for spent pulping liquor, soap, and turpentine management, spill prevention, and control.

top

(a) *Applicability.* This section applies to direct and indirect discharging pulp, paper, and paperboard mills with pulp production in subparts B (Bleached Papergrade Kraft and Soda) and E (Papergrade Sulfite).

(b) *Specialized definitions*—(1) *Action Level:* A daily pollutant loading that when exceeded triggers investigative or corrective action. Mills determine action levels by a statistical analysis of six months of daily measurements collected at the mill. For example, the lower action level may be the 75th percentile of the running seven-day averages (that value exceeded by 25 percent of the running seven-day averages) and the upper action level may be the 90th percentile of the running seven-day averages (that value exceeded by 10 percent of the running seven-day averages).

(2) *Equipment Items in Spent Pulping Liquor, Soap, and Turpentine Service:* Any process vessel, storage tank, pumping system, evaporator, heat exchanger, recovery furnace or boiler, pipeline, valve, fitting, or other device that contains, processes, transports, or comes into contact with spent pulping liquor, soap, or turpentine. Sometimes referred to as "equipment items."

(3) *Immediate Process Area:* The location at the mill where pulping, screening, knotting, pulp washing, pulping liquor concentration, pulping liquor processing, and chemical recovery facilities are located, generally the battery limits of the aforementioned processes. "Immediate process area" includes spent pulping liquor storage and spill control tanks located at the mill, whether or not they are located in the immediate process area.

(4) *Intentional Diversion:* The planned removal of spent pulping liquor, soap, or turpentine from equipment items in spent pulping liquor, soap, or turpentine service by the mill for any purpose including, but not limited to, maintenance, grade changes, or process shutdowns.

(5) *Mill:* The owner or operator of a direct or indirect discharging pulp, paper, or paperboard manufacturing facility subject to this section.

(6) *Senior Technical Manager:* The person designated by the mill manager to review the BMP Plan. The senior technical manager shall be the chief engineer at the mill, the manager of pulping and chemical recovery operations, or other such responsible person designated by the mill manager who has knowledge of and responsibility for pulping and chemical recovery operations.

(7) *Soap:* The product of reaction between the alkali in kraft pulping liquor and fatty acid portions of the wood, which precipitate out when water is evaporated from the spent pulping liquor.

(8) *Spent Pulping Liquor:* For kraft and soda mills "spent pulping liquor" means black liquor that is used, generated, stored, or processed at any point in the pulping and chemical recovery processes. For sulfite mills "spent pulping liquor" means any intermediate, final, or used chemical solution that is used, generated, stored, or processed at any point in the sulfite pulping and chemical recovery processes (e.g., ammonium-, calcium-, magnesium-, or sodium-based sulfite liquors).

(9) *Turpentine:* A mixture of terpenes, principally pinene, obtained by the steam distillation of pine gum recovered from the condensation of digester relief gases from the cooking of softwoods by the kraft pulping process. Sometimes referred to as sulfate turpentine.

(c) *Requirement to implement Best Management Practices.* Each mill subject to this section must implement the Best Management Practices (BMPs) specified in paragraphs (c)(1) through (10) of this section. The primary objective of the BMPs is to prevent leaks and spills of spent pulping liquors, soap, and turpentine. The secondary objective is to contain, collect, and recover at the immediate process area, or otherwise control, those leaks, spills, and intentional diversions of spent pulping liquor, soap, and turpentine that do occur. BMPs must be developed according to best engineering practices and must be implemented in a manner that takes into account the specific circumstances at each mill. The BMPs are as follows:

(1) The mill must return spilled or diverted spent pulping liquors, soap, and turpentine to the process to the maximum extent practicable as determined by the mill, recover such materials outside the process, or discharge spilled or diverted material at a rate that does not disrupt the receiving wastewater treatment system.

(2) The mill must establish a program to identify and repair leaking equipment items. This program must include:

(i) Regular visual inspections (e.g., once per day) of process areas with equipment items in spent pulping liquor, soap, and turpentine service;

(ii) Immediate repairs of leaking equipment items, when possible. Leaking equipment items that cannot be repaired during normal operations must be identified, temporary means for mitigating the leaks must be provided, and the leaking equipment items repaired during the next maintenance outage;

(iii) Identification of conditions under which production will be curtailed or halted to repair leaking equipment items or to prevent pulping liquor, soap, and turpentine leaks and spills; and

(iv) A means for tracking repairs over time to identify those equipment items where upgrade or replacement may be warranted based on frequency and severity of leaks, spills, or failures.

(3) The mill must operate continuous, automatic monitoring systems that the mill determines are necessary to detect and control leaks, spills, and intentional diversions of spent pulping liquor, soap, and turpentine. These monitoring systems should be integrated with the mill process control system and may include, e.g., high level monitors and alarms on storage tanks; process area conductivity (or pH) monitors and alarms; and process area sewer, process wastewater, and wastewater treatment plant conductivity (or pH) monitors and alarms.

(4) The mill must establish a program of initial and refresher training of operators, maintenance personnel, and other technical and supervisory personnel who have responsibility for operating, maintaining, or supervising the operation and maintenance of equipment items in spent pulping liquor, soap, and turpentine service. The refresher training must be conducted at least annually and the training program must be documented.

(5) The mill must prepare a brief report that evaluates each spill of spent pulping liquor, soap, or turpentine that is not contained at the immediate process area and any intentional diversion of spent pulping liquor, soap, or turpentine that is not contained at the immediate process area. The report must describe the equipment items involved, the circumstances leading to the incident, the effectiveness of the corrective actions taken to contain and recover the spill or intentional diversion, and plans to develop changes to equipment and operating and maintenance practices as necessary to prevent recurrence. Discussion of the reports must be included as part of the annual refresher training.

(6) The mill must establish a program to review any planned modifications to the pulping and chemical recovery facilities and any construction activities in the pulping and chemical recovery areas before these activities commence. The purpose of such review is to prevent leaks and spills of spent pulping liquor, soap, and turpentine during the planned modifications, and to ensure that construction and supervisory personnel are aware of possible liquor diversions and of the requirement to prevent leaks and spills of spent pulping liquors, soap, and turpentine during construction.

(7) The mill must install and maintain secondary containment (*i.e.*, containment constructed of materials impervious to pulping liquors) for spent pulping liquor bulk storage tanks equivalent to the volume of the largest tank plus sufficient freeboard for precipitation. An annual tank integrity testing program, if coupled with other containment or diversion structures, may be substituted for secondary containment for spent pulping liquor bulk storage tanks.

(8) The mill must install and maintain secondary containment for turpentine bulk storage tanks.

(9) The mill must install and maintain curbing, diking or other means of isolating soap and turpentine processing and loading areas from the wastewater treatment facilities.

(10) The mill must conduct wastewater monitoring to detect leaks and spills, to track the effectiveness of the BMPs, and to detect trends in spent pulping liquor losses. Such monitoring must be performed in accordance with paragraph (i) of this section.

(d) *Requirement to develop a BMP Plan.* (1) Each mill subject to this section must prepare and implement a BMP Plan. The BMP Plan must be based on a detailed engineering review as described in paragraphs (d)(2) and (3) of this section. The BMP Plan must specify the procedures and the practices required for each mill to meet the requirements of paragraph (c) of this section, the construction the mill determines is necessary to meet those requirements including a schedule for such construction, and the monitoring program (including the statistically derived action levels) that will be used to meet the requirements of paragraph (i) of this section. The BMP Plan also must specify the period of time that the mill determines the action levels established under paragraph (h) of this section may be exceeded without triggering the responses specified in paragraph (i) of this section.

(2) Each mill subject to this section must conduct a detailed engineering review of the pulping and chemical recovery operations—including but not limited to process equipment, storage tanks, pipelines and pumping systems, loading and unloading facilities, and other appurtenant pulping and chemical recovery equipment items in spent pulping liquor, soap, and turpentine service—for the purpose of determining the magnitude and routing of potential leaks, spills, and intentional diversions of spent pulping liquors, soap, and turpentine during the following periods of operation:

(i) Process start-ups and shut downs;

(ii) Maintenance;

(iii) Production grade changes;

(iv) Storm or other weather events;

(v) Power failures; and

(vi) Normal operations.

(3) As part of the engineering review, the mill must determine whether existing spent pulping liquor containment facilities are of adequate capacity for collection

and storage of anticipated intentional liquor diversions with sufficient contingency for collection and containment of spills. The engineering review must also consider:

(i) The need for continuous, automatic monitoring systems to detect and control leaks and spills of spent pulping liquor, soap, and turpentine;

(ii) The need for process wastewater diversion facilities to protect end-of-pipe wastewater treatment facilities from adverse effects of spills and diversions of spent pulping liquors, soap, and turpentine;

(iii) The potential for contamination of storm water from the immediate process areas; and

(iv) The extent to which segregation and/or collection and treatment of contaminated storm water from the immediate process areas is appropriate.

(e) *Amendment of BMP Plan.* (1) Each mill subject to this section must amend its BMP Plan whenever there is a change in mill design, construction, operation, or maintenance that materially affects the potential for leaks or spills of spent pulping liquor, turpentine, or soap from the immediate process areas.

(2) Each mill subject to this section must complete a review and evaluation of the BMP Plan five years after the first BMP Plan is prepared and, except as provided in paragraph (e)(1) of this section, once every five years thereafter. As a result of this review and evaluation, the mill must amend the BMP Plan within three months of the review if the mill determines that any new or modified management practices and engineered controls are necessary to reduce significantly the likelihood of spent pulping liquor, soap, and turpentine leaks, spills, or intentional diversions from the immediate process areas, including a schedule for implementation of such practices and controls.

(f) *Review and certification of BMP Plan.* The BMP Plan, and any amendments thereto, must be reviewed by the senior technical manager at the mill and approved and signed by the mill manager. Any person signing the BMP Plan or its amendments must certify to the permitting or pretreatment control authority under penalty of law that the BMP Plan (or its amendments) has been prepared in accordance with good engineering practices and in accordance with this regulation. The mill is not required to obtain approval from the permitting or pretreatment control authority of the BMP Plan or any amendments thereto.

(g) *Record keeping requirements.* (1) Each mill subject to this section must maintain on its premises a complete copy of the current BMP Plan and the records specified in paragraph (g)(2) of this section and must make such BMP Plan and records available to the permitting or pretreatment control authority and the Regional Administrator or his or her designee for review upon request.

(2) The mill must maintain the following records for 3 years from the date they are created:

(i) Records tracking the repairs performed in accordance with the repair program described in paragraph (c)(2) of this section;

(ii) Records of initial and refresher training conducted in accordance with paragraph (c)(4) of this section;

(iii) Reports prepared in accordance with paragraph (c)(5) of this section; and

(iv) Records of monitoring required by paragraphs (c)(10) and (i) of this section.

(h) *Establishment of wastewater treatment system influent action levels.* (1) Each mill subject to this section must conduct a monitoring program, described in paragraph (h)(2) of this section, for the purpose of defining wastewater treatment system influent characteristics (or action levels), described in paragraph (h)(3) of

this section, that will trigger requirements to initiate investigations on BMP effectiveness and to take corrective action.

(2) Each mill subject to this section must employ the following procedures in order to develop the action levels required by paragraph (h) of this section:

(i) *Monitoring parameters.* The mill must collect 24-hour composite samples and analyze the samples for a measure of organic content (e.g., Chemical Oxygen Demand (COD) or Total Organic Carbon (TOC)). Alternatively, the mill may use a measure related to spent pulping liquor losses measured continuously and averaged over 24 hours (e.g., specific conductivity or color).

(ii) *Monitoring locations.* For direct dischargers, monitoring must be conducted at the point influent enters the wastewater treatment system. For indirect dischargers monitoring must be conducted at the point of discharge to the POTW. For the purposes of this requirement, the mill may select alternate monitoring point(s) in order to isolate possible sources of spent pulping liquor, soap, or turpentine from other possible sources of organic wastewaters that are tributary to the wastewater treatment facilities (e.g., bleach plants, paper machines and secondary fiber operations).

(3) By the date prescribed in paragraph (j)(1)(iii) of this section, each existing discharger subject to this section must complete an initial six-month monitoring program using the procedures specified in paragraph (h)(2) of this section and must establish initial action levels based on the results of that program. A wastewater treatment influent action level is a statistically determined pollutant loading determined by a statistical analysis of six months of daily measurements. The action levels must consist of a lower action level, which if exceeded will trigger the investigation requirements described in paragraph (i) of this section, and an upper action level, which if exceeded will trigger the corrective action requirements described in paragraph (i) of this section.

(4) By the date prescribed in paragraph (j)(1)(vi) of this section, each existing discharger must complete a second six-month monitoring program using the procedures specified in paragraph (h)(2) of this section and must establish revised action levels based on the results of that program. The initial action levels shall remain in effect until replaced by revised action levels.

(5) By the date prescribed in paragraph (j)(2) of this section, each new source subject to this section must complete a six-month monitoring program using the procedures specified in paragraph (h)(2) of this section and must develop a lower action level and an upper action level based on the results of that program.

(6) Action levels developed under this paragraph must be revised using six months of monitoring data after any change in mill design, construction, operation, or maintenance that materially affects the potential for leaks or spills of spent pulping liquor, soap, or turpentine from the immediate process areas.

(i) *Monitoring, corrective action, and reporting requirements.* (1) Each mill subject to this section must conduct daily monitoring of the influent to the wastewater treatment system in accordance with the procedures described in paragraph (h)(2) of this section for the purpose of detecting leaks and spills, tracking the effectiveness of the BMPs, and detecting trends in spent pulping liquor losses.

(2) Whenever monitoring results exceed the lower action level for the period of time specified in the BMP Plan, the mill must conduct an investigation to determine the cause of such exceedance. Whenever monitoring results exceed the upper action level for the period of time specified in the BMP Plan, the mill must complete corrective action to bring the wastewater treatment system influent mass loading below the lower action level as soon as practicable.

(3) Although exceedances of the action levels will not constitute violations of an NPDES permit or pretreatment standard, failure to take the actions required by paragraph (i)(2) of this section as soon as practicable will be a permit or pretreatment standard violation.

(4) Each mill subject to this section must report to the NPDES permitting or pretreatment control authority the results of the daily monitoring conducted pursuant to paragraph (i)(1) of this section. Such reports must include a summary of the monitoring results, the number and dates of exceedances of the applicable action levels, and brief descriptions of any corrective actions taken to respond to such exceedances. Submission of such reports shall be at the frequency established by the NPDES permitting or pretreatment control authority, but in no case less than once per year.

(j) *Compliance deadlines*—(1) *Existing direct and indirect dischargers.* Except as provided in paragraph (j)(2) of this section for new sources, indirect discharging mills subject to this section must meet the deadlines set forth below. Except as provided in paragraph (j)(2) of this section for new sources, NPDES permits must require direct discharging mills subject to this section to meet the deadlines set forth below. If a deadline set forth below has passed at the time the NPDES permit containing the BMP requirement is issued, the NPDES permit must require immediate compliance with such BMP requirement(s).

(i) Prepare BMP Plans and certify to the permitting or pretreatment authority that the BMP Plan has been prepared in accordance with this regulation not later than April 15, 1999;

(ii) Implement all BMPs specified in paragraph (c) of this section that do not require the construction of containment or diversion structures or the installation of monitoring and alarm systems not later than April 15, 1999.

(iii) Establish initial action levels required by paragraph (h)(3) of this section not later than April 15, 1999.

(iv) Commence operation of any new or upgraded continuous, automatic monitoring systems that the mill determines to be necessary under paragraph (c)(3) of this section (other than those associated with construction of containment or diversion structures) not later than April 17, 2000.

(v) Complete construction and commence operation of any spent pulping liquor, collection, containment, diversion, or other facilities, including any associated continuous monitoring systems, necessary to fully implement BMPs specified in paragraph (c) of this section not later than April 16, 2001.

(vi) Establish revised action levels required by paragraph (h)(4) of this section as soon as possible after fully implementing the BMPs specified in paragraph (c) of this section, but not later than January 15, 2002.

(2) *New sources.* Upon commencing discharge, new sources subject to this section must implement all of the BMPs specified in paragraph (c) of this section, prepare the BMP Plan required by paragraph (d) of this section, and certify to the permitting or pretreatment authority that the BMP Plan has been prepared in accordance with this regulation as required by paragraph (f) of this section, except that the action levels required by paragraph (h)(5) of this section must be established not later than 12 months after commencement of discharge, based on six months of monitoring data obtained prior to that date in accordance with the procedures specified in paragraph (h)(2) of this section.

(k) The provisions of paragraphs (c) through (j) of this section do not apply to the bleached papergrade kraft mill, commonly known as the Androscoggin Mill, that is owned by International Paper and located in Jay, Maine. In lieu of imposing the

requirements specified in those paragraphs, the permitting authority shall establish conditions for the discharge of COD and color for this mill on the basis of best professional judgment.

[63 FR 18635, Apr. 15, 1998, as amended at 65 FR 46108, July 27, 2000]

Subpart A—Dissolving Kraft Subcategory

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§ 430.10 Applicability; description of the dissolving kraft subcategory.

top

The provisions of this subpart apply to discharges resulting from the production of dissolving pulp at kraft mills.

§ 430.11 Specialized definitions.

top

For the purpose of this subpart, the general definitions, abbreviations, and methods of analysis set forth in 40 CFR part 401 and §430.01 of this part shall apply to this subpart.

§ 430.12 Effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT).

top

(a) Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT), except that non-continuous dischargers shall not be subject to the maximum day and average of 30 consecutive days limitations but shall be subject to annual average effluent limitations:

Subpart A [BPT effluent limitations]

(b) The following limitations establish the quantity or quality of pollutants or pollutant properties, controlled by this section, resulting from the use of wet barking operations, which may be discharged by a point source subject to the provisions of this subpart. These limitations are in addition to the limitations set forth in paragraph (a) of this section and shall be calculated using the proportion of the mill's total production due to use of logs which are subject to such operations. Non-continuous dischargers shall not be subject to the maximum day and average of 30 consecutive days limitations, but shall be subject to annual average effluent limitations:

Subpart A [BPT effluent limitations]

(c) The following limitations establish the quantity or quality of pollutants or pollutant parameters, controlled by this section, resulting from the use of log washing or chip washing operations, which may be discharged by a point source subject to the provisions of this subpart. These limitations are in addition to the limitations set forth in paragraph (a) of this section and shall be calculated using the proportion of the mill's total production due to use of logs and/or chips which are subject to such operations. Non-continuous dischargers shall not be subject to

the maximum day and average of 30 consecutive days limitations, but shall be subject to the annual average effluent limitations:

Subpart A [BPT effluent limitations]----------

(d) The following limitations establish the quantity or quality of pollutants or pollutant properties, controlled by this section, resulting from the use of log flumes or log ponds, which may be discharged by a point source subject to the provisions of this subpart. These limitations are in addition to the limitations set forth in paragraph (a) of this section and shall be calculated using the proportion of the mill's total production due to use of logs which are subject to such operations. Non-continuous dischargers shall not be subject to the maximum day and average of 30 consecutive days limitations but shall be subject to the annual average effluent limitations:

Subpart A [BPT effluent limitations]----------

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

top

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart shall achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT): The limitations shall be the same as those specified for conventional pollutants (which are defined in 40 CFR 401.16) in §430.12 of this subpart for the best practicable control technology currently available (BPT).

§ 430.14 Effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT).

top

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart where chlorophenolic-containing biocides are used must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT). Non-continuous dischargers shall not be subject to the maximum day mass limitations in kg/kkg (lb/1000 lb) but shall be subject to concentration limitations. Concentration limitations are only applicable to non-continuous dischargers. Permittees not using chlorophenolic-containing biocides must certify to the permit-issuing authority that they are not using these biocides:

Subpart A [BAT effluent limitations]----------

§ 430.15 New source performance standards (NSPS).

top

Any new source subject to this subpart must achieve the following new source performance standards (NSPS), except that non-continuous dischargers shall not be subject to the maximum day and average of 30 consecutive days effluent limitations for BOD5 and TSS, but shall be subject to annual average effluent limitations. Also, for non-continuous dischargers, concentration limitations (mg/l) shall apply, where provided. Concentration limitations will only apply to non-

continuous dischargers. Only facilities where chlorophenolic-containing biocides are used shall be subject to pentachlorophenol and trichlorophenol limitations. Permittees not using chlorophenolic-containing biocides must certify to the permit-issuing authority that they are not using these biocides:

Subpart A [NSPS]----------

Maximum for any 1 day

§ 430.16 Pretreatment standards for existing sources (PSES).

top

Except as provided in 40 CFR 403.7 and 403.13, any existing source subject to this subpart that introduces pollutants into a publicly owned treatment works must: comply with 40 CFR part 403; and achieve the following pretreatment standards for existing sources (PSES) if it uses chlorophenolic-containing biocides. Permittees not using chlorophenolic-containing biocides must certify to the permit-issuing authority that they are not using these biocides. PSES must be attained on or before July 1, 1984:

Subpart A [

§ 430.17 Pretreatment standards for new sources (PSNS).

top

Except as provided in 40 CFR 403.7, any new source subject to this subpart that introduces pollutants into a publicly owned treatment works must: comply with 40 CFR part 403; and achieve the following pretreatment standards for new sources (PSNS) if it uses chlorophenolic-containing biocides. Permittees not using chlorophenolic-containing biocides must certify to the permit-issuing authority that they are not using these biocides:

Subpart A [

Subpart B—Bleached Papergrade Kraft and Soda Subcategory

top

§ 430.20 Applicability; description of the bleached papergrade kraft and soda subcategory.

top

The provisions of this subpart apply to discharges resulting from: The production of market pulp at bleached kraft mills; the integrated production of paperboard, coarse paper, and tissue paper at bleached kraft mills; the integrated production of pulp and fine papers at bleached kraft mills; and the integrated production of pulp and paper at soda mills.

§ 430.21 Specialized definitions.

top

(a) The general definitions, abbreviations, and methods of analysis set forth in 40 CFR part 401 and §430.01 of this part apply to this subpart.

(b) *Baseline BAT limitations or NSPS* means the BAT limitations specified in §430.24(a) (1) or (2), as applicable, and the NSPS specified in §430.25(b) (1) or (2), as applicable, that apply to any direct discharger that is not "enrolled" in the "Voluntary Advanced Technology Incentives Program."

(c) *Enroll* means to notify the permitting authority that a mill intends to participate in the "Voluntary Advanced Technology Incentives Program." A mill can enroll by indicating its intention to participate in the program either as part of its application for a National Pollutant Discharge Elimination System (NPDES) permit, or through separate correspondence to the permitting authority as long as the mill signs the correspondence in accordance with 40 CFR 122.22.

(d) *Existing effluent quality* means the level at which the pollutants identified in §430.24(a)(1) are present in the effluent of a mill "enrolled" in the "Voluntary Advanced Technology Incentives Program."

(e) *Kappa number* is a measure of the lignin content in unbleached pulp, determined after pulping and prior to bleaching.

(f) *Voluntary Advanced Technology Incentives Program* is the program established under §430.24(b) (for existing direct dischargers) and §430.25(c) (for new direct dischargers) whereby participating mills agree to accept enforceable effluent limitations and conditions in their NPDES permits that are more stringent than the "baseline BAT limitations or NSPS" that would otherwise apply, in exchange for regulatory- and enforcement-related rewards and incentives.

§ 430.22 Effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT).

top

(a) Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT):

Subpart B [BPT effluent limitations for bleached kraft facilities where market

Subpart B [BPT effluent limitations for bleached kraft facilities where

Subpart B [BPT effluent limitations for bleached kraft facilities where pulp and

Subpart B [BPT effluent limitations for soda facilities where pulp and paper are

(b) The following limitations establish the quantity or quality of pollutants or pollutant properties, controlled by this section, resulting from the use of wet barking operations, which may be discharged by a point source subject to the provisions of this subpart. These limitations are in addition to the limitations set forth in paragraph (a) of this section and shall be calculated using the proportion of the mill's total production due to use of logs which are subject to such operations:

Subpart B [BPT effluent limitations for bleached kraft facilities where market

Subpart B [BPT effluent limitations for bleached kraft facilities where

Subpart B [BPT effluent limitations for bleached kraft facilities where pulp and

Subpart B [BPT effluent limitations for soda facilities where pulp and papers are

(c) The following limitations establish the quantity or quality of pollutants or pollutant parameters, controlled by this section, resulting from the use of log washing or chip washing operations, which may be discharged by a point source subject to the provisions of this subpart. These limitations are in addition to the limitations set forth in paragraph (a) of this section and shall be calculated using the proportion of the mill's total production due to use of logs and/or chips which are subject to such operations:

Subpart B [BPT effluent limitations for bleached kraft facilities where market

Subpart B [BPT effluent limitations for bleached kraft facilities where

Subpart B [BPT effluent limitations for bleached kraft facilities where pulp and

Subpart B [BPT effluent limitations for soda facilities where pulp and papers are

(d) The following limitations establish the quantity or quality of pollutants or pollutant properties, controlled by this section, resulting from the use of log flumes or log ponds, which may be discharged by a point source subject to the provisions of this subpart. These limitations are in addition to the limitations set forth in paragraph (a) of this section and shall be calculated using the proportion of the mill's total production due to use of logs which are subject to such operations:

Subpart B [BPT effluent limitations for bleached kraft facilities where market

Subpart B [BPT effluent limitations for bleached kraft facilities where

Subpart B [BPT effluent limitations for bleached kraft facilities where pulp and

Subpart B [BPT effluent limitations for soda facilities where pulp and papers are

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

top

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT). The limitations shall be the same as those specified in §430.22 of this subpart for the best practicable control technology currently available (BPT).

§ 430.24 Effluent limitations representing the degree of effluent reduction attainable by the application of best available technology economically achievable (BAT).

top

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT).

(a) Except as provided in paragraph (b) of this section--

(1) The following effluent limitations apply with respect to each fiber line that does not use an exclusively TCF bleaching process, as disclosed by the discharger in its NPDES permit application under 40 CFR 122.21(g)(3) and certified under 40 CFR 122.22:

Subpart B----------

Continuous dischargers Non-

(2) The following effluent limitations apply with respect to each fiber line that uses exclusively TCF bleaching processes, as disclosed by the discharger in its NPDES permit application under 40 CFR 122.21(g)(3) and certified under 40 CFR 122.22:

Subpart B----------

(b) The following limitations apply with respect to each fiber line enrolled in the Voluntary Advanced Technology Incentives Program:

(1) Stage 1 Limitations: Numeric limitations that are equivalent to the discharger's existing effluent quality or the discharger's current effluent limitations established under CWA section 301(b)(2), whichever are more stringent, for the pollutants identified in paragraph (a)(1) of this section (with the exception of COD). For AOX, the permitting authority must determine existing effluent quality for each fiber line enrolled in the Voluntary Advanced Technology Incentives Program at the end of the pipe based on loadings attributable to that fiber line. For the remaining pollutants, with the exception of COD, the permitting authority must determine existing effluent quality for each fiber line enrolled in the Voluntary Advanced Technology Incentives Program at the point where the wastewater containing those pollutants leaves the bleach plant. These limitations must be recalculated each time the NPDES permit of a discharger enrolled in the Voluntary Advanced Technology Incentives Program is reissued, up to:

(i) April 15, 2004 for all pollutants in paragraph (a)(1) of this section except AOX; and

(ii) The date specified in paragraph (b)(4)(ii) of this section for achieving the applicable AOX limitation specified in paragraph (b)(4)(i).

(2) Best Professional Judgment Milestones: Narrative or numeric limitations and/or special permit conditions, as appropriate, established by the permitting authority on the basis of his or her best professional judgment that reflect reasonable interim milestones toward achievement of the effluent limitations specified in paragraphs (b)(3) and (b)(4) of this section, as applicable, after consideration of the Milestones Plan submitted by the discharger in accordance with paragraph (c) of this section.

(3) Six-year Milestones: By April 15, 2004 all dischargers enrolled in the Voluntary Advanced Technology Incentives Program must achieve the following:

(i) The effluent limitations specified in paragraph (a)(1) of this section, except that, with respect to AOX, dischargers subject to Tier I effluent limitations specified in paragraph (b)(4)(i) of this section must achieve the AOX limitation specified in that paragraph; or

(ii) For dischargers that use exclusively TCF bleaching processes as of April 15, 2004, the effluent limitations specified in paragraph (a)(2) of this section.

(4)(i) Stage 2 Limitations:

(ii) Deadlines.

(A) A discharger enrolled in Tier I of the Voluntary Advanced Technology Incentives Program must achieve the Tier I limitations in paragraph (b)(4)(i) of this section by April 15, 2004.

(B) A discharger enrolled in Tier II of the Voluntary Advanced Technology Incentives Program must achieve the Tier II limitations in paragraph (b)(4)(i) of this section by April 15, 2009.

(C) A discharger enrolled in Tier III of the Voluntary Advanced Technology Incentives Program must achieve the Tier III limitations in paragraph (b)(4)(i) of this section by April 15, 2014.

(c) All dischargers enrolled or intending to enroll in the Voluntary Advanced Technology Incentives Program must submit to the NPDES permitting authority a Milestones Plan covering all fiber lines enrolled or intended to be enrolled in that program at their mill by October 5, 1999 or the date the discharger applies for an NPDES permit containing limitations and conditions based on paragraph (b) of this section, whichever is later. Mills may claim all or part of the Milestones Plan as confidential business information (CBI) in accordance with 40 CFR Part 2 and 40 CFR 122.7. If a mill claims all or part of the plan as CBI, the mill must prepare and submit to the NPDES permitting authority a summary of the plan for public release. The Milestones Plan must include the following information:

(1) A description of each anticipated new technology component or process modification that the discharger intends to implement in order to achieve the limitations in paragraphs (b)(3) and (b)(4) of this section;

(2) A master schedule showing the sequence of implementing the new technology components or process modifications and identifying critical path relationships within the sequence;

(3) A schedule for each individual new technology component or process modification that includes:

(i) The anticipated initiation and completion dates of construction, installation and operational "shakedown" period associated with the technology components or process modifications and, when applicable, the anticipated dates of initiation and completion of associated research, process development, and mill trials;

(ii) The anticipated dates that the discharger expects the technologies and process modifications selected to achieve the limitations specified in paragraphs (b)(3) and (b)(4) of this section to be operational on a full-scale basis; and

(iii) The anticipated magnitude of reductions in effluent quantity and the anticipated improvements in effluent quality associated with each technology and process modification implemented as measured at the bleach plant (for bleach plant, pulping area and evaporator condensates flow and BAT parameters other than Adsorbable Organic Halides (AOX)) and at the end of the pipe (for AOX), and the dates the discharger expects those reductions and improvements to be achieved;

(4) Contingency plans in the event that any technology or process specified in the Milestones Plan need to be adjusted or alternative approaches developed to ensure that the limitations specified in paragraphs (b)(3)and (b)(4) of this section are met; and

(5) A signature by the responsible corporate officer as defined in 40 CFR 122.22.

(d) The following additional effluent limitations apply to all dischargers subject to this section in accordance with the previous subcategorization scheme unless the discharger certifies to the permitting authority that it is not using these compounds as biocides. Also, for non-continuous dischargers, concentration limitations (mg/l) shall apply. Concentration limitations will only apply to non-continuous dischargers:

Subpart B [Supplemental BAT effluent limitations for bleached kraft facilities

Subpart B [Supplemental BAT effluent limitations for bleached kraft facilities

Subpart B [Supplemental BAT effluent limitations for bleached kraft facilities whe

(e) Pursuant to 40 CFR 122.44(i) and 122.45(h), a discharger must demonstrate compliance with the effluent limitations in paragraph (a)(1) or (b)(3) of this section, as applicable, by monitoring for all pollutants (except for AOX and COD) at the point where the wastewater containing those pollutants leaves the bleach plant. The permitting authority may impose effluent limitations and/or monitoring requirements on internal wastestreams for any other pollutants covered in this section as appropriate under 40 CFR 122.44(i) and 122.45(h). In addition, a discharger subject to a limitation on total pulping area condensate, evaporator condensate, and bleach plant wastewater flow under paragraph (b)(4)(i) of this section, for Tier II and Tier III, must demonstrate compliance with that limitation by establishing and maintaining flow measurement equipment to monitor these flows at the point or points where they leave the pulping area, evaporator area, and bleach plant.

[63 FR 18635, Apr. 15, 1998; 63 FR 42239, Aug. 7, 1998, as amended at 64 FR 36586, July 7, 1999]

§ 430.25 New source performance standards (NSPS).

top

New sources subject to this subpart must achieve the following new source performance standards (NSPS), as applicable.

(a) The following standards apply to each new source that commenced discharge after June 15, 1988 and before June 15, 1998, provided that the new source was constructed to meet these standards:

Subpart B [1982 New Source Performance Standards for bleached kraft facilities

Subpart B [1982 New Source Performance Standards for bleached kraft facilities

Subpart B [1982 New Source Performance Standards for bleached kraft facilities whe

(b) Except as provided in paragraph (c) of this section—

(1) The following standards apply with respect to each new source fiber line that does not use an exclusively TCF bleaching process, as disclosed by the discharger in its NPDES permit application under 40 CFR 122.21(g)(3) and certified under 40 CFR 122.22, and that commences discharge after June 15, 1998:

Subpart B----------

Continuous dischargers Non-

(2) The following standards apply with respect to each new source fiber line that uses exclusively TCF bleaching processes, as disclosed by the discharger in its NPDES permit application under 40 CFR 122.21(g)(3) and certified under 40 CFR 122.22, and that commences discharge after June 15, 1998:

Subpart B----------

(c) With respect to each new source fiber line that is enrolled in the Voluntary Advanced Technology Incentives Program, dischargers subject to this section must achieve:

(1) The standards specified in paragraph (b)(1) of this section (except for AOX) or paragraph (b)(2) of this section, as applicable; and

(2) Standards for filtrates, flow, and AOX:

Ultimate Voluntary Advanced Technology Incentives Program NSPS----------

(d) These additional standards apply to all new sources, regardless of when they commenced discharge, in accordance with the previous subcategorization scheme unless the discharger certifies to the permitting authority that it is not using these compounds as biocides. Also, for non-continuous dischargers, concentration limitations (mg/l) shall apply. Concentration limitations will only apply to non-continuous dischargers:

Subpart B [Supplemental NSPS for bleached kraft facilities where market pulp is

Subpart B [Supplemental NSPS for bleached kraft facilities where paperboard,

Subpart B [Supplemental NSPS for bleached kraft facilities where pulp and fine]

(e) Pursuant to 40 CFR 122.44(i) and 122.45(h), a discharger must demonstrate compliance with the limitations in paragraph (b)(1) or (c)(1) of this section, as applicable, by monitoring for all pollutants (except for AOX, COD, BOD5, TSS, and pH) at the point where the wastewater containing those pollutants leaves the bleach plant. The permitting authority may impose effluent limitations and/or monitoring requirements on internal wastestreams for any other pollutants covered in this section as appropriate under 40 CFR 122.44(i) and 122.45(h). In addition, a discharger subject to a limitation on total pulping area condensate, evaporator condensate, and bleach plant wastewater flow under paragraph (c)(2) of this section must demonstrate compliance with that limitation by establishing and maintaining flow measurement equipment monitoring these flows at the point or points where they leave the pulping area, evaporator area, and the bleach plant.

[63 FR 18635, Apr. 15, 1998; 63 FR 42239, Aug. 7, 1998]

§ 430.26 Pretreatment standards for existing sources (PSES).

top

Except as provided in 40 CFR 403.7 and 403.13, any existing source subject to this subpart that introduces pollutants into a publicly owned treatment works must

comply with 40 CFR part 403 and must achieve the following pretreatment standards for existing sources (PSES).

(a)(1) The following pretreatment standards apply with respect to each fiber line operated by an indirect discharger subject to this section, unless the indirect discharger discloses to the pretreatment control authority in a report submitted under 40 CFR 403.12(b) that it uses exclusively TCF bleaching processes at that fiber line. These pretreatment standards must be attained on or before April 16, 2001:

Subpart B----------

(2) The following pretreatment standards apply with respect to each fiber line operated by an indirect discharger subject to this section if the indirect discharger discloses to the pretreatment control authority in a report submitted under 40 CFR 403.12(b), (d), or (e) that it uses exclusively TCF bleaching processes at that fiber line. These pretreatment standards must be attained on or before April 16, 2001:

Subpart B----------

(b) The following pretreatment standards apply to all indirect dischargers, in accordance with the previous subcategorization scheme. An indirect discharger is not required to meet these pretreatment standards if it certifies to the pretreatment control authority that it is not using these compounds as biocides. In cases when POTWs find it necessary to impose mass effluent limitations, equivalent mass limitations are provided as guidance:

Subpart B [Supplemental PSES for bleached kraft facilities where market pulp is

Subpart B [Supplemental PSES for bleached kraft facilities where paperboard,

Subpart B [Supplemental PSES for bleached kraft facilities where pulp and fine)

(c) An indirect discharger must demonstrate compliance with the pretreatment standards in paragraph (a)(1) of this section by monitoring at the point where the wastewater containing those pollutants leaves the bleach plant.

[63 FR 18635, Apr. 15, 1998; 63 FR 42239, Aug. 7, 1998]

§ 430.27 Pretreatment standards for new sources (PSNS).

top

Except as provided in 40 CFR 403.7, any new source subject to this subpart that introduces pollutants into a publicly owned treatment works must comply with 40 CFR part 403 and must achieve the following pretreatment standards for new sources (PSNS).

(a)(1) The following pretreatment standards apply with respect to each fiber line that is a new source, unless the indirect discharger discloses to the pretreatment control authority in a report submitted under 40 CFR 403.12 that it uses exclusively TCF bleaching processes at that fiber line:

Subpart B----------

(2) The following pretreatment standards apply with respect to each new source fiber line operated by an indirect discharger subject to this section if the indirect

discharger discloses to the pretreatment control authority in a report submitted under 40 CFR 403.12(b), (d), or (e) that it uses exclusively TCF bleaching processes at that fiber line:

Subpart B----------

(b) The following pretreatment standards apply to all new source indirect dischargers, regardless of when they commenced discharge, in accordance with the previous subcategorization scheme. An indirect discharger is not required to meet these pretreatment standards if it certifies to the pretreatment control authority that it is not using these compounds as biocides. In cases when POTWs find it necessary to impose mass-based effluent limitations, equivalent mass limitations are provided as guidance:

Subpart B [Supplemental PSNS for bleached kraft facilities where market pulp is

Subpart B [Supplemental PSNS for bleached kraft facilities where paperboard,

Subpart B [Supplemental PSNS for bleached kraft facilities where pulp and fine]

(c) An indirect discharger must demonstrate compliance with the pretreatment standards in paragraph (a)(1) of this section by monitoring at the point where the wastewater containing those pollutants leaves the bleach plant.

[63 FR 18635, Apr. 15, 1998; 63 FR 42239, Aug. 7, 1998]

§ 430.28 Best management practices (BMPs).

top

The definitions and requirements set forth in 40 CFR 430.03 apply to facilities in this subpart.

Subpart C—Unbleached Kraft Subcategory

top

§ 430.30 Applicability; description of the unbleached kraft subcategory.

top

The provisions of this subpart are applicable to discharges resulting from: the production of pulp and paper at unbleached kraft mills; the production of pulp and paper at unbleached kraft-neutral sulfite semi-chemical (cross recovery) mills; and the production of pulp and paper at combined unbleached kraft and semi-chemical mills, wherein the spent semi-chemical cooking liquor is burned within the unbleached kraft chemical recovery system.

§ 430.31 Specialized definitions.

top

For the purpose of this subpart, the general definitions, abbreviations, and methods of analysis set forth in 40 CFR part 401 and §430.01 of this part shall apply to this subpart.

§ 430.32 Effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT).

top

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT):

Subpart C [BPT effluent limitations for unbleached kraft facilities]---------

Subpart C[BPT effluent limitations for unbleached kraft facilities producing pulp

Subpart C[BPT effluent limitations for unbleached kraft facilities where pulp and p

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

top

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart shall achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT), except that non-continuous dischargers shall not be subject to the maximum day and average-of-30-consecutive-days limitations, but shall be subject to annual average effluent limitations:

Subpart C [BCT effluent limitations for unbleached kraft facilities]---------

Subpart C [BCT effluent limitations for unbleached kraft-neutral sulfite semi-chem

§ 430.34 Effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT).

top

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart where chlorophenolic-containing biocides are used must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT). Non-continuous dischargers shall not be subject to the maximum day mass limitations in kg/kkg (lb/1000 lb), but shall be subject to concentration limitations. Concentration limitations are only applicable to non-continuous dischargers. Permittees not using chlorophenolic-containing biocides must certify to the permit-issuing authority that they are not using these biocides:

Subpart C [BAT effluent limitations for unbleached kraft facilities]---------

Subpart C[BAT effluent limitations for unbleached kraft facilities where pulp and

§ 430.35 New source performance standards (NSPS).

top

Any new source subject to this subpart must achieve the following new source performance standards (NSPS), except that non-continuous dischargers shall not be subject to the maximum day and average of 30 consecutive days effluent

limitations for BOD5 and TSS, but shall be subject to annual average effluent limitations. Also, for non-continuous dischargers, concentration limitations (mg/l) shall apply, where provided. Concentration limitations will only apply to non-continuous dischargers. Only facilities where chlorophenolic-containing biocides are used shall be subject to pentachlorophenol and trichlorophenol limitations. Permittees not using chlorophenolic-containing biocides must certify to the permit-issuing authority that they are not using these biocides:

Subpart C [NSPS for unbleached kraft facilities where linerboard is produced]----

Maximum for any 1 day ----------

Subpart C [NSPS for unbleached kraft facilities where bag paper and other mixed

Maximum for any 1 day ----------

Subpart C [NSPS for unbleached kraft facilities where pulp and paper are produced

Maximum for any 1 day ----------

§ 430.36 Pretreatment standards for existing sources (PSES).

top

Except as provided in 40 CFR 403.7 and 403.13, any existing source subject to this subpart that introduces pollutants into a publicly owned treatment works must: comply with 40 CFR part 403; and achieve the following pretreatment standards for existing sources (PSES) if it uses chlorophenolic-containing biocides. Permittees not using chlorophenolic-containing biocides must certify to the permit-issuing authority that they are not using those biocides. PSES must be attained on or before July 1, 1984:

Subpart C [PSES for unbleac

Subpart C [PSES for unbleached kraft facilities where pulp an

§ 430.37 Pretreatment standards for new sources (PSNS).

top

(a) Except as provided in 40 CFR 403.7, any new source subject to this subpart that introduces pollutants into a publicly owned treatment works must: comply with 40 CFR part 403; and achieve the following pretreatment standards for new sources (PSNS) if it uses chlorophenolic-containing biocides. Permittees not using chlorophenolic-containing biocides must certify to the permit-issuing authority that they are not using these biocides:

Subpart C [PSNS for unbleached kraft faci

Subpart C [PSNS for unbleached kraft facilities where

Subpart C [PSNS for unbleached kraft facilities where pulp an

Subpart D—Dissolving Sulfite Subcategory

↑ top

§ 430.40 Applicability; description of the dissolving sulfite subcategory.

↑ top

The provisions of this subpart are applicable to discharges resulting from the production of pulp at dissolving sulfite mills.

§ 430.41 Specialized definitions.

↑ top

For the purpose of this subpart, the general definitions, abbreviations, and methods of analysis set forth in 40 CFR part 401 and §430.01 of this part shall apply to this subpart.

§ 430.42 Effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT).

↑ top

(a) Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT), except that non-continuous dischargers shall not be subject to the maximum day and average of 30 consecutive days limitations but shall be subject to annual average effluent limitations:

Subpart D [BPT effluent limitations for dissolving sulfite pulp facilities where

Subpart D [BPT effluent limitations for dissolving sulfite pulp facilities where

Subpart D [BPT effluent limitations for dissolving sulfite pulp facilities where

Subpart D [BPT effluent limitations for dissolving sulfite pulp facilities where

(b) The following limitations establish the quantity or quality of pollutants or pollutant properties, controlled by this section, resulting from the use of wet barking operations, which may be discharged by a point source subject to the provisions of this subpart. These limitations are in addition to the limitations set forth in paragraph (a) of this section and shall be calculated using the proportion of the mill's total production due to use of logs which are subject to such operations. Non-continuous dischargers shall not be subject to the maximum day and average of 30 consecutive days limitations, but shall be subject to annual average effluent limitations:

Subpart D [BPT effluent limitations]

(c) The following limitations establish the quantity or quality of pollutants or pollutant parameters, controlled by this section, resulting from the use of log washing or chip washing operations, which may be discharged by a point source subject to the provisions of this subpart. These limitations are in addition to the limitations set forth in paragraph (a) of this section and shall be calculated using

the proportion of the mill's total production due to use of logs and/or chips which are subject to such operations. Non-continuous dischargers shall not be subject to the maximum day and average of 30 consecutive days limitations, but shall be subject to the annual average effluent limitations:

Subpart D [BPT effluent limitations]----------

(d) The following limitations establish the quantity or quality of pollutants or pollutant properties, controlled by this section, resulting from the use of log flumes or log ponds, which may be discharged by a point source subject to the provisions of this subpart. These limitations are in addition to the limitations set forth in paragraph (a) of this section and shall be calculated using the proportion of the mill's total production due to use of logs which are subject to such operations. Non-continuous dischargers shall not be subject to the maximum day and average of 30 consecutive days limitations but shall be subject to the annual average effluent limitations:

Subpart D [BPT effluent limitations]----------

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

top

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart shall achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT): The limitations shall be the same as those specified for conventional pollutants (which are defined in 40 CFR 401.16) in §430.42 of this subpart for the best practicable control technology currently available (BPT).

§ 430.44 Effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT).

top

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart where chlorophenolic-containing biocides are used must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT). Non-continuous dischargers shall not be subject to the maximum day mass limitations in kg/kkg (lb/1000 lb) but shall be subject to concentration limitations. Concentration limitations are only applicable to non-continuous dischargers. Permittees not using chlorophenolic-containing biocides must certify to the permit-issuing authority that they are not using these biocides:

Subpart D [BAT effluent limitations for dissolving sulfite pulp facilities where

Subpart D [BAT effluent limitations for dissolving sulfite pulp facilities where

§ 430.45 New source performance standards (NSPS).

top

Any new source subject to this subpart must achieve the following new source performance standards (NSPS), except that non-continuous dischargers shall not

be subject to the maximum day and average of 30 consecutive days effluent limitations for BOD5 and TSS, but shall be subject to annual average effluent limitations. Also, for non-continuous dischargers, concentration limitations (mg/l) shall apply, where provided. Concentration limitations will only apply to non-continuous dischargers. Only facilities where chlorophenolic-containing biocides are used shall be subject to pentachlorophenol and trichlorophenol limitations. Permittees not using chlorophenolic-containing biocides must certify to the permit-issuing authority that they are not using these biocides:

Subpart D [NSPS for dissolving sulfite pulp facilities where nitration grade pulp

Maximum for any 1 day ----------

Subpart D[NSPS for dissolving sulfite pulp facilities where viscose grade pulp is

Maximum for any 1 day ----------

Subpart D[NSPS for dissolving sulfite pulp facilities where cellophane grade pulp

Maximum for any 1 day ----------

Subpart D[NSPS for dissolving sulfite pulp facilities where acetate grade pulp is

Maximum for any 1 day ----------

§ 430.46 Pretreatment standards for existing sources (PSES).

top

Except as provided in 40 CFR 403.7 and 403.13, any existing source subject to this subpart that introduces pollutants into a publicly owned treatment works must: comply with 40 CFR part 403; and achieve the following pretreatment standards for existing sources (PSES) if it uses chlorophenolic-containing biocides. Permittees not using chlorophenolic-containing biocides must certify to the permit-issuing authority that they are not using these biocides. PSES must be attained on or before July 1, 1984:

Subpart D [PSES for dissolving sulfite pulp facilities where ni

Subpart D [PSES for dissolving sulfite pulp facil

§ 430.47 Pretreatment standards for new sources (PSNS).

top

Except as provided in 40 CFR 403.7, any new source subject to this subpart that introduces pollutants into a publicly owned treatment works must: comply with 40 CFR part 403; and achieve the following pretreatment standards for new sources (PSNS) if it uses chlorophenolic-containing biocides. Permittees not using chlorophenolic-containing biocides must certify to the permit-issuing authority that they are not using these biocides:

Subpart D [PSNS for dissolving sulfite pulp facilities where ni

Subpart E—Papergrade Sulfite Subcategory

top

§ 430.50 Applicability; description of the papergrade sulfite subcategory.

top

The provisions of this subpart apply to discharges resulting from the: Integrated production of pulp and paper at papergrade sulfite mills, where blow pit pulp washing techniques are used; and the integrated production of pulp and paper at papergrade sulfite mills where vacuum or pressure drums are used to wash pulp.

§ 430.51 Specialized definitions.

top

(a) Except as provided in paragraphs (b) and (c) of this section, the general definitions, abbreviations, and methods of analysis set forth in 40 CFR part 401 and §430.01 of this part apply to this subpart.

(b) *Sulfite cooking liquor* is defined as bisulfite cooking liquor when the pH of the liquor is between 3.0 and 6.0 and as acid sulfite cooking liquor when the pH is less than 3.0.

(c) For this subpart, the segments for the papergrade sulfite subcategory are defined as follows:

(1) The calcium-, magnesium-, or sodium-based sulfite pulp segment consists of papergrade sulfite mills where pulp and paper are produced using an acidic cooking liquor of calcium, magnesium, or sodium sulfite, unless those mills are specialty grade sulfite mills;

(2) The ammonium-based sulfite pulp segment consists of papergrade sulfite mills where pulp and paper are produced using an acidic cooking liquor of ammonium sulfite, unless those mills are specialty grade sulfite mills;

(3) The specialty grade sulfite pulp segment consists of those papergrade sulfite mills where a significant portion of production is characterized by pulp with a high percentage of alpha cellulose and high brightness sufficent to produce end products such as plastic molding compounds, saturating and laminating products, and photographic papers. The specialty grade segment also includes those mills where a major portion of production is 91 ISO brightness and above.

§ 430.52 Effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT).

top

(a) Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT):

Subpart E[Acid sulfite liquor/barometric condensers; BPT effluent limitations for

Subpart E [Bisulfite liquor/surface condensers; BPT effluent limitations forpaper

Subpart E [Bisulfite liquor/barometric condensers; BPT effluent limitations forpap

Subpart E [Acid sulfite liquor/surface condensers; BPT effluent limitations forpap

Subpart E[Acid sulfite liquor/barometric condensers; BPT effluent limitations forpa

Subpart E [Continuous digesters; BPT effluent limitations for papergrade sulfite

(b) The following limitations establish the quantity or quality of pollutants or pollutant properties, controlled by this section, resulting from the use of wet barking operations, which may be discharged by a point source subject to the provisions of this subpart. These limitations are in addition to the limitations set forth in paragraph (a) of this section and shall be calculated using the proportion of the mill's total production due to use of logs which are subject to such operations:

Subpart E [BPT effluent limitations for papergrade sulfite facilities where blow

Subpart E[BPT effluent limitations for papergrade sulfite facilities where vacuum

(c) The following limitations establish the quantity or quality of pollutants or pollutant parameters, controlled by this section, resulting from the use of log washing or chip washing operations, which may be discharged by a point source subject to the provisions of this subpart. These limitations are in addition to the limitations set forth in paragraph (a) of this section and shall be calculated using the proportion of the mill's total production due to use of logs and/or chips which are subject to such operations:

Subpart E [BPT effluent limitations for papergrade sulfite facilities where blow

Subpart E[BPT effluent limitations for papergrade sulfite facilities where vacuum

(d) The following limitations establish the quantity or quality of pollutants or pollutant properties, controlled by this section, resulting from the use of log flumes or log ponds, which may be discharged by a point source subject to the provisions of this subpart. These limitations are in addition to the limitations set forth in paragraph (a) of this section and shall be calculated using the proportion of the mill's total production due to use of logs which are subject to such operations:

Subpart E [BPT effluent limitations for papergrade sulfite facilities where blow

Subpart E[BPT effluent limitations for papergrade sulfite facilities where vacuum

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

top

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT). The limitations shall be the same as those specified for conventional pollutants in §430.52 of this subpart for the best practicable control technology currently available (BCT).

§ 430.54 Effluent limitations representing the degree of effluent reduction attainable by the application of best available technology economically achievable (BAT).

top

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT).

(a)(1) The following effluent limitations apply to all dischargers in the calcium-, magnesium-, or sodium-based sulfite pulp segment:

Subpart E [Production of Calcium-, Magnes

(2)(i) The following effluent limitations apply to all dischargers in the ammonium-based sulfite pulp segment:

Subpart E_Production of Ammonium-Based Sulfite Pulps

Continuous dischargers Non-continuous

(ii) The following effluent limitations apply to all dischargers in the ammonium-based sulfite pulp segment with respect to each fiber line that uses exclusively TCF bleaching processes, as disclosed by the discharger in its NPDES permit application under 40 CFR 122.21(g)(3) and certified under 40 CFR 122.22:

Subpart E_Production of Ammonium-Based Sulfite Pulps

(3)(i) The following effluent limitations apply to all dischargers in the specialty grade pulp segment:

Subpart E_Production of Specialty Grade Sulfite Pulps

Continuous dischargers Non-continuous

(ii) The following effluent limitations apply to dischargers in the specialty grade pulp segment with respect to each fiber line that uses exclusively TCF bleaching processes, as disclosed by the discharger in its NPDES permit application under 40 CFR 122.21(g)(3) and certified under 40 CFR 122.22:

Subpart E_Production of Specialty Grade Pulps

(b) The following additional effluent limitations apply to each discharger subject to this section in accordance with the previous subcatgorization scheme unless it certifies to the permitting authority that it is not using these compounds as biocides. Also, for non-continuous dischargers, concentration limitations (mg/l) shall apply. Concentration limitations will only apply to non-continuous dischargers:

Subpart E [Supplemental BAT

(c) Pursuant to 40 CFR 122.44(i) and 122.45(h), a discharger must demonstrate compliance with the limitations in paragraphs (a)(2) or (a)(3) of this section, as applicable, by monitoring for all pollutants (except for AOX and COD) at the point where the wastewater containing those pollutants leaves the bleach plant. The permitting authority may impose effluent limitations and/or monitoring requirements on internal wastestreams for any other pollutants covered in this section as appropriate under 40 CFR 122.44(i) and 122.45(h).

§ 430.55 New source performance standards (NSPS).

top

New sources subject to this subpart must achieve the following new source performance standards (NSPS), as applicable.

(a) The following standards apply to each new source regardless of when it commenced discharge:

Subpart E [19

(b) The following standards apply with respect to each new source fiber line that commences discharge after June 15, 1998.

(1) The following standards apply to all new sources in the calcium-, magnesium-, or sodium-based sulfite pulp segment:

Subpart E [Production of Calcium-, Magnes

(2)(i) The following standards apply to all new sources in the ammonium-based sulfite pulp segment:

Subpart E_Production of Ammonium-based Sulfite Pulps----------

Continuous dischargers Non-continuous

(ii) The following standards apply to all new sources in the ammonium-based sulfite pulp segment with respect to each fiber line that uses exclusively TCF bleaching processes, as disclosed by the discharger in its NPDES permit application under 40 CFR 122.21(g)(3) and certified under 40 CFR 122.22:

Subpart E_Production of Ammonium-based Sulfite Pulps----------

(3)(i) The following standards apply to all new sources in the specialty grade sulfite pulp segment:

Subpart E_Production of Specialty Grade Sulfite Pulps----------

Continuous dischargers Non-continuous

(ii) The following standards apply to all new sources within the specialty grade sulfite pulp segment with respect to each fiber line that uses exclusively TCF bleaching processes, as disclosed by the discharger in its NPDES permit application under 40 CFR 122.21(g)(3) and certified under 40 CFR 122.22:

Subpart E_Production of Specialty Grade Sulfite Pulps----------

(c) The following standards apply to each new source regardless of when it commenced discharge, unless it certifies to the permitting authority that it is not using these compounds as biocides. Also, for non-continuous dischargers, concentration limitations (mg/l) shall apply. Concentration limitations will only apply to non-continuous dischargers:

Subpart E [Supple

(d) Pursuant to 40 CFR 122.44(i) and 122.45(h), a discharger must demonstrate compliance with the standards in paragraphs (b)(2) or (b)(3) of this section, as applicable, by monitoring for all pollutants (except for AOX, COD, BOD5, TSS, and pH) at the point where the wastewater containing those pollutants leaves the bleach plant. The permitting authority may impose effluent limitations and/or monitoring requirements on internal wastestreams for any other pollutants covered in this section as appropriate under 40 CFR 122.44(i) and 122.45(h).

§ 430.56 Pretreatment standards for existing sources (PSES).

top

Except as provided in 40 CFR 403.7 and 403.13, any existing source subject to this subpart that introduces pollutants into a publicly owned treatment works must comply with 40 CFR part 403 and must achieve the following pretreatment standards for existing sources (PSES).

(a) The following pretreatment standards must be attained on or before April 16, 2001.

(1) The following pretreatment standards apply to all indirect dischargers in the calcium-, magnesium-, or sodium-based sulfite pulp segment:

Subpart E [Production of Calcium-, Magnes

(2)(i) The following pretreatment standards apply to all indirect dischargers in the ammonium-based sulfite pulp segment:

Subpart E_Production of Ammonium-Based Sulfite Pulps----------

(ii) The following pretreatment standards apply with respect to each new source fiber line operated by an indirect discharger producing ammonium-based sulfite pulps if the indirect discharger discloses to the pretreatment control authority in a report submitted under 40 CFR 403.12(b) that it uses exclusively TCF bleaching processes at that fiber line:

Subpart E_Production of Ammonium-Based Sulfite Pulps----------

(3)(i) The following pretreatment standards apply to all indirect dischargers in the specialty grade sulfite pulp segment:

Subpart E_Production of Specialty Grade Sulfite Pulps----------

(ii) The following pretreatment standards apply with respect to each fiber line operated by an indirect discharger producing specialty grade sulfite pulps if the indirect discharger discloses to the pretreatment control authority in a report submitted under 40 CFR 403.12(b), (d), or (e) that it uses exclusively TCF bleaching processes at that fiber line. These pretreatment standards must be attained on or before April 16, 2001:

Subpart E----------

(b) The following pretreatment standards apply to each indirect discharger, in accordance with the previous subcategorization scheme, unless it certifies to the pretreatment control authority that it is not using these compounds as biocides. In cases when POTWs find it necessary to impose mass effluent limitations, equivalent mass limitations are provided as guidance:

Subpart E----------

(c) An indirect discharger must demonstrate compliance with the pretreatment standards in paragraphs (a)(2) or (a)(3) of this section, as applicable, by monitoring for all pollutants at the point where the wastewater containing those pollutants leaves the bleach plant.

[63 FR 18635, Apr. 15, 1998; 63 FR 42239 Aug. 7, 1998]

§ 430.57 Pretreatment standards for new sources (PSNS).

top

Except as provided in 40 CFR 403.7, any new source subject to this subpart that introduces pollutants into a publicly owned treatment works must: comply with 40 CFR part 403; and achieve the following pretreatment standards for new sources (PSNS).

(a) (1) The following pretreatment standards apply to each indirect discharger in the calcium-,

magnesium-, or sodium-based sulfite pulp segment that is a new source:

Subpart E [Production of Calcium-, Magnes

(2)(i) The following standards apply to each indirect discharger in the ammonium-based sulfite pulp segment that is a new source:

Subpart E_Production of Ammonium-Based Sulfite Pulps----------

(ii) The following pretreatment standards apply with respect to each new source fiber line operated by an indirect discharger producing ammonium-based sulfite pulps if the indirect discharger discloses to the pretreatment control authority in a report submitted under 40 CFR 403.12(b), (d), or (e) that it uses exclusively TCF bleaching processes at that fiber line:

Subpart E_Production of Ammonium-Based Sulfite Pulps----------

(3)(i) The following pretreatment standards apply to each indirect discharger in the specialty grade sulfite pulp segment that is a new source:

Subpart E_Production of Specialty Grade Sulfite Pulps

(ii) The following pretreatment standards apply with respect to each new source fiber line operated by an indirect discharger producing specialty grade sulfite pulps if the indirect discharger discloses to the pretreatment control authority in a report submitted under 40 CFR 403.12(b), (d), or (e) that it uses exclusively TCF bleaching processes at that fiber line:

Subpart E_Production of Specialty Grade Sulfite Pulps

(b) The following pretreatment standards shall apply to each new source indirect dischargers unless the indirect discharger certifies to the pretreatment control authority that it is not using these compounds as biocides. In cases when POTWs find it necessary to impose mass effluent standards, equivalent mass standards are provided as guidance:

Subpart E

(c) An indirect discharger must demonstrate compliance with the pretreatment standards in paragraphs (a)(2) or (a)(3) of this section, as applicable, by monitoring for all pollutants at the point where the wastewater containing those pollutants leaves the bleach plant.

[63 FR 18635, Apr. 15, 1998; 63 FR 42240, Aug. 7, 1998]

§ 430.58 Best management practices (BMPs).

top

The definitions and requirements set forth in 40 CFR 430.03 apply to facilities in this subpart.

Subpart F—Semi-Chemical Subcategory

top

§ 430.60 Applicability; description of the semi-chemical subcategory.

top

The provisions of this subpart are applicable to discharges resulting from the integrated production of pulp and paper at semi-chemical mills.

§ 430.61 Specialized definitions.

top

For the purpose of this subpart, the general definitions, abbreviations, and methods of analysis set forth in 40 CFR part 401 and §430.01 of this part shall apply to this subpart.

§ 430.62 Effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT).

top

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve the following effluent limitations representing

the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT):

Subpart F [BPT effluent limitati

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

top

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart shall achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT): The limitations shall be the same as those specified for conventional pollutants (which are defined in 40 CFR 401.16) in §430.62 of this subpart for the best practicable control technology currently available (BPT), except that non-continuous dischargers shall not be subject to the maximum day and average-of-30-consecutive-days limitations, but shall be subject to annual average effluent limitations determined by dividing the average-of-30-consecutive-days limitations for BOD5 by 1.36 and TSS by 1.36.

§ 430.64 Effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT).

top

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart where chlorophenolic-containing biocides are used must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT). Non-continuous dischargers shall not be subject to the maximum day mass limitations in kg/kkg (lb/1,000 lb), but shall be subject to concentration limitations. Concentration limitations are only applicable to non-continuous dischargers. Permittees not using chlorophenolic-containing biocides must certify to the permit-issuing authority that they are not using these biocides:

§ 430.65 New source performance standards (NSPS).

top

Any new source subject to this subpart must achieve the following new source performance standards (NSPS), except that non-continuous dischargers shall not be subject to the maximum day and average of 30 consecutive days effluent limitations for BOD5 and TSS, but shall be subject to annual average effluent limitations. Also, for non-continuous dischargers, concentration limitations (mg/l) shall apply, where provided. Concentration limitations will only apply to non-continuous dischargers. Only facilities where chlorophenolic-containing biocides are used shall be subject to pentachlorophenol and trichlorophenol limitations. Permittees not using chlorophenolic-containing biocides must certify to the permit-issuing authority that they are not using these biocides:

Maximum for any 1 day

§ 430.66 Pretreatment standards for existing sources (PSES).

top

Except as provided in 40 CFR 403.7 and 403.13, any existing source subject to this subpart that introduces pollutants into a publicly owned treatment works must: comply with 40 CFR part 403; and achieve the following pretreatment standards for existing sources (PSES) if it uses chlorophenolic-containing biocides. Permittees not using chlorophenolic-containing biocides must certify to the permit-issuing authority that they are not using these biocides. PSES must be attained on or before July 1, 1984:

Subpart F----------

§ 430.67 Pretreatment standards for new sources (PSNS).

top

Except as provided in 40 CFR 403.7, any new source subject to this subpart that introduces pollutants into a publicly owned treatment works must: comply with 40 CFR part 403; and achieve the following pretreatment standards for new sources (PSNS) if it uses chlorophenolic-containing biocides. Permittees not using chlorophenolic-containing biocides must certify to the permit-issuing authority that they are not using these biocides:

Subpart F----------

Subpart G—Mechanical Pulp Subcategory

top

§ 430.70 Applicability; description of the mechanical pulp subcategory.

top

The provisions of this subpart are applicable to discharges resulting from: the production of pulp and paper at groundwood chemi-mechanical mills; the production of pulp and paper at groundwood mills through the application of the thermo-mechanical process; the integrated production of pulp and coarse paper, molded pulp products, and newsprint at groundwood mills; and the integrated production of pulp and fine paper at groundwood mills.

§ 430.71 Specialized definitions.

top

For the purpose of this subpart, the general definitions, abbreviations, and methods of analysis set forth in 40 CFR part 401 and §430.01 of this part shall apply to this subpart.

§ 430.72 Effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT).

top

(a) Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT), except that non-continuous dischargers shall not be subject to the maximum day and average of

30 consecutive days limitations but shall be subject to annual average effluent limitations:

Subpart G [BPT effluent limitations for mechanical pulp facili

Subpart G [BPT effluent limitations for mechanical pulp facilit

Subpart G [BPT effluent limitations for mechanical pulp facil

Subpart G [BPT effluent limitations for mechanical pulp facilit

(b) The following limitations establish the quantity or quality of pollutants or pollutant properties, controlled by this section, resulting from the use of wet barking operations, which may be discharged by a point source subject to the provisions of this subpart. These limitations are in addition to the limitations set forth in paragraph (a) of this section and shall be calculated using the proportion of the mill's total production due to use of logs which are subject to such operations. Non-continuous dischargers shall not be subject to the maximum day and average of 30 consecutive days limitations, but shall be subject to annual average effluent limitations:

Subpart G [BPT effluent limitations for mechanical pulp facili

Subpart G [BPT effluent limitations for mechanical pulp facilit

Subpart G [BPT effluent limitations for mechanical pulp facil

Subpart G [BPT effluent limitations for mechanical pulp facilit

(c) The following limitations establish the quantity or quality of pollutants or pollutant parameters, controlled by this section, resulting from the use of log washing or chip washing operations, which may be discharged by a point source subject to the provisions of this subpart. These limitations are in addition to the limitations set forth in paragraph (a) of this section and shall be calculated using the proportion of the mill's total production due to use of logs and/or chips which are subject to such operations. Non-continuous dischargers shall not be subject to the maximum day and average of 30 consecutive days limitations, but shall be subject to the annual average effluent limitations:

Subpart G [BPT effluent limitations for mechanical pulp facili

Subpart G [BPT effluent limitations for mechanical pulp facilit

Subpart G [BPT effluent limitations for mechanical pulp facil

Subpart G [BPT effluent limitations for mechanical pulp facilit

(d) The following limitations establish the quantity or quality of pollutants or pollutant properties, controlled by this section, resulting from the use of log flumes

or log ponds, which may be discharged by a point source subject to the provisions of this subpart. These limitations are in addition to the limitations set forth in paragraph (a) of this section and shall be calculated using the proportion of the mill's total production due to use of logs which are subject to such operations. Non-continuous dischargers shall not be subject to the maximum day and average of 30 consecutive days limitations but shall be subject to the annual average effluent limitations:

Subpart G [BPT effluent limitations for mechanical pulp facili

Subpart G [BPT effluent limitations for mechanical pulp facilit

Subpart G [BPT effluent limitations for mechanical pulp facil

Subpart G [BPT effluent limitations for mechanical pulp facilit

(e) For those mills using zinc hydrosulfite as a bleaching agent in the manufacturing process, the following effluent limitations are to be added to the base limitations set forth in paragraph (a) of this section. Permittees not using zinc hydrosulfite as a bleaching agent must certify to the permit issuing authority that they are not using this bleaching compound. Non-continuous dischargers shall not be subject to the maximum day and average of 30 consecutive days effluent limitations, but shall be subject to annual average effluent limitations:

Subpart G [BPT effluent limitations for mechanical pulp facili

Subpart G [BPT effluent limitations for mechanical pulp facilit

Subpart G [BPT effluent limitations for mechanical pulp facil

Subpart G [BPT effluent limitations for mechanical pulp facilit

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

top

(a)(1) The following applies to: mechanical pulp facilities where the integrated production of pulp and coarse paper, molded pulp products, and newsprint at groundwood mills occurs; and mechanical pulp facilities where the integrated production of pulp and fine paper at groundwood mills occurs:

(2) Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart shall achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT): The limitations shall be the same as those specified for conventional pollutants (which are defined in 40 CFR 401.16) in §430.72 of this subpart for the best practicable control technology currently available (BPT).

(b) [Reserved]

§ 430.74 Effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT).

top

(a) The following applies to mechanical pulp facilities where pulp and paper at groundwood mills are produced through the application of the thermo-mechanical process; mechanical pulp facilities where the integrated production of pulp and coarse paper, molded pulp products, and newsprint at groundwood mills occurs; and mechanical pulp facilities where the integrated production of pulp and fine paper at groundwood mills occurs: except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT), except that non-continuous dischargers shall not be subject to the maximum day mass limitations in kg/kkg (lb/1000 lb), but shall be subject to concentration limitations. Concentration limitations are only applicable to non-continuous dischargers. Pentachlorophenol and trichlorophenol limitations are only applicable at facilities where chlorophenolic-containing biocides are used. Permittees not using chlorophenolic-containing biocides must certify to the permit-issuing authority that they are not using these biocides. Zinc limitations are only applicable at facilities where zinc hydrosulfite is used as a bleaching agent. Permittees not using zinc hydrosulfite as a bleaching agent must certify to the permit issuing authority that they are not using this bleaching compound:

Subpart G [BAT effluent limitations for mechanical pulp facilit

Subpart G [BAT effluent limitations for mechanical pulp facil

Subpart G [BAT effluent limitations for mechanical pulp facilit

(b) [Reserved]

§ 430.75 New source performance standards (NSPS).

top

(a) The following applies to mechanical pulp facilities where pulp and paper at groundwood mills are produced through the application of the thermo-mechanical process; mechanical pulp facilities where the integrated production of pulp and coarse paper, molded pulp products, and newsprint at groundwood mills occurs; and mechanical pulp facilities where the integrated production of pulp and fine paper at groundwood mills occurs: any new source subject to this subpart must achieve the following new source performance standards (NSPS), except that non-continuous dischargers shall not be subject to the maximum day and average of 30 consecutive days effluent limitations for BOD5 and TSS, but shall be subject to annual average effluent limitations. Also, for non-continuous dischargers, concentration limitations (mg/l) shall apply, where provided. Concentration limitations will only apply to non-continuous dischargers. Pentachlorophenol and trichlorophenol limitations are only applicable at facilities where chlorophenolic-containing biocides are used. Permittees not using chlorophenolic-containing biocides must certify to the permit-issuing authority that they are not using these biocides. Zinc limitations are only applicable at facilities where zinc hydrosulfite is used as a bleaching agent. Permittees not using zinc hydrosulfite as a bleaching agent must certify to the permit issuing authority that they are not using this bleaching compound:

Subpart G [NSPS for mechanical pulp facilities where pulp a	
	Maximum for any 1 day
Subpart G [NSPS for mechanical pulp facilities where the inte	
	Maximum for any 1 day
Subpart G [NSPS mechanical pulp facilities where the integrat	
	Maximum for any 1 day

(b) [Reserved]

§ 430.76 Pretreatment standards for existing sources (PSES).

top

(a) The following applies to mechanical pulp facilities where pulp and paper at groundwood mills are produced through the application of the thermo-mechanical process; mechanical pulp facilities where the integrated production of pulp and coarse paper, molded pulp products, and newsprint at groundwood mills occurs; and mechanical pulp facilities where the integrated production of pulp and fine paper at groundwood mills occurs: except as provided in 40 CFR 403.7 and 403.13, any existing source subject to this subpart that introduces pollutants into a publicly owned treatment works must comply with 40 CFR part 403 and achieve the following pretreatment standards for existing sources (PSES). Pentachlorophenol and trichlorophenol limitations are only applicable at facilities where chlorophenolic-containing biocides are used. Permittees not using chlorophenolic-containing biocides must certify to the permit-issuing authority that they are not using these biocides. Zinc limitations are only applicable at facilities where zinc hydrosulfite is used as a bleaching agent. Permittees not using zinc hydrosulfite as a bleaching agent must certify to the permit-issuing authority that they are not using this bleaching compound. PSES must be attained on or before July 1, 1984:

Subpart G [PSES for mechanical pulp facilities where pulp a	
Subpart G [PSES for mechanical pulp facilities where the inte	
Subpart G [PSNS for mechanical pulp facilities where the integr	

(b) [Reserved]

§ 430.77 Pretreatment standards for new sources (PSNS).

top

(a) The following applies to mechanical pulp facilities where pulp and paper at groundwood mills are produced through the application of the thermo-mechanical process; mechanical pulp facilities where the integrated production of pulp and coarse paper, molded pulp products, and newsprint at groundwood mills occurs; and mechanical pulp facilities where the integrated production of pulp and fine paper at groundwood mills occurs: except as provided in 40 CFR 403.7, any new

source subject to this subpart that introduces pollutants into a publicly owned treatment works must comply with 40 CFR part 403 and achieve the following pretreatment standards for new sources (PSNS). Pentachlorophenol and trichlorophenol limitations are only applicable at facilities where chlorophenolic-containing biocides are used. Permittees not using chlorophenolic-containing biocides must certify to the permit-issuing authority that they are not using these biocides. Zinc limitations are only applicable at facilities where zinc hydrosulfite is used as a bleaching agent. Permittees not using zinc hydrosulfite as a bleaching agent must certify to the permit issuing authority that they are not using this bleaching compound:

Subpart G [PSNS for mechanical pulp facilities where pulp a

Subpart G [PSNS for mechanical pulp facilities where the inte

Subpart G [PSNS for mechanical pulp facilities where the integr

(b) [Reserved]

Subpart H—Non-Wood Chemical Pulp Subcategory

top

§ 430.80 Applicability; description of the non-wood chemical pulp subcategory.

top

The provisions of this subpart are applicable to discharges resulting from the production of pulp and paper at non-wood chemical pulp mills. This subcategory includes, but is not limited to, mills producing non-wood pulps from chemical pulping processes such as kraft, sulfite, or soda.

§ 430.81 Specialized definitions.

top

The general definitions, abbreviations, and methods of analysis set forth in 40 CFR 401 and §430.01 of this part shall apply to this subpart.

§ 430.82 Effluent limitations representing the degree of effluent reduction attainable by the application of best practicable control technology currently available (BPT). [Reserved]

top

§ 430.83 Effluent limitations representing the degree of effluent reduction attainable by the application of best conventional pollutant control technology (BCT). [Reserved]

top

§ 430.84 Effluent limitations representing the degree of effluent reduction attainable by the application of best available technology economically achievable (BAT). [Reserved]

top

§ 430.85 New source performance standards (NSPS). [Reserved]

top

§ 430.86 Pretreatment standards for existing sources (PSES). [Reserved]

top

§ 430.87 Pretreatment standards for new sources (PSNS). [Reserved]

top

Subpart I—Secondary Fiber Deink Subcategory

top

§ 430.90 Applicability; description of the secondary fiber deink subcategory.

top

The provisions of this subpart are applicable to discharges resulting from the integrated production of pulp and paper at deink mills.

§ 430.91 Specialized definitions.

top

For the purpose of this subpart, the general definitions, abbreviations, and methods of analysis set forth in 40 CFR part 401 and §430.01 of this part shall apply to this subpart.

§ 430.92 Effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT).

top

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT), except that non-continuous dischargers shall not be subject to the maximum day and average of 30 consecutive days limitations but shall be subject to annual average effluent limitations:

Subpart I [BPT efflue

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

top

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart shall achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT): The limitations shall be the same as those specified for conventional pollutants (which are defined in 40 CFR 401.16) in §430.92 of this subpart for the best practicable control technology currently available (BPT).

§ 430.94 Effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT).

top

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart where chlorophenolic-containing biocides are used must

achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT). Non-continuous dischargers shall not be subject to the maximum day mass limitations in kg/kkg (lb/1000 lb) but shall be subject to concentration limitations. Concentration limitations are only applicable to non-continuous dischargers. Permittees not using chlorophenolic-containing biocides must certify to the permit-issuing authority that they are not using these biocides:

Subpart I [Facilities where fine

Subpart I [Facilities where

§ 430.95 New source performance standards (NSPS).

top

Any new source subject to this subpart must achieve the following new source performance standards (NSPS), except that non-continuous dischargers shall not be subject to the maximum day and average of 30 consecutive days effluent limitations for BOD5 and TSS, but shall be subject to annual average effluent limitations. Also, for non-continuous dischargers, concentration limitations (mg/l) shall apply, where provided. Concentration limitations will only apply to non-continuous dischargers. Only facilities where chlorophenolic-containing biocides are used shall be subject to pentachlorophenol and trichlorophenol limitations. Permittees not using chlorophenolic-containing biocides must certify to the permit-issuing authority that they are not using these biocides:

Subpart I [Facilities where

Maximum for any 1 day

Subpart I [Facilities where t

Maximum for any 1 day

Subpart I [Facilities where

Maximum for any 1 day

§ 430.96 Pretreatment standards for existing sources (PSES).

top

(a) Except as provided in 40 CFR 403.7 and 403.13, any existing source subject to this subpart that introduces pollutants into a publicly owned treatment works must comply with 40 CFR part 403 and achieve the following pretreatment standards for existing sources (PSES) if it uses chlorophenolic-containing biocides. Permittees not using chlorophenolic-containing biocides must certify to the permit-issuing authority that they are not using these biocides. PSES must be attained on or before July 1, 1984:

Subpart I [Facilities where fine

Subpart I	[Facilities where

§ 430.97 Pretreatment standards for new sources (PSNS).

top

(a) Except as provided in 40 CFR 403.7, any new source subject to this subpart that introduces pollutants into a publicly owned treatment works must comply with 40 CFR part 403 and achieve the following pretreatment standards for new sources (PSNS) if it uses chlorophenolic-containing biocides. Permittees not using chlorophenolic-containing biocides must certify to the permit-issuing authority that they are not using these biocides:

Subpart I	[Facilities where
Subpart I	[Facilities where t
Subpart I	[Facilities where

Subpart J—Secondary Fiber Non-Deink Subcategory

top

§ 430.100 Applicability; description of the secondary fiber non-deink subcategory.

top

The provisions of this subpart are applicable to discharges resulting from the production of: Paperboard from wastepaper; tissue paper from wastepaper without deinking at secondary fiber mills; molded products from wastepaper without deinking at secondary fiber mills; and builders' paper and roofing felt from wastepaper.

§ 430.101 Specialized definitions.

top

For the purpose of this subpart:

(a) Except as provided below, the general definitions, abbreviations, and methods of analysis set forth in 40 CFR part 401 and §430.01 of this part shall apply to this subpart.

(b) Noncorrugating medium furnish subdivision mills are mills where recycled corrugating medium is not used in the production of paperboard.

(c) Corrugating medium furnish subdivision mills are mills where only recycled corrugating medium is used in the production of paperboard.

§ 430.102 Effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT).

top

(a) Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT):

Subpart J[BPT effluent limitations for secondary fiber non-deink facilities where

Subpart J[BPT effluent limitations for secondary fiber non-deink facilities where

(b) Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT), except that non-continuous dischargers shall not be subject to the maximum day and average of 30 consecutive days limitations but shall be subject to annual average effluent limitations:

Subpart J [BPT effluent limitations for secondary fiber non-de

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

top

(a) Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart shall achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT): The limitations shall be the same as those specified for conventional pollutants (which are defined in 40 CFR 401.16) in §430.102 of this subpart for the best practicable control technology currently available (BPT).

(b) For secondary fiber non-deink facilities where paperboard from wastepaper is produced, non-continuous dischargers shall not be subject to the maximum day and average-of-30-consecutive-days limitations, but shall be subject to annual average effluent limitations determined by dividing the average-of-30-consecutive-days limitations for BOD5 and TSS by 1.77 and 2.18.

(c) For secondary fiber non-deink facilities where builders' paper and roofing felt from wastepaper are produced, non-continuous dischargers shall not be subject to the maximum day and average-of-30-consecutive-days limitations, but shall be subject to annual average effluent limitations determined by dividing the average-of-30-consecutive-days limitations for BOD5 and TSS by 1.90 and 1.90.

§ 430.104 Effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT).

top

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart where chlorophenolic-containing biocides are used must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT). Non-continuous dischargers shall not be subject to the maximum day mass limitations in kg/kkg (lb/1000 lb) but shall be subject to concentration limitations. Concentration limitations are only applicable to non-continuous dischargers. Permittees not using chlorophenolic-containing biocides must certify to the permit-issuing authority that they are not using these biocides:

Subpart J[BAT effluent limitations for secondary fiber non-dein

Subpart J [BAT effluent limitations for secondary fiber non-dei

Subpart J [BAT effluent limitations for secondary fiber non-d

Subpart J [BAT effluent limitations for secondary fiber non-de

§ 430.105 New source performance standards (NSPS).

top

Any new source subject to this subpart must achieve the following new source performance standards (NSPS), except that non-continuous dischargers shall not be subject to the maximum day and average of 30 consecutive days effluent limitations for BOD5 and TSS, but shall be subject to annual average effluent limitations. Also, for non-continuous dischargers, concentration limitations (mg/l) shall apply, where provided. Concentration limitations will only apply to non-continuous dischargers. Only facilities where chlorophenolic-containing biocides are used shall be subject to pentachlorophenol and trichlorophenol limitations. Permittees not using chlorophenolic-containing biocides must certify to the permit-issuing authority that they are not using these biocides:

Subpart J [NSPS for secondary fiber non-deink facilities wher

Maximum for any 1 day

Subpart J [NSPS for secondary fiber non-deink facilities where

Maximum for any 1 day

Subpart J [NSPS for secondary fiber non-deink facilities whe

Maximum for any 1 day

Subpart J [NSPS for secondary fiber non-deink facilities whe

Maximum for any 1 day

Subpart J [NSPS for secondary fiber non-deink facilities whe

Maximum for any 1 day

§ 430.106 Pretreatment standards for existing sources (PSES).

top

Except as provided in 40 CFR 403.7 and 403.13, any existing source subject to this subpart that introduces pollutants into a publicly owned treatment works must: Comply with 40 CFR part 403; and achieve the following pretreatment standards

for existing sources (PSES) if it uses chlorophenolic-containing biocides. Permittees not using chlorophenolic-containing biocides must certify to the permit-issuing authority that they are not using these biocides. PSES must be attained on or before July 1, 1984:

Subpart J	[PSES for secondary fiber non-deink faciliti
Subpart J	[PSES for secondary fiber non-deink facilities whe
Subpart J	[PSES for secondary fiber non-deink facilities whe
Subpart J	[PSES for secondary fiber non-deink facilities whe

§ 430.107 Pretreatment standards for new sources (PSNS).

top

Except as provided in 40 CFR 403.7, any new source subject to this subpart that introduces pollutants into a publicly owned treatment works must: Comply with 40 CFR part 403; and achieve the following pretreatment standards for new sources (PSNS) if it uses chlorophenolic-containing biocides. Permittees not using chlorophenolic-containing biocides must certify to the permit-issuing authority that they are not using these biocides:

Subpart J	[PSNS for secondary fiber non-deink faciliti
Subpart J	[PSNS for secondary fiber non-deink facilities whe
Subpart J	[PSNS for secondary fiber non-deink facilities whe
Subpart J	[PSNS for secondary fiber non-deink facilities whe

Subpart K—Fine and Lightweight Papers from Purchased Pulp Subcategory

top

§ 430.110 Applicability; description of the fine and lightweight papers from purchased pulp subcategory.

top

The provisions of this subpart are applicable to discharges resulting from the production of: fine paper at nonintegrated mills; and lightweight paper at nonintegrated mills.

§ 430.111 Specialized definitions.

top

For the purpose of this subpart:

(a) Except as provided in paragraphs (b) and (c) of this section, the general definitions, abbreviations, and methods of analysis set forth in 40 CFR part 401 and §430.01 of this part shall apply to this subpart.

(b) Cotton fiber furnish subdivision mills are those mills where significant quantities of cotton fibers (equal to or greater than 4 percent of the total product) are used in the production of fine papers.

(c) Wood fiber furnish subdivision mills are those mills where cotton fibers are not used in the production of fine papers.

§ 430.112 Effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT).

top

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT), except that non-continuous dischargers shall not be subject to the maximum day and average of 30 consecutive days limitations but shall be subject to annual average effluent limitations:

Subpart K [BPT effluent limitations for non-integrated mills wh

Subpart K[BPT effluent limitations for non-integrated mills whe

Subpart K [BPT effluent limitations for non-integrated mills w

Subpart K [BPT effluent limitations for non-integrated mill

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

top

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart shall achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT): The limitations shall be the same as those specified for conventional pollutants (which are defined in 40 CFR 401.16) in §430.102 of this subpart for the best practicable control technology currently available (BPT).

§ 430.114 Effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT).

top

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart where chlorophenolic-containing biocides are used must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT). Non-continuous dischargers shall not be subject to the maximum day mass limitations in kg/kkg (lb/1000 lb) but shall be subject to concentration limitations. Concentration limitations are only applicable to non-continuous dischargers. Permittees not using chlorophenolic-containing biocides must certify to the permit-issuing authority that they are not using these biocides:

Subpart K [BAT effluent limitations for non-integrated mills wh

Subpart K[BAT effluent limitations for non-integrated mills whe

Subpart K [BAT effluent limitations for non-integrated mills w

Subpart K [BAT effluent limitations for non-integrated mill

§ 430.115 New source performance standards (NSPS).

top

Any new source subject to this subpart must achieve the following new source performance standards (NSPS), except that non-continuous dischargers shall not be subject to the maximum day and average of 30 consecutive days effluent limitations for BOD5 and TSS, but shall be subject to annual average effluent limitations. Also, for non-continuous dischargers, concentration limitations (mg/l) shall apply, where provided. Concentration limitations will only apply to non-continuous dischargers. Only facilities where chlorophenolic-containing biocides are used shall be subject to pentachlorophenol and trichlorophenol limitations. Permittees not using chlorophenolic-containing biocides must certify to the permit-issuing authority that they are not using these biocides:

Subpart K [NSPS for non-integrated mills where fine paper is pr

Maximum for any 1 day

Subpart K [NSPS for non-integrated mills where fine paper

Maximum for any 1 day

Subpart K [NSPS for non-integrated mills where light

Maximum for any 1 day

Subpart K[NSPS for non-integrated mills where lightweight paper

Maximum for any 1 day

§ 430.116 Pretreatment standards for existing sources (PSES).

top

Except as provided in 40 CFR 403.7 and 403.13, any existing source subject to this subpart that introduces pollutants into a publicly owned treatment works must: Comply with 40 CFR part 403; and achieve the following pretreatment standards for existing sources (PSES) if it uses chlorophenolic-containing biocides. Permittees not using chlorophenolic-containing biocides must certify to the permit-issuing authority that they are not using these biocides. PSES must be attained on or before July 1, 1984:

Subpart K [PSES for non-integrated mills where fine paper is pr

Subpart K [PSES for non-integrated mills where fine paper

Subpart K	[PSES for non-integrated mills where light
Subpart K	[PSES for non-integrated mills where lightweight paper

§ 430.117 Pretreatment standards for new sources (PSNS).

top

Except as provided in 40 CFR 403.7, any new source subject to this subpart that introduces pollutants into a publicly owned treatment works must: Comply with 40 CFR part 403; and achieve the following pretreatment standards for new sources (PSNS) if it uses chlorophenolic-containing biocides. Permittees not using chlorophenolic-containing biocides must certify to the permit-issuing authority that they are not using these biocides:

Subpart K	[PSNS for non-integrated mills where fine paper is pr
Subpart K	[PSNS for non-integrated mills where fine paper
Subpart K	[PSNS for non-integrated mills where light
Subpart K	[PSNS for non-integrated mills where lightweight paper

Subpart L—Tissue, Filter, Non-Woven, and Paperboard From Purchased Pulp Subcategory

top

§ 430.120 Applicability; description of the tissue, filter, non-woven, and paperboard from purchased pulp subcategory.

top

The provisions of this subpart are applicable to discharges resulting from the production of tissue papers at non-integrated mills, filter and non-woven papers at non-integrated mills, and paperboard at non-integrated mills. The production of electrical grades of board and matrix board is not included in this subpart.

§ 430.121 Specialized definitions.

top

For the purpose of this subpart, the general definitions, abbreviations, and methods of analysis set forth in 40 CFR part 401 and §430.01 of this part shall apply to this subpart.

§ 430.122 Effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT).

top

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT), except that non-continuous dischargers shall not be subject to the maximum day and average of 30 consecutive days limitations but shall be subject to annual average effluent limitations:

Subpart L[BPT effluent limitations for non-integrated mills whe

Subpart L [BPT effluent limitations for non-integrated mil

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

top

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart shall achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT): The limitations shall be the same as those specified for conventional pollutants (which are defined in 40 CFR 401.16) in §430.122 of this subpart for the best practicable control technology currently available (BPT).

§ 430.124 Effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT).

top

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart where chlorophenolic-containing biocides are used must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT). Non-continuous dischargers shall not be subject to the maximum day mass limitations in kg/kkg (lb/1000 lb) but shall be subject to concentration limitations. Concentration limitations are only applicable to non-continuous dischargers. Permittees not using chlorophenolic-containing biocides must certify to the permit-issuing authority that they are not using these biocides:

Subpart L[BAT effluent limitations for non-integrated mills whe

Subpart L [BAT effluent limitations for non-integrated mil

§ 430.125 New source performance standards (NSPS).

top

Any new source subject to this subpart must achieve the following new source performance standards (NSPS), except that non-continuous dischargers shall not be subject to the maximum day and average of 30 consecutive days effluent limitations for BOD5 and TSS, but shall be subject to annual average effluent limitations. Also, for non-continuous dischargers, concentration limitations (mg/l) shall apply, where provided. Concentration limitations will only apply to non-continuous dischargers. Only facilities where chlorophenolic-containing biocides are used shall be subject to pentachlorophenol and trichlorophenol limitations. Permittees not using chlorophenolic-containing biocides must certify to the permit-issuing authority that they are not using these biocides:

Subpart L	[NSPS for non-integrated mills where tis.
	Maximum for any 1 day
Subpart L	[NSPS for non-integrated mills where filter and
	Maximum for any 1 day
Subpart L	[NSPS for non-integrated mills where p.
	Maximum for any 1 day

§ 430.126 Pretreatment standards for existing sources (PSES).

top

Except as provided in 40 CFR 403.7 and 403.13, any existing source subject to this subpart that introduces pollutants into a publicly owned treatment works must: Comply with 40 CFR part 403; and achieve the following pretreatment standards for existing sources (PSES) if it uses chlorophenolic-containing biocides. Permittees not using chlorophenolic-containing biocides must certify to the permit-issuing authority that they are not using these biocides. PSES must be attained on or before July 1, 1984:

Subpart L	[PSES for non-integrated mills where tis.
Subpart L	[PSES for non-integrated mills where filter and
Subpart L	[PSES for non-integrated mills where p.

§ 430.127 Pretreatment standards for new sources (PSNS).

top

Except as provided in 40 CFR 403.7, any new source subject to this subpart that introduces pollutants into a publicly owned treatment works must: Comply with 40 CFR part 403; and achieve the following pretreatment standards for new sources (PSNS) if it uses chlorophenolic-containing biocides. Permittees not using chlorophenolic-containing biocides must certify to the permit-issuing authority that they are not using these biocides:

Subpart L	[PSNS for non-integrated mills where tis.
Subpart L	[PSNS for non-integrated mills where filter and
Subpart L	[PSNS for non-integrated mills where p.

Appendix A to Part 430—Methods 1650 and 1653

top

Method 1650—Adsorbable Organic Halides by Adsorption and Coulometric Titration

1.0 Scope and Application

1.1 This method is for determination of adsorbable organic halides (AOX) associated with the Clean Water Act; the Resource Conservation and Recovery Act; the Comprehensive Environmental Response, Compensation, and Liability Act; and other organic halides amenable to combustion and coulometric titration. The method is designed to meet the survey and monitoring requirements of the Environmental Protection Agency (EPA).

1.2 The method is applicable to the determination of AOX in water and wastewater. This method is a combination of several existing methods for organic halide measurements (References 1 through 7).

1.3 The method can be used to measure organically-bound halides (chlorine, bromine, iodine) present in dissolved or suspended form. Results are reported as organic chloride (Cl^-). The detection limit of the method is usually dependent on interferences rather than instrumental limitations. A method detection limit (MDL; Reference 8) of 6.6 µg/L, and a minimum level (ML; Section 18) of 20 µg/L, can be achieved with no interferences present.

1.4 This method is for use by or under the supervision of analysts experienced in the use of a combustion/micro-coulometer. Each laboratory that uses this method must demonstrate the ability to generate acceptable results using the procedures described in Section 9.2.

1.5 Any modification of the method beyond those expressly permitted (Section 9.1.2) is subject to application and approval of an alternate test procedure under 40 CFR 136.4 and 136.5.

2.0 Summary of Method

2.1 Sample preservation: Residual chlorine that may be present is removed by the addition of sodium thiosulfate. Samples are adjusted to a pH < 2 and maintained at 0 to 4 °C until analysis.

2.2 Sample analysis: Organic halide in water is determined by adsorption onto granular activated carbon (GAC), washing the adsorbed sample and GAC to remove inorganic halide, combustion of the sample and GAC to form the hydrogen halide, and titration of the hydrogen halide with a micro-coulometer, as shown in Figure 1.

2.3 Micro-coulometer.

2.3.1 This detector operates by maintaining a constant silver-ion concentration in a titration cell. An electric potential is applied to a solid silver electrode to produce silver ions in the cell. As hydrogen halide produced from the combustion of organic halide enters the cell, it is partitioned into an acetic acid electrolyte where it precipitates as silver halide. The current produced is integrated over the combustion period. The electric charge is proportional to the number of moles of halogen captured in the cell (Reference 6).

2.3.2 The mass concentration of organic halides is reported as an equivalent concentration of organically bound chloride (Cl^-).

3.0 Definitions

3.1 Adsorbable organic halides is defined as the analyte measured by this method. The nature of the organo-halides and the presence of semi-extractable material will influence the amount measured and interpretation of results.

3.2 Definitions for terms used in this method are given in the glossary at the end of the method (Section 18).

4.0 Interferences

4.1 Solvents, reagents, glassware, and other sample processing hardware may yield elevated readings from the micro-coulometer. All materials used in the analysis shall be demonstrated to be free from interferences under the conditions of analysis by running method blanks initially and with each sample batch (samples started through the adsorption process in a given eight-hour shift, to a maximum of 20 samples). Specific selection of reagents and purification of solvents may be required.

4.2 Glassware is cleaned by detergent washing in hot water, rinsing with tap water and distilled water, capping with aluminum foil, and baking at 450 °C for at least one hour. For some glassware, immersion in a chromate cleaning solution prior to detergent washing may be required. If blanks from glassware without cleaning or with fewer cleaning steps show no detectable organic halide, the cleaning steps that do not eliminate organic halide may be omitted.

4.3 Most often, contamination results from methylene chloride vapors in laboratories that perform organic extractions. Heating, ventilating, and air conditioning systems that are shared between the extraction laboratory and the laboratory in which organic halide measurements are performed transfer the methylene chloride vapors to the air in the organic halide laboratory. Exposure of the activated carbon used in the analysis results in contamination. Separate air handling systems, charcoal filters, and glove boxes can be used to minimize this exposure.

4.4 Activated carbon.

4.4.1 The purity of each lot of activated carbon must be verified before each use by measuring the adsorption capacity and the background level of halogen (Section 9.5). The stock of activated carbon should be stored in its granular form in a glass container that is capped tightly. Protect carbon at all times from sources of halogen vapors.

4.4.2 Inorganic substances such as chloride, chlorite, bromide, and iodide will adsorb on activated carbon to an extent dependent on their original concentration in the aqueous solution and the volume of sample adsorbed. Treating the activated carbon with a solution of nitrate causes competitive desorption of inorganic halide species. However, if the inorganic halide concentration is greater than 2,000 times the organic halide concentration, artificially high results may be obtained.

4.4.3 Halogenated organic compounds that are weakly adsorbed on activated carbon are only partially recovered from the sample. These include certain alcohols and acids such as chloroethanol and chloroacetic acid that can be removed from activated carbon by the nitrate wash.

4.5 Polyethylene gloves should be worn when handling equipment surfaces in contact with the sample to prevent transfer of contaminants that may be present on the hands.

5.0 Safety

5.1 The toxicity or carcinogenicity of each reagent used in this method has not been precisely determined; however, each chemical substance should be treated as a potential health hazard. Exposure to these substances should be reduced to the lowest possible level. The laboratory is responsible for maintaining a current awareness file of OSHA regulations regarding the safe handling of the chemicals specified in this method. A reference file of material safety data sheets (MSDSs) should be made available to all personnel involved in the chemical analysis. Additional information on laboratory safety can be found in References 9 through 11.

5.2 This method employs strong acids. Appropriate clothing, gloves, and eye protection should be worn when handling these substances.

5.3 Field samples may contain high concentrations of toxic volatile compounds. Sample containers should be opened in a hood and handled with gloves that will prevent exposure.

6.0 Equipment and Supplies

Note: Brand names, suppliers, and part numbers are for illustrative purposes only. No endorsement is implied. Equivalent performance may be achieved using apparatus and materials other than those specified here, but demonstration of equivalent performance that meets the requirements of this method is the responsibility of the laboratory.

6.1 Sampling equipment.

6.1.1 Bottles: 100- to 4000-mL, amber glass, sufficient for all testing (Section 8.2). Detergent water wash, chromic acid rinse, rinse with tap and distilled water, cover with aluminum foil, and heat to 450 °C for at least one hour before use.

6.1.2 PTFE liner: Cleaned as above and baked at 100 to 200 °C for at least one hour.

6.1.3 Bottles and liners must be lot certified to be free of organic halide by running blanks according to this method.

6.2 Scoop for granular activated carbon (GAC): Capable of precisely measuring 40 mg (±5 mg) GAC (Dohrmann Measuring Cup 521–021, or equivalent).

6.3 Batch adsorption and filtration system.

6.3.1 Adsorption system: Rotary shaker, wrist action shaker, ultrasonic system, or other system for assuring thorough contact of sample with activated carbon. Systems different from the one described below must be demonstrated to meet the performance requirements in Section 9 of this method.

6.3.1.1 Erlenmeyer flasks: 250- to 1500-mL with ground-glass stopper, for use with rotary shaker.

6.3.1.2 Shake table: Sybron Thermolyne Model LE "Big Bill" rotator/shaker, or equivalent.

6.3.1.3 Rack attached to shake table to permit agitation of 16 to 25 samples simultaneously.

6.3.2 Filtration system (Figure 2).

6.3.2.1 Vacuum filter holder: Glass, with fritted-glass support (Fisher Model 09–753E, or equivalent).

6.3.2.2 Polycarbonate filter: 0.40 to 0.45 micron, 25-mm diameter (Micro Separations Inc, Model K04CP02500, or equivalent).

6.3.2.3 Filter forceps: Fisher Model 09–753–50, or equivalent, for handling filters. Two forceps may better aid in handling filters. Clean by washing with detergent and water, rinsing with tap and deionized water, and air drying on aluminum foil.

6.3.2.4 Vacuum flask: 500- to 1500-mL (Fisher 10–1800, or equivalent).

6.3.2.5 Vacuum Source: A pressure/vacuum pump, rotary vacuum pump, or other vacuum source capable of providing at least 610 mm (24 in.) Hg vacuum at 30 L/min free air displacement.

6.3.2.6 Stopper and tubing to mate the filter holder to the flask and the flask to the pump.

6.3.2.7 Polyethylene gloves: (Fisher 11-394-110-B, or equivalent).

6.4 Column adsorption system.

6.4.1 Adsorption module: Dohrmann AD-2, Mitsubishi TXA-2, or equivalent with pressurized sample and nitrate-wash reservoirs, adsorption columns, column housings, gas and gas pressure regulators, and receiving vessels. For each sample reservoir, there are two adsorption columns connected in series. A small steel funnel for filling the columns and a rod for pushing out the carbon are also required. A schematic of the column adsorption system is shown in Figure 3.

6.4.2 Adsorption columns: Pyrex, 5 ±0.2 cm long × 2 mm ID, to hold 40 mg of granular activated carbon (GAC).

6.4.3 Cerafelt: Johns-Manville, or equivalent, formed into plugs using stainless steel borer (2 mm ID) with ejection rod (available from Dohrmann or Mitsubishi) to hold 40 mg of granular activated carbon (GAC). Caution: Handle Cerafelt with gloves.

6.4.4 Column holders: To support adsorption columns.

6.5 Combustion/micro-coulometer system: Commercially available as a single unit or assembled from parts. At the time of the writing of this method, organic halide units were commercially available from the Dohrmann Division of Rosemount Analytical, Santa Clara, California; Euroglas BV, Delft, the Netherlands; and Mitsubishi Chemical Industries, Ltd., Tokyo, Japan.

6.5.1 Combustion system: Older systems may not have all of the features shown in Figure 4. These older systems may be used provided the performance requirements (Section 9) of this method are met.

6.5.1.1 Combustion tube: Quartz, capable of being heated to 800 to 1000 °C and accommodating a boat sampler. The tube must contain an air lock for introduction of a combustion boat, connections for purge and combustion gas, and connection to the micro-coulometer cell.

6.5.1.2 Tube furnace capable of controlling combustion tube in the range of 800 to 1000 °C.

6.5.1.3 Boat sampler: Capable of holding 35 to 45 mg of activated carbon and a polycarbonate filter, and fitting into the combustion tube (Section 6.5.1.1). Some manufacturers offer an enlarged boat and combustion tube for this purpose. Under a time-controlled sequence, the boat is first moved into an evaporation zone where water and other volatiles are evaporated, and then into the combustion zone where the carbon and all other organic material in the boat are burned in a flowing oxygen stream. The evolved gases are transported by a non-reactive carrier gas to the micro-coulometer cell.

6.5.1.4 Motor driven boat sampler: Capable of advancing the combustion boat into the furnace in a reproducible time sequence. A suggested time sequence is as follows:

A. Establish initial gas flow rates: 160 mL/min CO_2; 40 mL/min O_2.

B. Sequence start.

C. Hold boat in hatch for five seconds to allow integration for baseline subtraction.

D. Advance boat into vaporization zone.

E. Hold boat in vaporization zone for 110 seconds.

F. Establish gas flow rates for combustion: 200 mL/min O_2; 0 mL/min CO_2; advance boat into pyrolysis zone (800 °C).

G. Hold boat in pyrolysis zone for six minutes.

H. Return gas flow rates to initial values; retract boat into hatch to cool and to allow remaining HX to be swept into detector (approximately two minutes).

I. Stop integration at 10 minutes after sequence start.

Note: If the signal from the detector does not return to baseline, it may be necessary to extend the pyrolysis time.The sequence above may need to be optimized for each instrument.

6.5.1.5 Absorber: Containing sulfuric acid to dry the gas stream after combustion to prevent backflush of electrolyte is highly recommended.

6.5.2 Micro-coulometer system: Capable of detecting the equivalent of 0.2 µg of Cl^- at a signal-to-noise ratio of 2; capable of detecting the equivalent of 1 µg of Cl^- with a relative standard deviation less than 10%, and capable of accumulating a minimum of the equivalent of 500 µg of Cl^- before a change of electrolyte is required.

6.5.2.1 Micro-coulometer cell: The three cell designs presently in use are shown in Figure 1. Cell operation is described in Section 2.

6.5.2.2 Cell controller: Electronics capable of measuring the small currents generated in the cell and accumulating and displaying the charge produced by hydrogen halides entering the cell. A strip-chart recorder is desirable for display of accumulated charge.

6.6 Miscellaneous glassware: nominal sizes are specified below; other sizes may be used, as necessary.

6.6.1 Volumetric flasks: 5-, 10-, 25-, 50-, 100-, and 1000-mL.

6.6.2 Beakers: 100-, 500-, and 1000-mL.

6.6.3 Volumetric pipets: 1- and 10-mL with pipet bulbs.

6.6.4 Volumetric micro-pipets: 10-, 20-, 50-, 100-, 200-, and 500-µL with pipet control (Hamilton 0010, or equivalent).

6.6.5 Graduated cylinders: 10-, 100-, and 1000-mL.

6.7 Micro-syringes: 10-, 50-, and 100-µL.

6.8 Balances.

6.8.1 Top-loading, capable of weighing 0.1 g.

6.8.2 Analytical, capable of weighing 0.1 mg.

6.9 pH meter.

6.10 Wash bottles: 500- to 1000-mL, PTFE or polyethylene.

6.11 Strip-chart recorder: suggested but not required—useful for determining end of integration (Section 11.4.2).

7.0 Reagents and Standards

7.1 Granular activated carbon (GAC): 75 to 150 µm (100 to 200 mesh); (Dohrmann, Mitsubishi, Carbon Plus, or equivalent), with chlorine content less than 1 µg Cl^- per scoop (< 25 µg Cl^- per gram), adsorption capacity greater than 1000 µg Cl^- (as 2,4,6-trichlorophenol) per scoop (≤25,000 µg/g), inorganic halide retention of less than 1 µg Cl^- per scoop in the presence of 10 mg of inorganic halide (< 20 µg Cl^- per gram in the presence of 2500 mg of inorganic halide), and that meets the other test criteria in this method.

7.2 Reagent water: Water in which organic halide is not detected by this method.

7.2.1 Preparation: Reagent water may be generated by:

7.2.1.1 Activated carbon: Pass tap watér through a carbon bed (Calgon Filtrasorb-300, or equivalent).

7.2.1.2 Water purifier: Pass tap water through a purifier (Millipore Super Q, or equivalent).

7.2.2 pH adjustment: Adjust the pH of the reagent water to < 2 with nitric acid for all reagent water used in this method, except for the acetic acid solution (Section 7.13).

7.3 Nitric acid (HNO_3): Concentrated, analytical grade.

7.4 Sodium chloride (NaCl) solution (100 µg/mL of Cl^-): Dissolve 0.165g NaCl in 1000 mL reagent water. This solution is used for cell testing and for the inorganic halide rejection test.

7.5 Ammonium chloride (NH_4Cl) solution (100 µg/mL of Cl^-): Dissolve 0.1509 g NH_4Cl in 1000 mL reagent water.

7.6 Sulfuric acid: Reagent grade (specific gravity 1.84).

7.7 Oxygen: 99.9% purity.

7.8 Carbon Dioxide: 99.9% purity.

7.9 Nitrate stock solution: In a 1000-mL volumetric flask, dissolve 17g of $NaNO_3$ in approximately 100 mL of reagent water, add 1.4 mL nitric acid (Section 7.3) and dilute to the mark with reagent water.

7.10 Nitrate wash solution: Dilute 50 mL of nitrate stock solution (Section 7.9) to 1000 mL with reagent water.

7.11 Sodium thiosulfate ($Na_2S_2O_3$) solution (1 N): Weigh 79 grams of $Na_2S_2O_3$ in a 1-L volumetric flask and dilute to the mark with reagent water.

7.12 Trichlorophenol solutions.

Note: The calibration solutions in this section employ 100-mL volumes. For determinations requiring a larger or smaller volume, increase or decrease the size of the volumetric flasks commensurately. For example, if a 1-L sample is to be analyzed, use 1000-mL flasks (Sections 7.12.3.1 and 7.12.4) and 10 times the volume of reagent water (Sections 7.12.3.1 and 7.12.4). The volume of stock solution added to the calibration solutions and precision and recovery (PAR) test solution remain as specified (Sections 7.12.3.2 and 7.12.4) so that the same amount of chloride is delivered to the coulometric cell regardless of the volume of the calibration and PAR solutions.

7.12.1 Methanol: HPLC grade.

7.12.2 Trichlorophenol stock solution (1.0 mg/mL of Cl^-): Dissolve 0.186 g of 2,4,6-trichlorophenol in 100 mL of halide-free methanol.

7.12.3 Trichlorophenol calibration solutions.

7.12.3.1 Place approximately 90 mL of reagent water in each of five 100-mL volumetric flasks.

7.12.3.2 Using a calibrated micro-syringe or micro-pipets, add 2, 5, 10, 30, and 80 µL of the trichlorophenol stock solution (Section 7.12.2) to the volumetric flasks and dilute each to the mark with reagent water to produce calibration solutions of 2, 5, 10, 30, and 80 µg Cl^- per 100 mL of solution (20, 50, 100, 300, and 800 µg/L).

7.12.3.3 Some instruments may have a calibration range that does not extend to 800 µg/L (80 µg of Cl^-). For those instruments, a narrower dynamic range may be used. However, if the concentration of halide in a sample exceeds that range, the sample must be diluted to bring the concentration within the range calibrated.

7.12.4 Trichlorophenol precision and recovery (PAR) test solution (10 µg/L of Cl^-): Partially fill a 100-mL volumetric flask, add 10 µL of the stock solution (Section 7.12.2), and dilute to the mark with reagent water.

7.13 Acetic acid solution: Containing 30 to 70% acetic acid in deionized water, per the instrument manufacturer's instructions.

8.0 Sample Collection, Preservation, and Storage

8.1 Sample preservation.

8.1.1 Residual chlorine: If the sample is known or suspected to contain free chlorine, the chlorine must be reduced to eliminate positive interference that may result from continued chlorination reactions. A knowledge of the process from which the sample is collected may be of value in determining whether dechlorination is necessary. Immediately after sampling, test for residual chlorine using the following method or an alternative EPA method (Reference 12):

8.1.1.1 Dissolve a few crystals of potassium iodide in the sample and add three to five drops of a 1% starch solution. A blue color indicates the presence of residual chlorine.

8.1.1.2 If residual chlorine is found, add 1 mL of sodium thiosulfate solution (Section 7.11) for each 2.5 ppm of free chlorine or until the blue color disappears. Do not add an excess of sodium thiosulfate. Excess sodium thiosulfate may cause decomposition of a small fraction of the OX.

8.1.2 Acidification: Adjust the pH of aqueous samples to < 2 with nitric acid. Acidification inhibits biological activity and stabilizes chemical degradation, including possible dehalogenation reactions that may occur at high pH. Acidification is necessary to facilitate thorough adsorption.

8.1.3 Refrigeration: Maintain samples at a temperature of 0 to 4 °C from time of collection until analysis.

8.2 Collect the amount of sample necessary for analysis (Section 11) and all QC tests (Section 9) in an amber glass bottle of the appropriate size (Section 6.1.1).

8.3 Analyze samples no less than three days nor more than six months after collection.

9.0 Quality Control

9.1 Each laboratory that uses this method is required to operate a formal quality assurance program. The minimum requirements of this program consist of an initial demonstration of laboratory capability, an ongoing analysis of standards and blanks as tests of continued performance, and analysis of matrix spike and matrix spike duplicate (MS/MSD) samples to assess accuracy and precision. Laboratory performance is compared to established performance criteria to determine if the results of analyses meet the performance characteristics of the method.

9.1.1 The laboratory shall make an initial demonstration of the ability to produce acceptable results with this method. This ability is demonstrated as described in Section 9.2.

9.1.2 The laboratory is permitted to modify this method to improve separations or lower the costs of measurements, provided that all performance specifications are met. Each time a modification is made to the method, the laboratory is required to

repeat the procedures in Sections 9.2.2 and 10 to demonstrate continued method performance. If the detection limit of the method will be affected by the modification, the laboratory should demonstrate that the MDL (40 CFR 136, Appendix B) is less than or equal to the MDL in this method or one-third the regulatory compliance level, whichever is higher.

9.1.3 The laboratory shall spike 10% of the samples with known concentrations of 2,4,6-trichlorophenol to monitor method performance and matrix interferences (interferences caused by the sample matrix). This test is described in Section 9.3. When results of these spikes indicate atypical method performance for samples, the samples are diluted to bring method performance within acceptable limits.

9.1.4 Analyses of blanks are required to demonstrate freedom from contamination. The procedures and criteria for analysis of blanks are described in Section 9.4.

9.1.5 The laboratory shall, on an ongoing basis, demonstrate through the analysis of the precision and recovery (PAR) standard that the analysis system is in control. These procedures are described in Section 9.10.

9.1.6 The laboratory shall perform quality control tests on the granular activated carbon. These procedures are described in Section 9.5.

9.1.7 Samples are analyzed in duplicate to demonstrate precision. These procedures are described in Section 9.6.

9.2 Initial demonstration of laboratory capability.

9.2.1 Method Detection Limit (MDL): To establish the ability to detect AOX, the laboratory should determine the MDL per the procedure in 40 CFR 136, Appendix B using the apparatus, reagents, and standards that will be used in the practice of this method. An MDL less than or equal to the MDL in Section 1.3 should be achieved prior to the practice of this method.

9.2.2 Initial precision and recovery (IPR): To establish the ability to generate acceptable precision and recovery, the laboratory shall perform the following operations:

9.2.2.1 Analyze four aliquots of the PAR standard (Section 7.12.4) and a method blank according to the procedures in Sections 9.4 and 11.

9.2.2.2 Using the blank-subtracted results of the set of four analyses, compute the average percent recovery (X) and the standard deviation of the percent recovery (s) for the results.

9.2.2.3 The average percent recovery shall be in the range of 81 to 114 µg/L and the standard deviation shall be less than 8 µg/L. If X and s meet these acceptance criteria, system performance is acceptable and analysis of blanks and samples may begin. If, however, s exceeds the precision limit or X falls outside the range for recovery, system performance is unacceptable. In this case, correct the problem and repeat the test.

9.3 Matrix spikes: The laboratory shall spike a minimum of 10% of samples from a given matrix type (e.g., C-stage filtrate, produced water, treated effluent) in duplicate (MS/MSD). If only one sample from a given matrix type is analyzed, an additional two aliquots of that sample shall be spiked.

9.3.1 The concentration of the analytes spiked into the MS/MSD shall be determined as follows:

9.3.1.1 If, as in compliance monitoring, the concentration of OX is being checked against a regulatory concentration limit, the spiking level shall be at that limit or at one to five times higher than the background concentration determined in Section 9.3.2, whichever concentration is higher.

9.3.1.2 If the concentration of OX is not being checked against a regulatory limit, the spike shall be at the concentration of the precision and recovery standard (PAR; Section 7.12.4) or at one to five times higher than the background concentration determined in Section 9.3.2, whichever concentration is higher.

9.3.2 Analyze one sample out of each batch of 10 samples from each site to determine the background concentration of AOX. If necessary, prepare a solution of 2,4,6-trichlorophenol appropriate to produce a level in the sample one to five times the background concentration. Spike two additional sample aliquots with spiking solution and analyze them to determine the concentration after spiking.

9.3.2.1 Compute the percent recovery of each analyte in each aliquot:

$$\% \text{ Recovery} = \frac{100\ (\text{Found} - \text{Background})}{T}$$

where:

T is the true value of the spike

9.3.2.2 Compute the relative percent difference (RPD) between the two results (not between the two recoveries) as described in Section 12.4.

9.3.2.3 If the RPD is less than 20%, and the recoveries for the MS and MSD are within the range of 78 to 116%, the results are acceptable.

9.3.2.4 If the RPD is greater than 20%, analyze two aliquots of the precision and recovery standard (PAR).

9.3.2.4.1 If the RPD for the two aliquots of the PAR is greater than 20%, the analytical system is out of control. In this case, repair the problem and repeat the analysis of the sample batch, including the MS/MSD.

9.3.2.4.2 If, however, the RPD for the two aliquots of the PAR is less than 20%, dilute the sample chosen for the MS/MSD by a factor of 2–10 (to remain within the working range of the analytical system) and repeat the MS/MSD test. If the RPD is still greater than 20%, the result may not be reported for regulatory compliance purposes. In this case, choose another sample for the MS/MSD and repeat analysis of the sample batch.

9.3.2.5 If the percent recovery for both the MS and MSD are less than 78% or greater than 116%, analyze the precision and recovery (PAR) standard.

9.3.2.5.1 If the recovery of the PAR is outside the 78 to 116% range, the analytical system is out of control. In this case, repair the problem and repeat the analysis of the sample batch, including the MS/MSD.

9.3.2.5.2 If the recovery of the PAR is within the range of 78 to 116%, dilute the sample, MS, and MSD by a factor of 2–10 (to remain within the working range of the analytical system) and re-analyze. If the results of the dilute analyses remain outside of the acceptable range, these results may not be reported for regulatory compliance purposes. In this case, choose another sample for the MS/MSD and repeat the analysis of the sample batch.

9.4 Blanks.

9.4.1 Reagent water blanks: Analyzed to demonstrate freedom from contamination.

9.4.1.1 Analyze a reagent water blank with each batch of samples. The blank must be analyzed immediately preceding calibration verification to allow for blank subtraction and to demonstrate freedom from contamination and memory effects, and must include all details of the procedure to be followed when analyzing samples.

9.4.1.2 Prepare the reagent water blank using a volume of reagent water equivalent to the volume used for sample preparation (Section 11.1). If using the micro-column procedure, adsorb the method blank using two columns, as described in Section 11. Combust the GAC from each column separately, as described in Section 11.

9.4.1.3 If the result from the blank from the batch method or the sum of the results from two columns is more than 20 µg/L, analysis of samples is halted until the source of contamination is eliminated and a blank shows no evidence of contamination at this level.

9.4.2 Nitrate-washed GAC blanks: Analyzed daily to demonstrate that the GAC is free from contamination.

9.4.2.1 Nitrate-washed GAC blank for the batch procedure: Analyze a batch nitrate-washed GAC blank by adding a scoop of dry GAC to the assembled filter apparatus containing the polycarbonate membrane and washing the GAC with the nitrate wash solution (Section 7.10) using the procedure in Section 11.2.6.

9.4.2.2 Nitrate-washed GAC blank for the column procedure: Analyze a column nitrate-washed GAC blank by assembling two carbon columns in series and washing the columns with the nitrate wash solution (Section 7.10) using the procedure in Section 11.3.4.2. Analyze the GAC in each column separately. The results of the second analysis must be within ±0.2 µg Cl^- of the first. A difference greater than 0.2 µg Cl^- indicates a lack of homogeneity in the GAC that could introduce unacceptable variability. If the difference exceeds this amount, the GAC should be replaced.

9.4.3 The result for the reagent water blank (Section 9.4.1) shall not exceed the result for the nitrate wash blank (Section 9.4.2.1 or 9.4.2.2) by more than 0.5 µg Cl^-.

9.5 Granular activated carbon (GAC) batch testing: Each lot number or batch of activated carbon received from a supplier is tested once before use to ensure adequate quality. Use only GAC that meets the test criteria below.

9.5.1 Contamination test: Analyze a scoop of GAC. Reject carbon if the amount of OX exceeds 1 µg (25 µg Cl^-/g).

9.5.2 Inorganic chloride adsorption test: Attempt to adsorb NaCl from 100 mL of a solution containing 100 mg/L in reagent water. Wash with nitrate solution and analyze. The amount of halide should be less than 1 µg Cl^- larger than the blank. A larger amount indicates significant uptake of inorganic chloride by the carbon. Reject carbon if the 1 µg level is exceeded.

9.6 Samples that are being used for regulatory compliance purposes shall be analyzed in duplicate.

9.6.1 The procedure for preparing duplicate sample aliquots is described in Section 11.5.

9.6.2 Calculate the RPD by following the same procedure described in Section 12.4.

9.6.3 If the RPD is greater than 20%, the analyses must be repeated.

9.6.4 If the RPD remains greater than 20%, the result may not be reported for regulatory compliance purposes.

9.7 The specifications in this method can be met if the apparatus used is calibrated properly and maintained in a calibrated state. The standards used for calibration (Section 10), calibration verification (Section 9.9), and for initial

(Section 9.2.2) and ongoing (Section 9.10) precision and recovery should be identical, so that the most precise results will be obtained.

9.8 Depending on specific program requirements, field duplicates may be collected to determine the precision of the sampling technique.

9.9 At the beginning and end of each eight-hour shift during which analyses are performed, system performance and calibration are verified. Verification of system performance and calibration may be performed more frequently, if desired.

9.9.1 If performance and calibration are verified at the beginning and end of each shift (or more frequently), samples analyzed during that period are considered valid.

9.9.2 If performance and calibration are not verified at both the beginning and end of a shift (or more frequently), samples analyzed during that period must be reanalyzed.

9.9.3 If calibration is verified at the beginning of a shift, recalibration using the five standards described in Section 10.6 is not necessary; otherwise, the instrument must be recalibrated prior to analyzing samples (Section 10).

9.9.4 Cell maintenance and other changes to the analytical system that can affect system performance may not be performed during the eight-hour (or shorter) shift.

9.10 Calibration verification and ongoing precision and recovery: Calibration and system performance are verified by the analysis of the 100 µg/L PAR standard.

9.10.1 Analyze a blank (Section 9.4) and analyze the PAR standard (Section 7.12.4) immediately thereafter at the beginning and end of each shift. Compute the concentration of organic halide in the blank and in the PAR standard using the procedures in Section 12. The blank shall be less than 2 µg Cl^- (20 µg/L equivalent).

9.10.2 Subtract the result for the blank from the result of the PAR standard using the procedures in Section 12, and compute the percent recovery of the blank-subtracted PAR standard. The percent recovery shall be in the range of 78 to 116%.

9.10.3 If the recovery is within this range, the analytical process is in control and analysis of blanks and samples may proceed. If, however, the recovery is not within the acceptable range, the analytical process is not in control. In this event, correct the problem and repeat the ongoing precision and recovery test (Section 9.10), or recalibrate (Sections 10.5 through 10.6).

9.10.4 If the recovery is not within the acceptable range for the PAR standard analyzed at the end of the eight-hour shift, correct the problem, repeat the ongoing precision and recovery test (Section 9.10), or recalibrate (Sections 10.5 through 10.6), and reanalyze the sample batch that was analyzed during the eight -hour shift.

9.10.5 If the recovery is within the acceptable range at the end of the shift, and samples are to be analyzed during the next eight-hour shift, the end of shift verification may be used as the beginning of shift verification for the subsequent shift, provided the next eight-hour shift begins as the first shift ends.

9.11 It is suggested but not required that the laboratory develop a statement of data quality for AOX and develop QC charts to form a graphic demonstration of method performance. Add results that pass the specification in Section 9.10.2 to initial and previous ongoing data. Develop a statement of data quality by calculating the average percent recovery (R) and the standard deviation of percent

recovery (s_r). Express the accuracy as a recovery interval from $R - 2s_r$ to $R = 2s_r$. For example, if R=95% and s_r=5%, the accuracy is 85 to 105%.

10.0 Calibration and Standardization

10.1 Assemble the OX system and establish the operating conditions necessary for analysis. Differences between various makes and models of instruments will require different operating procedures. Laboratories should follow the operating instructions provided by the manufacturer of their particular instrument. Sensitivity, instrument detection limit, precision, linear range, and interference effects must be investigated and established for each particular instrument. Calibration is performed when the instrument is first set up and when calibration cannot be verified (Section 9.9).

10.2 Cell performance test: Inject 100 µL of the sodium chloride solution (10 µg Cl^-; Section 7.4) directly into the titration cell electrolyte. Adjust the instrument to produce a reading of 10 µg Cl^-.

10.3 Combustion system test: This test can be used to assure that the combustion/micro-coulometer systems are performing properly without introduction of carbon. This test should be used during initial instrument setup and when instrument performance indicates a problem with the combustion system.

10.3.1 Designate a quartz boat for use with the ammonium chloride (NH_4Cl) solution only.

10.3.2 Inject 100 µL of the NH_4Cl solution (Section 7.5) into this boat and proceed with the analysis.

10.3.3 The result shall be between 9.5 and 10.5 µg Cl^-. If the recovery is not between these limits, the combustion or micro-coulometer systems are not performing properly. Check the temperature of the combustion system, verify that there are no leaks in the combustion system, confirm that the cell is performing properly (Section 10.2), and then repeat the test.

10.4 Trichlorophenol combustion test: This test can be used to assure that the combustion/micro-coulometer systems are performing properly when carbon is introduced. It should be used during instrument setup and when it is necessary to isolate the adsorption and combustion steps.

10.4.1 Inject 10 µL of the 1 mg/mL trichlorophenol stock solution (Section 7.12.2) onto one level scoop of GAC in a quartz boat.

10.4.2 Immediately proceed with the analysis to prevent loss of trichlorophenol and to prevent contamination of the carbon.

10.4.3 The result shall be between 9.0 and 11.0 µg Cl^-. If the recovery is not between these limits, the combustion/micro-coulometer system shall be adjusted and the test repeated until the result falls within these limits.

10.5 Background level of Cl^-: Determine the average background level of Cl^- for the entire analytical system as follows:

10.5.1 Using the procedure in Section 11 (batch or column) that will be used for the analysis of samples, determine the background level of Cl^- in each of three portions of reagent water. The volume of reagent water used shall be the same as the volume used for analysis of samples.

10.5.2 Calculate the average (mean) concentration of Cl^- and the standard deviation of the concentration.

10.5.3 The sum of the average concentration plus two times the standard deviation of the concentration shall be less than 20 µg/L. If not, the water or carbon shall be replaced, or the adsorption system moved to an area free of organic halide vapors, and the test (Section 10.5) shall be repeated. Only after this test is passed may calibration proceed.

10.6 Calibration by external standard: A calibration line encompassing the calibration range is developed using solutions of 2,4,6-trichlorophenol.

10.6.1 Analyze each of the five calibration solutions (Section 7.12.3) using the procedure in Section 11 (batch or column) that will be used for the analysis of samples, and the same procedure that was used for determination of the system background (Section 10.5). Analyze these solutions beginning with the lowest concentration and proceeding to the highest. Record the response of the micro-coulometer to each calibration solution.

10.6.2 Prepare a method blank as described in Section 9.4. Subtract the value of the blank from each of the five calibration results, as described in Section 12.

10.6.3 Calibration factor (ratio of response to concentration) Using the blank subtracted results, compute the calibration factor at each calibration point, and compute the average calibration factor and the relative standard deviation (coefficient of variation; Cv) of the calibration factor over the calibration range.

10.6.4 Linearity: The Cv of the calibration factor shall be less than 20%; otherwise, the calibration shall be repeated after adjustment of the combustion/micro-coulometer system and/or preparation of fresh calibration standards.

10.6.5 Using the average calibration factor, compute the percent recovery at each calibration point. The recovery at each calibration point shall be within the range of 80 to 111%. If any point is not within this range, a fresh calibration standard shall be prepared for that point, this standard shall be analyzed, and the calibration factor (Section 10.6.3) and calibration linearity (Section 10.6.4) shall be computed using the new calibration point. All points used in the calibration must meet the 80 to 111% recovery specification.

11.0 Procedure

11.1 Sample dilution: Many samples will contain high concentrations of halide. If analyzed without dilution, the micro-coulometer can be overloaded, resulting in frequent cell cleaning and downtime. The following guidance is provided to assist in estimating dilution levels.

11.1.1 Paper and pulp mills that employ chlorine bleaching: Samples from pulp mills that use a chlorine bleaching process may overload the micro-coulometer. To prevent system overload, the maximum volume suggested for paper industry samples that employ halide in the bleaching process is 100 mL. An adsorption volume as small as 25 mL may be used, provided the concentration of AOX in the sample can be measured reliably, as defined by the requirements in Section 9.11. To minimize volumetric error, an adsorption volume less than 25 mL may not be used. If AOX cannot be measured reliably in a 100-mL sample volume, a sample volume to a maximum of 1000 mL must be used. The sample and adsorption volumes are suggested for paper industry samples employing chlorine compounds in the bleaching process:

11.1.2 Sample dilution procedure.

11.1.2.1 Partially fill a precleaned volumetric flask with pH < 2 reagent water, allowing for the volume of sample to be added.

11.1.2.2 Mix sample thoroughly by tumbling or shaking vigorously.

11.1.2.3 Immediately withdraw the required sample aliquot using a pipet or micro -syringe.

Note: Because it will be necessary to rinse the pipet or micro-syringe (Section 11.1.2.5), it may be necessary to pre-calibrate the pipet or micro-syringe to assure that the exact volume desired will be delivered.

11.1.2.4 Dispense or inject the aliquot into the volumetric flask.

11.1.2.5 Rinse the pipet or syringe with small portions of reagent water and add to the flask.

11.1.2.6 Dilute to the mark with pH < 2 reagent water.

11.1.3 All samples to be reported for regulatory compliance monitoring purposes must be analyzed in duplicate, as described in Section 11.5.

11.1.4 Pulp and Paper in-process samples: The concentration of organic halide in in-process samples has been shown to be 20 to 30% greater using the micro-column adsorption technique than using the batch adsorption technique. For this reason, the micro-column technique shall be used for monitoring in-process samples. Examples of in-process samples include: combined bleach plant effluent, C-stage filtrate, and E-stage filtrate.

11.2 Batch adsorption and filtration.

11.2.1 Place the appropriate volume of sample (diluted if necessary), preserved as described in Section 8, into an Erlenmeyer flask.

11.2.2 Add 5 mL of nitrate stock solution to the sample aliquot.

11.2.3 Add one level scoop of activated carbon that has passed the quality control tests in Section 9.

11.2.4 Shake the suspension for at least one hour in a mechanical shaker.

11.2.5 Filter the suspension through a polycarbonate membrane filter. Filter by suction until the liquid level reaches the top of the carbon.

11.2.6 Wash the inside surface of the filter funnel with 25 mL (±5 mL) of nitrate wash solution in several portions. After the level of the final wash reaches the top of the GAC, filter by suction until the cake is barely dry. The time required for drying should be minimized to prevent exposure of the GAC to halogen vapors in the air, but should be sufficient to permit drying of the cake so that excess water is not introduced into the combustion apparatus. A drying time of approximately 10 seconds under vacuum has been shown to be effective for this operation.

11.2.7 Carefully remove the top of the filter holder, making sure that no carbon is lost. This operation is most successfully performed by removing the clamp, tilting the top of the filter holder (the funnel portion) to one side, and lifting upward.

11.2.8 Using a squeeze bottle or micro-syringe, rapidly rinse the carbon from the inside of the filter holder onto the filter cake using small portions of wash solution. Allow the cake to dry under vacuum for no more than 10 seconds after the final rinse. Immediately turn the vacuum off.

11.2.9 Using tweezers, carefully fold the polycarbonate filter in half, then in fourths, making sure that no carbon is lost.

11.3 Column adsorption.

11.3.1 Column preparation: Prepare a sufficient number of columns for one day's operation as follows:

11.3.1.1 In a glove box or area free from halide vapors, place a plug of Cerafelt into the end of a clean glass column.

11.3.1.2 Fill the glass column with one level scoop (approximately 40 mg) of granular activated carbon that has passed the quality control tests in Section 9.

11.3.1.3 Insert a Cerafelt plug into the open end of the column to hold the carbon in place.

11.3.1.4 Store the columns in a glass jar with PTFE lined screw-cap to prevent infiltration of halide vapors from the air.

11.3.2 Column setup.

11.3.2.1 Install two columns in series in the adsorption module.

11.3.2.2 If the sample is known or expected to contain particulates that could prevent free flow of sample through the micro-columns, a Cerafelt plug is placed in the tubing ahead of the columns. If a measurement of the OX content of the particulates is desired, the Cerafelt plug can be washed with nitrate solution, placed in a combustion boat, and processed as a separate sample.

11.3.3 Adjusting sample flow rate: Because the flow rate used to load the sample onto the columns can affect the ability of the GAC to adsorb organic halides, the flow rate of the method blank is measured, and the gas pressure used to process samples is adjusted accordingly. The flow rate of the blank, which is composed of acidified reagent water and contains no particulate matter, should be greater than the flow rate of any sample containing even small amounts of particulate matter.

11.3.3.1 Fill the sample reservoir with the volume of reagent water chosen for the analysis (Section 9.4.1.2) that has been preserved and acidified as described in Section 8. Cap the reservoir.

11.3.3.2 Adjust the gas pressure per the manufacturer's instructions. Record the time required for the entire volume of reagent water to pass through both columns. The flow rate must not exceed 3 mL/min over the duration of the time required to adsorb the volume. If this flow rate is exceeded, adjust gas pressure, prepare another blank, and repeat the adsorption.

11.3.3.3 Once the flow rate for the blank has been established, the same adsorption conditions must be applied to all subsequent samples during that eight-hour shift, or until another method blank is processed, whichever comes first. To aid in overcoming breakthrough problems, a lower gas pressure (and, therefore, flow rate) may be used for processing of samples, if desired. If the sample adsorption unit is disassembled or cleaned, the flow rate must be checked before processing additional samples.

11.3.3.4 Elute the pair of columns with 2 mL of nitrate wash solution. The flow rate of nitrate wash solution must not exceed 3 mL/min.

11.3.3.5 Separate the columns and mark for subsequent analysis.

11.3.4 The adsorption of sample volumes is performed in a similar fashion. Fill the sample reservoir with the sample volume chosen for the analysis (Section 11.1), that has been preserved as described in Section 8. All analyses must be performed with this volume (sample volume plus reagent water, as needed) in order to maintain a flow rate no greater than that determined for the blank (see Section 11.3.3).

11.3.4.1 Use the same gas pressure for sample adsorption as is used for the blank.

11.3.4.2 Elute the columns with 2 mL of the nitrate wash solution.

11.3.4.3 Separate the columns and mark for subsequent analysis.

11.3.5 If it is desirable to make measurements at levels lower than can be achieved with the sample volume chosen, or if the instrument response of an undiluted sample is less than three times the instrument response of the blank (Section 12.6.3), a larger sample volume must be used.

11.4 Combustion and titration.

11.4.1 Polycarbonate filter and GAC from batch adsorption.

11.4.1.1 Place the folded polycarbonate filter containing the GAC in a quartz combustion boat, close the airlock, and proceed with the automated sequence.

11.4.1.2 Record the signal from the micro-coulometer for a minimum integration time of 10 minutes and determine the concentration of Cl^- from calibration data, per Section 12.

11.4.2 Columns from column adsorption.

11.4.2.1 Using the push rod, push the carbon and the Cerafelt plug(s) from the first column into a combustion boat. Proceed with the automated sequence.

11.4.2.2 Record the signal from the micro-coulometer for a minimum integration time of 10 minutes and determine the concentration of Cl^- for the first column from calibration data, per Section 12.

11.4.2.3 Repeat the automated sequence with the second column.

11.4.2.4 Determine the extent of breakthrough of organic halides from the first column to the second column, as described in Section 12.

11.4.3 The two columns that are used for the method blank must be combusted separately, as is done for samples. 11.5 Duplicate sample analysis: All samples to be reported for regulatory compliance purposes must be analyzed in duplicate. This requirement applies to both the batch and column adsorption procedures. In addition, if it is necessary to dilute the sample for the purposes of reducing breakthrough or maintaining the concentration within the calibration range, a more or less dilute sample must be analyzed. The adsorption volumes used for analysis of undiluted samples, diluted samples, and all replicates must be the same as the volume used for QC tests and calibration (Sections 9 and 10).

11.5.1 Using results from analysis of one sample volume (Section 11.4) and the procedure in Section 11.1.2, determine if the dilution used was within the calibration range of the instrument and/or if breakthrough exceeded the specification in Section 12.3.1. If the breakthrough criterion was exceeded or the sample was not within the calibration range, adjust the dilution volume as needed. If the breakthrough criterion was not exceeded and the sample dilution was within the calibration range, a second volume at the same dilution level may be used.

11.5.2 Adsorb the sample using the same technique (batch or column) used for the first sample volume. Combust the GAC from the second volume as described in Section 11.4, and calculate the results as described in Section 12. Compare the results of the two analyses as described in Section 12.4.

11.5.3 Duplicate analyses are not required for method blanks, as different dilution levels are not possible.

11.5.4 Duplicate analyses of the PAR standard used for calibration verification (Section 9.10) are not required.

12.0 Data Analysis and Calculations

12.1 Batch Adsorption Method: Calculate the blank-subtracted concentration of adsorbable organic halide detected in each sample (in micrograms of chloride per liter) using the following equation:

$$AOX(\mu g/L) = \frac{(C - B)}{V}$$

Where:

C=µg Cl^- from micro-coulometer for the sample

B=µg Cl^- from micro-coulometer for the reagent water blank (Section 9.4.1)

V = volume of sample in liters

This calculation is performed for each of the two dilution levels analyzed for each sample.

12.2 Column Adsorption Method: Calculate the blank-subtracted concentration of adsorbable organic halide detected in each sample (in micrograms of chloride per liter) using the following equation:

$$AOX(\mu g/L) = \frac{\left[(C_1 + C_2) - (B_1 + B_2)\right]}{V}$$

C_1=µg Cl^- from micro-coulometer for first column from the sample

C_2=µg Cl^- from micro-coulometer for second column from the sample

B_1=µg from micro-coulometer for first column from the reagent water blank (Section 9.4.1)

B_2=µg Cl^- from micro-coulometer for second column from the reagent water blank (Section 9.4.1)

V=volume of sample in liters

12.3 Percent breakthrough: For each sample analyzed by the column method, calculate the percent breakthrough of halide from the first column to the second column, using the following equation:

$$\%\,\text{Breakthrough} = \frac{(C_2 - B_2)(100)}{\left[(C_1 - B_1) + (C_2 - B_2)\right]}$$

12.3.1 For samples to be reported for regulatory compliance purposes, the percent breakthrough must be less than or equal to 25% for both of the two analyses performed on each sample (see Section 11.5).

12.3.2 If the breakthrough exceeds 25%, dilute the affected sample further, maintaining the amount of halide at least three times higher than the level of blank, and reanalyze the sample. Ensure that the sample is also analyzed at a second level of dilution that is at least a factor of 2 different (and still higher than three times the blank).

12.4 Relative percent difference (RPD): Calculate the relative percent difference between the results of the two analyses of each sample, using the following equation:

$$RPD = \frac{200\left|(AOX_1 - AOX_2)\right|}{\left[(AOX_1 + AOX_2)\right]}$$

12.5 High concentrations of AOX: If the amount of halide from either analysis exceeds the calibration range, dilute the sample and reanalyze, maintaining at least a factor of 2 difference in the dilution levels of the two portions of the sample used.

12.6 Low concentrations of AOX: The blank-subtracted final result from the batch procedure or the sum of the blank-subtracted results from the two carbon columns should be significantly above the level of the blank.

12.6.1 If the instrument response for a sample exceeds the instrument response for the blank by a factor of at least 3, the result is acceptable.

12.6.2 If the instrument response for a sample is less than three times the instrument response for the blank, and the sample has been diluted, analyze a less dilute aliquot of sample.

12.6.3 If the instrument response of an undiluted sample containing AOX above the minimum level is less than three times the instrument response for the blank, the result is suspect and may not be used for regulatory compliance purposes. In this case, find the cause of contamination, correct the problem, and reanalyze the sample under the corrected conditions.

12.7 Report results that meet all of the specifications in this method as the mean of the blank-subtracted values from Section 12.1 or 12.2 for the two analyses at different dilution levels, in µg/L of Cl^- (not as 2,4,6-trichlorophenol), to three significant figures. Report the RPD of the two analyses. For samples analyzed by the column procedure, also report the percent breakthrough.

13.0 Method Performance

The specifications contained in this method are based on data from a single laboratory and from a large-scale study of the pulp and paper industry.

14.0 Pollution Prevention

14.1 The solvents used in this method pose little threat to the environment when recycled and managed properly.

14.2 Standards should be prepared in volumes consistent with laboratory use to minimize the volume of expired standards to be disposed.

15.0 Waste Management

15.1 It is the laboratory's responsibility to comply with all federal, state, and local regulations governing waste management, particularly the hazardous waste identification rules and land disposal restrictions, and to protect the air, water, and land by minimizing and controlling all releases from fume hoods and bench operations. Compliance with all sewage discharge permits and regulations is also required.

15.2 Samples preserved with HCl or H_2SO_4 to pH <2 are hazardous and must be neutralized before being disposed, or must be handled as hazardous waste. Acetic acid and silver acetate solutions resulting from cell flushing must be disposed of in accordance with all applicable federal, state, and local regulations.

15.3 For further information on waste management, consult "The Waste Management Manual for Laboratory Personnel," and "Less is Better: Laboratory Chemical Management for Waste Reduction," both available from the American Chemical Society's Department of Government Relations and Science Policy, 1155 16th Street NW., Washington, DC 20036.

16.0 References

16.1 "Total Organic Halide, Methods 450.1—Interim," Prepared by Stephen Billets and James J. Lichtenberg, USEPA, Office of Research and Development, Physical and Chemical Methods Branch, EMSL-Cincinnati, Cincinnati, OH 45268, EPA 600/4-81-056 (1981).

16.2 Method 9020, USEPA Office of Solid Waste, "Test Methods for Evaluating Solid Waste, SW-846," Third Edition, 1987.

16.3 "Determination of Adsorbable Organic Halogens (AOX)," "German Standard Methods for the Analysis of Water, Waste Water and Sludge—General Parameters of Effects and Substances," Deutsche Industrie Norm (DIN) Method 38 409, Part 14, DIN German Standards Institute, Beuth Verlag, Berlin, Germany (1987).

16.4 "Water Quality: Determination of Adsorbable Organic Halogens (AOX)," International Organization for Standard/Draft International Standardization (ISO/DIS) Method 9562 (1988).

16.5 "Organically Bound Chlorine by the AOX Method," SCAN-W 9:89, Secretariat, Scandinavian Pulp, Paper and Board Testing Committee, Box 5604, S-11486, Stockholm, Sweden (1989).

16.6 Method 5320, "Dissolved Organic Halogen," from "Standard Methods for the Examination of Water and Wastewater," 5320, American Public Health Association, 1015 15th St. NW, Washington, DC 20005 (1989).

16.7 "Canadian Standard Method for the Determination of Adsorbable Organic Halides (AOX) in Waters and Wastewaters," Environment Canada and The Canadian Pulp and Paper Association (1990).

16.8 40 CFR Part 136, Appendix B.

16.9 "Working with Carcinogens," DHEW, PHS, CDC, NIOSH, Publication 77-206, (Aug 1977).

16.10 "OSHA Safety and Health Standards, General Industry" OSHA 2206, 29 CFR 1910 (Jan 1976).

16.11 "Safety in Academic Chemistry Laboratories," ACS Committee on Chemical Safety (1979).

16.12 "Methods 330.4 and 330.5 for Total Residual Chlorine," USEPA, EMSL-Cincinnati, Cincinnati, OH 45268, EPA-4-79-020 (March 1979).

16.13 "Validation of Method 1650: Determination of Organic Halide," Analytical Technologies Inc., ERCE Contract 87-3410, November 15, 1990. Available from the EPA Sample Control Center, DynCorp, 300 N. Lee St., Alexandria, VA 22314 (703-519-1140).

17.0 Figures

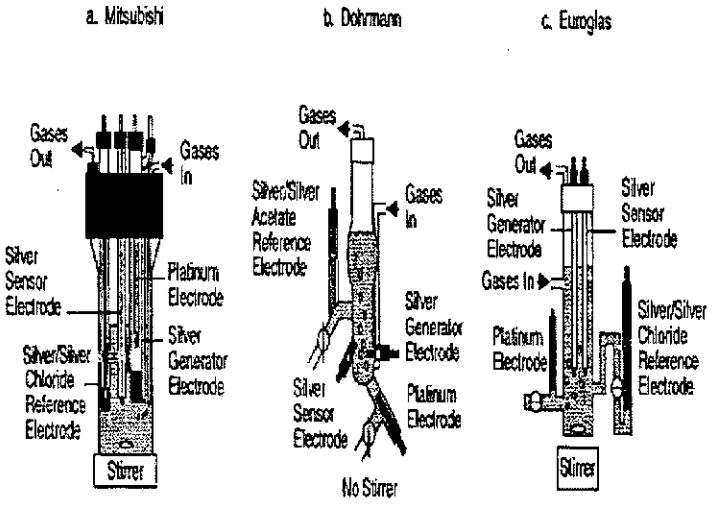

Figure 1. Microcoulometric Titration Cells (from Reference 7)

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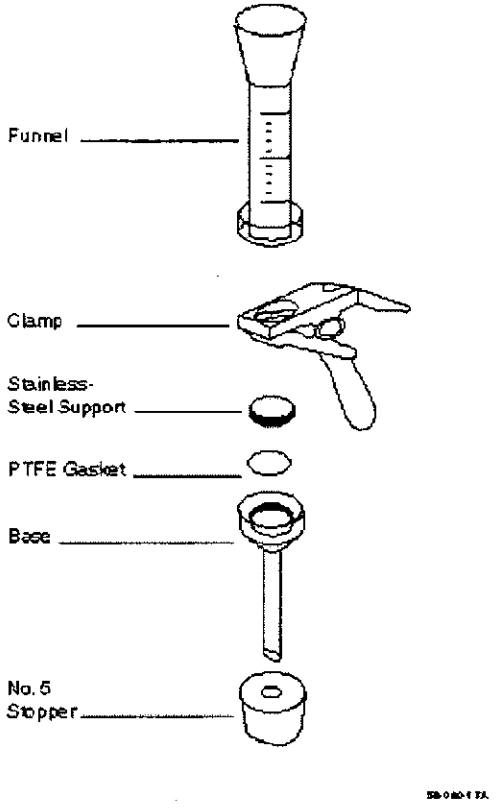

Figure 2. Filter Apparatus

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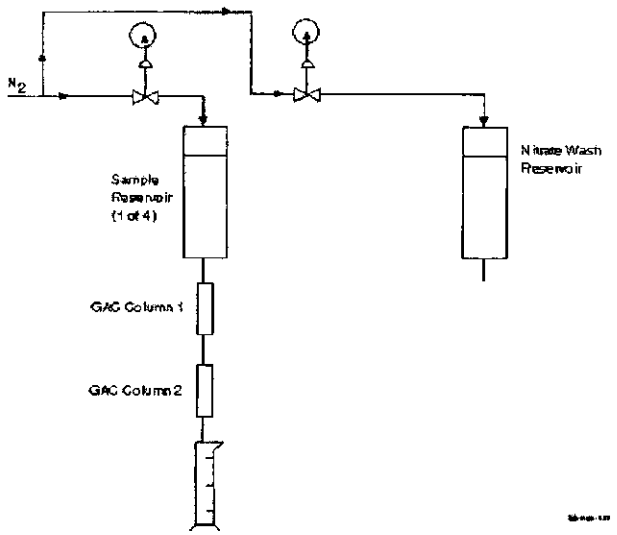

Figure3. Schematic of the Column Adsorption System

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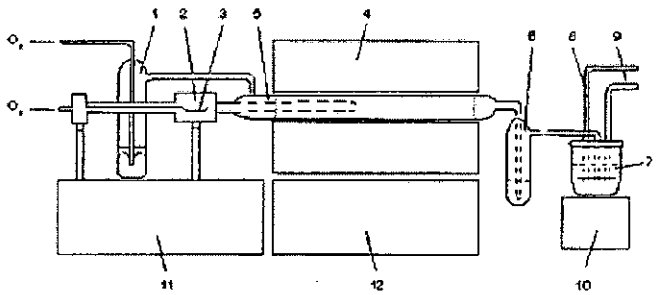

1. Stripping Device
2. Sample inlet for AOX
3. AOX Sample
4. Furnace
5. Combustion Tube
6. Absorber filled with H_2SO_4
7. Titration cell
8. Working electrodes
9. Measuring electrodes
10. Stirrer
11. Titration micro-processor
12. Gas flow and temperature control device

Figure 4. Schematic of an AOX Apparatus

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18.0 Glossary of Definitions and Purposes

These definitions and purposes are specific to this method but have been conformed to common usage as much as possible.

18.1 Units of weight and measure and their abbreviations.

18.1.1 Symbols.

°C degrees Celsius

µg microgram

µL microliter

< less than

> greater than

% percent

18.1.2 Alphabetical characters.

cm centimeter

g gram

h hour

ID inside diameter

in inch

L liter

m meter

mg milligram

min minute

mL milliliter

mm millimeter

N normal; gram molecular weight of solute divided by hydrogen equivalent of solute, per liter of solution

OD outside diameter

ppb part-per-billion

ppm part-per-million

ppt part-per-trillion

psig pounds-per-square inch gauge

v/v volume per unit volume

w/v weight per unit volume

18.2 Definitions and acronyms (in alphabetical order).

Analyte: AOX tested for by this method.

Calibration standard (CAL): A solution prepared from a secondary standard and/or stock solution which is used to calibrate the response of the instrument with respect to analyte concentration.

Calibration verification standard (VER): The mid-point calibration standard (CS3) that is used to verify calibration.

Field blank: An aliquot of reagent water or other reference matrix that is placed in a sample container in the laboratory or the field, and treated as a sample in all respects, including exposure to sampling site conditions, storage, preservation, and all analytical procedures. The purpose of the field blank is to determine if the field or sample transporting procedures and environments have contaminated the sample.

IPR: Initial precision and recovery; four aliquots of the diluted PAR standard analyzed to establish the ability to generate acceptable precision and accuracy. An IPR is performed prior to the first time this method is used and any time the method or instrumentation is modified.

Laboratory blank: See Method blank.

Laboratory control sample (LCS): See Ongoing precision and recovery sample (OPR).

Laboratory reagent blank: See Method blank.

May: This action, activity, or procedural step is neither required nor prohibited.

May not: This action, activity, or procedural step is prohibited.

Method blank: An aliquot of reagent water that is treated exactly as a sample including exposure to all glassware, equipment, solvents, reagents, internal standards, and surrogates that are used with samples. The method blank is used to determine if analytes or interferences are present in the laboratory environment, the reagents, or the apparatus.

Minimum level (ML): The level at which the entire analytical system must give a recognizable signal and acceptable calibration point for the analyte. It is equivalent to the concentration of the lowest calibration standard, assuming that all method-specified sample weights, volumes, and cleanup procedures have been employed.

Must: This action, activity, or procedural step is required.

OPR: Ongoing precision and recovery standard; a laboratory blank spiked with a known quantity of analyte. The OPR is analyzed exactly like a sample. Its purpose is to assure that the results produced by the laboratory remain within the limits specified in this method for precision and recovery.

PAR: Precision and recovery standard; secondary standard that is diluted and spiked to form the IPR and OPR.

Preparation blank: See Method blank.

Primary dilution standard: A solution containing the specified analytes that is purchased or prepared from stock solutions and diluted as needed to prepare calibration solutions and other solutions.

Quality control check sample (QCS): A sample containing all or a subset of the analytes at known concentrations. The QCS is obtained from a source external to the laboratory or is prepared from a source of standards different from the source of calibration standards. It is used to check laboratory performance with test materials prepared external to the normal preparation process.

Reagent water: Water demonstrated to be free from the analyte of interest and potentially interfering substances at the method detection limit for the analyte.

Relative standard deviation (RSD): The standard deviation multiplied by 100, divided by the mean.

RSD: See Relative standard deviation.

Should: This action, activity, or procedural step is suggested but not required.

Stock solution: A solution containing an analyte that is prepared using a reference material traceable to EPA, the National Institute of Science and Technology (NIST), or a source that will attest to the purity and authenticity of the reference material.

VER: See Calibration verification standard.

Method 1653—Chlorinated Phenolics in Wastewater by In Situ Acetylation and GCMS

1.0 Scope and Application

1.1 This method is for determination of chlorinated phenolics (chlorinated phenols, guaiacols, catechols, vanillins, syringaldehydes) and other compounds associated with the Clean Water Act; the Resource Conservation and Recovery Act; and the Comprehensive Environmental Response, Compensation, and Liability Act; and

that are amenable to in situ acetylation, extraction, and analysis by capillary column gas chromatography/mass spectrometry (GCMS). This method is based on existing methods for determination of chlorophenolics in pulp and paper industry wastewaters (References 1 and 2).

1.2 The chemical compounds listed in Table 1 may be determined in waters and, specifically, in in-process streams and wastewaters associated with the pulp and paper industry. The method is designed to meet the survey and monitoring requirements of the Environmental Protection Agency (EPA).

1.3 The detection limit of this method is usually dependent on the level of interferences rather than instrumental limitations. The method detection limits (MDLs) in Table 2 typify the minimum quantity that can be detected with no interferences present.

1.4 The GCMS portions of this method are for use only by persons experienced with GCMS or under the close supervision of such qualified persons. Laboratories unfamiliar with analyses of environmental samples by GCMS should run the performance tests in Reference 3 before beginning.

1.5 Any modification of the method beyond those expressly permitted is subject to the application and approval of alternative test procedures under 40 CFR Parts 136.4 and 136.5.

2.0 Summary of Method

2.1 A 1000-mL aliquot of water is spiked with stable isotopically labeled analogs of the compounds of interest and an internal standard. The solution is adjusted to neutral pH, potassium carbonate buffer is added, and the pH is raised to 9–11.5. The chlorophenolics are converted in situ to acetates by the addition of acetic anhydride. After acetylation, the solution is extracted with hexane. The hexane is concentrated to a final volume of 0.5 mL, an instrument internal standard is added, and an aliquot of the concentrated extract is injected into the gas chromatograph (GC). The compounds are separated by GC and detected by a mass spectrometer (MS). The labeled compounds and internal standard serve to correct the variability of the analytical technique.

2.2 Identification of a pollutant (qualitative analysis) is performed by comparing the relative retention time and mass spectrum to that of an authentic standard. A compound is identified when its relative retention time and mass spectrum agree.

2.3 Quantitative analysis is performed in one of two ways by GCMS using extracted ion-current profile (EICP) areas: (1) For those compounds listed in Table 1 for which standards and labeled analogs are available, the GCMS system is calibrated and the compound concentration is determined using an isotope dilution technique; (2) for those compounds listed in Table 1 for which authentic standards but no labeled compounds are available, the GCMS system is calibrated and the compound concentration is determined using an internal standard technique.

2.4 Quality is assured through reproducible calibration and testing of the extraction and GCMS systems.

3.0 Definitions

3.1 Chlorinated phenolics are the chlorinated phenols, guaiacols, catechols, vanillins, syringaldehydes and other compounds amenable to in situ acetylation, extraction, and determination by GCMS using this method.

3.2 Definitions for other terms used in this method are given in the glossary at the end of the method (Section 20.0).

4.0 Interferences

4.1 Solvents, reagents, glassware, and other sample processing hardware may yield artifacts and/or elevated baselines, causing misinterpretation of chromatograms and spectra. All materials used in the analysis shall be demonstrated to be free from interferences under the conditions of analysis by running method blanks initially and with each sample batch (samples started through the extraction process on a given eight-hour shift, to a maximum of 20). Specific selection of reagents and purification of solvents by distillation in all-glass systems may be required. Glassware and, where possible, reagents are cleaned by using solvent rinse and baking at 450 °C for a minimum of one hour.

4.2 Interferences co-extracted from samples will vary considerably from source to source, depending on the diversity of the site being sampled. Industry experience suggests that high levels of non-chlorinated phenols may cause poor recovery of the compounds of interest, particularly in samples collected in the vicinity of a source of creosote, such as a wood-preserving plant (Reference 1).

4.3 The internal standard, 3,4,5-trichlorophenol, has been reported to be an anaerobic degradation product of 2,3,4,5-tetrachlorophenol and/or pentachlorophenol (Reference 1). When an interference with this or another compound occurs, labeled pentachlorophenol or another labeled compound may be used as an alternative internal standard; otherwise, the internal standards and reference compounds must be used as specified in this method.

4.4 Blank contamination by pentachlorophenol has been reported (Reference 1) to be traceable to potassium carbonate; it has also been reported that this contamination may be removed by baking overnight at 400 to 500 °C.

4.5 Catechols are susceptible to degradation by active sites on injection port liners and columns, and are subject to oxidation to the corresponding chloro-o-benzoquinones (Reference 2). A small amount of ascorbic acid may be added to samples to prevent auto-oxidation (Reference 2; also see Section 11.1.6). For pulp and paper industry samples, ascorbic acid may be added to treated effluent samples only.

5.0 Safety

5.1 The toxicity or carcinogenicity of each compound or reagent used in this method has not been precisely determined; however, each chemical compound should be treated as a potential health hazard. Exposure to these compounds should be reduced to the lowest possible level. The laboratory is responsible for maintaining a current awareness file of OSHA regulations regarding the safe handling of the chemicals specified in this method. A reference file of materials safety data sheets (MSDSs) should be made available to all personnel involved in these analyses. Additional information on laboratory safety can be found in References 4 through 6.

5.2 Samples may contain high concentrations of toxic compounds, and should be handled with gloves and a hood opened to prevent exposure.

6.0 Equipment and Supplies

Note: Brand names, suppliers, and part numbers are for illustrative purposes only. No endorsement is implied. Equivalent performance may be achieved using apparatus and materials other than those specified here, but demonstration of equivalent performance that meets the requirements of this method is the responsibility of the laboratory.

6.1 Sampling equipment for discrete or composite sampling.

6.1.1 Sample bottles and caps.

6.1.1.1 Sample bottle: Amber glass, 1000-mL minimum, with screw-cap. If amber bottles are not available, samples shall be protected from light.

6.1.1.2 Bottle caps: Threaded to fit sample bottles. Caps shall be lined with PTFE.

6.1.1.3 Cleaning bottles: Detergent water wash, cap with aluminum foil, and bake at 450 °C for a minimum of one hour before use.

6.1.1.4 Cleaning liners: Detergent water wash, reagent water (Section 7.4) and solvent rinse, and bake at approximately 200 °C for a minimum of 1 hour prior to use.

6.1.1.5 Bottles and liners must be lot-certified to be free of chlorophenolics by running blanks according to this method. If blanks from bottles and/or liners without cleaning or with fewer cleaning steps show no detectable chlorophenolics, the bottle and liner cleaning steps that do not eliminate chlorophenolics may be omitted.

6.1.2 Compositing equipment: Automatic or manual compositing system incorporating glass containers cleaned per bottle cleaning procedure above. Sample containers are kept at 0 to 4 °C during sampling. Glass or PTFE tubing only shall be used. If the sampler uses a peristaltic pump, a minimum length of compressible silicone rubber tubing may be used in the pump only. Before use, the tubing shall be thoroughly rinsed with methanol, followed by repeated rinsing with reagent water (Section 7.4) to minimize sample contamination. An integrating flow meter is used to collect proportional composite samples.

6.2 Extraction apparatus.

6.2.1 Bottle or beaker: 1500-to 2000-mL capacity.

6.2.2 Separatory funnel: 500-to 2000-mL, glass, with PTFE stopcock.

6.2.3 Magnetic stirrer: Corning Model 320, or equivalent, with stirring bar.

6.3 Polyethylene gloves: For handling samples and extraction equipment (Fisher 11-394-110-B, or equivalent).

6.4 Graduated cylinders: 1000-mL, 100-mL, and 10-mL nominal.

6.5 Centrifuge: Capable of accepting 50-mL centrifuge tubes and achieving 3000 RPM.

6.5.1 Centrifuge tubes.

6.5.1.1 35-mL nominal, with PTFE-lined screw-cap.

6.5.1.2 15-mL nominal, conical graduated, with ground-glass stopper.

6.6 Concentration apparatus.

6.6.1 Kuderna-Danish (K-D) concentrator tube: 10-mL, graduated (Kontes K-570050-1025, or equivalent) with calibration verified. Ground-glass stopper (size 19/22 joint) is used to prevent evaporation of extracts.

6.6.2 Kuderna-Danish (K-D) evaporation flask: 1000-mL (Kontes K-570001-1000, or equivalent), attached to concentrator tube with springs (Kontes K-662750-0012).

6.6.3 Snyder column: Three-ball macro (Kontes K-503000-0232, or equivalent).

6.6.4 Snyder column: Two-ball micro (Kontes K-469002-0219, or equivalent).

6.6.5 Boiling chips: Approximately 10/40 mesh, extracted with methylene chloride and baked at 450 °C for a minimum of one hour.

6.6.6 Nitrogen evaporation apparatus: Equipped with a water bath controlled at 35 to 40 °C (N-Evap, Organomation Associates, Inc., South Berlin, MA, or

equivalent), installed in a fume hood. This device may be used in place of the micro-Snyder column concentrator in Section 6.6.4 above.

6.7 Water bath: Heated, with concentric ring cover, capable of temperature control (±2 °C), installed in a fume hood.

6.8 Sample vials: Amber glass, 1- to 3-mL, with PTFE-lined screw-cap.

6.9 Balances.

6.9.1 Analytical: Capable of weighing 0.1 mg.

6.9.2 Top loading: Capable of weighing 10 mg.

6.10 pH meter.

6.11 Gas chromatograph: Shall have splitless or on-column injection port for capillary column, temperature program with 50 °C hold, and shall meet all of the performance specifications in Section 9.

6.12 Gas chromatographic column: 30 m (±5 m) × 0.25 mm (±0.02 mm) I.D. × 0.25 micron, 5% phenyl, 94% methyl, 1% vinyl silicone bonded-phase fused-silica capillary column (J & W DB–5, or equivalent).

6.13 Mass spectrometer: 70 eV electron impact ionization, shall repetitively scan from 42 to 450 amu in 0.95 to 1.00 second, and shall produce a unit resolution (valleys between m/z 441–442 less than 10% of the height of the 441 peak), background-corrected mass spectrum from 50 ng decafluorotriphenylphosphine (DFTPP) introduced through the GC inlet. The spectrum shall meet the mass-intensity criteria in Table 3 (Reference 7). The mass spectrometer shall be interfaced to the GC such that the end of the capillary column terminates within 1 cm of the ion source, but does not intercept the electron or ion beams. All portions of the column which connect the GC to the ion source shall remain at or above the column temperature during analysis to preclude condensation of less volatile compounds.

6.14 Data system: Shall collect and record MS data, store mass-intensity data in spectral libraries, process GCMS data, generate reports, and compute and record response factors.

6.14.1 Data acquisition: Mass spectra shall be collected continuously throughout the analysis and stored on a mass storage device.

6.14.2 Mass spectral libraries: User-created libraries containing mass spectra obtained from analysis of authentic standards shall be employed to reverse search GCMS runs for the compounds of interest (Section 10.2).

6.14.3 Data processing: The data system shall be used to search, locate, identify, and quantify the compounds of interest in each GCMS analysis. Software routines shall be employed to compute retention times, and to compute peak areas at the m/z's specified (Table 4). Displays of spectra, mass chromatograms, and library comparisons are required to verify results.

6.14.4 Response factors and multi-point calibrations: The data system shall be used to record and maintain lists of response factors (response ratios for isotope dilution) and multi-point calibration curves (Section 10). Computations of relative standard deviation (coefficient of variation) are used for testing calibration linearity. Statistics on initial (Section 9.3.2) and ongoing (Section 9.6) performance shall be computed and maintained.

7.0 Reagents and Standards

7.1 Reagents for adjusting sample pH.

7.1.1 Sodium hydroxide: Reagent grade, 6 N in reagent water.

7.1.2 Sulfuric acid: Reagent grade, 6 N in reagent water.

7.2 Reagents for sample preservation.

7.2.1 Sodium thiosulfate ($Na_2S_2O_3$) solution (1 N): Weigh 79 g $Na_2S_2O_3$ in a 1-L volumetric flask and dilute to the mark with reagent water.

7.2.2 Ascorbic acid solution: Prepare a solution of ascorbic acid in reagent water at a concentration of 0.1 g/mL. This solution must be prepared fresh on each day when derivatizations will be performed. Therefore, do not prepare more than will be used that day. (A 50-mL volume is sufficient for ten analyses).

7.3 Solvents: Hexane, acetone, and methanol. Distilled in glass (Burdick and Jackson, or equivalent).

7.4 Reagent water: Water in which the compounds of interest and interfering compounds are not detected by this method.

7.5 Reagents for derivatization.

7.5.1 Potassium carbonate (K_2CO_3).

7.5.1.1 Purification: Spread in a shallow baking dish, heat overnight at 400 to 500 °C.

7.5.1.2 Solution: Dissolve 150 g purified K_2CO_3 in 250 mL reagent water.

7.5.2 Acetic anhydride: Redistilled reagent grade.

7.6 Analytical standards.

7.6.1 Derivatization: Because the chlorinated phenolics are determined as their acetate derivatives after in situ acetylation, the method requires that the calibration standards be prepared by spiking the underivatized materials into reagent water and carrying the spiked reagent water aliquot through the entire derivatization and extraction procedure that is applied to the field samples.

7.6.2 Standard solutions: Purchased as solutions or mixtures with certification to their purity, concentration, and authenticity, or prepared from materials of known purity and composition. If chemical purity of a compound is 98% or greater, the weight may be used without correction to compute the concentration of the standard. When not being used, standards are stored in the dark at −20 to −10 °C in screw-capped vials with PTFE-lined lids. A mark is placed on the vial at the level of the solution so that solvent evaporation loss can be detected. The vials are brought to room temperature prior to use.

7.6.3 If the chemical purity of any standard does not meet the 98% requirement above, the laboratory must correct all calculations, calibrations, etc., for the difference in purity.

7.7 Preparation of stock solutions: Prepare chlorovanillins and chlorosyringaldehydes in acetone, as these compounds are subject to degradation in methanol. Prepare the remaining chlorophenolics in methanol. Prepare all standards per the steps below. Observe the safety precautions in Section 5.

7.7.1 Dissolve an appropriate amount of assayed reference material in a suitable solvent. For example, weigh 50 mg (±0.1 mg) of pentachlorophenol in a 10-mL ground-glass-stoppered volumetric flask and fill to the mark with methanol. After the pentachlorophenol is completely dissolved, transfer the solution to a 15-mL vial with PTFE-lined cap.

7.7.2 Stock solutions should be checked for signs of degradation prior to the preparation of calibration or performance test standards and shall be replaced after six months, or sooner if comparison with quality control check standards indicates a change in concentration.

7.8 Labeled compound spiking solution: From stock solutions prepared as above, or from mixtures, prepare one spiking solution to contain the labeled chlorovanillin in acetone and a second spiking solution to contain the remaining chlorophenolics, including the 3,4,5-trichlorophenol sample matrix internal standard (SMIS), in methanol. The labeled compounds and SMIS are each at a concentration of 12.5 µg/mL.

7.9 Secondary standards for calibration: Using stock solutions (Section 7.7), prepare one secondary standard containing the chlorovanillins and chlorsyringaldehydes listed in Table 1 in acetone and a second secondary standard containing the remaining chlorophenolics in methanol. The monochlorinated phenol, guaiacol, and catechol are included at a concentration of 25 µg/mL; the trichlorinated catechols, tetrachlorinated guaiacol and catechol, pentachlorophenol, 5,6-dichlorovanillin, and 2,6-dichlorosyringaldehyde are included at a concentration of 100 µg/mL; and the remaining compounds are included at a concentration of 50 µg/mL, each in their respective solutions.

7.10 Instrument internal standard (IIS): Prepare a solution of 2,2'-difluorobiphenyl (DFB) at a concentration of 2.5 mg/mL in hexane.

7.11 DFTPP solution: Prepare a solution of DFTPP at 50 µg/mL in acetone.

7.12 Solutions for obtaining authentic mass spectra (Section 10.2): Prepare mixtures of compounds at concentrations which will assure authentic spectra are obtained for storage in libraries.

7.13 Preparation of calibration solutions.

7.13.1 Into five 1000-mL aliquots of reagent water, spike 50, 100, 200, 500 and 1000 µL of each of the two solutions in Section 7.9. Spike 1.00 mL of each of the two labeled compound spiking solutions (Section 7.8) into each of the five aliquots.

7.13.2 Using the procedure in Section 11, derivatize and extract each solution, and concentrate the extract to a final volume of 0.50 mL. This will produce calibration solutions of nominal 5, 10, 20, 50, and 100 µg/mL of the native chlorophenolics and a constant concentration of 25 µg/mL of each labeled compound and the SMIS (assuming 100% derivatization and recovery). As noted in Section 11.1.6, ascorbic acid is added to all samples of final effluents to stabilize chlorocatechols, but is not added to samples of pulp and paper in-process wastewaters. Therefore, it is necessary to prepare separate sets of five initial calibration standards with and without the addition of ascorbic acid. Also, in the event that the laboratory is extracting final effluent samples by both the stir-bar and separatory funnel procedures (see Section 11.3), initial calibration standards should be prepared by both methods.

7.13.3 These solutions permit the relative response (labeled to unlabeled) and the response factor to be measured as a function of concentration (Sections 10.4 and 10.5).

7.13.4 The nominal 50 µg/mL standard may also be used as a calibration verification standard (see Section 9.6).

7.14 Ongoing precision and recovery (OPR) standard: Used for determination of initial (Section 9.3.2) and ongoing (Section 9.6) precision and recovery. This solution is prepared by spiking 500 µL of each the two solutions of the secondary calibration standards (Section 7.9) and 1 mL of each of the two labeled compound spiking solutions (Section 7.8) into 1000 mL of reagent water.

7.15 Stability of solutions: All standard solutions (Sections 7.7 through 7.14) shall be analyzed within 48 hours of preparation and on a monthly basis thereafter for signs of degradation. Standards will remain acceptable if the peak area at the

quantitation m/z relative to the DFB internal standard remains within ±15% of the area obtained in the initial analysis of the standard.

8.0 Sample Collection, Preservation, and Storage

8.1 Collect samples in glass containers (Section 6.1) following conventional sampling practices (Reference 9). Aqueous samples are collected in refrigerated bottles using automatic sampling equipment.

8.2 Sample preservation.

8.2.1 Residual chlorine: If the sample contains residual chlorine, the chlorine must be reduced to eliminate positive interference resulting from continued chlorination reactions. Immediately after sampling, test for residual chlorine using the following method or an alternative EPA method (Reference 10).

8.2.1.1 Dissolve a few crystals of potassium iodide in the sample and add three to five drops of a 1% starch solution. A blue color indicates the presence of residual chlorine.

8.2.1.2 If residual chlorine is found, add 1 mL of sodium thiosulfate solution (Section 7.2.1) for each 2.5 ppm of free chlorine or until the blue color disappears.

8.2.2 Acidification: Adjust pH of all aqueous samples to <2 with sulfuric acid (Section 7.1.2). Failure to acidify samples may result in positive interferences from continued chlorination reactions.

8.2.3 Refrigeration: Maintain sample temperature at 0 to 4 °C from time of collection until extraction, and maintain extracts at a temperature of 0 to 4 °C from time of extraction until analysis.

8.3 Collect a minimum of 2000 mL of sample. This will provide a sufficient amount for all testing. Smaller amounts may be collected if the stream is known to contain high levels of chlorophenolics.

8.4 All samples must be acetylated and extracted within 30 days of collection, and must be analyzed within 30 days of acetylation. If labeled compound recoveries for a sample do not meet the acceptance criteria in Table 5 and the 30-day holding time is not met, a new sample must be collected.

9.0 Quality Control

9.1 Each laboratory that uses this method is required to operate a formal quality assurance program (Reference 8). The minimum requirements of this program consist of an initial demonstration of laboratory capability, analysis of samples spiked with labeled compounds to evaluate and document data quality, and analysis of standards and blanks as tests of continued performance. Laboratory performance is compared to established performance criteria to determine if the results of analyses meet the performance characteristics of the method.

9.1.1 DFTPP spectrum validity shall be checked at the beginning of each eight-hour shift during which analyses are performed. This test is described in Section 9.2.

9.1.2 The laboratory shall make an initial demonstration of the ability to generate acceptable results with this method. This ability is established as described in Section 9.3.

9.1.3 The laboratory is permitted to modify this method to improve separations or lower the costs of measurements, provided all performance specifications are met. Each time a modification is made to the method, the laboratory is required to repeat the procedures in Sections 10.3 and 9.3.2 to demonstrate method performance. If the detection limits for the analytes in this method will be affected by the modification, the laboratory should demonstrate that each MDL (40 CFR

136, Appendix B) is less than or equal to the MDL in this method or one-third the regulatory compliance level, whichever is higher.

9.1.4 The laboratory shall spike all samples with labeled compounds and the sample matrix internal standard (SMIS) to monitor method performance. This test is described in Section 9.4. When results of these spikes indicate atypical method performance for samples, the samples are diluted to bring method performance within acceptable limits (Section 13).

9.1.5 Analyses of blanks are required to demonstrate freedom from contamination. The procedures and criteria for analysis of a blank are described in Section 9.5.

9.1.6 The laboratory shall, on an ongoing basis, demonstrate through analysis of the ongoing precision and recovery standard (Section 7.14) that the analysis system is in control. These procedures are described in Section 9.6.

9.1.7 The laboratory shall maintain records to define the quality of data that is generated. Development of accuracy statements is described in Section 9.4.4 and 9.6.3.

9.2 DFTPP spectrum validity: Inject 1 µL of the DFTPP solution (Section 7.11) either separately or within a few seconds of injection of the OPR standard (Section 9.6) analyzed at the beginning of each shift. The criteria in Table 3 shall be met.

9.3 Initial demonstration of laboratory capability.

9.3.1 Method Detection Limit (MDL): To establish the ability to detect the analytes in this method, the laboratory should determine the MDL per the procedure in 40 CFR 136, Appendix B using the apparatus, reagents, and standards that will be used in the practice of this method. MDLs less than or equal to the MDLs in Table 2 should be achieved prior to the practice of this method.

9.3.2 Initial precision and recovery (IPR): To establish the ability to demonstrate control over the analysis system and to generate acceptable precision and accuracy, the laboratory shall perform the following operations:

9.3.2.1 Derivatize, extract, concentrate, and analyze four 1000-mL aliquots of the ongoing precision and recovery standard (OPR; Section 7.14), according to the procedure in Section 11. Separate sets of IPR aliquots must be prepared with the addition of ascorbic acid and without.

9.3.2.2 Using results of the four analyses, compute the average percent recovery (X) and the relative standard deviation of the recovery (s) for each compound, by isotope dilution for pollutants with a labeled analog, and by internal standard for pollutants with no labeled analog and for the labeled compounds and the SMIS.

9.3.2.3 For each compound, compare s and X with the corresponding limits for initial precision and recovery in Table 5. If s and X for all compounds meet the acceptance criteria, system performance is acceptable and analysis of blanks and samples may begin. If, however, any individual s exceeds the precision limit or any individual X falls outside the range for recovery, system performance is unacceptable for that compound. In this event, correct the problem and repeat the test (Section 9.3.2).

9.4 Labeled compound recovery: The laboratory shall spike all samples with labeled compounds and the sample matrix internal standard (SMIS) to assess method performance on the sample matrix.

9.4.1 Analyze each sample according to the method beginning in Section 11.

9.4.2 Compute the percent recovery (P) of the labeled compounds and the SMIS using the internal standard method (Section 14.3) with 2,2′-difluorobiphenyl as the reference compound.

9.4.3 Compare the labeled compound and SMIS recovery for each compound with the corresponding limits in Table 5. If the recovery of any compound falls outside its warning limit, method performance is unacceptable for that compound in that sample. Therefore, the sample is complex. The sample is diluted and reanalyzed per Section 13.

9.4.4 As part of the QA program for the laboratory, it is suggested, but not required, that method accuracy for samples be assessed and records maintained. After the analysis of five samples for which the labeled compounds pass the tests in Section 9.4.3, compute the average percent recovery (P) and the standard deviation of the percent recovery (sp) for the labeled compounds only. Express the accuracy assessment as a percent recovery interval from P−2sp to P + 2sp for each matrix. For example, if P = 90% and sp = 10%, the accuracy interval is expressed as 70 to 110%. Update the accuracy assessment for each compound on a regular basis (e.g., after each 20 to 30 new accuracy measurements).

9.5 Blanks: Reagent water blanks are analyzed to demonstrate freedom from contamination.

9.5.1 Extract and concentrate a 1000-mL reagent water blank with each sample batch (samples started through the extraction process on the same eight-hour shift, to a maximum of 20 samples). Blanks associated with samples to which ascorbic acid is added must be prepared with ascorbic acid, and blanks associated with samples to which ascorbic acid is not added must be prepared without ascorbic acid. Analyze the blank immediately after analysis of the OPR (Section 7.14) to demonstrate freedom from contamination.

9.5.2 If any of the compounds of interest (Table 1) or any potentially interfering compound is found in an aqueous blank at greater than 5 µg/L (assuming a response factor of one relative to the sample matrix internal standard for compounds not listed in Table 1), analysis of samples is halted until the source of contamination is eliminated and a blank shows no evidence of contamination at this level.

9.6 Calibration verification and ongoing precision and recovery: At the beginning of each eight-hour shift during which analyses are performed, analytical system performance is verified for all compounds. Analysis of DFTPP (Section 9.2) and the nominal 50 µg/mL OPR (Section 11.1.5) is used to verify all performance criteria. Adjustment and/or recalibration, per Section 10, shall be performed until all performance criteria are met. Only after all performance criteria are met may samples and blanks be analyzed.

9.6.1 Analyze the extract of the OPR (Section 11.1.5) at the beginning of each eight-hour shift and prior to analysis of samples from the same batch. Alternatively, a separate calibration verification may be performed using an aliquot of the midpoint calibration standard from Section 7.13 (with a nominal concentration of 50 µg/mL). This alternative may be used to check instrument performance on failure of an OPR, or when samples extracted with an OPR aliquot are not analyzed within the same eight-hour analysis shift.

9.6.1.1 Retention times: The absolute retention time of 2,2′-difluorobiphenyl shall be within the range of 765 to 885 seconds, and the relative retention times of all pollutants and labeled compounds shall fall within the limits given in Table 2.

9.6.1.2 GC resolution: The valley height between 4,6-dichloroguaiacol and 3,4-dichloroguaiacol at m/z 192 shall not exceed 10% of the height of the taller of the two peaks.

9.6.1.3 Multiple peaks: Each compound injected shall give a single, distinct GC peak.

9.6.2 Compute the percent recovery of each pollutant (Table 1) by isotope dilution (Section 10.4) for those compounds that have labeled analogs. Compute the percent recovery of each pollutant that has no labeled analog by the internal standard method (Section 10.5), using the 3,4,5-trichlorophenol (SMIS) as the internal standard. Compute the percent recovery of the labeled compounds and the SMIS by the internal standard method, using the 2,2'-difluorobiphenyl as the internal standard.

9.6.2.1 For each compound, compare the recovery with the limits for ongoing precision and recovery in Table 5. If all compounds meet the acceptance criteria, system performance is acceptable and analysis of blanks and samples may proceed. If, however, any individual recovery falls outside of the range given, system performance is unacceptable for that compound. In this event, there may be a problem with the GCMS or with the derivatization/extraction/concentration systems.

9.6.2.2 GCMS system: To determine if the failure of the OPR test (Section 9.6.2.1) is due to instrument drift, analyze the current calibration verification extract (Section 7.13.4), calculate the percent recoveries of all compounds, and compare with the OPR recovery limits in Table 5. If all compounds meet these criteria, GCMS performance/stability is verified, and the failure of the OPR analysis is attributed to problems in the derivatization/extraction/concentration of the OPR. In this case, analysis of the sample extracts may proceed. However, failure of any of the recovery criteria in the analysis of a sample extract requires rederivatization of that sample (Sections 13.3.1 and 13.3.2). If, however, the performance/stability of the GCMS is not verified by analysis of the calibration verification extract, the GCMS requires recalibration and all extracts associated with the failed OPR must be reanalyzed.

9.6.3 Add results that pass the specifications in Section 9.6.2.1 to initial and previous ongoing data for each compound. Update QC charts to form a graphic representation of continued laboratory performance. Develop a statement of laboratory accuracy for each pollutant and labeled compound in each matrix type (reagent water, C-stage filtrate, E-stage filtrate, final effluent, etc.) by calculating the average percent recovery (R) and the standard deviation of percent recovery (sr). Express the accuracy as a recovery interval from R− 2sr to R = 2sr. For example, if R = 95% and sr = 5%, the accuracy is 85 to 105%.

9.7 The specifications contained in this method can be met if the apparatus used is calibrated properly, then maintained in a calibrated state. The standards used for calibration (Section 10) and for initial (Section 9.3.2) and ongoing (Section 9.6) precision and recovery should be identical, so that the most precise results will be obtained. The GCMS instrument in particular will provide the most reproducible results if dedicated to the settings and conditions required for the analyses of chlorophenolics by this method.

9.8 Depending on specific program requirements, field replicates may be collected to determine the precision of the sampling technique, and spiked samples may be required to determine the accuracy of the analysis when the internal standard method is used.

10.0 Calibration and Standardization

10.1 Assemble the GCMS and establish the operating conditions in Section 12. Analyze standards per the procedure in Section 12 to demonstrate that the analytical system meets the minimum levels in Table 2, and the mass-intensity criteria in Table 3 for 50 ng DFTPP.

10.2 Mass-spectral libraries: Detection and identification of compounds of interest are dependent upon spectra stored in user-created libraries.

10.2.1 Obtain a mass spectrum of the acetyl derivative of each chlorophenolic compound (pollutant, labeled compound, and the sample matrix internal standard) by derivatizing and analyzing an authentic standard either singly or as part of a mixture in which there is no interference between closely eluting components. That only a single compound is present is determined by examination of the spectrum. Fragments not attributable to the compound under study indicate the presence of an interfering compound.

10.2.2 Adjust the analytical conditions and scan rate (for this test only) to produce an undistorted spectrum at the GC peak maximum. An undistorted spectrum will usually be obtained if five complete spectra are collected across the upper half of the GC peak. Software algorithms designed to "enhance" the spectrum may eliminate distortion, but may also eliminate authentic m/z's or introduce other distortion.

10.2.3 The authentic reference spectrum is obtained under DFTPP tuning conditions (Section 10.1 and Table 3) to normalize it to spectra from other instruments.

10.2.4 The spectrum is edited by removing all peaks in the m/z 42 to 45 range, and saving the five most intense mass spectral peaks and all other mass spectral peaks greater than 10% of the base peak (excluding the peaks in the m/z 42 to 45 range). The spectrum may be further edited to remove common interfering m/z's. The spectrum obtained is stored for reverse search and for compound confirmation. 10.3 Minimum level: Demonstrate that the chlorophenolics are detectable at the minimum level (per all criteria in Section 14). The nominal 5 µg/mL calibration standard (Section 7.13) can be used to demonstrate this performance.

10.4 Calibration with isotope dilution: Isotope dilution is used when (1) labeled compounds are available, (2) interferences do not preclude its use, and (3) the quantitation m/z (Table 4) extracted ion-current profile (EICP) area for the compound is in the calibration range. Alternative labeled compounds and quantitation m/z's may be used based on availability. If any of the above conditions preclude isotope dilution, the internal standard calibration method (Section 10.5) is used.

10.4.1 A calibration curve encompassing the concentration range is prepared for each compound to be determined. The relative response (pollutant to labeled) vs. concentration in standard solutions is plotted or computed using a linear regression. The example in Figure 1 shows a calibration curve for phenol using phenol-d5 as the isotopic diluent. Also shown are the ±10% error limits (dotted lines). Relative response (RR) is determined according to the procedures described below. A minimum of five data points are employed for calibration.

10.4.2 The relative response of a pollutant to its labeled analog is determined from isotope ratio values computed from acquired data. Three isotope ratios are used in this process:

R_x = the isotope ratio measured for the pure pollutant.

R_y = the isotope ratio measured for the labeled compound.

R_m = the isotope ratio of an analytical mixture of pollutant and labeled compounds.

The m/z's are selected such that $R_x > R_y$. If R_m is not between $2R_y$ and $0.5R_x$, the method does not apply and the sample is analyzed by the internal standard method.

10.4.3 Capillary columns sometimes separate the pollutant-labeled pair when deuterium labeled compounds are used, with the labeled compound eluted first (Figure 2). For this case,

$R_x = \left[\frac{area\ m_1/z}{1}\right]$, at the retention time of the pollutant (RT_2).

$R_y = \left[\frac{1}{area\ m_2/z}\right]$, at the retention time of the labeled compound (RT_1).

$R_m = \left[\frac{area\ \text{at}\ m_1/z\ (\text{at}\ RT_2)}{area\ \text{at}\ m_2/z\ (\text{at}\ RT_1)}\right]$, as measured in the mixture of the pollutant and labeled compounds (Figure 2), and $RR=R_m$.

10.4.4 When the pollutant-labeled pair is not separated (as occurs with carbon-13 -labeled compounds), or when another labeled compound with interfering spectral masses overlaps the pollutant (a case which can occur with isomeric compounds), it is necessary to determine the contributions of the pollutant and labeled compound to the respective EICP areas. If the peaks are separated well enough to permit the data system or operator to remove the contributions of the compounds to each other, the equations in Section 10.4.3 apply. This usually occurs when the height of the valley between the two GC peaks at the same m/z is less than 70 to 90% of the height of the shorter of the two peaks. If significant GC and spectral overlap occur, RR is computed using the following equation:

$$RR = \frac{(R_y - R_m)(R_x + 1)}{(R_m - R_x)(R_y + 1)}$$

Where:

R_x is measured as shown in figure 3A,

R_y is measured as shown in figure 3B,

R_m is measured as shown in figure 3C.

For example, R_x = 46100/4780 = 9.644; R_y = 2650/43600 = 0.0608; R_m = 49200/48300 = 1.1019; thus, RR = 1.114. 10.4.5 To calibrate the analytical system by isotope dilution, analyze a 1-µL aliquot of each of the calibration standards (Section 7.13) using the procedure in Section 12. Compute the RR at each concentration.

10.4.6 Linearity: If the ratio of relative response to concentration for any compound is constant (less than 20% coefficient of variation) over the five-point calibration range, an averaged relative response/concentration ratio may be used for that compound; otherwise, the complete calibration curve for that compound shall be used over the five-point calibration range.

10.5 Calibration by internal standard: The method contains two types of internal standards, the sample matrix internal standard (SMIS) and the instrument internal standard (IIS), and they are used for different quantitative purposes. The 3,4,5-trichlorophenol sample matrix internal standard (SMIS) is used for measurement of all pollutants with no labeled analog and when the criteria for isotope dilution (Section 10.4) cannot be met. The 2,2'-difluorobiphenyl instrument internal standard (IIS) is used for determination of the labeled compounds and the SMIS. The results are used for intralaboratory statistics (Sections 9.4.4 and 9.6.3).

10.5.1 Response factors: Calibration requires the determination of response factors (RF) for both the pollutants with no labeled analog and for the labeled compounds and the SMIS. The response factor is defined by the following equation:

$$RF = \frac{(A_s \times C_{is})}{(A_{is} \times C_s)}$$

Where:

A_s=the area of the characteristic mass for the compound in the daily standard.

A_{is}=the area of the characteristic mass for the internal standard.

C_{is}=the concentration of the internal standard (µg/mL).

C_s=is the concentration of the compound in the calibration standard (µg/mL).

When this equation is used to determine the response factors for pollutant compounds without labeled analogs, use the area (A_{is}) and concentration (C_{is}) of 3,4,5-trichlorophenol (SMIS) as the internal standard. When this equation is used to determine the response factors for the labeled analogs and the SMIS, use the area (A_{is}) and concentration (C_{is}) of 2,2′-difluorobiphenyl as the internal standard.

10.5.2 The response factor is determined for at least five concentrations appropriate to the response of each compound (Section 7.13); nominally, 5, 10, 20, 50, and 100 µg/mL. The amount of SMIS added to each solution is the same (25 µg/mL) so that C_{is} remains constant. Likewise, the concentration of IIS is constant in each solution. The area ratio (A_s/A_{is}) is plotted versus the concentration ratio (C_s/C_{is}) for each compound in the standard to produce a calibration curve.

10.5.3 Linearity: If the response factor (RF) for any compound is constant (less than 35% coefficient of variation) over the five-point calibration range, an averaged response factor may be used for that compound; otherwise, the complete calibration curve for that compound shall be used over the five-point range.

10.6 Combined calibration: By using calibration solutions (Section 7.13) containing the pollutants, labeled compounds, and the internal standards, a single set of analyses can be used to produce calibration curves for the isotope dilution and internal standard methods. These curves are verified each shift (Section 9) by analyzing the OPR standard, or an optional calibration verification (VER) standard. Recalibration is required only if OPR criteria (Section 9.6 and Table 5) cannot be met.

11.0 Sample Derivatization, Extraction, and Concentration

The procedure described in this section uses a stir-bar in a beaker for the derivatization. The extraction procedures applied to samples depend on the type of sample being analyzed. Extraction of samples from in-process wastewaters is performed using a separatory funnel procedure. All calibrations, IPR, OPR, and blank analyses associated with in-process wastewater samples must be performed by the separatory funnel procedure.

Extraction of samples of final effluents and raw water may be performed using either the stir-bar procedure or the separatory funnel procedure. However, all calibrations, IPR, OPR, blank, and sample analyses must be performed using the same procedure. Both procedures are described below.

11.1 Preparation of all sample types for stir-bar derivatization.

11.1.1 Allow sample to warm to room temperature.

11.1.2 Immediately prior to measuring, shake sample vigorously to insure homogeneity.

11.1.3 Measure 1000 mL (±10 mL) of sample into a clean 2000-mL beaker. Label the beaker with the sample number.

11.1.4 Dilute aliquot(s).

11.1.4.1 Complex samples: For samples that are expected to be difficult to derivatize, concentrate, or are expected to overload the GC column or mass spectrometer, measure an additional 100 mL (±1 mL) into a clean 2000-mL beaker and dilute to a final volume of 1000-mL (±50 mL) with reagent water. Label with the sample number and as the dilute aliquot. However, to ensure adequate sensitivity, a 1000-mL aliquot must always be prepared and analyzed.

11.1.4.2 Pulp and paper industry samples: For in-process streams such as E-stage and C-stage filtrates and other in-process wastewaters, it may be necessary to prepare an aliquot at an additional level of dilution. In this case, dilute 10 mL (±0.1 mL) of sample to 1000-mL (±50 mL).

11.1.5 QC aliquots: For a batch of samples of the same type to be extracted at the same time (to a maximum of 20), place two 1000-mL (±10 mL) aliquots of reagent water in clean 2000-mL beakers. Label one beaker as the blank and the other as the ongoing precision and recovery (OPR) aliquot. Because final effluent samples are treated with ascorbic acid and in-process wastewater samples are not (see Section 11.1.6), prepare an OPR aliquot and a blank for the final effluent and a separate pair for the in-process samples. Treat these QC aliquots in the same fashion as the associated samples, adding ascorbic acid to the pair associated with the final effluents, and not adding ascorbic acid to the pair associated with the in-process samples.

11.1.6 Ascorbic acid: Added to stabilize chlorocatechols. However, for pulp and paper industry in-process streams and other in-process wastewaters, the addition of ascorbic acid may convert chloro-o-quinones to catechols if these quinones are present. Separate calibration curves must be prepared with and without the addition of ascorbic acid (Section 7.13.2).

11.1.6.1 Spike 5 to 6 mL of the ascorbic acid solution (Section 7.2.2) into each final effluent sample, and the associated calibration standards, IPR and OPR aliquots, and blank.

11.1.6.2 For pulp and paper industry C-stage filtrates, E-stage filtrates, and untreated effluents, omit the ascorbic acid to prevent the conversion of chloro-o-quinones to catechols. Prepare calibration standards, IPR and OPR aliquots, and blanks associated with these samples without ascorbic acid as well.

11.1.7 Spike 1000 µL of the labeled compound spiking solution (Section 7.8) into the sample and QC aliquots.

11.1.8 Spike 500 µL of the nominal 50 µg/mL calibration solution (Section 7.13.4) into the OPR aliquot.

11.1.9 Adjust the pH of the sample aliquots to between 7.0 and 7.1. For calibration standards, IPR and OPR aliquots, and blanks, pH adjustment is not required.

11.1.10 Equilibrate all sample and QC solutions for approximately 15 minutes, with occasional stirring.

11.2 Derivatization: Because derivatization must proceed rapidly, particularly upon the addition of the K_2CO_3 buffer, it is necessary to work with one sample at a time until the derivatization step (Section 11.2.3) is complete.

11.2.1 Place a beaker containing a sample or QC aliquot on the magnetic stirrer in a fume hood, drop a clean stirring bar into the beaker, and increase the speed of the stirring bar until the vortex is drawn to the bottom of the beaker.

11.2.2 Measure 25 to 26 mL of K_2CO_3 buffer into a graduated cylinder or other container and 25 to 26 mL of acetic acid into another.

11.2.3 Add the K_2CO_3 buffer to the sample or QC aliquot, immediately (within one to three seconds) add the acetic anhydride, and stir for three to five minutes to complete the derivatization.

11.3 Extraction: Two procedures are described below for the extraction of derivatized samples. The choice of extraction procedure will depend on the sample type. For final effluent samples, either of two procedures may be utilized for extraction of derivatized samples. For samples of in-process wastewaters, the separatory funnel extraction procedure must be used.

Note: Whichever procedure is employed, the same extraction procedure must be used for calibration standards, IPR aliquots, OPR aliquots, blanks, and the associated field samples.

11.3.1 Stir-bar extraction of final effluents.

11.3.1.1 Add 200 mL (±20 mL) of hexane to the beaker and stir for three to five minutes, drawing the vortex to the bottom of the beaker.

11.3.1.2 Stop the stirring and drain the hexane and a portion of the water into a 500-to 1000-mL separatory funnel. Allow the layers to separate.

11.3.1.3 Drain the aqueous layer back into the beaker.

11.3.1.4 The formation of emulsions can be expected in any solvent extraction procedure. If an emulsion forms, the laboratory must take steps to break the emulsion before proceeding. Mechanical means of breaking the emulsion include the use of a glass stirring rod, filtration through glass wool, and other techniques. For emulsions that resist these techniques, centrifugation is nearly 100% effective.

If centrifugation is employed to break the emulsion, drain the organic layer into a centrifuge tube, cap the tube, and centrifuge for two to three minutes or until the phases separate. If the emulsion cannot be completely broken, collect as much of the organic phase as possible, and measure and record the volume of the organic phase collected.

If all efforts to break the emulsion fail, including centrifugation, and none of the organic phase can be collected, proceed with the dilute aliquot (Section 11.1.4.2). However, use of the dilute aliquot will sacrifice the sensitivity of the method, and may not be appropriate in all cases.

11.3.1.5 Drain the organic layer into a Kuderna-Danish (K-D) apparatus equipped with a 10-mL concentrator tube. Label the K-D apparatus. It may be necessary to pour the organic layer through a funnel containing anhydrous sodium sulfate to remove any traces of water from the extract.

11.3.1.6 Repeat the extraction (Section 11.3.1.1 through 11.3.1.5) two more times using another 200-mL of hexane for each extraction, combining the extracts in the K-D apparatus.

11.3.1.7 Proceed with concentration of the extract, as described in Section 11.4.

11.3.2 Separatory funnel extraction of either final effluents or in-process wastewaters.

11.3.2.1 Transfer the derivatized sample or QC aliquot to a 2-L separatory funnel.

11.3.2.2 Add 200 mL (±20 mL) of hexane to the separatory funnel. Cap the funnel and extract the sample by shaking the funnel for two to three minutes with periodic venting.

11.3.2.3 Allow the organic layer to separate from the water phase for a minimum of 10 minutes.