Jon Niermann, *Chairman*
Emily Lindley, *Commissioner*
Toby Baker, *Executive Director*

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

December 17, 2018

U.S. Environmental Protection Agency
Region 6
Attention: Stacey B. Dwyer, P.E. (6WQ)
1445 Ross Avenue
Dallas, Texas 75202

Re: TPDES Draft Permit No. WQ0000749000, EPA ID No. TX0007439
CN600132831, RN100238492

Dear Ms. Dwyer:

Enclosed are the draft permit and fact sheet for the above-referenced permit as required under the TCEQ/EPA memorandum of agreement. Please review and provide any written comments, objections (general or interim), or recommendations with respect to the draft permit within forty-five days from receipt of this draft permit, to my attention.

If you need additional information or have any questions, please contact Ms. Karen Holligan of my staff by telephone at (512) 239-4589, by e-mail at karen.holligan@tceq.texas.gov, by fax at (512) 239-4430, or, if by correspondence, include "MC 148" following the permit writer's name in the letterhead address. Thank you for your cooperation in this matter.

Sincerely,

G. Michael Lindner, Team Leader
Industrial Permits Team
Water Quality Division

GML/KH

Enclosures

ATTACHMENT 1

EPA - REGION 6
NPDES PERMIT CERTIFICATION CHECKLIST

In accordance with the MOA established between the State of Texas and the United States Environmental Protection Agency, Region 6, the Texas Commission on Environmental Quality submits the following draft Texas Pollutant Discharge Elimination System (TPDES) permit for Agency review.

Major X **Minor** _____

POTW _____ **Private Domestic** _____ **Non-POTW** X

Facility Name	GB Biosciences LLC, Greens Bayou Plant		
SIC Code	2879 and 2819		
Type of operation	Agricultural, specialty, and organic chemical manufacturing		
NPDES Permit No.	TX0007439	**TPDES Permit No.**	WQ0000749000
Segment No.	1006	**Basin**	San Jacinto River Basin
Receiving Water	Houston Ship Channel Tidal		

Permit Action:	**New**	
	Renewal WITH changes	X
	Renewal WITHOUT changes (permit and WQS)	
	Major Amendment with renewal	
	Amendment/Modification WITHOUT renewal, proceed directly to question 22, below	

Answer the following.	**Yes**	**No**	**N/A**
1. Are there known or potential interstate water issues associated with this permit?		X	
2. Is there known or potential third-party interest/environmental concern regarding this permit action?		X	
3. Does this facility discharge to a 303(d)-listed waterbody/segment?	X		
If **YES**, does the facility discharge any of the pollutant(s) of concern identified in the 303(d) listing?	X		
4. Is this permit consistent with the approved WQMP?			X
5. Does the facility discharge to a water body segment which has a finalized TMDL?	X		
If **YES**, does the permit implement the TMDL consistent with the WLAs?	X		
6. Does the Fact Sheet document the rationale for the inclusion/omission of permit conditions for each 303(d)-listed pollutant of concern or TMDL pollutant?	X		
7. Has a priority watershed of critical concern been identified by the U. S. Fish and Wildlife Service for this segment?		X	

	Yes	No	N/A
8. Does this permit authorize ammonia discharges > 4.0 mg/L at the edge of the mixing zone?		X	
9. Does this permit require testing for Whole Effluent Toxicity in accordance with the state's standard practices and implementation plan?	X		
10. If this facility has completed and implemented a Toxicity Reduction Evaluation (TRE), has any subsequent toxicity been identified?		X	
11. Does this permit propose to grant a variance request *(WQS, FDF, etc.)* or does it incorporate a proposed or final approval of a variance request?		X	
12. If a POTW is ≥ 5 MGD, does it have an approved Pretreatment Program?			X
13. Since the last permit issuance, has the POTW had a new Pretreatment Program approved or a Pretreatment Program modification approved?			X
14. Does this permit contain authorization for wet weather-related peak-flow discharges?		X	
15. Does this permit include a bypass of any treatment unit or authorize overflows in the system?		X	
16. Does this permit include provisions for effluent trading?		X	
17. Does this permit contain specific issues on which EPA and the state are not in agreement regarding the permitting approach?		X	
18. Is this facility subject to a national effluent limitations guideline? Please specify: Parts 414 and 455	X		
19. Does this permit contain "first-time" implementation of a new federal guideline, policy, regulation, etc.? Please specify:		X	
20. Is this a new facility or an expansion of an existing facility?		X	
For an **EXISTING** facility, if any limits have been removed or are less stringent than those in the previous permit, is it in accordance with the anti-backsliding regulations?			X
21. Does this permit incorporate any exceptions to the standards or regulations?		X	
22. Is this is a permit modification/amendment? Please specify:		X	

Name: Karen Holligan

Date: February 21, 2018

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

NOTICE OF APPLICATION AND PRELIMINARY DECISION FOR TPDES PERMIT FOR INDUSTRIAL WASTEWATER RENEWAL

PERMIT NO. WQ0000749000

APPLICATION AND PRELIMINARY DECISION. GB Biosciences LLC, 2239 Haden Road, Houston, Texas 77015, which operates the Greens Bayou Plant, a facility that manufactures agricultural, specialty, and industrial organic chemicals, has applied to the Texas Commission on Environmental Quality (TCEQ) for a renewal of Texas Pollutant Discharge Elimination System (TPDES) Permit No. WQ0000749000, which authorizes the discharge of previously monitored effluents (treated process wastewater, groundwater, treated domestic wastewater, non-process wastewater, incinerator wastewater, and treated stormwater) on a flow-variable basis via Outfall 001 and stormwater on an intermittent and flow-variable basis via Outfalls 002, 003, 004, 005, and 006. The TCEQ received this application on November 2, 2017.

The facility is located at 2239 Haden Road in the extraterritorial jurisdiction of the City of Houston, Harris County, Texas 77015. This link to an electronic map of the site or facility's general location is provided as a public courtesy and is not part of the application or notice. For the exact location, refer to the application.
http://www.tceq.texas.gov/assets/public/hb610/index.html?lat=29.763055&lng=-95.171111&zoom=13&type=r

The effluent is discharged via Outfalls 001, 003, and 004 to unnamed ditches, thence to Harris County Flood Control District (HCFCD) ditch P104-00-00, thence to Greens Bayou Tidal, a portion of the Houston Ship Channel Tidal in Segment No. 1006 of the San Jacinto River Basin; and via Outfalls 002, 005, and 006 to HCFCD ditch P104-00-00, thence to Greens Bayou Tidal, a portion of the Houston Ship Channel Tidal in Segment No. 1006 of the San Jacinto River Basin. The unclassified receiving water uses are minimal aquatic life use for the unnamed ditches and HCFCD ditch P104-00-00. The designated uses for Segment No. 1006 are navigation and industrial water supply.

The TCEQ executive director has completed the technical review of the application and prepared a draft permit. The draft permit, if approved, would establish the conditions under which the facility must operate. The executive director has made a preliminary decision that this permit, if issued, meets all statutory and regulatory requirements. The permit application, executive director's preliminary decision, and draft permit are available for viewing and copying at the North Channel Branch Library, 15741 Wallisville Road, Houston, Texas.

PUBLIC COMMENT / PUBLIC MEETING. You may submit public comments or request a public meeting about this application. The purpose of a public meeting is to provide the opportunity to submit written or oral comment or to ask questions about the application. Generally, the TCEQ will hold a public meeting if the executive director determines that there is a

significant degree of public interest in the application or if requested by a local legislator. A public meeting is not a contested case hearing.

OPPORTUNITY FOR A CONTESTED CASE HEARING. After the deadline for public comments, the executive director will consider the comments and prepare a response to all relevant and material, or significant public comments. **The response to comments, along with the executive director's decision on the application, will be mailed to everyone who submitted public comments or who requested to be on a mailing list for this application. If comments are received, the mailing will also provide instructions for requesting a contested case hearing or reconsideration of the executive director's decision.** A contested case hearing is a legal proceeding similar to a civil trial in a state district court.

TO REQUEST A CONTESTED CASE HEARING, YOU MUST INCLUDE THE FOLLOWING ITEMS IN YOUR REQUEST: your name, address, phone number; applicant's name and proposed permit number; the location and distance of your property/activities relative to the proposed facility; a specific description of how you would be adversely affected by the facility in a way not common to the general public; a list of all disputed issues of fact that you submit during the comment period; and the statement "[I/we] request a contested case hearing." If the request for contested case hearing is filed on behalf of a group or association, the request must designate the group's representative for receiving future correspondence; identify by name and physical address an individual member of the group who would be adversely affected by the proposed facility or activity; provide the information discussed above regarding the affected member's location and distance from the facility or activity; explain how and why the member would be affected; and explain how the interests the group seeks to protect are relevant to the group's purpose.

Following the close of all applicable comment and request periods, the executive director will forward the application and any requests for reconsideration or for a contested case hearing to the TCEQ Commissioners for their consideration at a scheduled Commission meeting.

The Commission may only grant a request for a contested case hearing on issues the requestor submitted in their timely comments that were not subsequently withdrawn. **If a hearing is granted, the subject of a hearing will be limited to disputed issues of fact or mixed questions of fact and law relating to relevant and material water quality concerns submitted during the comment period. TCEQ may act on an application to renew a permit for discharge of wastewater without providing an opportunity for a contested case hearing if certain criteria are met.**

EXECUTIVE DIRECTOR ACTION. The executive director may issue final approval of the application unless a timely contested case hearing request or a timely request for reconsideration is filed. If a timely hearing request or request for reconsideration is filed, the executive director will not issue final approval of the permit and will forward the application and requests to the TCEQ Commissioners for their consideration at a scheduled Commission meeting.

MAILING LIST. If you submit public comments, a request for a contested case hearing or a reconsideration of the executive director's decision, you will be added to the mailing list for this specific application to receive future public notices mailed by the Office of the Chief Clerk. In addition, you may request to be added to: (1) the permanent list for a specific applicant name and permit number; and (2) the mailing list for a specific county. If you wish to be placed on the

permanent and the county mailing list, clearly specify which list(s) and send your request to TCEQ Office of the Chief Clerk at the address below.

All written public comments and public meeting requests must be submitted to the Office of the Chief Clerk, MC 105, TCEQ, P.O. Box 13087, Austin, TX 78711-3087 or electronically at www.tceq.texas.gov/about/comments.html within 30 days from the date of newspaper publication of this notice.

INFORMATION AVAILABLE ONLINE. For details about the status of the application, visit the Commissioners' Integrated Database at www.tceq.texas.gov/goto/cid. Search the database using the permit number for this application, which is provided at the top of this notice.

AGENCY CONTACTS AND INFORMATION. Public comments and requests must be submitted either electronically at www.tceq.texas.gov/about/comments.html, or in writing to the Texas Commission on Environmental Quality, Office of the Chief Clerk, MC-105, P.O. Box 13087, Austin, Texas 78711-3087. Please be aware that any contact information you provide, including your name, phone number, email address, and physical address will become part of the agency's public record. For more information about this permit application or the permitting process, please call the TCEQ Public Education Program, Toll Free, at 1-800-687-4040 or visit their website at www.tceq.texas.gov/goto/pep. Si desea información en Español, puede llamar al 1-800-687-4040.

Further information may also be obtained from GB Biosciences LLC at the address stated above or by calling Ms. Carolyn Guillory at 713-450-6448.

Issued:

FACT SHEET AND EXECUTIVE DIRECTOR'S PRELIMINARY DECISION

For draft Texas Pollutant Discharge Elimination System (TPDES) Permit No. WQ0000749000, U.S. Environmental Protection Agency (EPA) ID No. TX0007439, to discharge to water in the state

Issuing Office:	Texas Commission on Environmental Quality (TCEQ) P.O. Box 13087 Austin, Texas 78711-3087
Applicant:	GB Biosciences LLC 2239 Haden Road Houston, Texas 77015
Prepared By:	Karen Holligan Wastewater Permitting Section Water Quality Division (512) 239-4589
Date:	November 29, 2018
Permit Action:	Renewal; TPDES Permit No. WQ0000749000

I. EXECUTIVE DIRECTOR RECOMMENDATION

The executive director has made a preliminary decision that this permit, if issued, meets all statutory and regulatory requirements. The draft permit includes an expiration date of five years from the date of permitt issuance.

II. APPLICANT ACTIVITY

The applicant currently operates the Greens Bayou Plant, a facility that manufactures agricultural, specialty, and industrial organic chemicals.

III. DISCHARGE LOCATION

As described in the application, the facility is located at 2239 Haden Road in the extraterritorial jurisdiction of the City of Houston, Harris County, Texas. Discharge is via Outfalls 001, 003, and 004 to unnamed ditches, thence to Harris County Flood Control District (HCFCD) ditch P104-00-00, thence to Greens Bayou Tidal, a portion of the Houston Ship Channel Tidal in Segment No. 1006 of the San Jacinto River Basin; and via Outfalls 002, 005, and 006 to HCFCD ditch P104-00-00, thence to Greens Bayou Tidal, a portion of the Houston Ship Channel Tidal in Segment No. 1006 of the San Jacinto River Basin.

IV. RECEIVING STREAM USES

The unclassified receiving water uses are minimal aquatic life use for the unnamed ditches and HCFCD ditch P104-00-00. The designated uses for Segment No. 1006 are navigation and industrial water supply.

V. STREAM STANDARDS

The general criteria and numerical criteria that make up the stream standards are provided in 30 TAC §§ 307.1 - 307.10.

VI. DISCHARGE DESCRIPTION

The following is a quantitative description of the discharge described in the monthly effluent report data for the period October 2012 through September 2017. The "average of daily average" values presented in the following table are the average of all daily average values for the reporting period for each pollutant. The "maximum of daily maximum" values presented in the following table are the individual maximum values for the reporting period for each pollutant. Flows are expressed in million gallons per day (MGD). All pH values are expressed in standard units (SU). Enterococci levels are expressed in colony forming units (cfu) or most probable number (MPN) per 100 milliliters (mL).

A. Flow

Outfall	Frequency	Average of Daily Average, MGD	Maximum of Daily Maximum, MGD
001	Continuous	0.54421	2.48
101	Continuous	0.3423	0.869
201	Intermittent	0.2266	7.625
002	Intermittent	0.2483	4.1246
003	Intermittent	0.038442	0.6029
004	Intermittent	0.271255	4.5142
005	Intermittent	0.047485	0.7976
006	Intermittent	0.007525	0.1269

B. Effluent Characteristics

Outfall	Pollutant	Avg of Daily Avg, mg/L	Max of Daily Max, mg/L
001	*Conventionals*		
	Oil and Grease	N/A	10.1
	pH	6.0 SU, min	11.7 SU
	Metals and Cyanide		
	Arsenic, Total	0.0183	0.247
	Cadmium, Total	0	0
	Chromium, Hexavalent	0	0
	Copper, Total	0.00079 mg/L 0.002179 lbs/day	0.026 mg/L 0.0623 lbs/day
	Cyanide, Free	0.001	0.033
	Lead, Total	0	0
	Manganese, Total	0.265	2.93
	Mercury, Total	0	0
	Selenium, Total	0.0019	0.011
	Silver, Total	0	0
	Vanadium, Total	0.1889	2.9
	Organics/Pesticides		
	Aldrin	0	0
	Chlordane	0	0
	DCPA [Dacthal or Dimethyl 2,3,5,6-tetrachloroterephthalate]	N/A	0
	4,4′-DDT	0	0
	4,4′-DDD	0	0
	4,4′-DDE	0	0

B. Effluent Characteristics

Outfall	Pollutant	Avg of Daily Avg, mg/L	Max of Daily Max, mg/L
001	Dieldrin	0	0
	Hexachlorobenzene	0.000011 mg/L 0.000010 lbs/day	0.002 mg/L 0.0005 lbs/day
	Hexachlorocyclohexane (*alpha*) [*alpha*-BHC]	0.000107	0.0011
	Hexachlorocyclohexane (*beta*) [*beta*-BHC]	0.000372	0.002
	Hexachlorocyclohexane (*delta*) [*delta*-BHC]	0.0157	0.37
	Hexachlorocyclohexane (*gamma*) [*gamma*-BHC]	0.0000455	0.0017
	Xylenes, Total	0.0006	0.034

B. Effluent Characteristics

Outfall	Pollutant	Avg of Daily Avg, lbs/day	Max of Daily Max, lbs/day
101	*Conventionals*		
	Biochemical Oxygen Demand, 5-day (BOD_5)	17.6143	243.007
	Total Suspended Solids (TSS)	11.3635	104
	Ammonia, as Nitrogen	0.7616	11.8
	Total Organic Carbon (TOC)	18.155	60
	Chemical Oxygen Demand (COD)	254.4	1,885
	Metals and Cyanide		
	Arsenic, Total	0.05633	0.897
	Cyanide, Total	0.004	0.14
	Bacteria		
	Enterococci	6 cfu/100 mL [1]	71 cfu/100 mL
	Organics/Pesticides		
	Acenaphthene	0	0
	Acenaphthylene	0	0
	Acrylonitrile	0	0
	Anthracene	0	0
	Benzene	0	0
	Benzo(*a*)anthracene	0	0
	3,4-Benzofluoranthene [Benzo(*b*)fluoranthene]	0	0
	Benzo(*k*)fluoranthene	0	0
	Benzo(*a*)pyrene	0	0
	Bis(2-ethylhexyl) phthalate	0	0
	Bromodichloromethane [Dichlorobromomethane]	0	0
	Bromomethane	0	0
	Chlorobenzene	0	0
	Chloroethane	0	0

[1] Geometric mean.

B. Effluent Characteristics

Outfall	Pollutant	Avg of Daily Avg, lbs/day	Max of Daily Max, lbs/day
101	Chloromethane [Methyl Chloride]	0	0
	2-Chlorophenol	0	0
	Chlorothalonil [Daconil]	0.000067	0.032
	Chrysene	0	0
	Dibromochloromethane [Chlorodibromomethane]	0	0
	Di-*n*-butyl phthalate	0	0
	1,2-Dichlorobenzene	0	0
	1,3-Dichlorobenzene	0	0
	1,4-Dichlorobenzene	0	0
	1,1-Dichloroethane	0	0
	1,2-Dichloroethane	0	0
	1,1-Dichloroethylene	0	0
	1,2-*trans*-Dichloroethylene	0	0
	Dichloromethane [Methylene Chloride]	0	0
	2,4-Dichlorophenol	0	0
	1,2-Dichloropropane	0	0
	1,3-Dichloropropene [1,3-Dichloropropylene]	0	0
	Diethyl phthalate	0	0
	2,4-Dimethylphenol	0	0
	Dimethyl phthalate	0	0
	4,6-Dinitro-*o*-cresol	0	0
	2,4-Dinitrophenol	0	0
	2,4-Dinitrotoluene	0	0
	2,6-Dinitrotoluene	0	0
	Ethylbenzene	0	0
	Fluoranthene	0	0
	Fluorene	0	0
	Hexachlorobutadiene	0	0
	Hexachloroethane	0	0
	Naphthalene	0	0
	Nitrobenzene	0	0
	2-Nitrophenol	0	0
	4-Nitrophenol	0	0
	Phenanthrene	0	0
	Phenol	0	0
	Pyrene	0	0
	Tetrachloroethylene	0	0
	Tetrachloromethane [Carbon Tetrachloride]	0	0
	Toluene	0	0
	Tribromomethane [Bromoform]	0	0
	1,2,4-Trichlorobenzene	0	0
	1,1,1-Trichloroethane	0	0
	1,1,2-Trichloroethane	0	0
	Trichloroethylene	0	0
	Trichloromethane [Chloroform]	0.0021	0.546
	Vinyl Chloride	0	0

B. Effluent Characteristics

Outfall	Pollutant	Avg of Daily Avg, mg/L	Max of Daily Max, mg/L
201	TOC	N/A	15.6
	Arsenic, Total	N/A	0.027
	Chlorothalonil [Daconil]	N/A	0.022
002	TOC	N/A	38.4
	Oil and Grease	N/A	ND [2]
	pH	6.0 SU, min	9.1 SU
003	TOC	N/A	32.9
	Oil and Grease	N/A	ND
	pH	6.0 SU, min	8.3 SU
004	TOC	N/A	56.3
	Oil and Grease	N/A	7.9
	pH	5.8 SU, min	7.7 SU
005	TOC	N/A	37.5
	Oil and Grease	N/A	ND
	pH	6.0 SU, min	8.0 SU
006	TOC	N/A	44.5
	Oil and Grease	N/A	ND
	pH	6.0 SU, min	8.5 SU

[2] Non-detect.

Effluent limit violations documented in the monthly effluent reports are summarized in the following table.

C. Effluent Limitation Violations

Outfall	Pollutant (units)	Month/ Year	Daily Average		Daily Maximum	
			Limit	Reported	Limit	Reported
001	Hexachlorobenzene (mg/L)	1/2015	0.0003	0.000625	0.0006	0.002
	Arsenic, Total (mg/L)	6/2013	—	—	0.2	0.247
		2/2016	—	—	0.2	0.205
	Cyanide, Free (mg/L)	1/2013	—	—	0.02	0.033
		10/2014	0.009	0.01075	0.02	0.033
		4/2015	—	—	0.02	0.024
	pH (SU)	5/2014	—	—	9.0	11.7
101	Chloroform (lbs/day)	7/2017	0.10	0.109	0.219	0.546
	COD (lbs/day)	4/2017	1,167	1,660	—	—
002	pH (SU)	6/2015	—	—	9.0	9.1
004	TOC (mg/L)	6/2013	—	—	55	56.3
	pH (SU)	9/2013	6.0, min	5.9, min	—	—
		1/2017	6.0, min	5.8, min	—	—

The draft permit was not changed to address these effluent limit violations because they were infrequent.

VII. DRAFT EFFLUENT LIMITATIONS

Effluent limitations are established in the draft permit as follows:

Outfall	Pollutant	Daily Average, mg/L	Daily Maximum, mg/L
001	Flow	Report, MGD	Report, MGD
	Conventionals		
	Oil and Grease	N/A	15
	pH	6.0 SU, min	9.0 SU
	Metals and Cyanide		
	Arsenic, Total	0.1	0.2
	Cadmium, Total	Report	Report
	Chromium, Hexavalent	Report	Report
	Copper, Total	0.024 mg/L 0.165 lbs/day	0.051 mg/L 0.350 lbs/day
	Cyanide, Free	0.009	0.019
	Lead, Total	0.155 mg/L 1.07 lbs/day	0.329 mg/L 2.27 lbs/day
	Manganese, Total	1.0	2.0
	Mercury, Total	Report	Report
	Selenium, Total	Report	Report
	Silver, Total	Report	Report
	Vanadium, Total	Report	Report
	Organics/Pesticides		
	Aldrin	Report	Report
	Chlordane	Report	Report
	DCPA [Dacthal or Dimethyl 2,3,5,6-tetrachloroterephthalate]	N/A	0.168
	4,4′-DDT	Report	Report
	4,4′-DDD	Report	Report
	4,4′-DDE	Report	Report
	Dieldrin	Report	Report
	Hexachlorobenzene	0.00015 mg/L 0.0005 lbs/day	0.00033 mg/L 0.0012 lbs/day
	Hexachlorocyclohexane (*alpha*) [*alpha*-BHC]	Report	Report
	Hexachlorocyclohexane (*beta*) [*beta*-BHC]	Report	Report
	Hexachlorocyclohexane (*delta*) [*delta*-BHC]	Report	Report
	Hexachlorocyclohexane (*gamma*) [*gamma*-BHC]	Report	Report
	TCDD Equivalents	N/A	Report, pg/L[2]
	Xylenes, Total	Report	Report

[2] Picograms/liter.

Outfall	Pollutant	Daily Average, mg/L	Daily Maximum, mg/L
001	*Whole Effluent Toxicity (WET) Limits*		
	Mysidopsis bahia (7-day chronic NOEC[3])	8%	8%
	Menidia beryllina (7-day chronic NOEC)	8%	8%
	Mysidopsis bahia (24-hour acute LC50[4])	>100%	>100%

Outfall	Pollutant	Daily Average, lbs/day	Daily Maximum, lbs/day
101	Flow	0.9 MGD	1.6 MGD
	Conventionals		
	BOD_5	180	500
	TSS	215	500
	Ammonia, as Nitrogen	20	40
	TOC	640	1,280
	COD	1,167	1,885
	Metals and Cyanide		
	Arsenic, Total	1.50	2.25
	Cyanide, Total	0.973	2.83
	Bacteria		
	Enterococci	35 cfu or MPN/100 mL[5]	104 cfu or MPN/100 mL
	Organics/Pesticides		
	Acenaphthene	0.012	0.033
	Acenaphthylene	0.012	0.033
	Acrylonitrile	0.054	0.135
	Anthracene	0.012	0.033
	Benzene	0.176	0.647
	Benzo(*a*)anthracene	0.012	0.033
	3,4-Benzofluoranthene [Benzo(*b*)fluoranthene]	0.013	0.034
	Benzo(*k*)fluoranthene	0.012	0.033
	Benzo(*a*)pyrene	0.013	0.034
	Bis(2-ethylhexyl) phthalate	0.058	0.156
	Bromodichloromethane [Dichlorobromomethane]	0.595	1.594
	Bromomethane	0.595	1.594
	Chlorobenzene	0.071	0.133
	Chloroethane	0.058	0.150
	Chloromethane [Methyl Chloride]	0.166	0.366
	2-Chlorophenol	0.147	0.466
	Chlorothalonil [Daconil]	0.053	0.176
	Chrysene	0.012	0.033

3 The no observed effect concentration (NOEC) is defined as the greatest effluent dilution at which no significant lethality is demonstrated. Significant lethality is defined as a statistically significant difference between a specified effluent dilution and the control for lethal effects.

4 The LC50 (Lethal Concentration 50) is defined as the effluent dilution at with 50% of the organisms survive.

5 Geometric mean.

Outfall	Pollutant	Daily Average, lbs/day	Daily Maximum, lbs/day
101	Dibromochloromethane [Chlorodibromomethane]	0.822	3.332
	Di-*n*-butyl phthalate	0.015	0.032
	1,2-Dichlorobenzene	0.366	0.775
	1,3-Dichlorobenzene	0.017	0.025
	1,4-Dichlorobenzene	0.071	0.133
	1,1-Dichloroethane	0.012	0.033
	1,2-Dichloroethane	0.323	1.003
	1,1-Dichloroethylene	0.076	0.119
	1,2-*trans*-Dichloroethylene	0.100	0.257
	Dichloromethane [Methylene Chloride]	0.190	0.423
	2,4-Dichlorophenol	0.185	0.533
	1,2-Dichloropropane	0.728	1.094
	1,3-Dichloropropene [1,3-Dichloropropylene]	0.138	0.210
	Diethyl phthalate	0.045	0.114
	2,4-Dimethylphenol	0.086	0.171
	Dimethyl phthalate	0.011	0.026
	4,6-Dinitro-*o*-cresol	0.044	0.155
	2,4-Dinitrophenol	0.040	0.069
	2,4-Dinitrotoluene	0.063	0.159
	2,6-Dinitrotoluene	0.143	0.358
	Ethylbenzene	0.152	0.514
	Fluoranthene	0.014	0.038
	Fluorene	0.012	0.033
	Hexachlorobutadiene	0.011	0.027
	Hexachloroethane	0.012	0.030
	Naphthalene	0.105	0.281
	Nitrobenzene	0.015	0.038
	2-Nitrophenol	0.023	0.039
	4-Nitrophenol	0.040	0.069
	Phenanthrene	0.012	0.033
	Phenol	0.071	0.124
	Pyrene	0.014	0.037
	Tetrachloroethylene	0.105	0.266
	Tetrachloromethane [Carbon Tetrachloride]	0.086	0.180
	Toluene	0.124	0.380
	Tribromomethane [Bromoform]	0.822	3.332
	1,2,4-Trichlorobenzene	0.038	0.078
	1,1,1-Trichloroethane	0.100	0.257
	1,1,2-Trichloroethane	0.012	0.030
	Trichloroethylene	0.012	0.030
	Trichloromethane [Chloroform]	0.100	0.219
	Vinyl Chloride	0.058	0.150

Outfall	Pollutant	Daily Average, mg/L	Daily Maximum, mg/L
201	Flow	Report, MGD	Report, MGD
	TOC	N/A	55
	Arsenic, Total	N/A	0.6
	Chlorothalonil [Daconil]	N/A	0.6
002	Flow	Report, MGD	Report, MGD
	TOC	N/A	55
	Oil and Grease	N/A	15
	pH	6.0 SU, min	9.0 SU
003	Flow	Report, MGD	Report, MGD
	TOC	N/A	55
	Oil and Grease	N/A	15
	pH	6.0 SU, min	9.0 SU
004	Flow	Report, MGD	Report, MGD
	TOC	N/A	55
	Oil and Grease	N/A	15
	pH	6.0 SU, min	9.0 SU
005	Flow	Report, MGD	Report, MGD
	TOC	N/A	55
	Oil and Grease	N/A	15
	pH	6.0 SU, min	9.0 SU
006	Flow	Report, MGD	Report, MGD
	TOC	N/A	55
	Oil and Grease	N/A	15
	pH	6.0 SU, min	9.0 SU

VIII. SUMMARY OF CHANGES FROM APPLICATION

The following changes have been made from the application that make the draft permit more stringent:

1. The daily maximum limit for total manganese at Outfall 001 has been reduced from 3.0 mg/L to 2.0 mg/L to be consistent with the requirements of 30 TAC § 319.22.
2. A daily maximum monitoring and reporting requirement for TCDD Equivalents (dioxins/furans) has been added to Outfall 001 based on the segment impairment for dioxin in edible tissue and on effluent data submitted during the application process that showed detection of a congener of dioxin. Other Requirement No. 11 has been added to provide toxic equivalency factors and minimum analytical levels for dioxin, furan, and their congeners. Other Requirement No. 12 has been added to require sludge testing twice per year.
3. The single grab limit for free cyanide at Outfall 001 has been reduced from 0.050 mg/L to equal the daily maximum limit of 0.019 mg/L. This change had to be made because the sample type for free cyanide was changed from composite to grab, consistent with EPA regulations. For grab sample types, the single grab limit is set equal to the daily maximum limit.
4. Daily average and daily maximum mass limits for bromodichloromethane and bromomethane at internal Outfall 101 have been reduced slightly based on updated calculations of technology-based limits.

5. Daily average and daily maximum mass limits for chlorothalonil (Daconil) at internal Outfall 101 have been reduced based on use of the correct effluent limitations guidelines (ELGs) from 40 CFR Part 455, Table 2.

6. A single grab limit of 104 cfu or MPN/100 mL has been added for Enterococci at internal Outfall 101.

7. Single grab limits at internal Outfall 101 have been reduced for the following pollutants based on use of correct calculations and methodology: acenaphthene, acenaphthylene, acrylonitrile, anthracene, benzo(*a*)anthracene, 3,4-benzofluoranthene, benzo(*k*)fluoranthene, benzo(*a*)pyrene, bis(2-ethylhexyl) phthalate, chloroethane, chlorothalonil [Daconil], chrysene, di-*n*-butyl phthalate, 1,3-dichlorobenzene, 1,1-dichloroethane, diethyl phthalate, dimethyl phthalate, 4,6-dinitro-*o*-cresol, 2,4-dinitrophenol, 2,4-dinitrotoluene, 2,6-dinitrotoluene, fluoranthene, fluorene, hexachlorobutadiene, hexachloroethane, nitrobenzene, 2-nitrophenol, 4-nitrophenol, phenanthrene, pyrene, 1,2,4-trichlorobenzene, 1,1,2-trichloroethane, trichloroethylene, and vinyl chloride. See Appendix D of this fact sheet for more details.

IX. SUMMARY OF CHANGES FROM EXISTING PERMIT

The permittee requested the following change that the executive director recommends granting with minor revisions:

1. *Change the description of the sampling location for Outfall 001 from "at the mix box where Outfalls 101 and 201 are combined and prior to discharging to the unnamed drainage ditch" to "at Outfall 001, at the ditch after commingling with Outfalls 101 and 201 and prior to discharging to the unnamed drainage ditch." In a comment letter on the draft permit, GBB requested that the description in the permit read "At Outfall 001, after waste streams* ***for Outfall 001*** *have commingled, and prior to discharge to the unnamed ditch."*

   The description of the sampling location for Outfall 001 has been revised to read as follows:

   > At Outfall 001, after waste streams for Outfall 001 have commingled, and prior to discharge to the unnamed ditch.

The permittee requested the following change that the executive director recommends granting:

1. *Allow the use of Method D4282 to demonstrate compliance with the free cyanide limits at Outfall 001. The permittee submitted the following justification:*

   > *It is our technical view from the data and studies that we have completed that the OIA-1677 and ASTM 4500 methods gives us false positives due to interferences.*
   >
   > *For several years we have run a version of the Latchet (Colloidal method on site distilling when needed) 335.4 for in-process operational samples while the compliance testing was done at an outside lab using the ASTM4282.*
   >
   > *Previous to this, we used the ASTM4500 method and experienced many false positives. This method has known interference issues with ammonia which is raw material in our IPN process. The ASTM4500 method is also much more sensitive to processing in general, leading to higher variability.*
   >
   > *In talking to the developers of the OIA1677 method, they felt this method would be likely to give false positives with our water due the fact our wastewater treatment facility uses larger volumes of thiosulfate and ferric chloride compared to most water treatment facilities. The thiosulfate is used to neutralize a bleach byproduct stream*

from the CTL plant and ferric chloride is an additive in the arsenic pretreatment (APT) area. This results in sulfate species which can be highly colored molecules and cause other interferences with the method and need to be removed before analysis with the OIA1677 method in order to give accurate results. This is an extra step that can produce analytical variation.

Side by side round robin testing with a permitted variant of OIA1677 and our latchet method with spiking studies found that the OIA1677 method was giving falsely high numbers. The variation was as high as 200 ppm between (1) an off-site vendor lab, (2) our on-site latchet method, and (3) onsite OIA1677 testing results. We believe this shows inconsistency with our waste water chemistry. It is our technical judgement that the OIA1677 method would produce much wider distribution of results with lower accuracy and precision and as a result many false positives.

Since moving to the ASTM4282 method for compliance samples, we have seen far fewer differences in our internal testing of cyanide. We believe through our studies and our comparison of the data that the ASTM4282 method is the best method for our process looking for true available CN species. Given the ASTM 4282 method gives much better consistency with the in-process latchet method, our extensive chemistry data, and expertise of the process on site, we would request that we be permitted to continue to use the ASTM4282 method.

The second paragraph of Other Requirement No. 11 (now 10) regarding cyanide test methods has been updated to specify that any test method for free cyanide or available cyanide that is approved in 40 CFR Part 136 may be used. Other Requirement No. 2 has been updated to show that the MAL of 0.009 mg/L is applicable for both free cyanide and available cyanide.

According to 30 TAC Chapter 307, Table 1, footnote 2, an analytical method for available cyanide is to be used to demonstrate compliance with free cyanide limits. This footnote originated before any analytical methods for free cyanide had been approved in 40 CFR Part 136, and test methods for available cyanide were deemed the best surrogate methods for free cyanide analysis. The current version of 40 CFR Part 136 includes two approved methods for free cyanide. It is reasonable to allow the use of an approved method for free cyanide to demonstrate compliance with effluent limits on free cyanide.

The following additional changes have been made to the draft permit:

1. The permittee's name has been revised on page 1 to be consistent with the TCEQ Endorsement that was issued on February 25, 2016.
2. The SIC codes on page 1 have been revised to match those submitted on the TCEQ Core Data Form.
3. Pollutant listings on existing pages 2-2d have been re-ordered based first on sampling frequency and then alphabetically. Pollutant names have been standardized to match the names in 40 CFR Part 455, Table 4, with alternate names shown in square brackets. This change was made because over 70% of the wastewater derives from the production of pesticides and is subject to the requirements in 40 CFR Part 455. Pollutants that are not listed in Part 455, Table 4 were named consistent with the list of pollutants in 40 CFR Part 414, Subpart I. Pollutants not found in either of these 40 CFR Parts were named consistent with 30 TAC Chapter 307, Table 1 or 2 as appropriate.
4. Interim effluent limits for hexachlorobenzene, total copper, and total lead at Outfall 001 have been removed because final limits are effective.

5. Interim monitoring and reporting requirements for Enterococci at internal Outfall 101 have been removed because final limits are effective.
6. The permit's boilerplate language (pages 3-13) has been updated to the current version (01/2016).
7. Other Requirement No. 2 has been updated to include current minimum analytical levels (MALs) from the June 2010 *Procedures to Implement the Texas Surface Water Quality Standards*. The list of pollutants has been reorganized, with the first table listing metals and cyanide, the second table listing organics, and the third table listing pesticides. Pollutants that are only required to be monitored and reported (no limits) have been moved farther down in the requirement.
8. Existing Other Requirement No. 3 has been moved to page 2d.
9. New Other Requirement No. 3 has been added regarding permittee notification to TCEQ of any change in methods of obtaining cooling water.
10. Other Requirement No. 4 has been updated to the TCEQ's current permit language regarding ponds.
11. Other Requirement No. 5 has been updated to be consistent with updates to the permit's boilerplate language.
12. Other Requirement No. 6 has been updated to include a reference to specific EPA regulations.
13. Other Requirement No. 7 has been updated to include the mixing zone definition from the Critical Conditions Memo.
14. Other Requirement No. 9 has been updated to include instructions for pollutants that are monitored once per year.
15. Existing Other Requirement No. 10 has been removed because the permittee has completed its requirements. Attachment A, Table 1 has also been deleted for the same reason.
16. Existing Other Requirement No. 11 (now 10) has been revised to remove the first paragraph because the permittee has completed its requirements.
17. The "Stormwater Best Management Practices" section has been numbered as Other Requirement No. 13.
18. Whole effluent toxicity testing requirements have been updated to be consistent with current TCEQ policies and practices.

X. DRAFT PERMIT RATIONALE

The following section sets forth the statutory and regulatory requirements considered in preparing the draft permit. Also set forth are any calculations or other necessary explanations of the derivation of specific effluent limitations and conditions, including a citation to the applicable effluent limitation guidelines and water quality standards.

A. REASON FOR PERMIT ISSUANCE

The applicant applied to the Texas Commission on Environmental Quality (TCEQ) for a renewal of Permit No. WQ0000749000, which authorizes the discharge of previously monitored effluents (treated process wastewater, groundwater, treated domestic wastewater, non-process wastewater, incinerator wastewater, and treated stormwater)

on a flow-variable basis via Outfall 001 and stormwater on an intermittent and flow-variable basis via Outfalls 002, 003, 004, 005, and 006.

The Executive Director has reviewed this action for consistency with the goals and policies of the Texas Coastal Management Program (CMP) in accordance with the regulations of the General Land Office and has determined that the action is consistent with the applicable CMP goals and policies.

B. WATER QUALITY SUMMARY

Discharge Routes

The discharge route is via Outfalls 001, 003, and 004 to unnamed ditches, thence to Harris County Flood Control District (HCFCD) ditch P104-00-00, thence to Greens Bayou Tidal, a portion of the Houston Ship Channel Tidal in Segment No. 1006 of the San Jacinto River Basin; and via Outfalls 002, 005, and 006 to HCFCD ditch P104-00-00, thence to Greens Bayou Tidal, a portion of the Houston Ship Channel Tidal in Segment No. 1006 of the San Jacinto River Basin. The unclassified receiving water uses are minimal aquatic life use for the unnamed ditches and HCFCD ditch P104-00-00. The designated uses for Segment No. 1006 are navigation and industrial water supply. Effluent limitations and conditions established in the draft permit comply with state water quality standards and the applicable water quality management plan. The effluent limits in the draft permit will maintain and protect the existing instream uses. Additional discussion of the water quality aspects of the draft permit can be found at Section X.D. of this fact sheet.

Endangered Species Review

The discharge from this permit is not expected to have an effect on any federal endangered or threatened aquatic or aquatic-dependent species or proposed species or their critical habitat. This determination is based on the United States Fish and Wildlife Service's (USFWS's) biological opinion on the State of Texas authorization of the TPDES (September 14, 1998; October 21, 1998 update). To make this determination for TPDES permits, TCEQ and EPA only considered aquatic or aquatic-dependent species occurring in watersheds of critical concern or high priority as listed in Appendix A of the USFWS's biological opinion. The determination is subject to reevaluation due to subsequent updates or amendments to the biological opinion. The permit does not require EPA review with respect to the presence of endangered or threatened species.

Impaired Water Bodies

Segment No. 1006 is currently listed on the state's inventory of impaired and threatened waters, the 2014 Clean Water Act Section 303(d) list. A discussion of why the draft permit will not contribute to the listed impairments is included for each impairment category.

- Bacteria: Goodyear Creek from the confluence with Greens Bayou Tidal to Granada St. in Harris County (AU 1006_05)

  Discharge from Outfall 001 includes treated domestic wastewater. The draft permit includes a daily average limit of 35 cfu or MPN/100 mL and a daily maximum limit of 104 cfu or MPN/100 mL for Enterococci at internal Outfall 101; these limits are equal to the saltwater criteria for primary contact recreation. Therefore, this permit action is not expected to contribute to the bacteria impairment in Goodyear Creek.

- Chlordane and heptachlor epoxide in edible tissue: Patrick Bayou Tidal from the confluence with the Houston Ship Channel to 100 m (328 ft) upstream of the railroad bridge (AU 1006_04)

  The facility has not detected chlordane in discharges from Outfall 001 for the last five years. Existing monitoring and reporting requirements on chlordane have been carried forward in the draft permit. Data submitted with the application did not detect heptachlor epoxide at or above the minimum analytical level. For these reasons, this permit action is not expected to contribute to the chlordane or heptachlor epoxide impairment in Patrick Bayou Tidal.

- Dieldrin in edible tissue:
  - Houston Ship Channel Tidal from the Patrick Bayou confluence to the Houston Ship Channel/San Jacinto River Tidal (Segment No. 1005) confluence (AU 1006_02)
  - Patrick Bayou Tidal from the confluence with the Houston Ship Channel to 100 m (328 ft) upstream of the railroad bridge (AU 1006_04)

  The facility has not detected dieldrin in discharges from Outfall 001 for the last five years. Existing monitoring and reporting requirements on dieldrin have been carried forward in the draft permit This permit action is not expected to contribute to the dieldrin impairment in either the Houston Ship Channel Tidal or Patrick Bayou Tidal.

- Dioxin and Polychlorinated Biphenyls (PCBs) in edible tissue:
  - Houston Ship Channel Tidal from the Greens Bayou confluence to the Patrick Bayou confluence (AU 1006_01)
  - Houston Ship Channel Tidal from the Patrick Bayou confluence to the Houston Ship Channel/San Jacinto River Tidal (Segment No. 1005) confluence (AU 1006_02)
  - Greens Bayou Tidal from the Houston Ship Channel confluence to a point 0.7 km (0.4 miles) upstream of the Halls Bayou confluence (AU 1006_03)
  - Patrick Bayou Tidal from the confluence with the Houston Ship Channel to 100 m (328 ft) upstream of the railroad bridge (AU 1006_04)
  - Goodyear Creek from the confluence with Greens Bayou Tidal to Granada St. in Harris County (AU 1006_05)
  - Tucker Bayou from the Houston Ship Channel confluence to a point 2.7 km (1.7 mi) upstream (AU 1006_06)
  - Carpenters Bayou from the Houston Ship Channel confluence to the lower boundary of Segment No. 1006B (2.3 km/1.4 mi) upstream from the Houston Ship Channel confluence (AU 1006_07)

  Data submitted with the application did not detect PCBs at or above the MAL. This permit action is therefore not expected to contribute to the PCBs impairment in Segment No. 1006.

  Information submitted in Worksheet 2.0, Table 12 of the Technical Report of the application indicated that at least one congener of dioxin (2,3,7,8-TCDF) was detected in the wastewater. The reported concentration of 0.516 picograms per liter (pg/L) is

well below the screening level (70% of the daily average limit) of 1.91 pg/L that would indicate a need for monitoring and reporting requirements. However, monitoring and reporting requirements for TCDD Equivalents have been added to Outfall 001 because of based on the detection and the impairment. The permit action does not authorize any increase in permitted flow or pollutant loadings. For these reasons, this permit action is not expected to contribute to the dioxin in edible tissue impairment in Segment No. 1006.

- Mercury in water: Patrick Bayou Tidal from the confluence with the Houston Ship Channel to 100 m (328 ft) upstream of the railroad bridge (AU 1006_04)

  Data provided in the application showed an average mercury concentration of 0.0248 µg/L, which is well below the screening level (70% of the daily average limit) of 0.598 µg/L that would indicate a need for monitoring and reporting requirements. However, the existing monitoring and reporting requirements on mercury at Outfall 001 have been carried forward in the draft permit. For these reasons, this permit action is not expected to contribute to the mercury impairment in Patrick Bayou Tidal.

- Toxicity in sediment: Patrick Bayou Tidal from the confluence with the Houston Ship Channel to 100 m (328 ft) upstream of the railroad bridge (AU 1006_04)

  The discharge is directly into Greens Bayou Tidal (AU 1006_03) and not into Patrick Bayou Tidal (AU 1006_04), and the permit action will not authorize any increase in flow or loading of toxic pollutants. The draft permit also includes whole effluent toxicity testing, which directly measures the aggregate toxicity of the wastewater. For these reasons, this permit action is not expected to contribute to the toxicity in sediment impairment.

Completed Total Maximum Daily Loads (TMDLs)
Segment No. 1006 is included in the agency's document *Fourteen Total Maximum Daily Loads for Nickel in the Houston Ship Channel System* (TMDL Project No. 1). The discharge was screened using the methods outlined in the documents *Procedures to Implement the Texas Surface Water Quality Standards (IP)*, TCEQ, June 2010, and *Implementation Plan for Dissolved Nickel in the Houston Ship Channel* (TMDL Implementation Plan), TCEQ, July 2001. The TMDL report indicates that the water quality criteria for dissolved nickel are generally being met in the Houston Ship Channel, and no additional limit for nickel is recommended for this facility by the Water Quality Assessment Team.

C. TECHNOLOGY-BASED EFFLUENT LIMITATIONS/CONDITIONS

1. GENERAL COMMENTS

Regulations in Title 40 of the Code of Federal Regulations (40 CFR) require that technology-based limitations be placed in wastewater discharge permits based on effluent limitations guidelines, where applicable, or on best professional judgment (BPJ) in the absence of guidelines.

The draft permit authorizes the discharge of previously monitored effluents (treated process wastewater, groundwater, treated domestic wastewater, non-process wastewater, incinerator wastewater, and treated stormwater) on a flow-

variable basis via Outfall 001 and stormwater on an intermittent and flow-variable basis via Outfalls 002, 003, 004, 005, and 006.

The discharge of treated process wastewater, groundwater, and incinerator wastewater via Outfall 001 from this facility is subject to federal effluent limitation guidelines at 40 CFR Parts 414 and 415. A new source determination was performed, and the discharge is not a new source as defined at 40 CFR §122.2. Therefore, new source performance standards are not required for this discharge.

The discharge of treated domestic wastewater via Outfall 001 is subject to regulations found at 30 TAC Chapter 309.

The discharge of non-process wastewater and treated stormwater via Outfall 001 and stormwater via Outfalls 002, 003, 004, 005, and 006 is not subject to federal effluent limitation guidelines, and any technology-based effluent limitations are based on previous permits or other information (see Appendix A for details).

Facility Description

The GB Biosciences Greens Bayou Plant (GBB) manufactures agricultural, specialty, and industrial organic chemicals. Primary products are chlorothalonil, a fungicide active ingredient, and isophthalonitrile, a specialty chemical used as an intermediate to manufacture chlorothalonil. Hydrochloric acid is produced as a co-product of the chlorothalonil manufacturing process. The facility also formulates fungicide products in the Formulations Unit using chlorothalonil and other fungicide active ingredients.

The facility's draft TPDES permit authorizes ten outfalls. Outfall 001 is the combined discharge of two internal outfalls, 101 and 201, and it is the point of compliance for water quality-based effluent limits. Internal Outfall 101 discharges treated process wastewater, incinerator wastewater, groundwater, treated domestic wastewater, and non-process wastewater. Outfall 201 discharges treated stormwater. Outfalls 002, 003, 004, 005, and 006 discharge stormwater from other parts of the property.

Wastewater System

Chlorothalonil (CTL) is manufactured in the CTL Complex (consisting of several processing areas) and formulated in the Formulations Unit. Isophthalonitrile (IPN) is manufactured in the IPN Unit. All of these process units use water in the manufacturing process and generate process wastewater through normal operation and/or maintenance. Process wastewater and process-area stormwater are routed to the Wastewater Treatment System (WTS). Some water is recycled at the units, and in certain instances, the wastewater is shipped offsite for disposal by deep well injection.

Various environmental remediation projects at the Greens Bayou Plant generate recovered groundwater. The recovered groundwater is routed to wastewater treatment. In 2009, nineteen wells were added to recover groundwater from south of the plant. The installation of these new recovery wells and upgrades to the HCFCD ditch allowed the decommissioning of the Retired Waste Disposal Area (RWDA, Area 51). The Retired Sludge Drying Beds system (RSDB, Area 67) was taken out of service in 2009 and decommissioned in 2010. Wastewater treatment includes the following systems:

- WTS – physical, biological, and chemical treatment of process wastewater
- Groundwater recovery operations – removal of contaminated groundwater

- Volatile organic compound (VOC) stripper – pretreatment of high VOC-containing streams
- Arsenic Pretreatment (APT) – pretreatment of high arsenic-containing streams
- Stormwater Treatment System (STS) – settling/filtration and arsenic removal of storm water
- Sanitary sewage system – biological waste treatment
- Offsite treatment or disposal – treatment or disposal for streams that cannot be adequately treated in the systems above.

Effluents from the APT, VOC stripper, and sanitary sewage systems are directed to the WTS for biological treatment prior to discharge. Recovered groundwater from the groundwater extraction systems is routed to the APT, the VOC stripper system, or directly to the WTS as appropriate. Effluent from the WTS is discharged via internal Outfall 101. Treated stormwater from the STS is discharged via internal Outfall 201. The Outfall 101 and 201 effluents commingle prior to discharge via Outfall 001.

Wastewater Treatment System (WTS)

Wastewaters low in VOCs and arsenic are transferred directly to the WTS Collection Tank. Wastewaters from the Spent Scrubber Liquor Tanks, Process/ Quality Control Lab Sump, package sanitary treatment unit, Stripper Recycle Tank, IPN unit, and CTL I and II units are routed to the WTS Collection Tank.

The combined WTS Collection Tank effluent is mixed with the weak acid stream and pumped to the pH Adjustment Tank, where pH is adjusted using caustic soda or hydrochloric acid. After pH adjustment, the wastewater flows to the Dechlorination Tank. Dechlorination is achieved by adding sodium thiosulfate. The Dechlorination Tank discharges to the Sludge Recycle Tank, where the recycled sludge from the Primary Clarifier mixes with the wastewater stream. The water from the Sludge Recycle Tank is routed to the Primary Clarifier for solids removal.

Acidic wastewater streams from water softener generation, the CTL Incinerator, the CTL Acid Sump, and the Modernization Sump are combined and routed to the Weak Acid Tank. Weak acid from the Weak Acid Tank is brought into the process flow stream to be neutralized. If the pH needs further adjustment, then off-spec acid from B-Tank is used to adjust the pH, either at the pH Adjustment Tank or the Batch Feed Tanks.

Solids are removed in the Primary Clarifier. Polymer coagulant may be mixed with the feed stream to improve solids settling, if required. The sludge is sent to the filter press for dewatering. Dewatered sludge is shipped offsite to an approved commercial waste landfill. The water from the filter press is sent to a Filtrate Surge Tank and then to further treatment or storage.

Water from the WTS Primary Clarifier flows by gravity to the Primary Clarifier Effluent Surge Tank. The Primary Clarifier Effluent Surge Tank is designed to minimize the flow variations to the Sequencing Batch Reactor (SBR) system. From the surge tank, the flow enters one of three SBR Batch Feed Tanks, where normal variations in wastewater composition are equalized prior to biological

treatment. In the feed tanks, sodium thiosulfate may be added to remove chlorine, and the pH may be adjusted with hydrochloric acid or caustic soda.

Wastewater from the batch feed tanks flows to the two SBRs. The SBR cycle consists of a fill stage (mixed fill and react fill), a react stage, settle, decant, and idle/sludge wasting stages. The SBRs have the ability to vary the time allowed for each stage of the cycle. During periods of low organic loading, supplemental feed in the form of propylene glycol or other material can be added to support biological treatment performance.

If the SBR effluent contains high levels of ammonia, cyanide, or other material, the SBR effluent is pumped back to the SBR Batch Feed Tanks for breakpoint chlorination treatment with hypochlorite. The wastewater is evaluated and may be either treated by the SBR again or sent to tertiary treatment. Retreatment requires that residual chlorine be destroyed by sodium thiosulfate addition prior to entry into the biological system or tertiary treatment. Additionally, the pretreatment provides the capability to maintain the desired biochemical oxygen demand (BOD), total organic carbon (TOC), and chemical oxygen demand (COD) concentrations.

The final SBR stages are settling and decant. Upon completion of the settle/decant stages, the treated wastewater is then decanted to the SBR Effluent Surge Tank. Waste sludge from the settled sludge (biosolids) in the SBRs is pumped to the aerobic digester, where the solids are reduced through biodegradation. Digested sludge is periodically removed and dewatered in the plate filter press at the primary wastewater treatment unit.

Treated water is pumped from the SBR Effluent Surge Tank to the tertiary carbon system, which consists of two trains of two-stage carbon adsorbers. The tertiary carbon effluent is transferred under pressure to internal Outfall 101. The tertiary carbon adsorbers are periodically backwashed, and the backwash wastewater is sent either to the SBR Feed Tanks or to the aerobic digester.

Groundwater Recovery Operations

Groundwater recovery operations extract contaminated groundwater from several areas of the facility. Groundwater is pumped from the various groundwater recovery operations located throughout the GBB Plant Site. Groundwater from the recovery wells is sent to either the VOC Stripper System or APT. Groundwater from all recovery wells can also be sent directly to the WTS Collection Tank without APT or VOC Stripper System pretreatment. The treatment requirements are determined by organic or arsenic loading in the recovered groundwater. Periodic internal sampling of the groundwater is conducted to ensure water specifications are met prior to progressing water through the WTS treatment process.

VOC Stripper System

Certain high VOC wastewaters are routed to the VOC Stripper System, which removes VOCs in a packed tower by the countercurrent flow of ambient air with the VOC-contaminated waters. VOC-contaminated streams from the following areas in the plant are pumped to the stripper: IPN Hold Tank A, CTL Water Decanter, Acid Pit Groundwater, Drying Pit Groundwater, Phase Separation Tank, and Three Phase Separator in the VOC recovery area's carbon adsorption unit (CAU). The feed streams from the IPN and CTL areas pass through basket strainers for solids removal prior to entering the stripper. Stripper water exits

the bottom of the stripper and flows by gravity through a flow meter to the stripper recycle tank. The flow meter is used to determine the amount of water to be recycled to the stripper in order to maintain the design flow rate. In addition to recycled water, the stripper bottoms water is used as a cooling water supply for the VOC condenser located in the VOC recovery area. The excess water flows by gravity from the recycle tank to the WTS Collection Tank.

The VOC-laden air from the stripper passes out of the top of the stripper and through a carbon bed pre-heater before entering the carbon adsorbers. VOC-laden air enters one of the Carbon Adsorbers, where the VOCs are adsorbed onto activated carbon. Air and other inert substances pass through the carbon beds and are vented to the atmosphere.

Live injection of steam is used to desorb VOCs from the carbon beds during regeneration. The desorbed VOCs are condensed in a condenser, which vents and drains to a noncondensible separator. The noncondensible separator vents the noncondensed compounds back to the carbon beds, while the condensed organics drain to a three-phase decanter, where they separate from the condensed water. The saturated water layer is then recycled back to the VOC stripper using the CAU recycle pumps, and the organics are collected in a storage tank. From the storage tank, the organics are periodically pumped into drums for disposal.

Some high VOC wastewaters are pretreated first to remove sludge or phased organics that would impair stripper operation. The Phase Separation Tank receives potentially high organic recycle wastewaters from downstream in the VOC Stripper System, from the WTS filter press filtrate, and from the Pre-Treatment Separator for the VOC Stripper. Organic streams exiting from the Phase Separation Tank are collected for disposal. Removed sludge is transferred to the WTS Sludge Hold Tank. The water stream exiting the Phase Separation Tank is routed to the Pre-Treatment Separator. The Pre-Treatment Separator receives water with organics from the following areas: downstream in the VOC Stripper system; the East Side Corrective Action (ESCA), Zone 2, and new groundwater recovery systems; CTL I and II reactor-area process sumps; and the Phase Separation Tank. Heavy organics removed in the Phased Separation Tank are sent to the WTS Sludge Hold Tank. Light organics exit the Pre-Treatment Separator for transfer to the Phase Separation Tank. Wastewater effluent from the Pre-Treatment Separator is routed to the Stripper Feed Tank.

High VOC wastewaters are transferred to the Stripper Feed Tank and then pumped to the VOC Stripper. Air is injected into the bottom of the VOC Stripper with the VOC constituents being transferred to the stripper gas. The VOC Stripper wastewater effluent flows by gravity to the WTS Collection Tank with the capability to recycle a portion of the effluent for process or performance reasons. The VOC Stripper offgas is dehumidified prior to entry into VOC carbon adsorbers. The VOC carbon adsorbers are thermally regenerated. The recovered organics/water mixture generated during the thermal regeneration is transferred to the Phase Separator Tank or to the Pre-Treatment Separator.

Wastewater Streams that are typically treated in the VOC Stripper System may bypass the VOC Stripper System and be transferred directly to the WTS for treatment if they are determined to have low hydrocarbon concentrations.

Periodic cleaning of the VOC Stripper with acid is required to remove the carbonates, which are present in the water and can build up over time on the

internal packing. The acidic water from the cleaning step is routed to the WTS Collection Tank for treatment.

Arsenic Pretreatment (APT) System

The APT system is designed to remove arsenic by coprecipitation/adsorption of arsenic with ferric hydroxide. Groundwater, stormwater, and process wastewater containing arsenic may be routed to the APT Collection Tank. Wastewater from the APT Collection Tank is pH adjusted, then reacted, coagulated, and clarified with ferric chloride, caustic soda, and polymer in the countercurrent parallel plate separators. The separators may be operated in series or parallel with one or more stages, based on flow rates and arsenic loading. The treated wastewater then flows by gravity to hold tanks for transfer either to the SBR Batch Feed Tanks or to the Stripper Feed Tank. The ferric hydroxide sludge from APT is thickened and dewatered in a plate-and-frame type filter press. Filter cake solids are shipped to an offsite commercial waste landfill. Filtrate from the filter press is recycled to the APT system via the APT filtrate surge tank.

Wastewater streams that are typically treated in the APT System may bypass the APT System and be transferred directly to the WTS for treatment, if they are determined to have low arsenic concentrations.

Stormwater Treatment System (STS)

Stormwater falling in improved areas of the manufacturing and storage areas of the site is collected in various drains and concrete-lined ditches throughout the facility. This stormwater can be routed directly to the WTS, where it combines with process wastewater for treatment or routed to the Stormwater Retention Basin and processed through a separate STS. During extended periods of high rainfall, stormwater flows by gravity to a concrete-lined, 9,300,000-gallon stormwater collection basin located just east of the North Firewater Pond, where it is accumulated for treatment in the STS. During low stormwater flow periods, the East, West, and North stormwater ditches are typically pumped to the APT system for treatment. During unusual rainfall events, such as hurricanes, the stormwater accumulated may exceed the site retention capacity, and excess stormwater overflows into Outfall 001.

Stormwater is pumped from the Stormwater Retention Basin to a pH adjustment tank, where ferric chloride and caustic soda are added for arsenic and solids removal. Polymer is then added, and the wastewater flows to the Stormwater Clarifier, where suspended solids are removed. Sludge from the clarifier is sent to the APT Collection Tank for additional processing. Although the STS is operated primarily for arsenic removal, chlorothalonil is also removed during the process.

Effluent from the Stormwater Clarifier flows through a multi-bed dual media filter before passing through internal Outfall 201.

Sanitary Sewer System

Sanitary wastewater collected from restrooms, lavatories, showers, and sink drains is treated onsite in a package sanitary treatment plant, then routed to the WTS. ISK Biosciences Corporation is located adjacent to GB Bioscience's property. Sanitary wastewater from ISK's small office is also routed to GBB's sanitary wastewater unit.

The sanitary wastewater is biologically treated in the aeration tank. Biosolids in the effluent from the aeration tank are settled out in the settling chamber. From the settling chamber, the sanitary wastewater is disinfected in the chlorine contact chamber. Chlorine tablets are normally used for disinfection. Effluent from the contact chamber is pumped to the WTS Collection Tank. As necessary, biosolids will be removed from the settling chamber and sent to an authorized off-site treatment facility.

Offsite Treatment or Disposal

Formulations Unit wastewater is typically recycled within the unit. Excess wastewater is sent offsite for treatment or disposal. Formulations wastewater can be sent offsite from any of the following tanks: Dirty Water Storage Tank (F6-T2305); SDG Water Storage Tank (F6-T1082); and Rainwater Storage Tank (F6-T2437). In addition, vacuum spray absorber (VSA) Wastewater from CTL and WTS Wastewater may be sent offsite for treatment or disposal.

Stormwater Outfalls

Stormwater from the manufacturing and storage areas of the facility is routed to either a process wastewater or stormwater sewer system and is treated and discharged via Outfall 001. However, stormwater from small portions of the site flow untreated to the HCFCD municipal separate storm sewer system (MS4), which then flows to Greens Bayou. Operations in these smaller areas involve industrial truck and rail traffic, storage of steel and wooden materials, and waste management areas. These smaller areas with much less industrial activity have stormwater discharges currently permitted through five outfalls (002, 003, 004, 005, 006) under TPDES Permit No. WQ0000749000. (These outfalls were originally permitted under the multi-sector general stormwater permit but were transferred to GBB's individual TPDES Permit No. WQ0000749000 in 2011.) These stormwater outfalls are described in the following sections.

Outfall 002

The drainage area of stormwater Outfall 002 includes a closed, capped landfill with a groundwater recovery system. The landfill area is referred to as Area 5 on facility maps. Groundwater from the recovery wells flows through an above-ground pipe manifold, which in turn flows to a groundwater collection facility. The area has a regular maintenance program in place for both erosion of the landfill cap and maintenance of the groundwater recovery system. The recovery system is contained by curbs and dikes. Stormwater within this containment area is transferred to the groundwater recovery tanks.

The potential for stormwater in the Outfall 002 drainage area to be in contact with contaminants is low because the landfill is capped and the equipment within the groundwater recovery system that has the greatest potential for spills and leaks is within a containment area.

Outfall 003

The drainage area of stormwater Outfall 003 includes truck traffic and a railroad spur with rail tank cars. The drainage area for Outfall 003 includes Area 1 and Area 2 as shown on facility maps. GB Biosciences retains an outside contractor to inspect and perform preventative maintenance on all railroad tracks inside the Greens Bayou facility. No trucks (including concrete trucks) are allowed to wash out or discharge any surplus materials on the GBB facility. All vehicles used in-plant are regularly inspected for leaks and receive scheduled

preventive maintenance to reduce the chance of leaking. Spill kits are located throughout the facility, and regular inspection of these kits is done to ensure they each have complete spill response supplies. All spills are cleaned up immediately, and for any spill large enough to potentially reach the storm drain, the procedures for reporting and response are followed.

Outfall 004
The drainage area of stormwater Outfall 004 covers Area 3 as shown in facility maps. This area includes former sludge drying beds, which were cleaned, capped, and closed in 1985 in accordance with Texas Water Commission (TWC) (TCEQ predecessor agency) requirements. In addition, there is occasional storage of scrap pallets, cleaned equipment, and metal materials in Area 3. Sealed drums of propylene glycol may also be stored in Area 3. In addition, a rail spur is located within this drainage area. All areas of runoff have erosion protection that is maintained on a regular basis. Wastewater treatment areas bordering the drainage area, but outside of it, are diked.

Outfalls 005 and 006
The area referred to as Area 7 on facility maps has a drainage area that discharges at two different points located close together (40 feet) and designated as Outfalls 005 and 006. The drainage area includes a former landfill area that was closed in 1981 in accordance with TWC requirements. The area also includes several groundwater recovery wells for the landfill that flow into an aboveground pipe manifold. Outfall 005 discharges through a swale along the east side. Outfall 006 discharges through a sewer inlet on the west side. The facilities in the area are regularly inspected. The groundwater piping is under a vacuum, which reduces the likelihood of spills and leaks.

2. CALCULATIONS

See Appendix A of this fact sheet for calculations and further discussion of technology-based effluent limitations proposed in the draft permit.

Outfall 001:
The technology-based effluent limitations for daily maximum oil and grease and DCPA [Dacthal] and pH limits of 6.0-9.0 SU are carried forward in the draft permit at Outfall 001.

Internal Outfall 101:
The following technology-based effluent limits have been made more stringent in the draft permit at internal Outfall 101: bromodichloromethane [dichlorobromomethane], bromomethane, and chlorothalonil [Daconil].

The following technology-based effluent limitations are carried forward in the draft permit at internal Outfall 101: BOD_5, TSS, ammonia (as nitrogen), TOC, COD, total arsenic, total cyanide, acenaphthene, acenaphthylene, acrylonitrile, anthracene, benzene, benzo(*a*)anthracene, 3,4-benzofluoranthene [benzo(*b*)fluoranthene], benzo(*k*)fluoranthene, benzo(*a*)pyrene, bis(2-ethylhexyl) phthalate, chlorobenzene, chloroethane, chloromethane [methyl chloride], 2-chlorophenol, chrysene, dibromochloromethane [chlorodibromomethane], di-*n*-butyl phthalate, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 1,1-dichloroethane, 1,2-dichloroethane, 1,1-

dichloroethylene, 1,2-*trans*-dichloroethylene, dichloromethane [methylene chloride], 2,4-dichlorophenol, 1,2-dichloropropane, 1,3-dichloropropene [1,3-dichloropropylene], diethyl phthalate, 2,4-dimethylphenol, dimethyl phthalate, 4,6-dinitro-*o*-cresol, 2,4-dinitrophenol, 2,4-dinitrotoluene, 2,6-dinitrotoluene, ethylbenzene, fluoranthene, fluorene, hexachlorobutadiene, hexachloroethane, naphthalene, nitrobenzene, 2-nitrophenol, 4-nitrophenol, phenanthrene, phenol, pyrene, tetrachloroethylene, tetrachloromethane [carbon tetrachloride], toluene, tribromomethane [bromoform], 1,2,4-trichlorobenzene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, trichloroethylene, trichloromethane [chloroform], and vinyl chloride.

Internal Outfall 201:
The following technology-based effluent limitations are carried forward in the draft permit at internal Outfall 201: TOC, total arsenic, and chlorothalonil.

Outfalls 002-006:
The technology-based effluent limitations for TOC, oil and grease, and pH are carried forward in the draft permit at Outfalls 002-006.

The following technology-based effluent limitations are proposed in the draft permit:

Outfall	Pollutant	Daily Average, mg/L	Daily Maximum, mg/L
001	Oil and Grease	N/A	15
	DCPA [Dacthal]	N/A	0.168
	pH	6.0 SU, min	9.0 SU
201	TOC	N/A	55
	Arsenic, Total	N/A	0.6
	Chlorothalonil [Daconil]	N/A	0.6

Outfall	Pollutant	Daily Average, lbs/day	Daily Maximum, lbs/day
101	*Conventionals*		
	BOD_5	180	500
	TSS	215	500
	Ammonia, as Nitrogen	20	40
	TOC	640	1,280
	COD	1,167	1,885
	Metals and Cyanide		
	Arsenic, Total	1.50	2.25
	Cyanide, Total	0.973	2.83
	Organics/Pesticides		
	Acenaphthene	0.012	0.033
	Acenaphthylene	0.012	0.033
	Acrylonitrile	0.054	0.135
	Anthracene	0.012	0.033
	Benzene	0.176	0.647
	Benzo(*a*)anthracene	0.012	0.033
	3,4-Benzofluoranthene [Benzo(*b*)fluoranthene]	0.013	0.034

Outfall	Pollutant	Daily Average, lbs/day	Daily Maximum, lbs/day
101	Benzo(*k*)fluoranthene	0.012	0.033
	Benzo(*a*)pyrene	0.013	0.034
	Bis(2-ethylhexyl) phthalate	0.058	0.156
	Bromodichloromethane [Dichlorobromomethane]	0.595	1.594
	Bromomethane	0.595	1.594
	Chlorobenzene	0.071	0.133
	Chloroethane	0.058	0.150
	Chloromethane [Methyl Chloride]	0.166	0.366
	2-Chlorophenol	0.147	0.466
	Chlorothalonil [Daconil]	0.053	0.176
	Chrysene	0.012	0.033
	Dibromochloromethane [Chlorodibromomethane]	0.822	3.332
	Di-*n*-butyl phthalate	0.015	0.032
	1,2-Dichlorobenzene	0.366	0.775
	1,3-Dichlorobenzene	0.017	0.025
	1,4-Dichlorobenzene	0.071	0.133
	1,1-Dichloroethane	0.012	0.033
	1,2-Dichloroethane	0.323	1.003
	1,1-Dichloroethylene	0.076	0.119
	1,2-*trans*-Dichloroethylene	0.100	0.257
	Dichloromethane [Methylene Chloride]	0.190	0.423
	2,4-Dichlorophenol	0.185	0.533
	1,2-Dichloropropane	0.728	1.094
	1,3-Dichloropropene [1,3-Dichloropropylene]	0.138	0.210
	Diethyl phthalate	0.045	0.114
	2,4-Dimethylphenol	0.086	0.171
	Dimethyl phthalate	0.011	0.026
	4,6-Dinitro-*o*-cresol	0.044	0.155
	2,4-Dinitrophenol	0.040	0.069
	2,4-Dinitrotoluene	0.063	0.159
	2,6-Dinitrotoluene	0.143	0.358
	Ethylbenzene	0.152	0.514
	Fluoranthene	0.014	0.038
	Fluorene	0.012	0.033
	Hexachlorobutadiene	0.011	0.027
	Hexachloroethane	0.012	0.030
	Naphthalene	0.105	0.281
	Nitrobenzene	0.015	0.038
	2-Nitrophenol	0.023	0.039
	4-Nitrophenol	0.040	0.069
	Phenanthrene	0.012	0.033
	Phenol	0.071	0.124
	Pyrene	0.014	0.037

Outfall	Pollutant	Daily Average, lbs/day	Daily Maximum, lbs/day
101	Tetrachloroethylene	0.105	0.266
	Tetrachloromethane [Carbon Tetrachloride]	0.086	0.180
	Toluene	0.124	0.380
	Tribromomethane [Bromoform]	0.822	3.332
	1,2,4-Trichlorobenzene	0.038	0.078
	1,1,1-Trichloroethane	0.100	0.257
	1,1,2-Trichloroethane	0.012	0.030
	Trichloroethylene	0.012	0.030
	Trichloromethane [Chloroform]	0.100	0.219
	Vinyl Chloride	0.058	0.150

Outfall	Pollutant	Daily Average, mg/L	Daily Maximum, mg/L
002	TOC	N/A	55
	Oil and Grease	N/A	15
	pH	6.0 SU, min	9.0 SU
003	TOC	N/A	55
	Oil and Grease	N/A	15
	pH	6.0 SU, min	9.0 SU
004	TOC	N/A	55
	Oil and Grease	N/A	15
	pH	6.0 SU, min	9.0 SU
005	TOC	N/A	55
	Oil and Grease	N/A	15
	pH	6.0 SU, min	9.0 SU
006	TOC	N/A	55
	Oil and Grease	N/A	15
	pH	6.0 SU, min	9.0 SU

D. WATER QUALITY-BASED EFFLUENT LIMITATIONS/CONDITIONS

1. GENERAL COMMENTS

The *Texas Surface Water Quality Standards* found at 30 TAC Chapter 307 state that surface waters will not be toxic to man from ingestion of water, consumption of aquatic organisms, or contact with the skin, or to terrestrial or aquatic life. The methodology outlined in the TCEQ guidance document *Procedures to Implement the Texas Surface Water Quality Standards* (*IP*) is designed to ensure compliance with 30 TAC Chapter 307. Specifically, the methodology is designed to ensure that no source will be allowed to discharge any wastewater that (1) results in instream aquatic toxicity; (2) causes a violation of an applicable narrative or numerical state water quality standard; (3) results in the endangerment of a drinking water supply; or (4) results in aquatic bioaccumulation that threatens human health. Calculated water quality-based effluent limits can be found in Appendix B of this fact sheet.

TPDES permits contain technology-based effluent limits reflecting the best controls available. Where these technology-based permit limits do not protect

water quality or the designated uses, additional water quality-based effluent limitations or conditions are included. State narrative and numerical water quality standards are used in conjunction with EPA criteria and other toxicity databases to determine the adequacy of technology-based permit limits and the need for additional water quality-based controls. A comparison of technology-based effluent limits and calculated water quality-based effluent limits can be found in Appendix C of this fact sheet.

2. AQUATIC LIFE CRITERIA

a. SCREENING

Outfall 001

Water quality-based effluent limitations are calculated from freshwater and marine aquatic life criteria found in Table 1 of the *Texas Surface Water Quality Standards* (30 TAC Chapter 307).

There is no mixing zone or zone of initial dilution (ZID) for this discharge directly to an unnamed ditch, an intermittent stream; acute freshwater criteria apply at the end of pipe. Acute and chronic marine criteria are applied in the bay, estuary, or wide tidal river.

For the intermittent stream, the percent effluent for acute protection of aquatic life is 100% because the seven-day, two-year low-flow (7Q2) of the intermittent stream is 0.0 cfs. TCEQ practice is to establish minimum estimated effluent percentages for discharges that are 10 MGD or less into bays, estuaries, and wide tidal rivers that are at least 400 feet wide. These critical effluent percentages are as follows:

Acute Effluent % (ditches)	100 %
Acute Effluent % (Greens Bayou Tidal)	30 %
Chronic Effluent % (Greens Bayou Tidal)	8 %

Outfalls 002, 003, 004, 005, and 006

Aquatic life screening is not applicable because TPDES stormwater permits generally do not contain water quality-based effluent limitations. As stated in 30 TAC § 307.8(e), controls on the quality of permitted stormwater discharges are largely based on implementing best management practices and technology-based limits. Stormwater quality is compared to the allowable concentrations of metals found in 30 TAC § 319.22 to ensure that those concentrations are not exceeded.

General Screening Procedures

Waste load allocations (WLAs) are calculated using the above estimated effluent percentages, criteria outlined in the *Texas Surface Water Quality Standards*, and partitioning coefficients for metals (when appropriate and designated in the implementation procedures). The WLA is the end-of-pipe effluent concentration that can be discharged when, after mixing in the receiving stream, the instream numerical criteria will not be exceeded.

Greens Bayou Tidal: From the WLA, a long-term average (LTA) is calculated using a lognormal probability distribution, a given coefficient of variation (0.6), and a 99th percentile confidence level.

The LTA is the long-term average effluent concentration for which the WLA will never be exceeded using a selected percentile confidence level.

Ditches: From the WLA, an LTA is calculated using a lognormal probability distribution, a given coefficient of variation (0.6), and a 90th percentile confidence level. The LTA is the long-term average effluent concentration for which the WLA will never be exceeded using a selected percentile confidence level.

The lowest of the LTAs (acute freshwater, acute saltwater, or chronic saltwater) is used to calculate a daily average and daily maximum effluent limitation for the protection of aquatic life using the same statistical considerations with the 99th percentile confidence level and a standard number of monthly effluent samples collected (12).

For the ditches, assumptions used in deriving the effluent limitations include segment-specific values for hardness, chloride, pH, and TSS according to the *IP*. Values from Segment No. 1016 (freshwater) were used as follows: 65 mg/L for hardness (as calcium carbonate, $CaCO_3$), 82 mg/L for chloride, 7.5 standard units for pH, and 12 mg/L for TSS. For additional details on the calculation of water quality-based effluent limitations, refer to the *IP*.

For Greens Bayou Tidal (Segment No. 1006), assumptions used in deriving the effluent limitations include the segment-specific value for TSS according to the *IP*. The segment value is 10 mg/L for TSS. For additional details on the calculation of water quality-based effluent limitations, refer to the *IP*.

TCEQ practice for determining significant potential is to compare the reported analytical data against percentages of the calculated daily average water quality-based effluent limitation. Permit limitations are required when analytical data reported in the application equals or exceeds 85 percent of the calculated daily average water quality-based effluent limitation. Monitoring and reporting is required when analytical data reported in the application equals or exceeds 70 percent of the calculated daily average water quality-based effluent limitation.

b. PERMIT ACTION

Outfall 001

Evaluation of Application Data

Reported analytical data for free cyanide exceeds 70 percent of the calculated daily average water quality-based effluent limitation for aquatic life protection but is less than 85 percent of the calculated daily average water quality-based effluent limitation for aquatic life protection. The existing effluent limits have been carried forward in the draft permit.

Evaluation of Self-Reported Data

Self-reported data was screened against calculated water quality-based effluent limitations for the protection of aquatic life. Reported analytical data does not exceed 70 percent of the calculated daily average water quality-based effluent limitation for aquatic life protection.

Comparison of Existing Limits and Recalculated Water Quality-Based Limits

Effluent limits for total copper and total lead are still protective and have been carried forward in the draft permit.

Effluent limits for total arsenic (daily average = 0.1 mg/L, daily maximum = 0.2 mg/L) were previously established based on 30 TAC § 319.22 and have been carried forward in the draft permit unchanged.

Effluent limits for total manganese (daily average = 1.0 mg/L, daily maximum = 3.0 mg/L) were previously established based on 30 TAC § 319.22. However, the daily maximum concentration is not consistent with the 2.0 mg/L daily maximum listed in the rule. Therefore, the daily maximum limit on total manganese has been revised to 2.0 mg/L to comply with the requirements of 30 TAC § 319.22.

Outfalls 002, 003, 004, 005, and 006

Analytical data reported in the application was screened against the allowable concentrations of metals found in 30 TAC § 319.22. No additional limits or monitoring and reporting requirements have been added to the draft permit.

3. WHOLE EFFLUENT TOXICITY (BIOMONITORING) CRITERIA (7-DAY CHRONIC)

a. SCREENING AND REASONABLE POTENTIAL ANALYSIS

The existing permit includes chronic marine biomonitoring requirements at Outfall 001. In the past three years, the permittee has performed twenty-four chronic tests, with zero demonstrations of significant toxicity (*i.e.*, zero failures).

The lethal WET limit for both species remains in effect.

A reasonable potential (RP) determination was performed in accordance with 40 CFR §122.44(d)(1)(ii) to determine whether the discharge will reasonably be expected to cause or contribute to an exceedance of a state water quality standard or criterion within that standard. Each test species is evaluated separately. The RP determination is based on representative data from the previous three years of chronic WET testing. This determination was performed in accordance with the methodology outlined in the TCEQ letter to the EPA dated December 28, 2015 and approved by the EPA in a letter dated December 28, 2015.

With zero failures, a determination of no RP was made. Additional (sublethal) WET limits are not required, and both test species may be eligible for the testing frequency reduction after one year of quarterly testing.

b. PERMIT ACTION

The provisions of this section apply to Outfall 001.

Based on information contained in the permit application, the TCEQ has determined that there may be pollutants present in the effluent that may have the potential to cause toxic conditions in the receiving stream.

Whole effluent toxicity testing (biomonitoring) is the most direct measure of potential toxicity, which incorporates the effects of synergism of effluent components and receiving stream water quality characteristics. Biomonitoring of the effluent is, therefore, required as a condition of this permit to assess potential toxicity. The biomonitoring procedures stipulated as a condition of this permit are as follows:

i) Chronic static renewal 7-day survival and growth test using the mysid shrimp (*Mysidopsis bahia*). The frequency of the testing shall be once per quarter.

ii) Chronic static renewal 7-day larval survival and growth test using the inland silverside (*Menidia beryllina*). The frequency of the testing shall be once per quarter.

Toxicity tests shall be performed in accordance with protocols described in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms,* Third Edition (EPA-821-R-02-014) or the latest revision. The stipulated test species are appropriate to measure the toxicity of the effluent consistent with the requirements of the state water quality standards. The biomonitoring frequency has been established to reflect the likelihood of ambient toxicity and to provide data representative of the toxic potential of the facility's discharge.

This permit may be reopened to require effluent limits, additional testing, or other appropriate actions to address toxicity if biomonitoring data show actual or potential ambient toxicity to be the result of the permittee's discharge to the receiving stream or water body.

If none of the first four consecutive quarterly tests demonstrates significant lethal or sublethal effects, the permittee may submit this information in writing and, upon approval, reduce the testing frequency to once per six months for the invertebrate test species and once per year for the vertebrate test species. If one or more of the first four consecutive quarterly tests demonstrates significant sublethal effects, the permittee shall continue quarterly testing for that species until four consecutive quarterly tests demonstrate no significant sublethal effects. At that time, the permittee may apply for the appropriate testing frequency reduction for that species. If one or more of the first four consecutive quarterly tests demonstrates significant lethal effects, the permittee shall continue quarterly testing for that species until the permit is reissued.

c. DILUTION SERIES

The permit requires five dilutions in addition to the control (0% effluent) to be used in the toxicity tests. These additional effluent concentrations shall be 3%, 5%, 6%, 8%, and 11%. The low-flow effluent concentration (critical dilution) is defined as 8% effluent.

The dilution series outlined above was calculated using a 0.75 factor applied to the critical dilution. The critical dilution is the estimated effluent dilution at the edge of the aquatic life mixing zone, which is discussed in Section X.D.2.a. of this fact sheet.

4. AQUATIC ORGANISM TOXICITY CRITERIA (24-HOUR ACUTE)

a. SCREENING

The existing permit includes 24-hour acute saltwater biomonitoring language for Outfall 001. In the past three years, the permittee has performed ten 24-hour acute tests, with zero demonstrations of significant lethality (*i.e.*, zero failures).

The 24-hour acute WET limit remains in effect for the mysid shrimp.

Minimum 24-hour acute saltwater biomonitoring requirements are proposed in the draft permit as outlined below.

b. PERMIT ACTION

Twenty-four-hour 100% acute biomonitoring tests are required at Outfall 001 at a frequency of once per six months for the life of the permit.

The biomonitoring procedures stipulated as a condition of this permit are as follows:

i) Acute 24-hour static toxicity test using the mysid shrimp (*Mysidopsis bahia*). A minimum of five replicates with eight organisms per replicate shall be used for this test.

ii) Acute 24-hour static toxicity test using the inland silverside (*Menidia beryllina*). A minimum of five replicates with eight organisms per replicate shall be used for this test.

Toxicity tests shall be performed in accordance with protocols described in *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms*, Fifth Edition (EPA-821-R-02-012) or the latest revision.

5. AQUATIC ORGANISM BIOACCUMULATION CRITERIA

a. SCREENING

Outfall 001

Water quality-based effluent limitations for the protection of human health are calculated using criteria for the consumption of fish tissue found in Table 2 of the *Texas Surface Water Quality Standards* (30 TAC Chapter 307).

Fish tissue bioaccumulation criteria are applied in the bay, estuary, or wide tidal river for a discharge to an intermittent stream that enters a bay, estuary, or wide tidal river within 3 miles downstream of the discharge point. TCEQ practice is to establish a minimum estimated effluent percentage for discharges that are 10 MGD or less into bays, estuaries,

and wide tidal rivers that are at least 400 feet wide. This critical effluent percentage is:

Human Health Effluent %: 4%

Outfalls 002, 003, 004, 005, and 006
Human health screening is not applicable because TPDES stormwater permits generally do not contain water quality-based effluent limitations. As stated in 30 TAC §307.8(e), controls on the quality of permitted stormwater discharges are largely based on implementing best management practices and technology-based limits.

General Screening Procedures
Water quality-based effluent limitations for human health protection against the consumption of fish tissue are calculated using the same procedure as outlined for the calculation of water quality-based effluent limitations for aquatic life protection. A 99th percentile confidence level in the long-term average calculation is used, with only one long-term average value being calculated.

Significant potential is again determined by comparing reported analytical data against 70 percent and 85 percent of the calculated daily average water quality-based effluent limitation.

b. PERMIT ACTION

Outfall 001

Evaluation of Application Data
Analytical data reported in the application was screened against calculated water quality-based effluent limitations for the protection of human health. Reported analytical data does not exceed 70 percent of the calculated daily average water quality-based effluent limitation for human health protection.

Evaluation of Self-Reported Data
Self-reported data was screened against calculated water quality-based effluent limitations for the protection of human health. Reported analytical data does not exceed 70 percent of the calculated daily average water quality-based effluent limitation for human health protection.

Comparison of Existing Limits and Recalculated Water Quality-Based Limits
Water quality-based effluent limits in the existing permit are still protective of human health.

Outfalls 002, 003, 004, 005, and 006
None.

6. DRINKING WATER SUPPLY PROTECTION

a. SCREENING

Segment No. 1006, which receives the discharge from this facility, is not designated as a public water supply. Screening reported analytical data of the effluent against water quality-based effluent limitations calculated for the protection of a drinking water supply is not applicable.

b. PERMIT ACTION

None.

7. TOTAL DISSOLVED SOLIDS, CHLORIDE, AND SULFATE STANDARDS PROTECTION

a. SCREENING

Segment No. 1006, which receives the discharge from this facility, does not have criteria established for total dissolved solids (TDS), chloride, or sulfate in 30 TAC Chapter 307; therefore, no screening was performed for TDS, chloride, or sulfate in the effluent.

b. PERMIT ACTION

None.

8. PROTECTION OF pH STANDARDS

a. SCREENING

The existing permit includes limits on pH of 6.0 – 9.0 standard units at Outfall 001, which discharges into an unclassified water body. Consistent with the procedures for pH screening that were submitted to EPA with a letter dated May 28, 2014, and approved by EPA in a letter dated June 2, 2014, requiring this discharge to an unclassified water body to meet pH limits of 6.0 – 9.0 standard units reasonably ensures instream compliance with *Texas Surface Water Quality Standards* pH criteria.

b. PERMIT ACTION

The existing pH limits of 6.0 – 9.0 standard units are carried forward in the draft permit at Outfall 001.

9. DISSOLVED OXYGEN PROTECTION

a. SCREENING

Only Outfall 101 is expected to contain significant concentrations of oxygen-demanding constituents. The QUAL-TX model used for evaluation of Segment No. 1006 is described and documented in the

Waste Load Evaluation WLE-1R for the Houston Ship Channel System (September 2006).

Based on model results, the existing daily average effluent limits of 180 lbs/day BOD_5 and 20 lbs/day ammonia nitrogen are predicted to be adequate to maintain the dissolved oxygen levels above the criteria stipulated by the Standards Implementation Team for the unnamed ditches (2.0 mg/L), HCFCD ditch P104-00-00 (2.0 mg/L), and Greens Bayou Tidal, a portion of the Houston Ship Channel Tidal (2.0 mg/L).

b. PERMIT ACTION

The existing limits of 180 lbs/day BOD_5 and 20 lbs/day ammonia nitrogen have been carried forward at internal Outfall 101 in the draft permit.

10. BACTERIA STANDARDS PROTECTION

a. SCREENING

Treated domestic wastewater commingles with other wastewater prior to discharge at Outfall 001. Under 30 TAC Chapter 309, domestic wastewater discharges must be monitored for bacteria and meet an effluent limitation equivalent to the most stringent primary contact recreation standard in 30 TAC Chapter 307, the Texas Surface Water Quality Standards.

b. PERMIT ACTION

Exiting effluent limitations for bacteria (Enterococci) have been carried forward in the draft permit at internal Outfall 101. The limits equal the most stringent primary contact recreation standards, which include a daily average (calculated as a geometric mean) of 35 cfu or MPN per 100 mL and a daily maximum of 104 cfu or MPN per 100 mL.

11. 316(B) COOLING WATER INTAKE STRUCTURES

a. SCREENING

The facility obtains water from a public water system, PWS No. 1013092, for cooling purposes. If necessary, water can also be obtained from an on-site well. According to the rules applicable to cooling water intake structures (40 CFR § 125.91(c)), the use of water from a public water system or from a groundwater well for cooling purposes does not constitute the use of a cooling water intake structure; therefore, the facility is not subject to Clean Water Act (CWA) Section 316(b) or 40 CFR Part 125, Subpart J. The draft permit requires the permittee to notify the TCEQ in the event that a change in procedure or a facility modification alters the method by which cooling water is obtained. Upon receipt of such notification, the TCEQ may reopen the permit to include additional terms and conditions as necessary.

b. PERMIT ACTION

Other Requirement No. 3 has been added as follows:

> The permittee shall provide written notification to the TCEQ Industrial Permits Team (MC 148) and the Region 12 Office of any change in the method by which the facility obtains water for cooling purposes. This notification must be submitted 30 days prior to any such change and must include a description of the planned changes. The TCEQ may, upon review of the notification, reopen the permit to include additional terms and conditions as necessary.

XI. PRETREATMENT REQUIREMENTS

This facility is not defined as a publicly owned treatment works. Pretreatment requirements are not proposed in the draft permit.

XII. VARIANCE REQUESTS

No variance requests have been received.

XIII. PROCEDURES FOR FINAL DECISION

When an application is declared administratively complete, the chief clerk sends a letter to the applicant advising the applicant to publish the Notice of Receipt of Application and Intent to Obtain Permit in the newspaper. In addition, the chief clerk instructs the applicant to place a copy of the application in a public place for reviewing and copying in the county where the facility is or will be located. This application will be in a public place throughout the comment period. The chief clerk also mails this notice to any interested persons and, if required, to landowners identified in the permit application. This notice informs the public about the application and provides that an interested person may file comments on the application or request a contested case hearing or a public meeting.

Once a draft permit is completed, it is sent, along with the executive director's preliminary decision, as contained in the technical summary or fact sheet, to the chief clerk. At that time, the Notice of Application and Preliminary Decision will be mailed to the same people and published in the same newspaper as the prior notice. This notice sets a deadline for making public comments. The applicant must place a copy of the executive director's preliminary decision and draft permit in the public place with the application.

Any interested person may request a public meeting on the application until the deadline for filing public comments. A public meeting is intended for the taking of public comment and is not a contested case proceeding.

After the public comment deadline, the executive director prepares a response to all significant public comments on the application or the draft permit raised during the public comment period. The chief clerk then mails the executive director's response to comments and final decision to people who have filed comments, requested a contested case hearing, or requested to be on the mailing list. This notice provides that if a person is not satisfied with the executive director's response and decision, they can request a contested case hearing or file a request to reconsider the executive director's decision within 30 days after the notice is mailed.

The executive director will issue the permit unless a written hearing request or request for reconsideration is filed within 30 days after the executive director's response to comments and final decision is mailed. If a hearing request or request for reconsideration is filed, the executive

director will not issue the permit and will forward the application and request to the TCEQ Commissioners for their consideration at a scheduled Commission meeting. If a contested case hearing is held, it will be a legal proceeding similar to a civil trial in state district court.

If the executive director calls a public meeting or the Commission grants a contested case hearing as described above, the Commission will give notice of the date, time, and place of the meeting or hearing. If a hearing request or request for reconsideration is made, the Commission will consider all public comments in making its decision and shall either adopt the executive director's response to public comments or prepare its own response.

For additional information about this application, contact Karen Holligan at (512) 239-4589.

XIV. ADMINISTRATIVE RECORD

The following section is a list of the fact sheet citations to applicable statutory or regulatory provisions and appropriate supporting references.

A. PERMIT

TPDES Permit No. WQ0000749000 issued on July 16, 2015.

B. APPLICATION

TPDES wastewater permit application received on November 2, 2017.

C. 40 CFR CITATIONS

Part 414, Subparts H and I
Part 415, Subparts A and C

D. LETTERS/MEMORANDA/RECORDS OF COMMUNICATION

Letter dated April 29, 2014, from L'Oreal W. Stepney, P.E., Deputy Director, Office of Water, TCEQ, to Bill Honker, Director, Water Quality Protection Division, EPA (TCEQ proposed development strategy for thermal evaluation procedures).

Letter dated May 12, 2014, from William K. Honker, P.E., Director, Water Quality Protection Division, EPA, to L'Oreal W. Stepney, P.E., Deputy Director, Office of Water, TCEQ (Approval of TCEQ proposed development strategy for thermal evaluation procedures).

Letter dated May 28, 2014, from L'Oreal W. Stepney, P.E., Deputy Director, Office of Water, TCEQ, to Bill Honker, Director, Water Quality Protection Division, EPA (TCEQ proposed development strategy for pH evaluation procedures).

Letter dated June 2, 2014, from William K. Honker, P.E., Director, Water Quality Protection Division, EPA, to L'Oreal W. Stepney, P.E., Deputy Director, Office of Water, TCEQ (Approval of TCEQ proposed development strategy for pH evaluation procedures).

Letter dated December 28, 2015, from L'Oreal Stepney, P.E., Deputy Director, Office of Water, TCEQ, to Bill Honker, Director, Water Quality Protection Division, EPA (TCEQ proposed development strategy for procedures to determine reasonable potential for whole effluent toxicity limitations).

Letter dated December 28, 2015, from William K. Honker, P.E., Director, Water Quality Protection Division, EPA, to L'Oreal W. Stepney, P.E., Deputy Director, Office of Water, TCEQ (Approval of TCEQ proposed development strategy for procedures to determine reasonable potential for whole effluent toxicity limitations).

Letter dated November 10, 2017, from Cindy Cavazos, TCEQ, to Carolyn Guillory, GB Biosciences (request for additional administrative information).

Letter received November 27, 2017, from Carolyn Guillory, GB Biosciences, to Cindy Cavazos, TCEQ (additional administrative information).

TCEQ Interoffice Memorandum dated December 7, 2017, from Jeff Paull of the Standards Implementation Team, Water Quality Assessment Section, to the Industrial Permits Team, Wastewater Permitting Section (Standards Memo).

TCEQ Interoffice Memorandum dated December 12, 2017, from Kristin L. Seiter of the Water Quality Assessment Team, Water Quality Assessment Section, to the Industrial Permits Team, Wastewater Permitting Section (Critical Conditions Memo).

TCEQ Interoffice Memorandum dated December 27, 2017, from Kristin L. Seiter of the Water Quality Assessment Team, Water Quality Assessment Section, to the Industrial Permits Team, Wastewater Permitting Section (Modeling Memo).

TCEQ Interoffice Memorandum dated December 27, 2017, from Michael B. Pfeil of the Standards Implementation Team, Water Quality Assessment Section, to the Industrial Permits Team, Wastewater Permitting Section (Biomonitoring Memo).

Electronic mail dated February 12, 2018, from Dianna Kocurek, Tischler/Kocurek, to Karen Holligan, TCEQ (effluent data).

Electronic mail dated May 16, 2018, from Dianna Kocurek, Tischler/Kocurek, to Karen Holligan, TCEQ (comments on the draft permit).

Electronic mail dated May 25, 2018, from Karen Holligan, TCEQ, to Dianna Kocurek, Tischler/Kocurek (revised draft permit and fact sheet and responses to permittee comments).

Electronic mail dated June 5, 2018, from Dianna Kocurek, Tischler/Kocurek, to Karen Holligan, TCEQ (additional comments on the revised draft permit).

Electronic mail dated June 5, 2018, from Karen Holligan, TCEQ, to Dianna Kocurek, Tischler/Kocurek (revised draft permit and fact sheet).

Electronic mail dated August 13, 2018, from Dianna Kocurek, Tischler/Kocurek, to Karen Holligan, TCEQ (Table 12, wastewater and sludge testing results for dioxins/furans).

Electronic mail dated August 14, 2018, from Karen Holligan, TCEQ, to Dianna Kocurek, Tischler/Kocurek (revised draft permit and fact sheet and responses to permittee comments).

Electronic mail dated August 16, 2018, from Carolyn Guillory, GB Biosciences, to Karen Holligan, TCEQ (quick response on outfall renumbering).

Electronic mail dated August 23, 2018, from Carolyn Guillory, GB Biosciences, to Karen Holligan, TCEQ (additional comments and questions on draft permit).

Electronic mail dated September 12, 2018, from Karen Holligan, TCEQ, to Carolyn Guillory, GB Biosciences (responses to additional comments and questions).

Electronic mail dated October 4, 2018, from Carolyn Guillory, GB Biosciences, to Karen Holligan, TCEQ (feedback on options sent in the email dated September 12, 2018;

request and justification to use Method D4282 for free cyanide; and an additional question).

Electronic mail dated November 12, 2018, from Karen Holligan, TCEQ, to Carolyn Guillory, GB Biosciences (responses to comments and questions received on October 4, 2018, and revised fact sheet and draft permit).

Electronic mail dated November 29, 2018, from Carolyn Guillory, GB Biosciences, to Karen Holligan, TCEQ (additional comments and questions about the draft permit).

Electronic mail dated November 29, 2018, from Karen Holligan, TCEQ, to Carolyn Guillory, GB Biosciences (responses to comments and questions received on November 29, 2018, and revised fact sheet and draft permit).

Electronic mail dated December 5, 2018, from Carolyn Guillory, GB Biosciences, to Karen Holligan, TCEQ (acceptance of draft permit).

E. MISCELLANEOUS

The *State of Texas 2014 Integrated Report* – Texas 303(d) List (Category 5), TCEQ, November 19, 2015.

Texas Surface Water Quality Standards, 30 TAC §§307.1 - 307.10, TCEQ, effective March 6, 2014, as approved by EPA Region 6.

Texas Surface Water Quality Standards, 30 TAC §§307.1 - 307.10, TCEQ, effective July 22, 2010, as approved by EPA Region 6, for portions of the 2014 standards not yet approved by EPA Region 6.

Texas Surface Water Quality Standards, 30 TAC §§307.1 - 307.10, TCEQ, effective August 17, 2000, and Appendix E, effective February 27, 2002, for portions of the 2010 standards not yet approved by EPA Region 6.

Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms, Third Edition (EPA-821-R-02-014).

Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, Fifth Edition (EPA-821-R-02-012).

Procedures to Implement the Texas Surface Water Quality Standards, TCEQ, June 2010, as approved by EPA Region 6.

Procedures to Implement the Texas Surface Water Quality Standards, TCEQ, January 2003, for portions of the 2010 *IP* not approved by EPA Region 6.

Guidance Document for Establishing Monitoring Frequencies for Domestic and Industrial Wastewater Discharge Permits, TCEQ Document No. 98-001.000-OWR-WQ, May 1998

General Guidance – Industrial Permits: Uncontaminated Stormwater Runoff, EPA, January 1997.

Waste Load Evaluation WLE-1R for the Houston Ship Channel System (September 2006).

Fourteen Total Maximum Daily Loads for Nickel in the Houston Ship Channel System (TMDL Project No. 1), TCEQ, August 2000.

Implementation Plan for Dissolved Nickel in the Houston Ship Channel (TMDL Implementation Plan), TCEQ, July 2001.

Appendix A
Calculated Technology-Based Effluent Limits

Description of Waste Streams

The draft permit authorizes the discharge of previously monitored effluents (treated process wastewater, groundwater, treated domestic wastewater, non-process wastewater, and incinerator wastewater via internal Outfall 101 and treated stormwater via internal Outfall 201) on a flow-variable basis via Outfall 001 and stormwater on an intermittent and flow-variable basis via Outfalls 002, 003, 004, 005, and 006.

Internal Outfall 101

New Source Determination

A new source determination was performed, and the discharge of treated process wastewaters (including groundwater and incinerator wastewater) subject to 40 CFR Parts 414 and 455 via internal Outfall 101 is not considered a new source as defined in 40 CFR § 122.2. Specifically, the facility processes subject to 40 CFR Part 414 were initiated in 1979, and the new source date is November 5, 1987; and the facility processes subject to 40 CFR Part 455 were initiated in 1973, 1976, and 1977, and the new source date is April 25, 1978. Therefore, new source performance standards are not required, and BAT[1], BCT[2], and BPT[3] have been applied as appropriate.

1. Mass Allocations Developed from 40 CFR Part 414 Organic Chemicals, Plastics, and Synthetic Fibers (OCPSF)

Allocations for wastewaters identified as OCPSF process wastewaters were calculated based on the following ELGs:

40 CFR Part 414 – Organic Chemicals, Plastics, and Synthetic Fibers

Subpart H (*Specialty Organic Chemicals*) – 40 CFR § 414.81 (BPT). ELGs in 40 CFR § 414.82 (BCT) are reserved. ELGs in 40 CFR § 414.83 (BAT) are the same as BPT except for the addition of 40 CFR § 414.91.

Subpart I (*Direct Discharge Point Sources That Use End-of-Pipe Biological Treatment*) – 40 CFR § 414.91 (BAT)

Subpart H Calculations

Based on information provided during the application process, flows subject to Subpart H are as follows:

Table 1-1

Process Wastewater	Flow (MGD)
Isophthalonitrile (IPN) process wastewater, cyanide and ammonia bearing	0.0144
Other IPN process wastewater	0.0504
IPN process area stormwater[4]	0.0022
Total =	0.0670

1 BAT: Best Available Technology Economically Achievable
2 BCT: Best Conventional Pollutant Control Technology
3 BPT: Best Practicable Control Technology Currently Available
4 According to the "Development Document for Effluent Limitations and Guidelines and Standards for Organic Chemicals, Plastics, and Synthetic Fibers Point Source Category, Vol. 1, EPA 440/1-87/009, October 1987, Table VII-50, page VII-157, contact rainwater (or process area stormwater) is considered to be a process wastewater for the purposes of allocating pollutant loads limited in 40 CFR Part 414.

The applicable concentration limits from 40 CFR Part 414, Subpart H are as follows:

Table 1-2

40 CFR 414 Subcategory	BOD_5 (mg/L)		TSS (mg/L)		pH (SU)	
	Dly Avg	Dly Max	Dly Avg	Dly Max	Dly Min	Dly Max
Subpart H	45	120	57	183	6.0	9.0

The mass allocations for these waste streams are calculated as follows:

Dly Avg (lbs/day) = [Dly Avg (mg/L)] × [wastewater flow (MGD)] × 8.345

Dly Max (lbs/day) = [Dly Max (mg/L)] × [wastewater flow (MGD)] × 8.345

where 8.345 is a conversion factor.

BOD_5 dly avg	=	45 mg/L	×	0.067 MGD	×	8.345	=	25.160 lbs/day
BOD_5 dly max	=	120 mg/L	×	0.067 MGD	×	8.345	=	67.093 lbs/day
TSS dly avg	=	57 mg/L	×	0.067 MGD	×	8.345	=	31.869 lbs/day
TSS dly max	=	183 mg/L	×	0.067 MGD	×	8.345	=	102.318 lbs/day

Subpart I Calculations

Mass allocations for toxic pollutants (except total cyanide) are based on the total wastewater flow subject to 40 CFR Part 414 that receives biological treatment (0.067 MGD). Mass allocations for total cyanide are based on the flow of cyanide-bearing wastewater (0.0144 MGD).

Total Permitted Daily Average Flow from Outfall 101:	0.90 MGD
Subpart I Process Wastewater Flow:	0.067 MGD
Metal-Bearing Wastewater Flow:	0 MGD
Cyanide-Bearing Wastewater Flow:	0.0144 MGD

Mass allocations for the toxic pollutants limited in Subpart I were calculated as follows:

Dly Avg (lbs/day) = [Dly Avg (μg/L)/1000] × [Flow, MGD*] × 8.345

Dly Max (lbs/day) = [Dly Max (μg/L)/1000)] × [Flow, MGD*] × 8.345

* total process wastewater flow subject to 40 CFR Part 414 or cyanide-bearing flow, as appropriate

Single grab limits, which are expressed as concentrations, are calculated in Table 5-3 using total mass allocations from all sources.

Table 1-3

Parameter	Dly Avg (μg/L)	Dly Max (μg/L)	Dly Avg (lbs/day)	Dly Max (lbs/day)
Cyanide, total	420	1,200	0.05047	0.14420
Acenaphthene	22	59	0.01230	0.03298
Acenaphthylene	22	59	0.01230	0.03298
Acrylonitrile	96	242	0.05367	0.13530
Anthracene	22	59	0.01230	0.03298
Benzene	37	136	0.02068	0.07604
Benzo(*a*)anthracene	22	59	0.01230	0.03298
3,4-Benzofluoranthene	23	61	0.01286	0.03410
Benzo(*k*)fluoranthene	22	59	0.01230	0.03298

Table 1-3

Parameter	Dly Avg (µg/L)	Dly Max (µg/L)	Dly Avg (lbs/day)	Dly Max (lbs/day)
Benzo(*a*)pyrene	23	61	0.01286	0.03410
Bis(2-ethylhexyl) phthalate	103	279	0.05758	0.15599
Carbon Tetrachloride	18	38	0.01006	0.02124
Chlorobenzene	15	28	0.00838	0.01565
Chloroethane	104	268	0.05814	0.14984
Chloroform	21	46	0.01174	0.02571
2-Chlorophenol	31	98	0.01733	0.05479
Chrysene	22	59	0.01230	0.03298
Di-*n*-butyl Phthalate	27	57	0.01509	0.03187
1,2-Dichlorobenzene	77	163	0.04305	0.09113
1,3-Dichlorobenzene	31	44	0.01733	0.02460
1,4-Dichlorobenzene	15	28	0.00838	0.01565
1,1-Dichloroethane	22	59	0.01230	0.03298
1,2-Dichloroethane	68	211	0.03802	0.11797
1,1-Dichloroethylene	16	25	0.00894	0.01397
1,2-*trans*-Dichloroethylene	21	54	0.01174	0.03019
2,4-Dichlorophenol	39	112	0.02180	0.06262
1,2-Dichloropropane	153	230	0.08554	0.12859
1,3-Dichloropropylene	29	44	0.01621	0.02460
Diethyl Phthalate	81	203	0.04528	0.11350
2,4-Dimethylphenol	18	36	0.01006	0.02012
Dimethyl Phthalate	19	47	0.01062	0.02627
4,6-Dinitro-*o*-cresol	78	277	0.04361	0.15487
2,4-Dinitrophenol	71	123	0.03969	0.06877
2,4-Dinitrotoluene	113	285	0.06318	0.15934
2,6-Dinitrotoluene	255	641	0.14257	0.35839
Ethylbenzene	32	108	0.01789	0.06038
Fluoranthene	25	68	0.01397	0.03802
Fluorene	22	59	0.01230	0.03298
Hexachlorobenzene	15	28	0.00838	0.01565
Hexachlorobutadiene	20	49	0.01118	0.02739
Hexachloroethane	21	54	0.01174	0.03019
Methyl Chloride	86	190	0.04808	0.10623
Methylene Chloride	40	89	0.02236	0.04976
Naphthalene	22	59	0.01230	0.03298
Nitrobenzene	27	68	0.01509	0.03802
2-Nitrophenol	41	69	0.02292	0.03857
4-Nitrophenol	72	124	0.04025	0.06933
Phenanthrene	22	59	0.01230	0.03298
Phenol	15	26	0.00838	0.01453
Pyrene	25	67	0.01397	0.03746
Tetrachloroethylene	22	56	0.01230	0.03131
Toluene	26	80	0.01453	0.04472
1,2,4-Trichlorobenzene	68	140	0.03802	0.07827

Table 1-3

Parameter	Dly Avg (µg/L)	Dly Max (µg/L)	Dly Avg (lbs/day)	Dly Max (lbs/day)
1,1,1-Trichloroethane	21	54	0.01174	0.03019
1,1,2-Trichloroethane	21	54	0.01174	0.03019
Trichloroethylene	21	54	0.01174	0.03019
Vinyl Chloride	104	268	0.05814	0.14984

Non-Categorical Calculations

Mass allocations have been calculated for COD because wastewater subject to 40 CFR Part 455 has COD allocations and because COD is commonly present in industrial wastewater. Estimated effluent concentrations for COD were based on values used for OCPSF wastewater in another industrial wastewater permit (TPDES Permit No. WQ00001054000).

The mass allocations are calculated as follows:

Dly Avg (lbs/day) = [Dly Avg (mg/L)] × [wastewater flow (MGD)] × 8.345

Dly Max (lbs/day) = [Dly Max (mg/L)] × [wastewater flow (MGD)] × 8.345

where wastewater flow is equal to 0.067 MGD, the wastewater flow subject to 40 CFR Part 414.

Table 1-4

Pollutant	Dly Avg (mg/L)	Dly Max (mg/L)	Dly Avg (lbs/day)	Dly Max (lbs/day)
COD	200	400	111.823	223.646

2. Mass Allocations Developed from 40 CFR Part 455 Pesticide Chemicals

Allocations for wastewaters identified as process wastewaters from pesticide chemicals manufacturing were calculated based on the following ELGs:

40 CFR Part 455 – Pesticide Chemicals

Subpart A *(Organic Pesticide Chemicals Manufacturing)* – 40 CFR §§ 455.20 (Applicability), 455.22 (BPT), 455.23 (BCT), and 455.24 (BAT). BPT and BAT limitations were used because they were as stringent or more stringent than BCT limitations.

Subpart C (*Pesticide Chemicals Formulating and Packaging*) – 40 CFR §§ 455.42 (BPT), 455.43 (BCT), and 455.44 (BAT). All three sections require that there be "no discharge of process wastewater pollutants to navigable waters." Other Requirement No. 8 of the existing permit prohibits the discharge of wastewater from processes subject to Subpart C, and this requirement has been carried forward in the draft permit.

Production
Based on information provided in the application, wastewater received is from the production of **117,000 pounds/day** of total organic active ingredients (=product).

Flow
Based on information provided in the application, flows subject to Subpart A are as follows:

Table 2-1

Process Wastewater	Flow (MGD)
Chlorothalonil I (CTL I) Reactor	0.03795
CTL I Reactor process area stormwater	0.00140
Chlorothalonil II (CTL II) Reactor	0.11025
CTL II Reactor process area stormwater	0.00310
CTL Purification	0.00300
CTL Acid Area	0.13390
Process and Formulations Labs	0.03800
Acid Tank Scrubber	0.02560
Other plant area stormwater	0.00790
Arsenic Pretreatment	—
Recovered groundwater/leachate	0.02070
Low flow stormwater	0.07200
Other recovered groundwater to WTS	0.04900
Total =	**0.5028**

Subpart A Calculations

40 CFR § 455.20 (Applicability)

Requirements in 40 CFR § 455.20(d) specify that:

> A plant that manufactures a pesticide active ingredient listed in Table 1 of this part must comply with the BAT effluent limitations and new source performance and pretreatment standards for that pesticide active ingredient listed in Table 2 (BAT and PSES) or Table 3 of this part (NSPS and PSNS). A plant that manufactures a pesticide active ingredient listed in Table 1 of this part must also comply with the BAT effluent limitations and new source performance and pretreatment standards for priority pollutants listed in Tables 4, 5 and 6 of this part. The limitations in Table 4 of this part (BAT and NSPS) are applicable to existing and new direct discharge point sources that use End-of-Pipe biological treatment. The limitations in Table 5 of this part (BAT and NSPS) are

applicable to existing and new direct discharge point sources that do not use end-of-pipe biological treatment. The limitations in Table 6 of this part (PSES and PSNS) are applicable to existing and new sources that discharge to Publicly Owned Treatment Works.

The facility manufactures chlorothalonil, which is listed in Table 1 of 40 CFR Part 455. On this basis, the limits from Table 2 of 40 CFR Part 455 are applicable (see Table 2-2 below). The mass allocations for these waste streams are calculated as follows:

Dly Avg (lbs/day) = [Dly Avg (lbs/1,000 lbs product)] × [Mass of product (1,000 lbs/day)*]

Dly Max (lbs/day) = [Dly Max (lbs/1,000 lbs product)] × [Mass of product (1,000 lbs/day)*]

* Mass of product (1,000 lbs/day) = 117

Table 2-2

Pollutant	Effluent Limits (lbs/1,000 lbs product)		Mass Limits (lbs/day)	
	Dly Avg	Dly Max	Dly Avg	Dly Max
Chlorothalonil	4.57×10^{-4}	1.51×10^{-3}	0.05346	0.1766

The calculations for priority pollutants in Table 4 of 40 CFR Part 455 are also required by 40 CFR § 455.24 (BAT) and are presented in that section.

Note: the mass limits calculated above are significantly lower than the existing permit limits. It appears that incorrect ELGs were used to develop the limits in the permit issued in 2007 and that the error had not been identified until now. The values in Table 2-2 above are taken directly from Table 2 of 40 CFR Part 455.

40 CFR § 455.22 (BPT)

The applicable BPT limits are shown in Table 2-3 below. The mass allocations for these waste streams are calculated as follows:

Dly Avg (lbs/day) = [Dly Avg (lbs/1,000 lbs product)] × [Mass of product (1,000 lbs/day)*]

Dly Max (lbs/day) = [Dly Max (lbs/1,000 lbs product)] × [Mass of product (1,000 lbs/day)*]

* Mass of product (1,000 lbs/day) = 117

Table 2-3

Pollutant	Effluent Limits (lbs/1,000 lbs product)		Mass Allocations (lbs/day)	
	Dly Avg	Dly Max	Dly Avg	Dly Max
COD	9.0000	13.000	1,053	1,521
BOD_5	1.6000	7.400	187.2	865.8
TSS	1.8000	6.100	210.6	713.7
Organic pesticide chemicals[5]	N/A	N/A	N/A	N/A
pH	Between 6.0 and 9.0 SU			

5 Based on 40 CFR § 455.20(b), limits on organic pesticide chemicals are not required for this permit because chlorothalonil is not listed as one of the organic active ingredients that requires such limits.

40 CFR § 455.24 (BAT)

The applicable BAT limits are shown in Table 2-4 below (taken from 40 CFR Part 455, Table 4). The mass allocations for these waste streams are calculated as follows:

Dly Avg (lbs/day) = [Dly Avg (µg/L)/1,000] × [0.5028 MGD] × 8.345

Dly Max (lbs/day) = [Dly Max (µg/L)/1,000] × [0.5028 MGD] × 8.345

where 8.345 is a conversion factor.

Table 2-4

Pollutant	Effluent Limits (µg/L)		Mass Allocations (lbs/day)	
	Dly Avg	Dly Max	Dly Avg	Dly Max
Cyanide, Total	220	640	0.9231	2.6854
Lead, Total	320	690	1.3427	2.8951
Benzene	37	136	0.1552	0.5706
Bromodichloromethane	142	380	0.5958	1.5944
Bromomethane	142	380	0.5958	1.5944
Chlorobenzene	15	28	0.0629	0.1175
Chloromethane [Methyl Chloride]	86	190	0.3608	0.7972
2-Chlorophenol	31	98	0.1301	0.4112
Dibromochloromethane [Chlorodibromomethane]	196	794	0.8224	3.3315
1,2-Dichlorobenzene	77	163	0.3231	0.6839
1,4-Dichlorobenzene	15	28	0.0629	0.1175
1,2-Dichloroethane	68	211	0.2853	0.8853
1,1-Dichloroethylene	16	25	0.0671	0.1049
1,2-*trans*-Dichloroethylene	21	54	0.0881	0.2266
Dichloromethane [Methylene Chloride]	40	89	0.1678	0.3734
2,4-Dichlorophenol	39	112	0.1636	0.4699
1,2-Dichloropropane	153	230	0.6420	0.9650
1,3-Dichloropropene [1,3-Dichloropropylene]	29	44	0.1217	0.1846
2,4-Dimethylphenol	18	36	0.0755	0.1511
Ethylbenzene	32	108	0.1343	0.4532
Naphthalene	22	59	0.0923	0.2476
Phenol	15	26	0.0629	0.1091
Tetrachloroethylene	22	56	0.0923	0.2350
Tetrachloromethane [Carbon Tetrachloride]	18	38	0.0755	0.1594
Toluene	26	80	0.1091	0.3357
Tribromomethane [Bromoform]	196	794	0.8224	3.3315
1,1,1-Trichloroethane	21	54	0.0881	0.2266
Trichloromethane [Chloroform]	21	46	0.0881	0.1930

3. Mass Allocations Developed from 30 TAC Chapter 309 Domestic Wastewater

Allocations for domestic wastewater were calculated based on the requirements of 30 TAC Chapter 309. The applicable limits from 30 TAC Chapter 309 are shown in Table 3-1 below. The mass allocations for these waste streams are calculated as follows:

Dly Avg (lbs/day) = [Dly Avg (mg/L)] × [wastewater flow (MGD)] × 8.345

Dly Max (lbs/day) = [Dly Max (mg/L)] × [wastewater flow (MGD)] × 8.345

where wastewater flow is equal to 0.043 MGD, the domestic wastewater flow, and 8.345 is a conversion factor.

Table 3-1

Pollutant	Effluent Limits (mg/L)		Mass Allocations (lbs/day)	
	Dly Avg	Dly Max	Dly Avg	Dly Max
BOD_5	20	45	7.176	16.147
TSS	20	45	7.176	16.147
Chlorine Residual	1.0, min	4.0	—	—
pH	Between 6.0 and 9.0 SU			

Additional Calculations

Mass allocations have been calculated for COD because wastewater subject to 40 CFR Part 455 has COD allocations and because COD is also present in domestic wastewater. Estimated effluent concentrations for COD were based on values used for domestic wastewater in another industrial wastewater permit (TPDES Permit No. WQ00001054000).

The mass allocations are calculated as follows:

Dly Avg (lbs/day) = [Dly Avg (mg/L)] × [wastewater flow (MGD)] × 8.345

Dly Max (lbs/day) = [Dly Max (mg/L)] × [wastewater flow (MGD)] × 8.345

where wastewater flow is equal to 0.043 MGD, the domestic wastewater flow.

Table 3-2

Pollutant	Effluent Limits (mg/L)		Mass Allocations (lbs/day)	
	Dly Avg	Dly Max	Dly Avg	Dly Max
COD	100	225	35.883	80.737

4. Mass Allocations for Utility and Other Wastewaters

Allocations for utility and other wastewaters were calculated using estimated effluent concentrations for BOD_5, TSS, and COD that were based on values used for miscellaneous wastewaters (including utility wastewater) in another industrial wastewater permit (TPDES Permit No. WQ00001054000). The mass allocations for these waste streams are calculated as follows:

Dly Avg (lbs/day) = [Dly Avg (mg/L)] × [wastewater flow (MGD)] × 8.345

Dly Max (lbs/day) = [Dly Max (mg/L)] × [wastewater flow (MGD)] × 8.345

where wastewater flow is equal to 0.0745 MGD, and 8.345 is a conversion factor.

Table 4-1

Pollutant	Dly Avg (mg/L)	Dly Max (mg/L)	Dly Avg (lbs/day)	Dly Max (lbs/day)
BOD_5	20	40	12.434	24.868
TSS	50	120	31.085	74.604
COD	100	225	62.170	139.883
pH	Between 6.0 and 9.0 SU			

5. Sum of Mass Allocations

Mass allocations were developed for BOD_5, TSS, and COD for all waste streams. Summations of daily average technology-based effluent allocations are provided in Table 5-1, and summations of daily maximum technology-based effluent allocations are provided in Table 5-2.

Table 5-1: Daily Average Mass Limits (lbs/day)

Pollutant	414	455	309	Other	Total
BOD_5	25.160	187.200	7.176	12.434	231.970
TSS	31.869	210.600	7.176	31.085	280.730
COD	111.823	1,053.000	35.883	62.170	1,262.876

Table 5-2: Daily Maximum Mass Limits (lbs/day)

Pollutant	414	455	309	Other	Total
BOD_5	67.093	865.800	16.147	24.868	973.908
TSS	102.318	713.700	16.147	74.604	906.769
COD	223.646	1,521.000	80.737	139.883	1965.266

Mass allocations were developed for toxic pollutants for waste streams subject to 40 CFR Parts 414 and 455. Summations of technology-based effluent allocations are provided in Table 5-3. Single grab limits are developed in Appendix D.

Table 5-3: Mass Allocations

Parameter	Daily Average (lbs/day)			Daily Maximum (lbs/day)		
	414	455	Total	414	455	Total
Cyanide, total	0.05047	0.9231	0.973	0.14420	2.6854	2.83
Lead, total	—	1.3427	1.34	—	2.8951	2.89
Acenaphthene	0.01230	—	0.012	0.03298	—	0.033
Acenaphthylene	0.01230	—	0.012	0.03298	—	0.033
Acrylonitrile	0.05367	—	0.054	0.13530	—	0.135
Anthracene	0.01230	—	0.012	0.03298	—	0.033
Benzene	0.02068	0.1552	0.176	0.07604	0.5706	0.647
Benzo(*a*)anthracene	0.01230	—	0.012	0.03298	—	0.033
3,4-Benzofluoranthene	0.01286	—	0.013	0.03410	—	0.034
Benzo(*k*)fluoranthene	0.01230	—	0.012	0.03298	—	0.033
Benzo(*a*)pyrene	0.01286	—	0.013	0.03410	—	0.034
Bis(2-ethylhexyl) phthalate	0.05758	—	0.058	0.15599	—	0.156
Bromodichloromethane	—	0.5958	0.595	—	1.5944	1.594
Bromomethane	—	0.5958	0.595	—	1.5944	1.594
Chlorobenzene	0.00838	0.0629	0.071	0.01565	0.1175	0.133
Chloroethane	0.05814	—	0.058	0.14984	—	0.150
Chloromethane [Methyl Chloride]	0.04808	0.3608	0.408	0.10623	0.7972	0.903
2-Chlorophenol	0.01733	0.1301	0.147	0.05479	0.4112	0.466
Chrysene	0.01230	—	0.012	0.03298	—	0.033
Dibromochloromethane [Chlorodibromomethane]	—	0.8224	0.822	—	3.3315	3.332
Di-*n*-butyl Phthalate	0.01509	—	0.015	0.03187	—	0.032
1,2-Dichlorobenzene	0.04305	0.3231	0.366	0.09113	0.6839	0.775

Table 5-3: Mass Allocations

Parameter	Daily Average (lbs/day)			Daily Maximum (lbs/day)		
	414	455	Total	414	455	Total
1,3-Dichlorobenzene	0.01733	—	0.017	0.02460	—	0.025
1,4-Dichlorobenzene	0.00838	0.0629	0.071	0.01565	0.1175	0.133
1,1-Dichloroethane	0.01230	—	0.012	0.03298	—	0.033
1,2-Dichloroethane	0.03802	0.2853	0.323	0.11797	0.8853	1.003
1,1-Dichloroethylene	0.00894	0.0671	0.076	0.01397	0.1049	0.119
1,2-*trans*-Dichloroethylene	0.01174	0.0881	0.100	0.03019	0.2266	0.257
Dichloromethane [Methylene Chloride]	0.02236	0.1678	0.190	0.04976	0.3734	0.423
2,4-Dichlorophenol	0.02180	0.1636	0.185	0.06262	0.4699	0.533
1,2-Dichloropropane	0.08554	0.6420	0.728	0.12859	0.9650	1.094
1,3-Dichloropropene [1,3-Dichloropropylene]	0.01621	0.1217	0.138	0.02460	0.1846	0.210
Diethyl Phthalate	0.04528	—	0.045	0.11350	—	0.114
2,4-Dimethylphenol	0.01006	0.0755	0.086	0.02012	0.1511	0.171
Dimethyl Phthalate	0.01062	—	0.011	0.02627	—	0.026
4,6-Dinitro-*o*-cresol	0.04361	—	0.044	0.15487	—	0.155
2,4-Dinitrophenol	0.03969	—	0.040	0.06877	—	0.069
2,4-Dinitrotoluene	0.06318	—	0.063	0.15934	—	0.159
2,6-Dinitrotoluene	0.14257	—	0.143	0.35839	—	0.358
Ethylbenzene	0.01789	0.1343	0.152	0.06038	0.4532	0.514
Fluoranthene	0.01397	—	0.014	0.03802	—	0.038
Fluorene	0.01230	—	0.012	0.03298	—	0.033
Hexachlorobenzene	0.00838	—	0.0083	0.01565	—	0.0156
Hexachlorobutadiene	0.01118	—	0.011	0.02739	—	0.027
Hexachloroethane	0.01174	—	0.012	0.03019	—	0.030
Naphthalene	0.01230	0.0923	0.105	0.03298	0.2476	0.281
Nitrobenzene	0.01509	—	0.015	0.03802	—	0.038
2-Nitrophenol	0.02292	—	0.023	0.03857	—	0.039
4-Nitrophenol	0.04025	—	0.040	0.06933	—	0.069
Phenanthrene	0.01230	—	0.012	0.03298	—	0.033
Phenol	0.00838	0.0629	0.071	0.01453	0.1091	0.124
Pyrene	0.01397	—	0.014	0.03746	—	0.037
Tetrachloroethylene	0.01230	0.0923	0.105	0.03131	0.2350	0.266
Tetrachloromethane [Carbon Tetrachloride]	0.01006	0.0755	0.086	0.02124	0.1594	0.180
Toluene	0.01453	0.1091	0.124	0.04472	0.3357	0.380
Tribromomethane [Bromoform]	—	0.8224	0.822	—	3.3315	3.332
1,2,4-Trichlorobenzene	0.03802	—	0.038	0.07827	—	0.078
1,1,1-Trichloroethane	0.01174	0.0881	0.100	0.03019	0.2266	0.257
1,1,2-Trichloroethane	0.01174	—	0.012	0.03019	—	0.030
Trichloroethylene	0.01174	—	0.012	0.03019	—	0.030
Trichloromethane [Chloroform]	0.01174	0.0881	0.100	0.02571	0.1930	0.219
Vinyl Chloride	0.05814	—	0.058	0.14984	—	0.150

6. Additional Effluent Limitations

TOC
Limits on TOC at internal Outfall 101 have been in the permit since at least 1990 and have been carried forward in the draft permit based on EPA's anti-backsliding regulations at 40 CFR § 122.44(l).

Total Arsenic
Limits on total arsenic at internal Outfall 101 were brought over from the NPDES permit into the first TPDES permit (issued in 2007) and have been carried forward in the draft permit based on EPA's anti-backsliding regulations at 40 CFR § 122.44(l).

Internal Outfall 201

The daily maximum TOC limit of 55 mg/L at internal Outfall 201 has been in the permit since at least 1990 and is consistent with EPA guidance for industrial stormwater discharges. The daily maximum limits for total arsenic (0.6 mg/L) and chlorothalonil (Daconil) (0.6 mg/L) were brought over from the NPDES permit into the first TPDES permit (issued in 2007). All of these limits are still considered appropriate and have been carried forward in the draft permit based on EPA's anti-backsliding regulations at 40 CFR § 122.44(l).

Outfall 001

Oil and Grease
A daily maximum oil and grease limit of 15 mg/L was brought over from the NPDES permit into the first TPDES permit (issued in 2007) and has been carried forward in the draft permit based on EPA's anti-backsliding regulations at 40 CFR § 122.44(l).

DCPA [Dacthal]
The permit has included limits on DCPA [Dacthal] since at least 1990 because the facility previously manufactured it, and it may still be present in groundwater. The existing daily maximum effluent limit of 0.168 mg/L was established in the permit issued on April 20, 2007. It is a technology-based concentration limit that was calculated using the mass limit of 1.266 lbs/day and the daily average permitted flow of 0.9 MGD at internal Outfall 101 from the 1995 permit. That mass limit was established based on 40 CFR Part 455, Subpart A, that was in effect as of 1993. This concentration limit is still appropriate and has been carried forward in the draft permit.

pH
Limits on pH of 6.0-9.0 SU are appropriate for industrial wastewater discharge and are carried forward in the draft permit.

Outfalls 002, 003, 004, 005, and 006

Daily maximum effluent limitations for TOC (55 mg/L) and oil and grease (15 mg/L) and pH limits of 6.0-9.0 SU at Outfalls 002-006 are consistent with EPA guidance for industrial stormwater discharges. These limits are still appropriate and have been carried forward in the draft permit based on EPA's anti-backsliding regulations at 40 CFR § 122.44(l).

FACT SHEET AND EXECUTIVE DIRECTOR'S PRELIMINARY DECISION

Appendix B
Calculated Water Quality-Based Effluent Limits

TEXTOX MENU #10 - INTERMITTENT FRESHWATER STREAM WITHIN 3 MILES OF A BAY OR WIDE TIDAL RIVER

The water quality-based effluent limitations developed below are calculated using:

Table 1, 2014 Texas Surface Water Quality Standards (30 TAC 307) for Freshwater and Saltwater Aquatic Life
Table 2, 2014 Texas Surface Water Quality Standards for Human Health
"Procedures to Implement the Texas Surface Water Quality Standards," TCEQ, June 2010

PERMIT INFORMATION

Permittee Name:	GB Biosciences Corporation
TPDES Permit No:	WQ0000749000
Outfall No:	001
Prepared by:	Karen Holligan
Date:	January 8, 2018

DISCHARGE INFORMATION

Intermittent Receiving Waterbody:	unnamed ditches	
Segment No. for Freshwater Ambient Data:	1016	
TSS (mg/L) (Intermittent):	12	
pH (Standard Units) (Intermittent):	7.5	
Hardness (mg/L as $CaCO_3$) (Intermittent):	65	[data from Segments 1016 and 1017]
Chloride (mg/L) (Intermittent):	82	
Effluent Flow for Aquatic Life (MGD):	1.0	
% Effluent for Acute Aquatic Life (Intermittent):	100	
Saltwater Receiving Waterbody:	Greens Bayou Tidal	
Segment No.:	1006	
TSS (mg/L) (Bay/Tidal River):	10	
% Effluent for Chronic Aquatic Life (Bay/Tidal River):	8	
% Effluent for Acute Aquatic Life (Bay/Tidal River):	30	
Oyster Waters?	**No**	
Effluent Flow for Human Health (MGD):	0.605	
% Effluent for Human Health (Bay/Tidal River):	4	

CALCULATE DISSOLVED FRACTION (AND ENTER WATER EFFECT RATIO IF APPLICABLE):

Stream/River Metal	*Intercept (b)*	*Slope (m)*	*Partition Coefficient (Kp)*	*Dissolved Fraction (Cd/Ct)*		*Water Effect Ratio (WER)*	
Aluminum	N/A	N/A	N/A	1.00	Assumed	1.00	Assumed
Arsenic	5.68	-0.73	78018.52	0.52		1.00	Assumed
Cadmium	6.60	-1.13	240173.56	0.26		1.00	Assumed
Chromium (Total)	6.52	-0.93	328368.46	0.20		1.00	Assumed
Chromium (+3)	6.52	-0.93	328368.46	0.20		1.00	Assumed
Chromium (+6)	N/A	N/A	N/A	1.00	Assumed	1.00	Assumed
Copper	6.02	-0.74	166496.80	0.33		1.00	Assumed
Lead	6.45	-0.80	386060.17	0.18		1.00	Assumed
Mercury	N/A	N/A	N/A	1.00	Assumed	1.00	Assumed
Nickel	5.69	-0.57	118813.75	0.41		1.00	Assumed
Selenium	N/A	N/A	N/A	1.00	Assumed	1.00	Assumed
Silver	6.38	-1.03	185542.46	0.31		1.00	Assumed
Zinc	6.10	-0.70	221092.05	0.27		1.00	Assumed

CALCULATE DISSOLVED FRACTION (AND ENTER WATER EFFECT RATIO IF APPLICABLE):

Estuarine Metal	*Intercept (b)*	*Slope (m)*	*Partition Coefficient (Kp)*	*Dissolved Fraction (Cd/Ct)*		*Water Effect Ratio (WER)*	
Aluminum	N/A	N/A	N/A	1.00	Assumed	1.00	Assumed
Arsenic	N/A	N/A	N/A	1.00	Assumed	1.00	Assumed
Cadmium	N/A	N/A	N/A	1.00	Assumed	1.00	Assumed
Chromium (Total)	N/A	N/A	N/A	1.00	Assumed	1.00	Assumed
Chromium (+3)	N/A	N/A	N/A	1.00	Assumed	1.00	Assumed
Chromium (+6)	N/A	N/A	N/A	1.00	Assumed	1.00	Assumed
Copper	4.85	-0.72	13489.63	0.88		1.80	307 App. E
Lead	6.06	-0.85	162181.01	0.38		1.00	Assumed
Mercury	N/A	N/A	N/A	1.00	Assumed	1.00	Assumed
Nickel	N/A	N/A	N/A	1.00	Assumed	1.00	Assumed
Selenium	N/A	N/A	N/A	1.00	Assumed	1.00	Assumed
Silver	5.86	-0.74	131825.67	0.43		1.00	Assumed
Zinc	5.36	-0.52	69183.10	0.59		1.00	Assumed

AQUATIC LIFE
CALCULATE DAILY AVERAGE AND DAILY MAXIMUM EFFLUENT LIMITATIONS:

Parameter	*FW Acute Criterion (ug/L)*	*SW Acute Criterion (ug/L)*	*SW Chronic Criterion (ug/L)*	*FW WLAa*	*SW WLAa*	*SW WLAc*	*FW LTAa*	*SW LTAa*	*SW LTAc*	*Daily Avg. (ug/L)*	*Daily Max. (ug/L)*
Aldrin	3.0	1.3	N/A	3.0	4.33	N/A	1.72	1.39	N/A	2.04	4.31
Aluminum	991	N/A	N/A	991	N/A	N/A	568	N/A	N/A	835	1766
Arsenic	340	149	78	658	497	975	377	159	595	234	494
Cadmium	5.64	40.0	8.75	21.9	133	109	12.6	42.7	66.7	18.5	39.0
Carbaryl	2.0	613	N/A	2.0	2043	N/A	1.15	654	N/A	1.68	3.56
Chlordane	2.4	0.09	0.004	2.4	0.300	0.050	1.38	0.096	0.031	0.045	0.095
Chlorpyrifos	0.083	0.011	0.006	0.083	0.037	0.075	0.048	0.012	0.046	0.017	0.036
Chromium (+3)	400	N/A	N/A	1978	N/A	N/A	1133	N/A	N/A	1666	3525
Chromium (+6)	15.7	1090	49.6	15.7	3633	620	9.00	1163	378	13.2	28.0
Copper	9.46	24.3	6.48	28.4	91.9	91.9	16.3	29.4	56.1	23.9	50.6
Copper (oyster waters)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cyanide (free)	45.8	5.6	5.6	45.8	18.7	70.0	26.2	5.97	42.7	8.78	18.6
4,4'-DDT	1.1	0.13	0.001	1.1	0.433	0.013	0.630	0.139	0.0076	0.011	0.024
Demeton	N/A	N/A	0.1	N/A	N/A	1.25	N/A	N/A	0.763	1.12	2.37
Diazinon	0.17	0.819	0.819	0.17	2.73	10.2	0.097	0.874	6.24	0.143	0.303
Dicofol	59.3	N/A	N/A	59.3	N/A	N/A	34.0	N/A	N/A	49.9	106
Dieldrin	0.24	0.71	0.002	0.24	2.37	0.025	0.138	0.757	0.015	0.022	0.047
Diuron	210	N/A	N/A	210	N/A	N/A	120	N/A	N/A	177	374
Endosulfan I (alpha)	0.22	0.034	0.009	0.22	0.113	0.113	0.126	0.036	0.069	0.053	0.113
Endosulfan II (beta)	0.22	0.034	0.009	0.22	0.113	0.113	0.126	0.036	0.069	0.053	0.113
Endosulfan sulfate	0.22	0.034	0.009	0.22	0.113	0.113	0.126	0.036	0.069	0.053	0.113
Endrin	0.086	0.037	0.002	0.086	0.123	0.025	0.049	0.039	0.015	0.022	0.047
Guthion	N/A	N/A	0.01	N/A	N/A	0.125	N/A	N/A	0.076	0.112	0.237
Heptachlor	0.52	0.053	0.004	0.52	0.177	0.050	0.298	0.057	0.031	0.045	0.095
gamma-Hexachlorocyclohexane (Lindane)	1.126	0.16	N/A	1.126	0.533	N/A	0.645	0.171	N/A	0.251	0.531
Lead	40.3	133	5.3	227	1162	174	130	372	106	156	330
Malathion	N/A	N/A	0.01	N/A	N/A	0.125	N/A	N/A	0.076	0.112	0.237
Mercury	2.4	2.1	1.1	2.4	7.00	13.8	1.38	2.24	8.39	2.02	4.28
Methoxychlor	N/A	N/A	0.03	N/A	N/A	0.375	N/A	N/A	0.229	0.336	0.711

AQUATIC LIFE
CALCULATE DAILY AVERAGE AND DAILY MAXIMUM EFFLUENT LIMITATIONS:

Parameter	*FW Acute Criterion (ug/L)*	*SW Acute Criterion (ug/L)*	*SW Chronic Criterion (ug/L)*	*FW WLAa*	*SW WLAa*	*SW WLAc*	*FW LTAa*	*SW LTAa*	*SW LTAc*	*Daily Avg. (ug/L)*	*Daily Max. (ug/L)*
Mirex	N/A	N/A	0.001	N/A	N/A	0.013	N/A	N/A	0.0076	0.011	0.024
Nickel	325	118	13.1	789	393	164	452	126	99.9	147	311
Nonylphenol	28	7	1.7	28	23.3	21.3	16.0	7.47	13.0	11.0	23.2
Parathion (ethyl)	0.065	N/A	N/A	0.065	N/A	N/A	0.037	N/A	N/A	0.055	0.116
Pentachlorophenol	14.4	15.1	9.6	14.4	50.3	120	8.26	16.1	73.2	12.1	25.7
Phenanthrene	30	7.7	4.6	30	25.7	57.5	17.2	8.21	35.1	12.1	25.5
Polychlorinated Biphenyls (PCBs)	2.0	10	0.03	2.0	33.3	0.375	1.15	10.7	0.229	0.336	0.711
Selenium	20	564	136	20	1880	1700	11.5	602	1037	16.8	35.6
Silver	0.8	2	N/A	17.8	15.5	N/A	10.2	4.95	N/A	7.27	15.4
Toxaphene	0.78	0.21	0.0002	0.78	0.700	0.0025	0.447	0.224	0.0015	0.0022	0.0047
Tributyltin (TBT)	0.13	0.24	0.0074	0.13	0.800	0.093	0.074	0.256	0.056	0.083	0.175
2,4,5 Trichlorophenol	136	259	12	136	863	150	77.9	276	91.5	115	242
Zinc	81.3	92.7	84.2	297	523	1781	170	167	1086	246	520

HUMAN HEALTH
CALCULATE DAILY AVERAGE AND DAILY MAXIMUM EFFLUENT LIMITATIONS:

Parameter	*Fish Only Criterion (ug/L)*	*WLAh*	*LTAh*	*Daily Avg. (ug/L)*	*Daily Max. (ug/L)*
Acrylonitrile	3.8	95.0	88.4	130	275
Aldrin	0.001	0.025	0.023	0.034	0.072
Anthracene	N/A	N/A	N/A	N/A	N/A
Antimony	1071	26775	24901	36604	77441
Arsenic	N/A	N/A	N/A	N/A	N/A
Barium	N/A	N/A	N/A	N/A	N/A
Benzene	513	12825	11927	17533	37094
Benzidine	0.002	0.050	0.047	0.068	0.145
Benzo(a)anthracene	3.28	82.0	76.3	112	237
Benzo(a)pyrene	0.33	8.25	7.67	11.3	23.9
Bis(chloromethyl) ether	0.44	11.0	10.2	15.0	31.8
Bis(2-chloroethyl) ether	10.06	252	234	344	727
Bis(2-ethylhexyl) phthalate	41	1025	953	1401	2965
Bromodichloromethane (Dichlorobromomethane)	322	8050	7487	11005	23283
Bromoform (Tribromomethane)	2175	54375	50569	74336	157269
Cadmium	N/A	N/A	N/A	N/A	N/A
Carbon Tetrachloride (Tetrachloromethane)	30.5	763	709	1042	2205
Chlordane	0.0081	0.203	0.188	0.277	0.586
Chlorobenzene	5201	130025	120923	177757	376071
Chlorodibromomethane (Dibromochloromethane)	239	5975	5557	8168	17281
Chloroform (Trichloromethane)	7143	178575	166075	244130	516492
Chromium (+6)	502	12550	11672	17157	36298
Chrysene	327	8175	7603	11176	23645
Cresols (Methylphenols)	9301	232525	216248	317885	672532
Cyanide (free)	N/A	N/A	N/A	N/A	N/A
4,4'-DDD	0.0059	0.148	0.137	0.202	0.427
4,4'-DDE	0.004	0.100	0.093	0.137	0.289
4,4'-DDT	0.004	0.100	0.093	0.137	0.289
2,4'-D	N/A	N/A	N/A	N/A	N/A

HUMAN HEALTH

CALCULATE DAILY AVERAGE AND DAILY MAXIMUM EFFLUENT LIMITATIONS:

Parameter	*Fish Only Criterion (ug/L)*	*WLAh*	*LTAh*	*Daily Avg. (ug/L)*	*Daily Max. (ug/L)*
Danitol	473	11825	10997	16166	34201
1,2-Dibromoethane	4.24	106	98.6	145	307
m-Dichlorobenzene (1,3-Dichlorobenzene)	1445	36125	33596	49386	104484
o-Dichlorobenzene (1,2-Dichlorobenzene)	4336	108400	100812	148194	313525
p-Dichlorobenzene (1,4-Dichlorobenzene)	N/A	N/A	N/A	N/A	N/A
3,3'-Dichlorobenzidine	0.44	11.0	10.2	15.0	31.8
1,2-Dichloroethane	553	13825	12857	18900	39986
1,1-Dichloroethylene	23916	597900	556047	817389	1729306
Dichloromethane (Methylene Chloride)	22222	555550	516662	759492	1606817
1,2-Dichloropropane	226	5650	5255	7724	16341
1,3-Dichloropropene (1,3- Dichloropropylene)	211	5275	4906	7211	15257
Dicofol	0.3	7.50	6.98	10.3	21.7
Dieldrin	0.001	0.025	0.023	0.034	0.072
2,4-Dimethylphenol	571	14275	13276	19515	41288
Di-*n*-Butyl Phthalate	3010	75250	69983	102874	217646
Dioxins/Furans (TCDD Equivalents)	7.97E-08	1.99E-06	1.85E-06	2.72E-06	5.76E-06
Endrin	0.2	5.00	4.65	6.84	14.5
Ethylbenzene	7143	178575	166075	244130	516492
Fluoride	N/A	N/A	N/A	N/A	N/A
Heptachlor	0.0015	0.038	0.035	0.051	0.108
Heptachlor Epoxide	0.00075	0.019	0.017	0.026	0.054
Hexachlorobenzene	0.0045	0.113	0.105	0.154	0.325
Hexachlorobutadiene	274	6850	6371	9365	19812
Hexachlorocyclohexane (alpha)	0.093	2.33	2.16	3.18	6.72
Hexachlorocyclohexane (beta)	0.33	8.25	7.67	11.3	23.9
Hexachlorocyclohexane (gamma) (Lindane)	6.2	155	144	212	448
Hexachlorocyclopentadiene	N/A	N/A	N/A	N/A	N/A
Hexachloroethane	11.51	288	268	393	832
Hexachlorophene	2.9	72.5	67.4	99.1	210
Lead	3.83	251	233	343	726
Mercury	0.025	0.625	0.581	0.854	1.81
Methoxychlor	1.61	40.3	37.4	55.0	116
Methyl Ethyl Ketone	992000	24800000	23064000	33904080	71729040
Nickel	1140	28500	26505	38962	82431
Nitrate-Nitrogen (as Total Nitrogen)	N/A	N/A	N/A	N/A	N/A
Nitrobenzene	1853	46325	43082	63331	133986
N-Nitrosodiethylamine	2.1	52.5	48.8	71.8	152
N-Nitroso-di-n-Butylamine	4.2	105	97.7	144	304
Pentachlorobenzene	1	25.0	23.3	34.2	72.3
Pentachlorophenol	9.1	228	212	311	658
Polychlorinated Biphenyls (PCBs)	0.00064	0.016	0.015	0.022	0.046
Pyridine	947	23675	22018	32366	68475
Selenium	N/A	N/A	N/A	N/A	N/A
1,2,4,5-Tetrachlorobenzene	0.71	17.8	16.5	24.3	51.3
1,1,2,2-Tetrachloroethane	40	1000	930	1367	2892
Tetrachloroethylene	525	13125	12206	17943	37961
Thallium	0.23	5.75	5.35	7.86	16.6

HUMAN HEALTH

CALCULATE DAILY AVERAGE AND DAILY MAXIMUM EFFLUENT LIMITATIONS:

Parameter	*Fish Only Criterion (ug/L)*	*WLAh*	*LTAh*	*Daily Avg. (ug/L)*	*Daily Max. (ug/L)*
Toluene	N/A	N/A	N/A	N/A	N/A
Toxaphene	0.0053	0.133	0.123	0.181	0.383
2,4,5-TP (Silvex)	21	525	488	718	1518
1,1,1-Trichloroethane	956663	23916575	22242415	32696350	69173910
1,1,2-Trichloroethane	295	7375	6859	10082	21331
Trichloroethylene	82	2050	1907	2803	5929
2,4,5-Trichlorophenol	2435	60875	56614	83222	176069
TTHM (Sum of Total Trihalomethanes)	N/A	N/A	N/A	N/A	N/A
Vinyl Chloride	24	600	558	820	1735

CALCULATE 70% AND 85% OF DAILY AVERAGE EFFLUENT LIMITATIONS:

Aquatic Life

Parameter	*70%*	*85%*
Aldrin	1.43	1.73
Aluminum	584	710
Arsenic	164	199
Cadmium	12.9	15.7
Carbaryl	1.18	1.43
Chlordane	0.031	0.038
Chlorpyrifos	0.012	0.015
Chromium (+3)	1166	1416
Chromium (+6)	9.26	11.2
Copper	16.7	20.3
Copper (oyster waters)	N/A	N/A
Cyanide (free)	6.15	7.46
4,4'-DDT	0.0078	0.0095
Demeton	0.785	0.953
Diazinon	0.100	0.122
Dicofol	35.0	42.5
Dieldrin	0.016	0.019
Diuron	124	150
Endosulfan (alpha)	0.037	0.045
Endosulfan (beta)	0.037	0.045
Endosulfan sulfate	0.037	0.045
Endrin	0.016	0.019
Guthion	0.078	0.095
Heptachlor	0.031	0.038
gamma-Hexachlorocyclohexane (Lindane)	0.176	0.213
Lead	109	132
Malathion	0.078	0.095
Mercury	1.42	1.72
Methoxychlor	0.235	0.286
Mirex	0.0078	0.0095
Nickel	103	125
Nonylphenol	7.68	9.33
Parathion (ethyl)	0.038	0.047
Pentachlorophenol	8.50	10.3

Aquatic Life

Parameter	*70%*	*85%*
Phenanthrene	8.45	10.3
Polychlorinated Biphenyls (PCBs)	0.235	0.286
Selenium	11.8	14.3
Silver	5.09	6.18
Toxaphene	0.0016	0.0019
Tributyltin (TBT)	0.058	0.071
2,4,5 Trichlorophenol	80.2	97.4
Zinc	172	209

Human Health

Parameter	*70%*	*85%*
Acrylonitrile	90.9	110
Aldrin	0.024	0.029
Anthracene	N/A	N/A
Antimony	25623	31113
Arsenic	N/A	N/A
Barium	N/A	N/A
Benzene	12273	14903
Benzidine	0.048	0.058
Benzo(a)anthracene	78.5	95.3
Benzo(a)pyrene	7.90	9.59
Bis(chloromethyl) ether	10.5	12.8
Bis(2-chloroethyl) ether	241	292
Bis(2-ethylhexyl) phthalate	981	1191
Bromodichloromethane (Dichlorobromomethane)	7704	9354
Bromoform (Tribromomethane)	52035	63186
Cadmium	N/A	N/A
Carbon Tetrachloride (Tetrachloromethane)	730	886
Chlordane	0.194	0.235
Chlorobenzene	124430	151094
Chlorodibromomethane (Dibromochloromethane)	5718	6943
Chloroform (Trichloromethane)	170891	207510
Chromium (+6)	12010	14584
Chrysene	7823	9500
Cresols (Methylphenols)	222519	270202
Cyanide (free)	N/A	N/A
4,4'-DDD	0.141	0.171
4,4'-DDE	0.096	0.116
4,4'-DDT	0.096	0.116
2,4'-D	N/A	N/A
Danitol	11316	13741
1,2-Dibromoethane	101	123
m-Dichlorobenzene (1,3-Dichlorobenzene)	34571	41979
o-Dichlorobenzene (1,2-Dichlorobenzene)	103736	125965
p-Dichlorobenzene (1,4-Dichlorobenzene)	N/A	N/A
3,3'-Dichlorobenzidine	10.5	12.8
1,2-Dichloroethane	13230	16065
1,1-Dichloroethylene	572172	694781
Dichloromethane (Methylene Chloride)	531645	645569
1,2-Dichloropropane	5407	6565

Human Health

Parameter	*70%*	*85%*
1,3-Dichloropropene (1,3- Dichloropropylene)	5048	6130
Dicofol	7.18	8.72
Dieldrin	0.024	0.029
2,4-Dimethylphenol	13661	16588
Di-*n*-Butyl Phthalate	72012	87443
Dioxins/Furans (TCDD Equivalents)	1.91E-06	2.32E-06
Endrin	4.78	5.81
Ethylbenzene	170891	207510
Fluoride	N/A	N/A
Heptachlor	0.036	0.044
Heptachlor Epoxide	0.018	0.022
Hexachlorobenzene	0.108	0.131
Hexachlorobutadiene	6555	7960
Hexachlorocyclohexane (alpha)	2.22	2.70
Hexachlorocyclohexane (beta)	7.90	9.59
Hexachlorocyclohexane (gamma) (Lindane)	148	180
Hexachlorocyclopentadiene	N/A	N/A
Hexachloroethane	275	334
Hexachlorophene	69.4	84.2
Lead	240	292
Mercury	0.598	0.726
Methoxychlor	38.5	46.8
Methyl Ethyl Ketone	23732856	28818468
Nickel	27274	33118
Nitrate-Nitrogen (as Total Nitrogen)	N/A	N/A
Nitrobenzene	44332	53831
N-Nitrosodiethylamine	50.2	61.0
N-Nitroso-di-n-Butylamine	100	122
Pentachlorobenzene	23.9	29.1
Pentachlorophenol	218	264
Polychlorinated Biphenyls (PCBs)	0.015	0.019
Pyridine	22656	27511
Selenium	N/A	N/A
1,2,4,5-Tetrachlorobenzene	17.0	20.6
1,1,2,2-Tetrachloroethane	957	1162
Tetrachloroethylene	12560	15252
Thallium	5.50	6.68
Toluene	N/A	N/A
Toxaphene	0.127	0.154
2,4,5-TP (Silvex)	502	610
1,1,1-Trichloroethane	22887445	27791897
1,1,2-Trichloroethane	7058	8570
Trichloroethylene	1962	2382
2,4,5-Trichlorophenol	58256	70739
TTHM (Sum of Total Trihalomethanes)	N/A	N/A
Vinyl Chloride	574	697

Equivalent mass limits were calculated in order to directly compare the calculated water quality-based effluent limits at Outfall 001 to the required technology-based effluent limits at internal Outfall 101, which are in mass units. The effluent flow used for limits based on aquatic life criteria is 1.0 MGD, and the effluent flow used for limits based on human health criteria is 0.605 MGD. The equivalent mass limits are calculated as follows:

Mass Limit (lbs/day) = [(Concentration Limit, µg/L)/1000] × [Flow, MGD] × [8.345]

Parameter	Daily Avg (µg/L)	Daily Max (µg/L)	Daily Avg (lbs/day)	Daily Max (lbs/day)	Aquatic Life/ Human Health
Acrylonitrile	130	275	0.656	1.38	Human Health
Aldrin	0.034	0.072	0.017	0.035	Human Health
Arsenic	234	494	1.95	4.12	Aquatic Life
Benzene	17,533	37,094	88.5	187	Human Health
Benzo(*a*)anthracene	112	237	0.565	1.19	Human Health
Benzo(*a*)pyrene	11.3	23.9	0.057	0.120	Human Health
Bis(2-ethylhexyl) phthalate	1,401	2,965	7.07	14.9	Human Health
Bromodichloromethane (Dichlorobromomethane)	11,005	23,283	55.5	117	Human Health
Bromoform	74,336	157,269	375	794	Human Health
Cadmium, total	18.5	39.0	0.154	0.325	Aquatic Life
Carbon Tetrachloride (Tetrachloromethane)	1,042	2,205	5.26	11.1	Human Health
Chlordane	0.045	0.095	0.000376	0.000793	Aquatic Life
Chlorobenzene	177,757	376,071	897	1,898	Human Health
Chlorodibromomethane (Dibromochloromethane)	8,168	17,281	41.2	87.2	Human Health
Chloroform (Trichloromethane)	244,130	516,492	1,232	2,607	Human Health
Chromium, Hexavalent	13.2	28.0	0.110	0.233	Aquatic Life
Chrysene	11,176	23,645	56.4	119	Human Health
Copper, total	23.9	50.6	0.199	0.422	Aquatic Life
Cyanide, free	8.78	18.6	0.073	0.155	Aquatic Life
4,4′-DDD	0.202	0.427	0.00069	0.00145	Human Health
4,4′-DDE	0.137	0.289	0.00069	0.00145	Human Health
4,4′-DDT	0.011	0.024	0.000091	0.000200	Aquatic Life
Di-*n*-Butyl Phthalate	102,874	217,646	519	1,098	Human Health
m-Dichlorobenzene (1,3-Dichlorobenzene)	49,386	104,484	249	527	Human Health
o-Dichlorobenzene (1,2-Dichlorobenzene)	148,194	313,525	748	1,582	Human Health
1,2-Dichloroethane	18,900	39,986	95.4	201	Human Health
1,1-Dichloroethylene	817,389	1,729,306	4,126	8,730	Human Health
Dichloromethane (Methylene Chloride)	759,492	1,606,817	3,834	8,112	Human Health
1,2-Dichloropropane	7,724	16,341	38.9	82.5	Human Health
1,3-Dichloropropene (1,3-Dichloropropylene)	7,211	15,257	36.4	77.0	Human Health
Dieldrin	0.022	0.047	0.00018	0.00039	Aquatic Life
2,4-Dimethylphenol	19,515	41,288	98.5	208	Human Health

Parameter	Daily Avg (µg/L)	Daily Max (µg/L)	Daily Avg (lbs/day)	Daily Max (lbs/day)	Aquatic Life/ Human Health
Ethylbenzene	244,130	516,492	1,232	2,607	Human Health
Hexachlorobenzene	0.154	0.325	0.00077	0.00164	Human Health
Hexachlorobutadiene	9,365	19,812	47.2	100	Human Health
Hexachlorocyclohexane (alpha)	3.18	6.72	0.016	0.033	Human Health
Hexachlorocyclohexane (beta)	11.3	23.9	0.057	0.120	Human Health
Hexachlorocyclohexane (gamma)	0.251	0.531	0.0020	0.0044	Aquatic Life
Hexachloroethane	393	832	1.98	4.20	Human Health
Lead, total	156	330	1.30	2.75	Aquatic Life
Mercury	0.854	1.81	0.0043	0.0091	Human Health
Nitrobenzene	63,331	133,986	319	676	Human Health
Phenanthrene	12.1	25.5	0.100	0.212	Aquatic Life
Selenium, total	16.8	35.6	0.140	0.297	Aquatic Life
Silver, total	7.27	15.4	0.060	0.128	Aquatic Life
Tetrachloroethylene	17,943	37,961	90.5	191	Human Health
1,1,1-Trichloroethane	32,696,350	69,173,910	165,074	349,240	Human Health
1,1,2-Trichloroethane	10,082	21,331	50.9	107	Human Health
Trichloroethylene	2,803	5,929	14.1	29.9	Human Health
Vinyl Chloride	820	1,735	4.14	8.75	Human Health

Appendix C
Comparison of Technology-Based Effluent Limits and Water Quality-Based Effluent Limits

The following table is a summary of technology-based effluent limitations calculated/assessed in the draft permit (Technology-Based), calculated/ assessed water quality-based effluent limitations (Water Quality-Based), and effluent limitations in the existing permit (Existing Permit). Effluent limitations appearing in bold are the most stringent of the three and are included in the draft permit.

Out-fall	Pollutant	Technology-Based				Water Quality-Based				Existing Permit			
		Daily Avg		Daily Max		Daily Avg		Daily Max		Daily Avg		Daily Max	
		lbs/day	mg/L	lbs/day	mg/L	lbs/day	mg/L	lbs/day	mg/L	lbs/day	mg/L	lbs/day	mg/L
001	Flow	Report, MGD		Report, MGD		Report, MGD		Report, MGD		**Report, MGD**		**Report, MGD**	
	Conventionals												
	Oil and Grease	N/A	N/A	N/A	15	N/A	N/A	N/A	N/A	**N/A**	**N/A**	**N/A**	**15**
	pH	Between 6.0 and 9.0 SU				Between 6.0 and 9.0 SU				**Between 6.0 and 9.0 SU**			
	Metals and Cyanide												
	Arsenic, Total [1]	N/A	N/A	N/A	N/A	N/A	0.234	N/A	0.494	**N/A**	**0.1**	**N/A**	**0.2**
	Cadmium, Total	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**	**Report**	**N/A**	**Report**
	Chromium, Hexavalent	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**	**Report**	**N/A**	**Report**
	Copper, Total	N/A	N/A	N/A	N/A	0.199	0.024	0.422	0.051	**0.165**	**0.024**	**0.350**	**0.051**
	Cyanide, Free	N/A	N/A	N/A	N/A	N/A	0.009	N/A	0.019	**N/A**	**0.009**	**N/A**	**0.019**
	Lead, Total [2]	1.34	N/A	2.89	N/A	1.30	0.156	2.75	0.330	**1.07**	**0.155**	**2.27**	**0.329**
	Manganese, Total [3]	N/A	N/A	N/A	N/A	N/A	1.0	**N/A**	**2.0**	**N/A**	**1.0**	N/A	3.0
	Mercury, Total	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**	**Report**	**N/A**	**Report**
	Selenium, Total	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**	**Report**	**N/A**	**Report**
	Silver, Total	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**	**Report**	**N/A**	**Report**
	Vanadium, Total	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**	**Report**	**N/A**	**Report**
	Organics/Pesticides												
	Aldrin	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**	**Report**	**N/A**	**Report**
	Chlordane	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**	**Report**	**N/A**	**Report**
	DCPA [Dacthal or Dimethyl 2,3,5,6-tetrachloroterephthalate]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**	**N/A**	**N/A**	**0.168**
	4,4'-DDT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**	**Report**	**N/A**	**Report**
	4,4'-DDD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**	**Report**	**N/A**	**Report**

1 Existing limits are taken from 30 TAC § 319.22.
2 Technology-based limits would apply at internal Outfall 101, but water quality-based limits are more stringent and are applied at Outfall 001.
3 Existing daily average limit and proposed daily maximum limit are taken from 30 TAC § 319.22.

Out-fall	Pollutant	Technology-Based				Water Quality-Based				Existing Permit			
		Daily Avg		Daily Max		Daily Avg		Daily Max		Daily Avg		Daily Max	
		lbs/day	mg/L	lbs/day	mg/L	lbs/day	mg/L	lbs/day	mg/L	lbs/day	mg/L	lbs/day	mg/L
001	4,4'-DDE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**	**Report**	**N/A**	**Report**
	Dieldrin	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**	**Report**	**N/A**	**Report**
	Hexachlorobenzene [2]	0.0083	N/A	0.0156	N/A	0.00077	0.00015	0.00164	0.00033	**0.0005**	**0.00015**	**0.0012**	**0.00033**
	Hexachlorocyclohexane (*alpha*) [*alpha*-BHC]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**	**Report**	**N/A**	**Report**
	Hexachlorocyclohexane (*beta*) [*beta*-BHC]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**	**Report**	**N/A**	**Report**
	Hexachlorocyclohexane (*delta*) [*delta*-BHC]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**	**Report**	**N/A**	**Report**
	Hexachlorocyclohexane (*gamma*) [*gamma*-BHC]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**	**Report**	**N/A**	**Report**
	TCDD Equivalents [4]	N/A	N/A	N/A	N/A	**N/A**	**N/A**	**N/A**	**Report, pg/L**	N/A	N/A	N/A	N/A
	Xylenes, Total	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**	**Report**	**N/A**	**Report**
	Whole Effluent Toxicity (WET) limits												
	Mysidopsis bahia (7-day chronic NOEC [5])	N/A		N/A		8%		8%		**8%**		**8%**	
	Menidia beryllina (7-day chronic NOEC)	N/A		N/A		8%		8%		**8%**		**8%**	
	Mysidopsis bahia (24-hour acute LC50 [6])	N/A		N/A		>100%		>100%		**>100%**		**>100%**	
101	Flow	Report, MGD		Report, MGD		N/A		N/A		**0.9 MGD**		**1.6 MGD**	
	Conventionals												
	Biochemical Oxygen Demand, 5-day (BOD_5)	231	N/A	973	N/A	Existing limits are protective.				**180**	**N/A**	**500**	**N/A**
	Total Suspended Solids (TSS)	280	N/A	906	N/A	N/A	N/A	N/A	N/A	**215**	**N/A**	**500**	**N/A**
	Ammonia, as Nitrogen	N/A	N/A	N/A	N/A	Existing limits are protective.				**20**	**N/A**	**40**	**N/A**
	Total Organic Carbon (TOC)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**640**	**N/A**	**1,280**	**N/A**
	Chemical Oxygen Demand (COD)	1,262	N/A	1,965	N/A	N/A	N/A	N/A	N/A	**1,167**	**N/A**	**1,885**	**N/A**
	Metals and Cyanide												
	Arsenic, Total	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**1.50**	**N/A**	**2.25**	**N/A**

4 Monitoring and reporting requirements expires one month prior to the date of permit expiration.
5 The lethal NOEC is defined as the greatest effluent dilution at which no significant lethality is demonstrated. Significant lethality is defined as a statistically significant difference between a specified effluent dilution and the control.
6 The LC50 (Lethal Concentration 50) is defined as the effluent dilution at with 50% of the organisms survive.

Out-fall	Pollutant	Technology-Based				Water Quality-Based				Existing Permit			
		Daily Avg		Daily Max		Daily Avg		Daily Max		Daily Avg		Daily Max	
		lbs/day	mg/L	lbs/day	mg/L	lbs/day	mg/L	lbs/day	mg/L	lbs/day	mg/L	lbs/day	mg/L
101	Cyanide, Total	0.973	N/A	2.83	N/A	N/A	N/A	N/A	N/A	**0.973**	**N/A**	**2.83**	**N/A**
	Bacteria												
	Enterococci	N/A		N/A		35 cfu or MPN/100 mL		104 cfu or MPN/100 mL		**35 cfu or MPN/100 mL**		**104 cfu or MPN/100 mL**	
	Organics/Pesticides												
	Acenaphthene	0.012	N/A	0.033	N/A	N/A	N/A	N/A	N/A	**0.012**	**N/A**	**0.033**	**N/A**
	Acenaphthylene	0.012	N/A	0.033	N/A	N/A	N/A	N/A	N/A	**0.012**	**N/A**	**0.033**	**N/A**
	Acrylonitrile	0.054	N/A	0.135	N/A	0.656	[0.130]	1.38	[0.275]	**0.054**	**N/A**	**0.135**	**N/A**
	Anthracene	0.012	N/A	0.033	N/A	N/A	N/A	N/A	N/A	**0.012**	**N/A**	**0.033**	**N/A**
	Benzene	0.176	N/A	0.647	N/A	88.5	[17.5]	187	[37.0]	**0.176**	**N/A**	**0.647**	**N/A**
	Benzo(*a*)anthracene	0.012	N/A	0.033	N/A	0.565	[0.112]	1.19	[0.237]	**0.012**	**N/A**	**0.033**	**N/A**
	3,4-Benzofluoranthene [Benzo(*b*)fluoranthene]	0.013	N/A	0.034	N/A	N/A	N/A	N/A	N/A	**0.013**	**N/A**	**0.034**	**N/A**
	Benzo(*k*)fluoranthene	0.012	N/A	0.033	N/A	N/A	N/A	N/A	N/A	**0.012**	**N/A**	**0.033**	**N/A**
	Benzo(*a*)pyrene	0.013	N/A	0.034	N/A	0.057	[0.0113]	0.120	[0.0239]	**0.013**	**N/A**	**0.034**	**N/A**
	Bis(2-ethylhexyl) phthalate	0.058	N/A	0.156	N/A	7.07	[1.40]	14.9	[2.96]	**0.058**	**N/A**	**0.156**	**N/A**
	Bromodichloromethane [Dichlorobromomethane]	**0.595**	**N/A**	**1.594**	**N/A**	55.5	[11.0]	117	[23.2]	0.614	N/A	1.643	N/A
	Bromomethane	**0.595**	**N/A**	**1.594**	**N/A**	N/A	N/A	N/A	N/A	0.614	N/A	1.643	N/A
	Chlorobenzene	0.071	N/A	0.133	N/A	897	[177]	1,898	[376]	**0.071**	**N/A**	**0.133**	**N/A**
	Chloroethane	0.058	N/A	0.150	N/A	N/A	N/A	N/A	N/A	**0.058**	**N/A**	**0.150**	**N/A**
	Chloromethane [Methyl Chloride]	0.408	N/A	0.903	N/A	N/A	N/A	N/A	N/A	**0.166**	**N/A**	**0.366**	**N/A**
	2-Chlorophenol	0.147	N/A	0.466	N/A	N/A	N/A	N/A	N/A	**0.147**	**N/A**	**0.466**	**N/A**
	Chlorothalonil [Daconil]	**0.053**	**N/A**	**0.176**	**N/A**	N/A	N/A	N/A	N/A	0.277	N/A	1.54	N/A
	Chrysene	0.012	N/A	0.033	N/A	56.4	[11.1]	119	[23.6]	**0.012**	**N/A**	**0.033**	**N/A**
	Dibromochloromethane [Chlorodibromomethane]	0.822	N/A	3.332	N/A	41.2	[8.16]	87.2	[17.2]	**0.822**	**N/A**	**3.332**	**N/A**
	Di-*n*-butyl phthalate	0.015	N/A	0.032	N/A	519	[102]	1,098	[217]	**0.015**	**N/A**	**0.032**	**N/A**
	1,2-Dichlorobenzene	0.366	N/A	0.775	N/A	748	[148]	1,582	[313]	**0.366**	**N/A**	**0.775**	**N/A**
	1,3-Dichlorobenzene	0.017	N/A	0.025	N/A	249	[49.3]	527	[104]	**0.017**	**N/A**	**0.025**	**N/A**
	1,4-Dichlorobenzene	0.071	N/A	0.133	N/A	N/A	N/A	N/A	N/A	**0.071**	**N/A**	**0.133**	**N/A**
	1,1-Dichloroethane	0.012	N/A	0.033	N/A	N/A	N/A	N/A	N/A	**0.012**	**N/A**	**0.033**	**N/A**
	1,2-Dichloroethane	0.323	N/A	1.003	N/A	95.4	[18.9]	201	[39.9]	**0.323**	**N/A**	**1.003**	**N/A**
	1,1-Dichloroethylene	0.076	N/A	0.119	N/A	4,126	[817]	8,730	[1,729]	**0.076**	**N/A**	**0.119**	**N/A**
	1,2-*trans*-Dichloroethylene	0.100	N/A	0.257	N/A	N/A	N/A	N/A	N/A	**0.100**	**N/A**	**0.257**	**N/A**

Out-fall	Pollutant	Technology-Based				Water Quality-Based				Existing Permit			
		Daily Avg		Daily Max		Daily Avg		Daily Max		Daily Avg		Daily Max	
		lbs/day	mg/L	lbs/day	mg/L	lbs/day	mg/L	lbs/day	mg/L	lbs/day	mg/L	lbs/day	mg/L
101	Dichloromethane [Methylene Chloride]	0.190	N/A	0.423	N/A	3,834	[759]	8,112	[1,606]	**0.190**	**N/A**	**0.423**	**N/A**
	2,4-Dichlorophenol	0.185	N/A	0.533	N/A	N/A	N/A	N/A	N/A	**0.185**	**N/A**	**0.533**	**N/A**
	1,2-Dichloropropane	0.728	N/A	1.094	N/A	38.9	[7.72]	82.5	[16.3]	**0.728**	**N/A**	**1.094**	**N/A**
	1,3-Dichloropropene [1,3-Dichloropropylene]	0.138	N/A	0.210	N/A	36.4	[7.21]	77.0	[15.2]	**0.138**	**N/A**	**0.210**	**N/A**
	Diethyl phthalate	0.045	N/A	0.114	N/A	N/A	N/A	N/A	N/A	**0.045**	**N/A**	**0.114**	**N/A**
	2,4-Dimethylphenol	0.086	N/A	0.171	N/A	98.5	[19.5]	208	[41.2]	**0.086**	**N/A**	**0.171**	**N/A**
	Dimethyl phthalate	0.011	N/A	0.026	N/A	N/A	N/A	N/A	N/A	**0.011**	**N/A**	**0.026**	**N/A**
	4,6-Dinitro-*o*-cresol	0.044	N/A	0.155	N/A	N/A	N/A	N/A	N/A	**0.044**	**N/A**	**0.155**	**N/A**
	2,4-Dinitrophenol	0.040	N/A	0.069	N/A	N/A	N/A	N/A	N/A	**0.040**	**N/A**	**0.069**	**N/A**
	2,4-Dinitrotoluene	0.063	N/A	0.159	N/A	N/A	N/A	N/A	N/A	**0.063**	**N/A**	**0.159**	**N/A**
	2,6-Dinitrotoluene	0.143	N/A	0.358	N/A	N/A	N/A	N/A	N/A	**0.143**	**N/A**	**0.358**	**N/A**
	Ethylbenzene	0.152	N/A	0.514	N/A	1,232	[244]	2,607	[516]	**0.152**	**N/A**	**0.514**	**N/A**
	Fluoranthene	0.014	N/A	0.038	N/A	N/A	N/A	N/A	N/A	**0.014**	**N/A**	**0.038**	**N/A**
	Fluorene	0.012	N/A	0.033	N/A	N/A	N/A	N/A	N/A	**0.012**	**N/A**	**0.033**	**N/A**
	Hexachlorobutadiene	0.011	N/A	0.027	N/A	47.2	[9.36]	100	[19.8]	**0.011**	**N/A**	**0.027**	**N/A**
	Hexachloroethane	0.012	N/A	0.030	N/A	1.98	[0.393]	4.20	[0.832]	**0.012**	**N/A**	**0.030**	**N/A**
	Naphthalene	0.105	N/A	0.281	N/A	N/A	N/A	N/A	N/A	**0.105**	**N/A**	**0.281**	**N/A**
	Nitrobenzene	0.015	N/A	0.038	N/A	319	[63.3]	676	[133]	**0.015**	**N/A**	**0.038**	**N/A**
	2-Nitrophenol	0.023	N/A	0.039	N/A	N/A	N/A	N/A	N/A	**0.023**	**N/A**	**0.039**	**N/A**
	4-Nitrophenol	0.040	N/A	0.069	N/A	N/A	N/A	N/A	N/A	**0.040**	**N/A**	**0.069**	**N/A**
	Phenanthrene	0.012	N/A	0.033	N/A	0.100	[0.012]	0.212	[0.025]	**0.012**	**N/A**	**0.033**	**N/A**
	Phenol	0.071	N/A	0.124	N/A	N/A	N/A	N/A	N/A	**0.071**	**N/A**	**0.124**	**N/A**
	Pyrene	0.014	N/A	0.037	N/A	N/A	N/A	N/A	N/A	**0.014**	**N/A**	**0.037**	**N/A**
	Tetrachloroethylene	0.105	N/A	0.266	N/A	90.5	[17.9]	191	[37.9]	**0.105**	**N/A**	**0.266**	**N/A**
	Tetrachloromethane [Carbon Tetrachloride]	0.086	N/A	0.180	N/A	5.26	[1.04]	11.1	[2.20]	**0.086**	**N/A**	**0.180**	**N/A**
	Toluene	0.124	N/A	**0.380**	N/A	N/A	N/A	N/A	N/A	**0.124**	**N/A**	0.38	**N/A**
	Tribromomethane [Bromoform]	0.822	N/A	3.332	N/A	375	[74.3]	794	[157]	**0.822**	**N/A**	**3.332**	**N/A**
	1,2,4-Trichlorobenzene	0.038	N/A	0.078	N/A	N/A	N/A	N/A	N/A	**0.038**	**N/A**	**0.078**	**N/A**
	1,1,1-Trichloroethane	0.100	N/A	0.257	N/A	165,074	[32,696]	349,240	[69,173]	**0.100**	**N/A**	**0.257**	**N/A**
	1,1,2-Trichloroethane	0.012	N/A	0.030	N/A	50.9	[10.0]	107	[21.3]	**0.012**	**N/A**	**0.030**	**N/A**
	Trichloroethylene	0.012	N/A	0.030	N/A	14.1	[2.80]	29.9	[5.92]	**0.012**	**N/A**	**0.030**	**N/A**

Out-fall	*Pollutant*	*Technology-Based*				*Water Quality-Based*				*Existing Permit*			
		Daily Avg		*Daily Max*		*Daily Avg*		*Daily Max*		*Daily Avg*		*Daily Max*	
		lbs/day	*mg/L*	*lbs/day*	*mg/L*	*lbs/day*	*mg/L*	*lbs/day*	*mg/L*	*lbs/day*	*mg/L*	*lbs/day*	*mg/L*
101	Trichloromethane [Chloroform]	**0.100**	N/A	0.219	N/A	1,232	[244]	2,607	[516]	0.10	**N/A**	**0.219**	**N/A**
	Vinyl Chloride	0.058	N/A	0.150	N/A	4.14	[0.820]	8.75	[1.73]	**0.058**	**N/A**	**0.150**	**N/A**
201	Flow	Report, MGD		Report, MGD		N/A		N/A		**Report, MGD**		**Report, MGD**	
	TOC	N/A	N/A	N/A	55	N/A	N/A	N/A	N/A	**N/A**	**N/A**	**N/A**	**55**
	Total Arsenic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**	**N/A**	**N/A**	**0.6**
	Chlorothalonil [Daconil]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**	**N/A**	**N/A**	**0.6**
002	Flow	**Report, MGD**		**Report, MGD**		N/A		N/A		N/A		N/A	
	TOC	**N/A**	**N/A**	**N/A**	**55**	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Oil and Grease	**N/A**	**N/A**	**N/A**	**15**	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**15**
	pH	Between 6.0 and 9.0 SU				N/A				**Between 6.0 and 9.0 SU**			
003	Flow	Report, MGD		Report, MGD		N/A		N/A		**Report, MGD**		**Report, MGD**	
	TOC	N/A	N/A	N/A	55	N/A	N/A	N/A	N/A	**N/A**	**N/A**	**N/A**	**55**
	Oil and Grease	N/A	N/A	N/A	15	N/A	N/A	N/A	N/A	**N/A**	**N/A**	**N/A**	**15**
	pH	Between 6.0 and 9.0 SU				N/A				**Between 6.0 and 9.0 SU**			
004	Flow	Report, MGD		Report, MGD		N/A		N/A		**Report, MGD**		**Report, MGD**	
	TOC	N/A	N/A	N/A	55	N/A	N/A	N/A	N/A	**N/A**	**N/A**	**N/A**	**55**
	Oil and Grease	N/A	N/A	N/A	15	N/A	N/A	N/A	N/A	**N/A**	**N/A**	**N/A**	**15**
	pH	Between 6.0 and 9.0 SU				N/A				**Between 6.0 and 9.0 SU**			
005	Flow	Report, MGD		Report, MGD		N/A		N/A		**Report, MGD**		**Report, MGD**	
	TOC	N/A	N/A	N/A	55	N/A	N/A	N/A	N/A	**N/A**	**N/A**	**N/A**	**55**
	Oil and Grease	N/A	N/A	N/A	15	N/A	N/A	N/A	N/A	**N/A**	**N/A**	**N/A**	**15**
	pH	Between 6.0 and 9.0 SU				N/A				**Between 6.0 and 9.0 SU**			
006	Flow	Report, MGD		Report, MGD		N/A		N/A		**Report, MGD**		**Report, MGD**	
	TOC	N/A	N/A	N/A	55	N/A	N/A	N/A	N/A	**N/A**	**N/A**	**N/A**	**55**
	Oil and Grease	N/A	N/A	N/A	15	N/A	N/A	N/A	N/A	**N/A**	**N/A**	**N/A**	**15**
	pH	Between 6.0 and 9.0 SU				N/A				**Between 6.0 and 9.0 SU**			

Appendix D
Calculations of Single Grab Limits

Calculated single grab limits are shown in the table below. The column labeled "Single Grab Method" references an explanation of how the single grab limit was calculated for each pollutant. The column "Existing Single Grab" shows the single grab limit in the existing permit. The single grab limit included in the draft permit is shown in bold type. Recalculated single grab limits for a number of pollutants were lower than the respective MALs; these single grab limits have been set equal to the MAL. This adjustment is shown in the table and has "**E**" in the "Single Grab Note" column.

Out-fall	*Pollutant*	*Draft Permit Limits*						*Existing Single Grab*
		Daily Avg		*Daily Max*		*Single Grab*	*Single Grab Method*	
		lbs/day	*mg/L*	*lbs/day*	*mg/L*	*mg/L*		*mg/L*
001	*Conventionals*							
	Oil and Grease	—	—	—	15	15	C	**15**
	Metals and Cyanide							
	Arsenic, Total	—	0.1	—	0.2	0.3	D	**0.3**
	Copper, Total	0.165	0.024	0.350	0.051	0.072	A	**0.072**
	Cyanide, Free	—	0.009	—	0.019	**0.019**	C	0.050
	Lead, Total	1.07	0.155	2.27	0.329	0.465	A	**0.465**
	Manganese, Total	—	1.0	—	2.0	3.0	D	**3.0**
	Organics/Pesticides							
	DCPA [Dacthal]	—	—	—	0.168	0.336	B	**0.250**
	Hexachlorobenzene	0.0005	0.00015	0.0012	0.00033	0.00045 **0.005**	A **E**	0.00045
101	*Conventionals*							
	BOD_5	180	—	500	—	133	B	**100**
	TSS	215	—	500	—	133	B	**100**
	Ammonia, as Nitrogen	20	—	40	—	10.6	B	**8.0**
	TOC	640	—	1,280	—	340	B	**210**
	COD	1,167	—	1,885	—	502	B	**320**
	Metals and Cyanide							
	Arsenic, Total	1.50	—	2.25	—	0.6	B	**0.45**
	Cyanide, Total	0.973	—	2.83	—	**0.38**	C	0.746
	Bacteria							
	Enterococci (cfu or MPN/100 mL)	35		104		**104**	C	N/A
	Organics/Pesticides							
	Acenaphthene	0.012	—	0.033	—	0.009 **0.010**	B **E**	0.029
	Acenaphthylene	0.012	—	0.033	—	0.009 **0.010**	B **E**	0.029
	Acrylonitrile	0.054	—	0.135	—	0.036 **0.050**	B **E**	0.120
	Anthracene	0.012	—	0.033	—	0.009 **0.010**	B **E**	0.029

Out-fall	Pollutant	Draft Permit Limits						Existing Single Grab
		Daily Avg		Daily Max		Single Grab	Single Grab Method	
		lbs/day	mg/L	lbs/day	mg/L	mg/L		mg/L
101	Benzene	0.176	—	0.647	—	0.172	B	**0.170**
	Benzo(*a*)anthracene	0.012	—	0.033	—	**0.009**	B	0.029
	3,4-Benzofluoranthene [Benzo(*b*)fluoranthene]	0.013	—	0.034	—	0.009 **0.010**	B **E**	0.030
	Benzo(*k*)fluoranthene	0.012	—	0.033	—	**0.009**	B	0.029
	Benzo(*a*)pyrene	0.013	—	0.034	—	**0.009**	B	0.030
	Bis(2-ethylhexyl) phthalate	0.058	—	0.156	—	**0.042**	B	0.138
	Bromodichloromethane [Dichlorobromomethane]	0.595	—	1.594	—	0.424	B	**0.421**
	Bromomethane	0.595	—	1.594	—	0.424	B	**0.421**
	Chlorobenzene	0.071	—	0.133	—	0.035	B	**0.035**
	Chloroethane	0.058	—	0.150	—	0.040 **0.050**	B **E**	0.132
	Chloromethane [Methyl Chloride]	0.166	—	0.366	—	0.097	B	**0.094**
	2-Chlorophenol	0.147	—	0.466	—	0.124	B	**0.123**
	Chlorothalonil [Daconil]	0.053	—	0.176	—	**0.05**	B	0.25
	Chrysene	0.012	—	0.033	—	**0.009**	B	0.029
	Dibromochloromethane [Chlorodibromomethane]	0.822	—	3.332	—	0.880	B	**0.880**
	Di-*n*-butyl phthalate	0.015	—	0.032	—	0.008 **0.010**	B **E**	0.028
	1,2-Dichlorobenzene	0.366	—	0.775	—	0.206	B	**0.204**
	1,3-Dichlorobenzene	0.017	—	0.025	—	0.007 **0.010**	B **E**	0.022
	1,4-Dichlorobenzene	0.071	—	0.133	—	0.035	B	**0.035**
	1,1-Dichloroethane	0.012	—	0.033	—	0.009 **0.010**	B **E**	0.029
	1,2-Dichloroethane	0.323	—	1.003	—	0.267	B	**0.264**
	1,1-Dichloroethylene	0.076	—	0.119	—	0.032	B	**0.032**
	1,2-*trans*-Dichloroethylene	0.100	—	0.257	—	0.068	B	**0.068**
	Dichloromethane [Methylene Chloride]	0.190	—	0.423	—	0.112	B	**0.112**
	2,4-Dichlorophenol	0.185	—	0.533	—	0.141	B	**0.140**
	1,2-Dichloropropane	0.728	—	1.094	—	0.291	B	**0.288**
	1,3-Dichloropropene [1,3-Dichloropropylene]	0.138	—	0.210	—	0.055	B	**0.055**
	Diethyl phthalate	0.045	—	0.114	—	**0.030**	B	0.100
	2,4-Dimethylphenol	0.086	—	0.171	—	0.045	B	**0.045**
	Dimethyl phthalate	0.011	—	0.026	—	0.007 **0.010**	B **E**	0.023
	4,6-Dinitro-*o*-cresol	0.044	—	0.155	—	0.041 **0.050**	B **E**	0.137

Out-fall	Pollutant	Draft Permit Limits						Existing Single Grab
		Daily Avg		Daily Max		Single Grab	Single Grab	
		lbs/day	mg/L	lbs/day	mg/L	mg/L	Method	mg/L
101	2,4-Dinitrophenol	0.040	—	0.069	—	0.018 **0.050**	B **E**	0.061
	2,4-Dinitrotoluene	0.063	—	0.159	—	**0.042**	B	0.141
	2,6-Dinitrotoluene	0.143	—	0.358	—	**0.095**	B	0.317
	Ethylbenzene	0.152	—	0.514	—	0.136	B	**0.135**
	Fluoranthene	0.014	—	0.038	—	**0.010**	B	0.034
	Fluorene	0.012	—	0.033	—	0.009 **0.010**	B **E**	0.029
	Hexachlorobutadiene	0.011	—	0.027	—	0.007 **0.010**	B **E**	0.024
	Hexachloroethane	0.012	—	0.030	—	0.008 **0.020**	B **E**	0.027
	Naphthalene	0.105	—	0.281	—	0.074	B	**0.073**
	Nitrobenzene	0.015	—	0.038	—	**0.010**	B	0.034
	2-Nitrophenol	0.023	—	0.039	—	0.010 **0.020**	B **E**	0.034
	4-Nitrophenol	0.040	—	0.069	—	0.018 **0.050**	B **E**	0.061
	Phenanthrene	0.012	—	0.033	—	0.009 **0.010**	B **E**	0.029
	Phenol	0.071	—	0.124	—	0.033	B	**0.033**
	Pyrene	0.014	—	0.037	—	**0.010**	B	0.033
	Tetrachloroethylene	0.105	—	0.266	—	0.070	B	**0.070**
	Tetrachloromethane [Carbon Tetrachloride]	0.086	—	0.180	—	0.047	B	**0.047**
	Toluene	0.124	—	0.380	—	0.101	B	**0.100**
	Tribromomethane [Bromoform]	0.822	—	3.332	—	0.880	B	**0.880**
	1,2,4-Trichlorobenzene	0.038	—	0.078	—	**0.021**	B	0.069
	1,1,1-Trichloroethane	0.100	—	0.257	—	0.068	B	**0.068**
	1,1,2-Trichloroethane	0.012	—	0.030	—	0.008 **0.010**	B **E**	0.027
	Trichloroethylene	0.012	—	0.030	—	0.008 **0.010**	B **E**	0.027
	Trichloromethane [Chloroform]	0.100	—	0.219	—	0.058	B	**0.051**
	Vinyl Chloride	0.058	—	0.150	—	**0.040**	B	0.132
201	TOC	—	—	—	55	55	C	**55**
	Arsenic, Total	—	—	—	0.6	0.6	C	**0.6**
	Chlorothalonil [Daconil]	—	—	—	0.6	0.6	C	**0.6**
002	TOC	—	—	—	55	55	C	**55**
	Oil and Grease	—	—	—	15	15	C	**15**
003	TOC	—	—	—	55	55	C	**55**
	Oil and Grease	—	—	—	15	15	C	**15**

Out-fall	Pollutant	Draft Permit Limits						Existing Single Grab
		Daily Avg		Daily Max		Single Grab	Single Grab	
		lbs/day	mg/L	lbs/day	mg/L	mg/L	Method	mg/L
004	TOC	—	—	—	55	55	C	**55**
	Oil and Grease	—	—	—	15	15	C	**15**
005	TOC	—	—	—	55	55	C	**55**
	Oil and Grease	—	—	—	15	15	C	**15**
006	TOC	—	—	—	55	55	C	**55**
	Oil and Grease	—	—	—	15	15	C	**15**

Note	Single grab limit =			Note	Single grab limit =
A	$\frac{\text{Daily Avg (lbs/day)} \times 3}{0.9 \text{ MGD} \times 8.345}$	or	Daily Avg (mg/L) × 3	**D**	Value from 30 TAC § 319.23
B	$\frac{\text{Daily Max (lbs/day)} \times 2}{0.9 \text{ MGD} \times 8.345}$	or	Daily Max (mg/L) × 2	**E**	MAL
C	$\frac{\text{Daily Max (lbs/day)}}{0.9 \text{ MGD} \times 8.345}$	or	Daily Max (mg/L)		

Note on reductions of single grab limits.

In most cases, the single grab limits that were reduced were for pollutants whose limits are based solely on pollutants found in 40 CFR Part 414, Subpart I. It appears that previous single grab limits were calculated based only on the flow of wastewater subject to Part 414. The correct way to calculate these single grab limits is to divide by the entire flow of 0.9 MGD. Since the wastewater subject only to Part 414 comprises only about 10% of the entire wastewater flow, it is not surprising that the single grab limits were reduced significantly, in many cases to levels below the MAL. In these cases, the MAL has been specified as the single grab limit.

TPDES PERMIT NO. WQ0000749000
[For TCEQ office use only - EPA I.D. No. TX0007439]

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
P.O. Box 13087
Austin, Texas 78711-3087

This renewal replaces TPDES Permit No. WQ0000749000, issued on July 16, 2015.

PERMIT TO DISCHARGE WASTES
under provisions of
Section 402 of the Clean Water Act
and Chapter 26 of the Texas Water Code

GB Biosciences LLC

whose mailing address is

2239 Haden Road
Houston, Texas 77015

is authorized to treat and discharge wastes from the Greens Bayou Plant, which manufactures agricultural, specialty, and industrial organic chemicals (SIC 2879 and 2819)

located at 2239 Haden Road in the extraterritorial jurisdiction of the City of Houston, Harris County, Texas 77015

via Outfalls 001, 003, and 004 to unnamed ditches, thence to Harris County Flood Control District (HCFCD) ditch P104-00-00, thence to Greens Bayou Tidal, a portion of the Houston Ship Channel Tidal in Segment No. 1006 of the San Jacinto River Basin; and via Outfalls 002, 005, and 006 to HCFCD ditch P104-00-00, thence to Greens Bayou Tidal, a portion of the Houston Ship Channel Tidal in Segment No. 1006 of the San Jacinto River Basin

only according to effluent limitations, monitoring requirements, and other conditions set forth in this permit, as well as the rules of the Texas Commission on Environmental Quality (TCEQ), the laws of the State of Texas, and other orders of the TCEQ. The issuance of this permit does not grant to the permittee the right to use private or public property for conveyance of wastewater along the discharge route described in this permit. This includes, but is not limited to, property belonging to any individual, partnership, corporation, or other entity. Neither does this permit authorize any invasion of personal rights nor any violation of federal, state, or local laws or regulations. It is the responsibility of the permittee to acquire property rights as may be necessary to use the discharge route.

This permit shall expire at midnight, five years from the date of permit issuance.

ISSUED DATE:

For the Commission