Administrative Package Cover Page

This file contains the following documents:

1. Summary of application (in plain language)
2. First Notice (NORI-Notice of Receipt of Application and Intent to Obtain a Permit)
3. Application Materials

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

SUMMARY OF APPLICATION IN PLAIN LANGUAGE FOR TPDES OR TLAP PERMIT APPLICATIONS

Summary of Application (in plain language) Template and Instructions for Texas Pollutant Discharge Elimination System (TPDES) and Texas Land Application (TLAP) Permit Applications

ENGLISH TEMPLATE FOR TPDES or TLAP NEW/RENEWAL/AMENDMENT APPLICATIONS INDUSTRIAL WASTEWATER/STORMWATER

The following summary is provided for this pending water quality permit application being reviewed by the Texas Commission on Environmental Quality as required by 30 TAC Chapter 39. The information provided in this summary may change during the technical review of the application and is not a federal enforceable representation of the permit application.

The City of Austin (CN600135198) operates Nacogdoches Generating Facility (RN103219127), a steam electricity generation facility. The facility is located at 499 County Road 988, in Cushing, Nacogdoches County, Texas 75760. The application is for a renewal to discharge 1,750,000 gallons per day of cooling-tower blowdown, low-volume waste, and contact storm water.

Discharges from the facility are expected to contain Bromide, Nitrate-Nitrite, Sulfide, Boron, Cobalt, Iron, Magnesium, Manganese, Molybdenum, Tin, and Titanium. Cooling-tower blowdown, low-volume waste, and contact storm water are treated by the addition of sulfuric acid and small amounts of dispersants/antiscalants, filtration, reverse osmosis (RO), and final polishing by demineralization using a mixed bed resin tank or similar process.

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

NOTICE OF RECEIPT OF APPLICATION AND INTENT TO OBTAIN WATER QUALITY PERMIT RENEWAL

PERMIT NO. WQ0004414000

APPLICATION. City of Austin, 4815 Mueller Boulevard, Austin, Texas 78723, which owns a wood-fired steam electric power generation plant, has applied to the Texas Commission on Environmental Quality (TCEQ) to renew Texas Pollutant Discharge Elimination System (TPDES) Permit No. WQ0004414000 (EPA I.D. No. TX0124842) to authorize the discharge of treated wastewater at a volume not to exceed a daily average flow of 1,750,000 gallons per day. The facility is located at 499 County Road 988, near the city of Cushing, in Nacogdoches County, Texas 75760. The discharge route is from the plant site directly to Angelina River Above Sam Rayburn Reservoir. TCEQ received this application on October 27, 2025. The permit application will be available for viewing and copying at Nacogdoches County Clerks Office, District Clerks Office, 101 West Main Street, Suite 110, Nacogdoches, in Nacogdoches County, Texas and at Singletary Memorial Library, Reference Section, 207 East 6th Street, Rusk, in Cherokee County, Texas prior to the date this notice is published in the newspaper. The application, including any updates, and associated notices are available electronically at the following webpage: https://www.tceq.texas.gov/permitting/wastewater/pending-permits/tpdes-applications. This link to an electronic map of the site or facility's general location is provided as a public courtesy and not part of the application or notice. For the exact location, refer to the application. https://gisweb.tceq.texas.gov/LocationMapper/?marker=-94.900833,31.832222&level=18

ADDITIONAL NOTICE. TCEQ's Executive Director has determined the application is administratively complete and will conduct a technical review of the application. After technical review of the application is complete, the Executive Director may prepare a draft permit and will issue a preliminary decision on the application. **Notice of the Application and Preliminary Decision will be published and mailed to those who are on the county-wide mailing list and to those who are on the mailing list for this application. That notice will contain the deadline for submitting public comments.**

PUBLIC COMMENT / PUBLIC MEETING. You may submit public comments or request a public meeting on this application. The purpose of a public meeting is to provide the opportunity to submit comments or to ask questions about the application. 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 submitting public comments, the Executive Director will consider all timely comments and prepare a response to all relevant and material, or significant public comments. **Unless the application is directly referred for a contested case hearing, the response to comments, and the Executive Director's decision on the application, will be mailed to everyone who submitted public comments and to those persons who are on the mailing list for this application. If comments are received, the mailing will also provide instructions for requesting reconsideration of the Executive Director's decision and for requesting a contested case hearing.** A contested case hearing is a legal proceeding similar to a civil trial in 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.

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 placed on: (1) the permanent mailing list for a specific applicant name and permit number; and/or (2) the mailing list for a specific county. If you wish to be placed on the permanent and/or the county mailing list, clearly specify which list(s) and send your request to TCEQ Office of the Chief Clerk at the address below.

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. All public comments and requests must be submitted either electronically at **https://www14.tceq.texas.gov/epic/eComment/**, 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 City of Austin at the address stated above or by calling Mr. Ravi Joseph, P.E., Consulting Engineer, Austin Energy Environmental Services, at 512-963-3200.

Issuance Date: November 19, 2025

Brooke T. Paup, *Chairwoman*
Catarina R. Gonzales, *Commissioner*
Tonya R. Miller, *Commissioner*
Kelly Keel, *Executive Director*

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

October 27, 2025

Re: Confirmation of Submission of the Renewal without changes for Industrial Wastewater Authorization.

Dear Applicant:

This is an acknowledgement that you have successfully completed Renewal without changes for the Industrial Wastewater authorization.

ER Account Number: ER029898
Application Reference Number: 829236
Authorization Number: WQ0004414000
Site Name: Nacogdoches Generating Facility
Regulated Entity: RN103219127 - Nacogdoches Generating Facility
Customer(s): CN600135198 - City of Austin

Please be aware that TCEQ staff may contact your designated contact for any additional information.

If you have any questions, you may contact the Applications Review and Processing Team by email at WQ-ARPTeam@tceq.texas.gov or by telephone at (512) 239-4671.

Sincerely,
Applications Review and Processing Team
Water Quality Division

Texas Commission on Environmental Quality

Update Domestic or Industrial Individual Permit

WQ0004414000

Site Information (Regulated Entity)

What is the name of the site to be authorized?	NACOGDOCHES GENERATING FACILITY
Does the site have a physical address?	Yes
Physical Address	
Number and Street	499 COUNTY ROAD 988
City	CUSHING
State	TX
ZIP	75760
County	NACOGDOCHES
Latitude (N) (##.######)	31.832222
Longitude (W) (-###.######)	-94.900833
Primary SIC Code	4911
Secondary SIC Code	
Primary NAICS Code	221119
Secondary NAICS Code	
Regulated Entity Site Information	
What is the Regulated Entity's Number (RN)?	RN103219127
What is the name of the Regulated Entity (RE)?	NACOGDOCHES GENERATING FACILITY
Does the RE site have a physical address?	No
Because there is no physical address, describe how to locate this site:	499 COUNTY RD 988
City	CUSHING
State	TX
ZIP	75760
County	NACOGDOCHES
Latitude (N) (##.######)	31.832222
Longitude (W) (-###.######)	-94.901666
Facility NAICS Code	
What is the primary business of this entity?	ELECTRIC POWEER GENERATION FACILITY

City of-Customer (Applicant) Information (Owner)

How is this applicant associated with this site?	Owner
What is the applicant's Customer Number (CN)?	CN600135198
Type of Customer	City Government
Full legal name of the applicant:	
Legal Name	City of Austin
Texas SOS Filing Number	
Federal Tax ID	746000085
State Franchise Tax ID	
State Sales Tax ID	
Local Tax ID	
DUNS Number	66432683
Number of Employees	501+
Independently Owned and Operated?	No
I certify that the full legal name of the entity applying for this permit has been provided and is legally authorized to do business in Texas.	Yes
Responsible Authority Contact	
Organization Name	City of Austin
Prefix	MS
First	KATHLEEN
Middle	
Last	GARRETT
Suffix	
Credentials	
Title	DIRECTOR OF ENVIRONMENTAL HEALTH AND SAFETY
Responsible Authority Mailing Address	
Enter new address or copy one from list:	
Address Type	Domestic
Mailing Address (include Suite or Bldg. here, if applicable)	4815 MUELLER BLVD
Routing (such as Mail Code, Dept., or Attn:)	
City	AUSTIN
State	TX
ZIP	78723
Phone (###-###-####)	5129633200
Extension	
Alternate Phone (###-###-####)	
Fax (###-###-####)	

E-mail	RAVI.JOSEPH@AUSTINENERGY.COM

Billing Contact

Responsible contact for receiving billing statements:	
Select the permittee that is responsible for payment of the annual fee.	CN600135198, City of Austin
Organization Name	City of Austin
Prefix	MR
First	RAVI
Middle	
Last	JOSEPH
Suffix	
Credentials	CIH| PE
Title	CONSULTING ENGINEER
Enter new address or copy one from list:	
Mailing Address	
Address Type	Domestic
Mailing Address (include Suite or Bldg. here, if applicable)	4815 MUELLER BLVD
Routing (such as Mail Code, Dept., or Attn:)	
City	AUSTIN
State	TX
ZIP	78723
Phone (###-###-####)	5129633200
Extension	
Alternate Phone (###-###-####)	
Fax (###-###-####)	
E-mail	RAVI.JOSEPH@AUSTINENERGY.COM

Application Contact

Person TCEQ should contact for questions about this application:	
Same as another contact?	
Organization Name	AUSTIN ENERGY
Prefix	MR
First	RAVI
Middle	
Last	JOSEPH

Suffix	
Credentials	CIH| PE
Title	CONSULTING ENGINEER
Enter new address or copy one from list:	
Mailing Address	
Address Type	Domestic
Mailing Address (include Suite or Bldg. here, if applicable)	4815 MUELLER BLVD
Routing (such as Mail Code, Dept., or Attn:)	
City	AUSTIN
State	TX
ZIP	78723
Phone (###-###-####)	5129633200
Extension	
Alternate Phone (###-###-####)	
Fax (###-###-####)	
E-mail	RAVI.JOSEPH@AUSTINENERGY.COM

Technical Contact

Person TCEQ should contact for questions about this application:	
Same as another contact?	
Organization Name	TRC Environmental Corporation
Prefix	MR
First	Michael
Middle	
Last	Bohmfalk
Suffix	
Credentials	CHMM
Title	Senior Project Manager
Enter new address or copy one from list:	
Mailing Address	
Address Type	Domestic
Mailing Address (include Suite or Bldg. here, if applicable)	505 E HUNTLAND DR STE 250
Routing (such as Mail Code, Dept., or Attn:)	
City	AUSTIN
State	TX
ZIP	78752

Phone (###-###-####)	5129250662
Extension	
Alternate Phone (###-###-####)	
Fax (###-###-####)	
E-mail	mbohmfalk@trccompanies.com

DMR Contact

Person responsible for submitting Discharge Monitoring Report Forms:	
Same as another contact?	
Organization Name	NACOGDOCHES POWER LLC
Prefix	
First	Ravi
Middle	
Last	Joseph
Suffix	
Credentials	PE|CIH
Title	
Enter new address or copy one from list:	
Mailing Address:	
Address Type	Domestic
Mailing Address (include Suite or Bldg. here, if applicable)	4815 MUELLER BLVD
Routing (such as Mail Code, Dept., or Attn:)	
City	AUSTIN
State	TX
ZIP	78723
Phone (###-###-####)	5129633200
Extension	
Alternate Phone (###-###-####)	
Fax (###-###-####)	
E-mail	Ravi.Joseph@austinenergy.com

Section 1# Permit Contact

Permit Contact#: 1

Person TCEQ should contact throughout the permit term.

1) Same as another contact?	Billing Contact

2) Organization Name	City of Austin
3) Prefix	MR
4) First	RAVI
5) Middle	
6) Last	JOSEPH
7) Suffix	
8) Credentials	CIH| PE
9) Title	CONSULTING ENGINEER
Mailing Address	
10) Enter new address or copy one from list	
11) Address Type	Domestic
11.1) Mailing Address (include Suite or Bldg. here, if applicable)	4815 MUELLER BLVD
11.2) Routing (such as Mail Code, Dept., or Attn:)	
11.3) City	AUSTIN
11.4) State	TX
11.5) ZIP	78723
12) Phone (###-###-####)	5129633200
13) Extension	
14) Alternate Phone (###-###-####)	
15) Fax (###-###-####)	
16) E-mail	Ravi.Joseph@austinenergy.com

Owner Information

Owner of Treatment Facility	
1) Prefix	
2) First and Last Name	
3) Organization Name	City of Austin
4) Mailing Address	4815 Mueller Blvd
5) City	Austin
6) State	TX
7) Zip Code	78723
8) Phone (###-###-####)	5125053758
9) Extension	
10) Email	kathleen.garrett@austinenergycom
11) What is ownership of the treatment facility?	Public
Owner of Land (where treatment facility is or will be)	

12) Prefix	
13) First and Last Name	
14) Organization Name	City of Austin
15) Mailing Address	4815 Mueller Blvd
16) City	Austin
17) State	TX
18) Zip Code	78723
19) Phone (###-###-####)	5125053758
20) Extension	
21) Email	kathleen.garrett@austinenergy.com
22) Is the landowner the same person as the facility owner or co-applicant?	Yes

General Information Renewal-Amendment

1) Current authorization expiration date:	09/23/2026
2) Current Facility operational status:	Active
3) Is the facility located on or does the treated effluent cross American Indian Land?	No
4) What is the application type that you are seeking?	Renewal without changes
5) Current Authorization type:	Industrial Wastewater
5.1) What is your EPA facility classification?	Minor
5.1.1) Are the discharges at your facility subjected to federal effluent limitation guidelines (ELG) 40 CFR Part 400-471?	No
5.1.1.1) Select the applicable fee for the Minor facility that is not subjected to 40 CFR 400-471:	Renewal - $315
6) What is the classification for your authorization?	TPDES
6.1) What is the EPA Identification Number?	TX0124842
6.2) Is the wastewater treatment facility location in the existing permit accurate?	Yes
6.3) Are the point(s) of discharge and the discharge route(s) in the existing permit correct?	Yes
6.4) City nearest the outfall(s):	Cushing
6.5) County where the outfalls are located:	NACOGDOCHES|CHEROKEE
6.6) Is or will the treated wastewater discharge to a city, county, or state highway right-of-way, or a flood control district drainage ditch?	No
6.7) Is the daily average discharge at your facility of 5 MGD or more?	No
7) Did any person formerly employed by the TCEQ represent your company and get paid for service regarding this application?	No

Public Notice Information

Individual Publishing the Notices

1) Prefix	
2) First and Last Name	Michael Bohmfalk
3) Credential	CHMM
4) Title	
5) Organization Name	
6) Mailing Address	505 E HUNTLAND DR STE 250
7) Address Line 2	
8) City	AUSTIN
9) State	TX
10) Zip Code	78752
11) Phone (###-###-####)	5129250662
12) Extension	
13) Fax (###-###-####)	
14) Email	mbohmfalk@trccompanies.com
Contact person to be listed in the Notices	
15) Prefix	
16) First and Last Name	Ravi Joseph
17) Credential	CIH|PE
18) Title	Consulting Engineer
19) Organization Name	Austin Energy Environmental Services
20) Phone (###-###-####)	5129633200
21) Fax (###-###-####)	
22) Email	Ravi.Joseph@austinenergy.com
Bilingual Notice Requirements	
23) Is a bilingual education program required by the Texas Education Code at the elementary or middle school nearest to the facility or proposed facility?	No

Section 1# Public Viewing Information

County#: 1

1) County	NACOGDOCHES
2) Public building name	Nacogdoches County Clerks Office
3) Location within the building	Suite 120 District Clerks Office
4) Physical Address of Building	101 West Main Street
5) City	Nacogdoches
6) Contact Name	
7) Phone (###-###-####)	9635607740

8) Extension	
9) Is the location open to the public?	Yes

County#: 2

1) County	CHEROKEE
2) Public building name	Singletary Memorial Library/Rusk Public Library
3) Location within the building	Reference Section
4) Physical Address of Building	207 E 6th Street
5) City	Rusk
6) Contact Name	
7) Phone (###-###-####)	9036835916
8) Extension	
9) Is the location open to the public?	Yes

Plain Language

1) Plain Language	
[File Properties]	
File Name	LANG_20972_PLS_2024-11-08_2025 NAES TPDES_v1.pdf
Hash	6CE3A55687BEEF17BDDFD53920BF10DD62B89CCDC4DCE216F03F36E8D23242CD
MIME-Type	application/pdf

Supplemental Permit Information Form

1) Supplemental Permit Information Form (SPIF)	
[File Properties]	
File Name	SPIF_1-Supplemental Permit Information Form - 20971_Final.pdf
Hash	3AC5CBA4010B4C5DB6B4CFAEECDA12DC1A5B91B84855454E098333EE40A7E582
MIME-Type	application/pdf

Industrial Attachments

1) Attach an 8.5"x11", reproduced portion of the most current and original USGS Topographic Quadrangle Map(s) that meets the 1:24,000 scale.	
[File Properties]	
File Name	MAP_Attachment C - USGS Topographic Map_2025_Final Draft for Review_v2 (1).pdf

Hash	F843BBCDC82806646E4C0627AE916F629F536C359D4181C4006D205BC0DFA515
MIME-Type	application/pdf

2) I confirm that all required sections of Technical Report 1.0 are complete and will be included in the Technical Attachment.	Yes
2.1) I confirm that Worksheet 2.0 (Pollutant Analyses Requirements) is complete and included in the Technical Attachment.	Yes
2.2) I confirm that Worksheet 4.0 (Receiving Waters) is complete and included in the Technical Attachment.	Yes
2.3) Are you planning to include Worksheet 4.1 (Waterbody Physical Characteristics) in the Technical Attachment?	No
2.4) Are you planning to include Worksheet 6.0 (Industrial Waste Contribution) in the Technical Attachment?	No
2.5) Are you planning to include Worksheet 7.0 (Stormwater Discharges Associated with Industrial Activities) to the Technical Attachment?	No
2.6) Are you planning to include Worksheet 8.0 (Aquaculture) in the Technical Attachment?	No
2.7) Are you planning to include Worksheet 9.0 (Class V Injection Well Inventory/Authorization) in the Technical Attachment?	No
2.8) Are you planning to include Worksheet 10.0 (Quarries in the John Graves Scenic Riverway) in the Technical Attachment?	No
2.9) Are you planning to include Worksheet 11.0 (Cooling Water System Information) in the Technical Attachment?	Yes
2.10) Are you planning to include Worksheet 11.1 (Impingement Mortality) in the Technical Attachment?	Yes
2.11) Are you planning to include Worksheet 11.2 (Source Water Biological Data) in the Technical Attachment?	Yes
2.12) Are you planning to include Worksheet 11.3 (Entrainment) in the Technical Attachment?	Yes
2.13) Technical Attachment	
[File Properties]	
File Name	TECH_2025_Nacogdoches Facility TPDES Application for TCEQ_Technical Attachment_Final.pdf
Hash	18B37C31BC494195CE06FE13B0172B4A8987034D860783B446CDCE00158D370A
MIME-Type	application/pdf

3) Flow Diagram	
[File Properties]	
File Name	FLDIA_Attachment F - Flow Schematic with Water Balance_2025_Final Draft for Review_v2.pdf
Hash	E85210B5AFDA97F70CDA017E15CC791ECFB6E46478A22C4BADC4A3F5730D70A2
MIME-Type	application/pdf

4) Site Drawing

[File Properties]

File Name	SITEDR_Attachment E - Facility Map_2025_Final Draft for Review_v3.pdf
Hash	232CF79521C555545791BDAD007842B6852C71818F6AEBA145A773949AB99D56
MIME-Type	application/pdf

5) Design Calculations

[File Properties]

File Name	DES_CAL_Attachment E - Facility Map_2025_Final Draft for Review_v3.pdf
Hash	232CF79521C555545791BDAD007842B6852C71818F6AEBA145A773949AB99D56
MIME-Type	application/pdf

6) Solids Management Plan

7) Water Balance

[File Properties]

File Name	WB_Attachment F - Flow Schematic with Water Balance_2025_Final Draft for Review_v2.pdf
Hash	E85210B5AFDA97F70CDA017E15CC791ECFB6E46478A22C4BADC4A3F5730D70A2
MIME-Type	application/pdf

8) Other Attachments

[File Properties]

File Name	OTHER_Attachment A - Core Data Form_2025_Final Draft for Review.pdf
Hash	4A8DAAC7E99E7202772827AB29B0FFD69A4F837043265AC8FF532EB18DE6DAB0
MIME-Type	application/pdf

[File Properties]

File Name	OTHER_Attachment B - Additional Administrative Information_2025_Final Draft for Review_v2.pdf
Hash	956339D7DF63275B5C61D74BD8E0D17B74368D4857285365E7CD70B49B244FBC
MIME-Type	application/pdf

[File Properties]

File Name	OTHER_Attachment D - Facility and Site Information_2025_Final Draft for Review_v2.pdf
Hash	E1F377A3197DB537DBBFA6052B73BCC826342BDD1CC53717534330847652A256

MIME-Type	application/pdf
[File Properties]	
File Name	OTHER_Attachment G_Chem List and SDSs_Final Draft for Review.pdf
Hash	B40D71CAF6A21EA5B2965BE8130C60C4B703E849C1303C6449B3736798F410F3
MIME-Type	application/pdf
[File Properties]	
File Name	OTHER_Attachment H - Information Required by 40 CFR_2025_Final Draft for Review.pdf
Hash	2D3EC7045AF21727EBEB4743FBFA6F5F70A84B261FCAE08FD0F6DB48B007B621
MIME-Type	application/pdf
[File Properties]	
File Name	OTHER_Attachment I - Lab Info_2025_Final Draft for Review.pdf
Hash	EA344D92DFCAD8E27817D8CD139829C00321A5CE4E39EEF1FA7D12F06B9E0DC0
MIME-Type	application/pdf
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File Name	OTHER_Attachment K - Biological Characterization_2025_Final Draft for Review.pdf
Hash	7AC1CFF6D472AF6D017224A847DA9BC2B141F948162CEB005CE007FFA406C9A7
MIME-Type	application/pdf
[File Properties]	
File Name	OTHER_Attachment L - Biological Monitoring_2025_Final Draft for Review.pdf
Hash	5999B2C3F8B22D1C561616B0616F521CC0AFD5461870033AA63FDE5FDC84726B
MIME-Type	application/pdf
[File Properties]	
File Name	OTHER_Attachment J - Cooling System Info_2025_Final_v4.pdf
Hash	62012F8BAA4438DD410C47CD345D5F2E7D11A01D962747B1157F60CD0AD0CE8F
MIME-Type	application/pdf

Certification

I certify that I am authorized under 30 Texas Administrative Code 305.44 to sign this document and can provide documentation in proof of such authorization upon request.

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

1. I am Ravinder Joseph, the owner of the STEERS account ER012775.
2. I have the authority to sign this data on behalf of the applicant named above.
3. I have personally examined the foregoing and am familiar with its content and the content of any attachments, and based upon my personal knowledge and/or inquiry of any individual responsible for information contained herein, that this information is true, accurate, and complete.
4. I further certify that I have not violated any term in my TCEQ STEERS participation agreement and that I have no reason to believe that the confidentiality or use of my password has been compromised at any time.
5. I understand that use of my password constitutes an electronic signature legally equivalent to my written signature.
6. I also understand that the attestations of fact contained herein pertain to the implementation, oversight and enforcement of a state and/or federal environmental program and must be true and complete to the best of my knowledge.
7. I am aware that criminal penalties may be imposed for statements or omissions that I know or have reason to believe are untrue or misleading.
8. I am knowingly and intentionally signing Update Domestic or Industrial Individual Permit WQ0004414000.
9. My signature indicates that I am in agreement with the information on this form, and authorize its submittal to the TCEQ.

OWNER Signature: Ravinder Joseph OWNER

Customer Number:	CN600135198
Legal Name:	City of Austin
Account Number:	ER012775
Signature IP Address:	198.148.149.10
Signature Date:	2025-10-27
Signature Hash:	786C63C96BB5F6EB657592E7F4BDBDABF7B6762688947CA33E8DE613509A8420
Form Hash Code at time of Signature:	39B572A86C3CBB856177B1AABF94E79A45A5693370AE4B3B15C872BE3AC0C140

Fee Payment

Transaction by:	The application fee payment transaction was made by ER029898/Michael D Bohmfalk
Paid by:	The application fee was paid by MICHAEL BOHMFALK
Fee Amount:	$300.00
Paid Date:	The application fee was paid on 2025-10-27
Transaction/Voucher number:	The transaction number is 582EA000691394 and the voucher number is 790111

Submission

Reference Number:	The application reference number is 829236
Submitted by:	The application was submitted by ER029898/Michael D Bohmfalk
Submitted Timestamp:	The application was submitted on 2025-10-27 at 08:34:07 CDT
Submitted From:	The application was submitted from IP address 12.196.183.130

Confirmation Number:	The confirmation number is 687695
Steers Version:	The STEERS version is 6.93
Permit Number:	The permit number is WQ0004414000

Additional Information

Application Creator: This account was created by Michael D Bohmfalk

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

SUMMARY OF APPLICATION IN PLAIN LANGUAGE FOR TPDES OR TLAP PERMIT APPLICATIONS

Summary of Application (in plain language) Template and Instructions for Texas Pollutant Discharge Elimination System (TPDES) and Texas Land Application (TLAP) Permit Applications

Applicants should use this template to develop a plain language summary of your facility and application as required by Title 30, Texas Administrative Code (30 TAC), Chapter 39, Subchapter H. You may modify the template as necessary to accurately describe your facility as long as the summary includes the following information: (1) the function of the proposed plant or facility; (2) the expected output of the proposed plant or facility; (3) the expected pollutants that may be emitted or discharged by the proposed plant or facility; and (4) how you will control those pollutants, so that the proposed plant will not have an adverse impact on human health or the environment.

Fill in the highlighted areas below to describe your facility and application in plain language. Instructions and examples are provided below. Make any other edits necessary to improve readability or grammar and to comply with the rule requirements. After filling in the information for your facility delete these instructions.

If you are subject to the alternative language notice requirements in 30 TAC Section 39.426, **you must provide a translated copy of the completed plain language summary in the appropriate alternative language as part of your application package**. For your convenience, a Spanish template has been provided below.

ENGLISH TEMPLATE FOR TPDES or TLAP NEW/RENEWAL/AMENDMENT APPLICATIONS INDUSTRIAL WASTEWATER/STORMWATER

The following summary is provided for this pending water quality permit application being reviewed by the Texas Commission on Environmental Quality as required by 30 TAC Chapter 39. The information provided in this summary may change during the technical review of the application and is not a federal enforceable representation of the permit application.

The City of Austin (CN600135198) operates Nacogdoches Generating Facility (RN103219127), a steam electricity generation facility. The facility is located at 499 County Road 988, in Cushing, Nacogdoches County, Texas 75760. The application is for a renewal to discharge 2,500,000 gallons per day of cooling-tower blowdown, low-volume waste, and contact storm water.

Discharges from the facility are expected to contain Bromide, Nitrate-Nitrite, Sulfide, Boron, Cobalt, Iron, Magnesium, Manganese, Molybdenum, Tin, and Titanium. Cooling-tower blowdown, low-volume waste, and contact storm water are treated by the addition of sulfuric acid and small amounts of dispersants/antiscalants, filtration, reverse osmosis (RO), and final polishing by demineralization using a mixed bed resin tank or similar process.

PLANTILLA EN ESPAÑOL PARA SOLICITUDES NUEVAS/RENOVACIONES/ENMIENDAS DE TPDES o TLAP

AGUAS RESIDUALES Introduzca 'INDUSTRIALES' o 'DOMÉSTICAS' aquí **/AGUAS PLUVIALES**

El siguiente resumen se proporciona para esta solicitud de permiso de calidad del agua pendiente que está siendo revisada por la Comisión de Calidad Ambiental de Texas según lo requerido por el Capítulo 39 del Código Administrativo de Texas 30. La información proporcionada en este resumen puede cambiar durante la revisión técnica de la solicitud y no es una representación ejecutiva fedérale de la solicitud de permiso.

1. Introduzca el nombre del solicitante aquí (2. Introduzca el número de cliente aquí (es decir, CN6########).) 3. Elija del menú desplegable 4. Introduzca el nombre de la instalación aquí 5. Introduzca el número de entidad regulada aquí (es decir, RN1########), 6. Elija del menú desplegable 7. Introduzca la descripción de la instalación aquí. La instalación 8. Elija del menú desplegable. ubicada en 9. Introduzca la ubicación aquí, en 10. Introduzca el nombre de la ciudad aquí, Condado de 11. Introduzca el nombre del condado aquí, Texas 12. Introduzca el código postal aquí. 13. Introduzca el resumen de la petición de solicitud aquí. *<<Para las solicitudes de TLAP incluya la siguiente oración, de lo contrario, elimine:>>* Este permiso no autorizará una descarga de contaminantes en el agua en el estado.

Se espera que las descargas de la instalación contengan 14. Liste todos los contaminantes esperados aquí. 15. Introduzca los tipos de aguas residuales descargadas aquí. 16. Elija del menú desplegable tratado por 17. Introduzca una descripción del tratamiento de aguas residuales utilizado en la instalación aquí.

INSTRUCTIONS

1. Enter the name of applicant in this section. The applicant name should match the name associated with the customer number.
2. Enter the Customer Number in this section. Each Individual or Organization is issued a unique 11-digit identification number called a CN (e.g. CN123456789).
3. Choose “operates” in this section for existing facility applications or choose “proposes to operate” for new facility applications.
4. Enter the name of the facility in this section. The facility name should match the name associated with the regulated entity number.
5. Enter the Regulated Entity number in this section. Each site location is issued a unique 11-digit identification number called an RN (e.g. RN123456789).
6. Choose the appropriate article (a or an) to complete the sentence.
7. Enter a description of the facility in this section. For example: steam electric generating facility, nitrogenous fertilizer manufacturing facility, etc.
8. Choose “is” for an existing facility or “will be” for a new facility.
9. Enter the location of the facility in this section.
10. Enter the City nearest the facility in this section.
11. Enter the County nearest the facility in this section.
12. Enter the zip code for the facility address in this section.
13. Enter a summary of the application request in this section. For example: renewal to discharge 25,000 gallons per day of treated domestic wastewater, new application to discharge process wastewater and stormwater on an intermittent and flow-variable basis, or major amendment to reduce monitoring frequency for pH, etc. If more than one outfall is included in the application, provide applicable information for each individual outfall.
14. List all pollutants expected in the discharge from this facility in this section. If applicable, refer to the pollutants from any federal numeric effluent limitations that apply to your facility.
15. Enter the discharge types from your facility in this section (e.g., stormwater, process wastewater, once through cooling water, etc.)
16. Choose the appropriate verb tense to complete the sentence.
17. Enter a description of the wastewater treatment used at your facility. Include a description of each process, starting with initial treatment and finishing with the outfall/point of disposal. Use additional lines for individual discharge types if necessary.

Questions or comments concerning this form may be directed to the Water Quality Division’s Application Review and Processing Team by email at WQ-ARPTeam@tceq.texas.gov or by phone at (512) 239-4671.

Example 1: Industrial Wastewater TPDES Application (ENGLISH)

The following summary is provided for this pending water quality permit application being reviewed by the Texas Commission on Environmental Quality as required by 30 TAC Chapter 39. The information provided in this summary may change during the technical review of the application and are not federal enforceable representations of the permit application.

ABC Corporation (CN600000000) operates the Starr Power Station (RN10000000000), a two-unit gas-fired electric generating facility. Unit 1 has a generating capacity of 393 megawatts (MWs) and Unit 2 has a generating capacity of 528 MWs. The facility is located at 1356 Starr Street, near the City of Austin, Travis County, Texas 78753.

This application is for a renewal to discharge 870,000,000 gallons per day of once through cooling water, auxiliary cooling water, and also authorizes the following waste streams monitored inside the facility (internal outfalls) before it is mixed with the other wastewaters authorized for discharge via main Outfall 001, referred to as "previously monitored effluents" (low-volume wastewater, metal-cleaning waste, and stormwater (from diked oil storage area yards and storm drains)) via Outfall 001. Low-volume waste sources, metal-cleaning waste, and stormwater drains on a continuous and flow-variable basis via internal Outfall 101.

The discharge of once through cooling water via Outfall 001 and low-volume waste and metal-cleaning waste via Outfall 101 from this facility is subject to federal effluent limitation guidelines at 40 CFR Part 423. The pollutants expected from these discharges based on 40 CFR Part 423 are: free available chlorine, total residual chlorine, total suspended solids, oil and grease, total iron, total copper, and pH. Temperature is also expected from these discharges. Additional potential pollutants are included in the Industrial Wastewater Application Technical Report, Worksheet 2.0.

Cooling water and boiler make-up water are supplied by Lake Starr Reservoir. The City of Austin municipal water plant (CN600000000, PWS 00000) supplies the facility's potable water and serves as an alternate source of boiler make-up water. Water from the Lake Starr Reservoir is withdrawn at the intake structure and treated with sodium hypochlorite to prevent biofouling and sodium bromide as a chlorine enhancer to improve efficacy and then passed through condensers and auxiliary equipment on a once-through basis to cool equipment and condense exhaust steam.

Low-volume wastewater from blowdown of boiler Units 1 and 2 and metal-cleaning wastes receive no treatment prior to discharge via Outfall 101. Plant floor and equipment drains and stormwater runoff from diked oil storage areas, yards, and storm drains are routed through an oil and water separator prior to discharge via Outfall 101. Domestic wastewater, blowdown, and backwash water from the service water filter, clarifier, and sand filter are routed to the Starr Creek Domestic Sewage Treatment Plant, TPDES Permit No. WQ0010000001, for treatment and disposal. Metal-cleaning waste from equipment cleaning is generally disposed of off-site.

Example 2: Domestic Wastewater TPDES Renewal application

The following summary is provided for this pending water quality permit application being reviewed by the Texas Commission on Environmental Quality as required by 30 Texas Administrative Code Chapter 39. The information provided in this summary may change during the technical review of the application and are not federal enforceable representations of the permit application.

The City of Texas (CN000000000) operates the City of Texas wastewater treatment plant (RN000000000), an activated sludge process plant operated in the complete mix mode. The facility is located at 123 Texas Street, near the City of More Texas, Texas County, Texas 71234.

This application is for a renewal to discharge at an annual average flow of 1,200,000 gallons per day of treated domestic wastewater via Outfalls 001 and 002.

Discharges from the facility are expected to contain five-day carbonaceous biochemical oxygen demand ($CBOD_5$), total suspended solids (TSS), ammonia nitrogen (NH_3-N), and *Escherichia coli*. Additional potential pollutants are included in the Domestic Technical Report 1.0, Section 7. Pollutant Analysis of Treated Effluent and Domestic Worksheet 4.0 in the permit application package. Domestic wastewater is treated by an activated sludge process plant and the treatment units include a bar screen, a grit chamber, aeration basins, final clarifiers, sludge digesters, a belt filter press, chlorine contact chambers and a dechlorination chamber.

Example 3: Domestic Wastewater TPDES New Application

The following summary is provided for this pending water quality permit application being reviewed by the Texas Commission on Environmental Quality as required by 30 Texas Administrative Code Chapter 39. The information provided in this summary may change during the technical review of the application and are not federal enforceable representations of the permit application.

The City of Texas (CN000000000) proposes to operate the City of Texas wastewater treatment plant (RN000000000), an activated sludge process plant operated in the extended aeration mode. The facility will be located at 123 Texas Street, in the City of More Texas, Texas County, Texas 71234.

This application is for a new application to discharge at a daily average flow of 200,000 gallons per day of treated domestic wastewater.

Discharges from the facility are expected to contain five-day carbonaceous biochemical oxygen demand ($CBOD_5$), total suspended solids (TSS), ammonia nitrogen (NH_3-N), and *Escherichia coli*. Additional potential pollutants are included in the Domestic Technical Report 1.0, Section 7. Pollutant Analysis of Treated Effluent in the permit application package. Domestic wastewater will be treated by an activated sludge process plant and the treatment units will include a bar screen, a grit chamber, aeration basins, final clarifiers, sludge digesters, a belt filter press, chlorine contact chambers and a dechlorination chamber.

Example 4: Domestic Wastewater TLAP Renewal application

The following summary is provided for this pending water quality permit application being reviewed by the Texas Commission on Environmental Quality as required by 30 Texas Administrative Code Chapter 39. The information provided in this summary may change during the technical review of the application and are not federal enforceable representations

of the permit application.

The City of Texas (CN000000000) operates the City of Texas wastewater treatment plant (RN000000000), an activated sludge process plant operated in the complete mix mode. The facility is located at 123 Texas Street, near the City of More Texas, Texas County, Texas 71234.

This application is for a renewal to dispose a daily average flow not to exceed 76,500 gallons per day of treated domestic wastewater via public access subsurface drip irrigation system with a minimum area of 32 acres. This permit will not authorize a discharge of pollutants into water in the state.

Land application of domestic wastewater from the facility are expected to contain five-day biochemical oxygen demand (BOD_5), total suspended solids (TSS), and *Escherichia coli*. Additional potential pollutants are included in the Domestic Technical Report 1.0, Section 7. Pollutant Analysis of Treated Effluent in the permit application package. Domestic wastewater is treated by an activated sludge process plant and the treatment units include a bar screen, an equalization basin, an aeration basin, a final clarifier, an aerobic sludge digester, tertiary filters, and a chlorine contact chamber. In addition, the facility includes a temporary storage that equals to at least three days of the daily average flow.

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

SUPPLEMENTAL PERMIT INFORMATION FORM (SPIF)

FOR AGENCIES REVIEWING DOMESTIC OR INDUSTRIAL TPDES WASTEWATER PERMIT APPLICATIONS

TCEQ USE ONLY:

Application type: ____Renewal ____Major Amendment ____Minor Amendment ____New

County: _____ Segment Number: _____

Admin Complete Date: _____

Agency Receiving SPIF:

_____ Texas Historical Commission _____ U.S. Fish and Wildlife

_____ Texas Parks and Wildlife Department _____ U.S. Army Corps of Engineers

This form applies to TPDES permit applications only. (Instructions, Page 53)

Complete this form as a separate document. TCEQ will mail a copy to each agency as required by our agreement with EPA. If any of the items are not completely addressed or further information is needed, we will contact you to provide the information before issuing the permit. Address each item completely.

Do not refer to your response to any item in the permit application form. Provide each attachment for this form separately from the Administrative Report of the application. The application will not be declared administratively complete without this SPIF form being completed in its entirety including all attachments. Questions or comments concerning this form may be directed to the Water Quality Division's Application Review and Processing Team by email at WQ-ARPTeam@tceq.texas.gov or by phone at (512) 239-4671.

The following applies to all applications:

1. Permittee: City of Austin

   Permit No. WQ00 04414000 EPA ID No. TX 124842

   Address of the project (or a location description that includes street/highway, city/vicinity, and county):

   499 County Road 988, Nacogdoches County, TX

Provide the name, address, phone and fax number of an individual that can be contacted to answer specific questions about the property.

Prefix (Mr., Ms., Miss): Mr.

First and Last Name: Thomas Johnston

Credential (P.E, P.G., Ph.D., etc.): N/A

Title: Compliance Manager

Mailing Address: 14780 State Highway 204

City, State, Zip Code: Cushing, TX 75760

Phone No.: (936) 326-5363 Ext.: Click here to enter text. Fax No.: N/A

E-mail Address: Thomas.Johnston@NAES.com

2. List the county in which the facility is located: Nacogdoches
3. If the property is publicly owned and the owner is different than the permittee/applicant, please list the owner of the property.

N/A – Property Owner is Applicant

4. Provide a description of the effluent discharge route. The discharge route must follow the flow of effluent from the point of discharge to the nearest major watercourse (from the point of discharge to a classified segment as defined in 30 TAC Chapter 307). If known, please identify the classified segment number.

Directly to Angelina River above Sam Rayburn Reservoir in Segment No. 0611 of the Neches River Basin

5. Please provide a separate 7.5-minute USGS quadrangle map with the project boundaries plotted and a general location map showing the project area. Please highlight the discharge route from the point of discharge for a distance of one mile downstream. (This map is required in addition to the map in the administrative report).

Provide original photographs of any structures 50 years or older on the property.

Does your project involve any of the following? Check all that apply.

☐ Proposed access roads, utility lines, construction easements

☐ Visual effects that could damage or detract from a historic property's integrity

☐ Vibration effects during construction or as a result of project design

☐ Additional phases of development that are planned for the future

☐ Sealing caves, fractures, sinkholes, other karst features

☐ Disturbance of vegetation or wetlands

1. List proposed construction impact (surface acres to be impacted, depth of excavation, sealing of caves, or other karst features):

N/A – No proposed construction

2. Describe existing disturbances, vegetation, and land use:

Parking areas, administrative and maintenance buildings, powerplant with woodchip storage yard, native vegetation at site perimeter

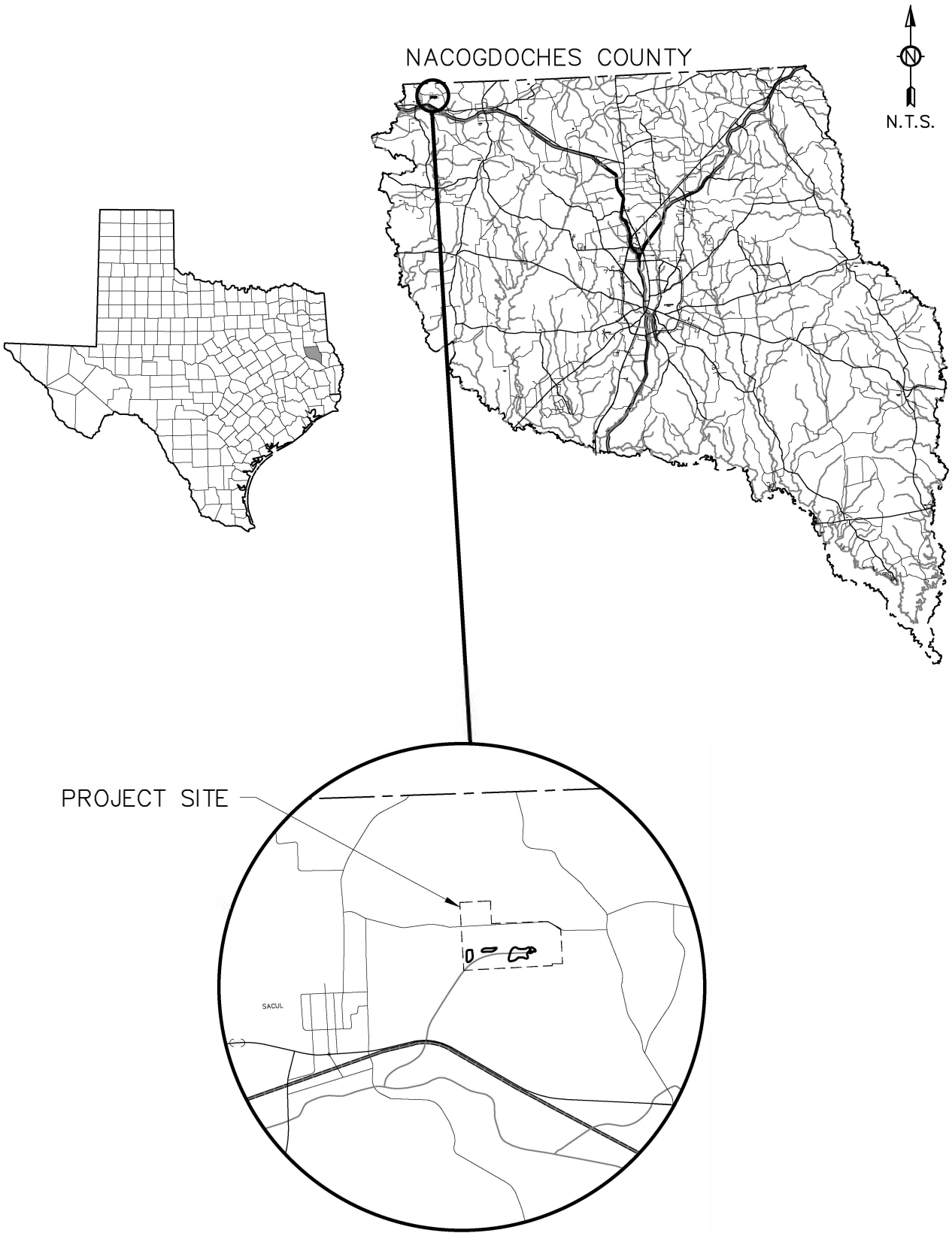
THE FOLLOWING ITEMS APPLY ONLY TO APPLICATIONS FOR NEW TPDES PERMITS AND MAJOR AMENDMENTS TO TPDES PERMITS

3. List construction dates of all buildings and structures on the property:

N/A

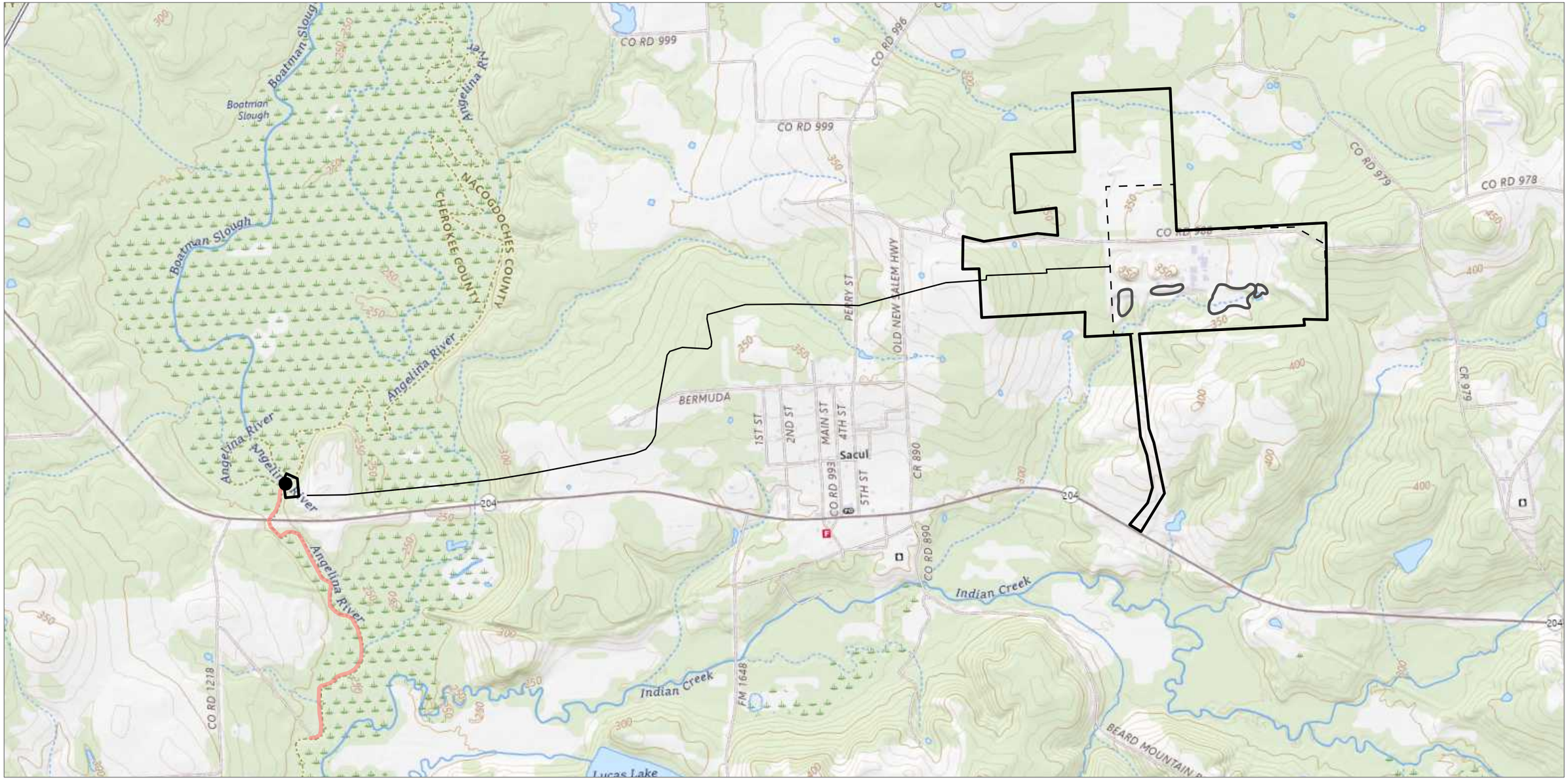
4. Provide a brief history of the property, and name of the architect/builder, if known.

N/A



SPIF 1
CITY OF AUSTIN
NACOGDOCHES GENERATING FACILITY
TPDES PERMIT RENEWAL APPLICATION
GENERAL LOCATION MAP

TEXAS REGISTERED ENGINEERING FIRM F-13
1/18/2021 9:30 AM M:\Projects\3516\001-01\2-0 Wrk Prod\2-1 ACAD\FIGURES\SPIF-GEN LOC.dwg Briand



LEGEND

- OUTFALL 001
- ROAD
- ONE MILE DOWNSTREAM OF OUTFALL 001
- APPLICANT'S PROPERTY BOUNDARY
- FACILITY BOUNDARY
- STORMWATER PONDS

0 750 1,500 FEET

1:18,000 1" = 1,500'



PROJECT:
CITY AUSTIN
NACOGDOCHES GENERATING FACILITY
TPDES PERMIT RENEWAL APPLICATION

TITLE:
USGS MAP

DRAWN BY:	A. CLINE	PROJ. NO.:	606438
CHECKED BY:	B. TRACY		
APPROVED BY:	M. MILLER		**SPIF 2**
DATE:	APRIL 2025		

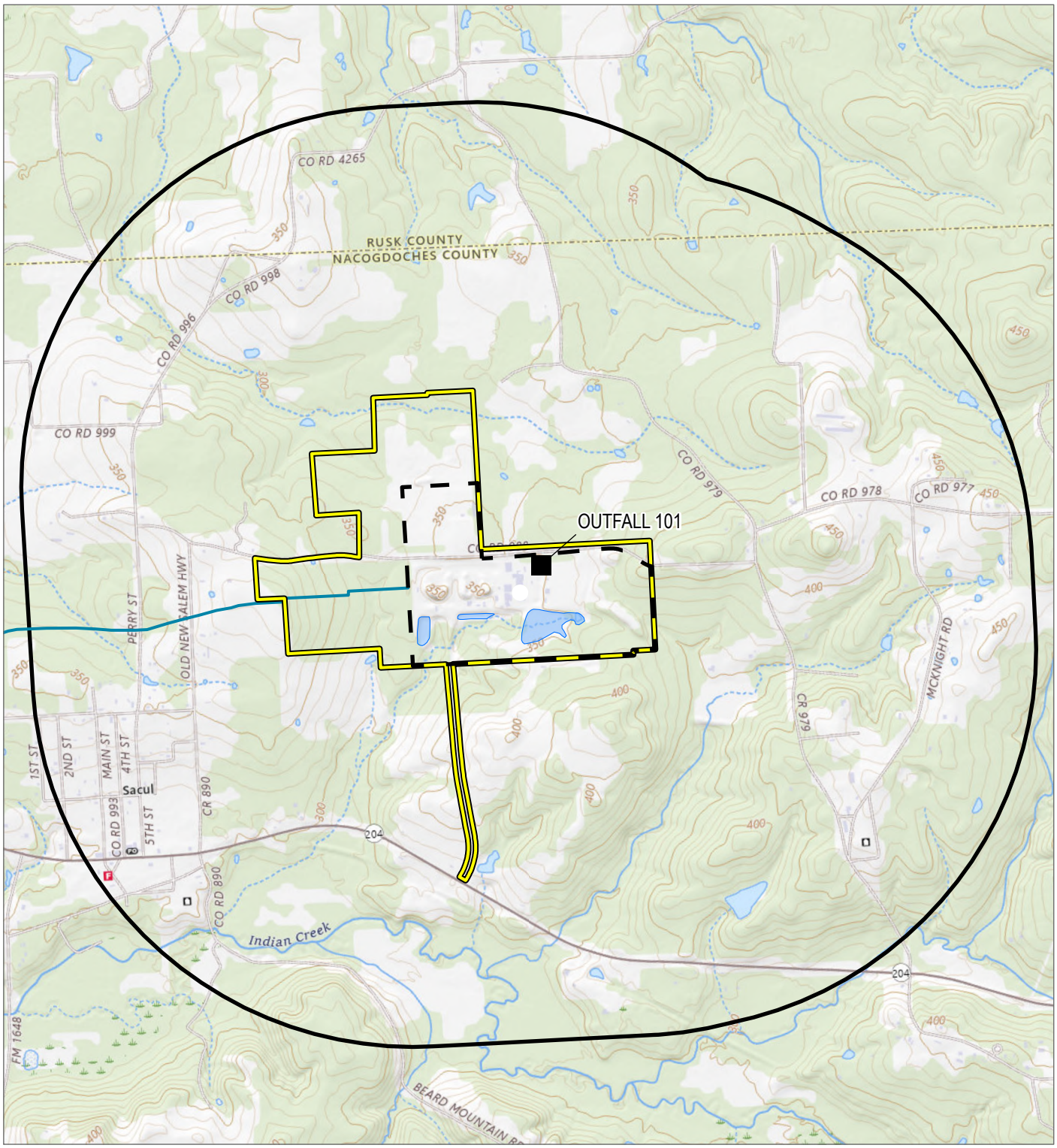
505 EAST HUNTLAND DRIVE
SUITE #250
AUSTIN, TX 78752
PHONE: 512.329.6080

FILE: 606438_NAES_TPDES_PERMIT_RENEWAL.APRX

Coordinate System: NAD 1983 StatePlane Texas Central FIPS 4203 Feet; Map Rotation: 0
Saved By: ACLINE on 4/8/2025, 1:51:55 PM; File Path: T:\PROJECTS\NAES_Corp\606438_TPDES_Permit_Renewal\2-APRX\606438_NAES_TPDES_P

ATTACHMENT C

USGS Topographic Map
Administrative Report 1.0
Item 11.b



PROPERTY BOUNDARY

FACILITY BOUNDARY

ONE MILE RADIUS

STORMWATER

6" DIA PIPELINE FROM FACILITY TO OUTFALL 001

OUTFALL

BASE MAP: ESRI "USGS TOPO" ONLINE SERVICE LAYER
DATA SOURCES: TRC, ESRI, USGS

N

0 1,000 2,000

FEET

1:24,000 1" = 2,000'



PROJECT: **NAES CORPORATION**
TPDES PERMIT RENEWAL
NACOGDOCHES COUNTY, TEXAS

TITLE: **USGS TOPOGRAPHIC MAP**

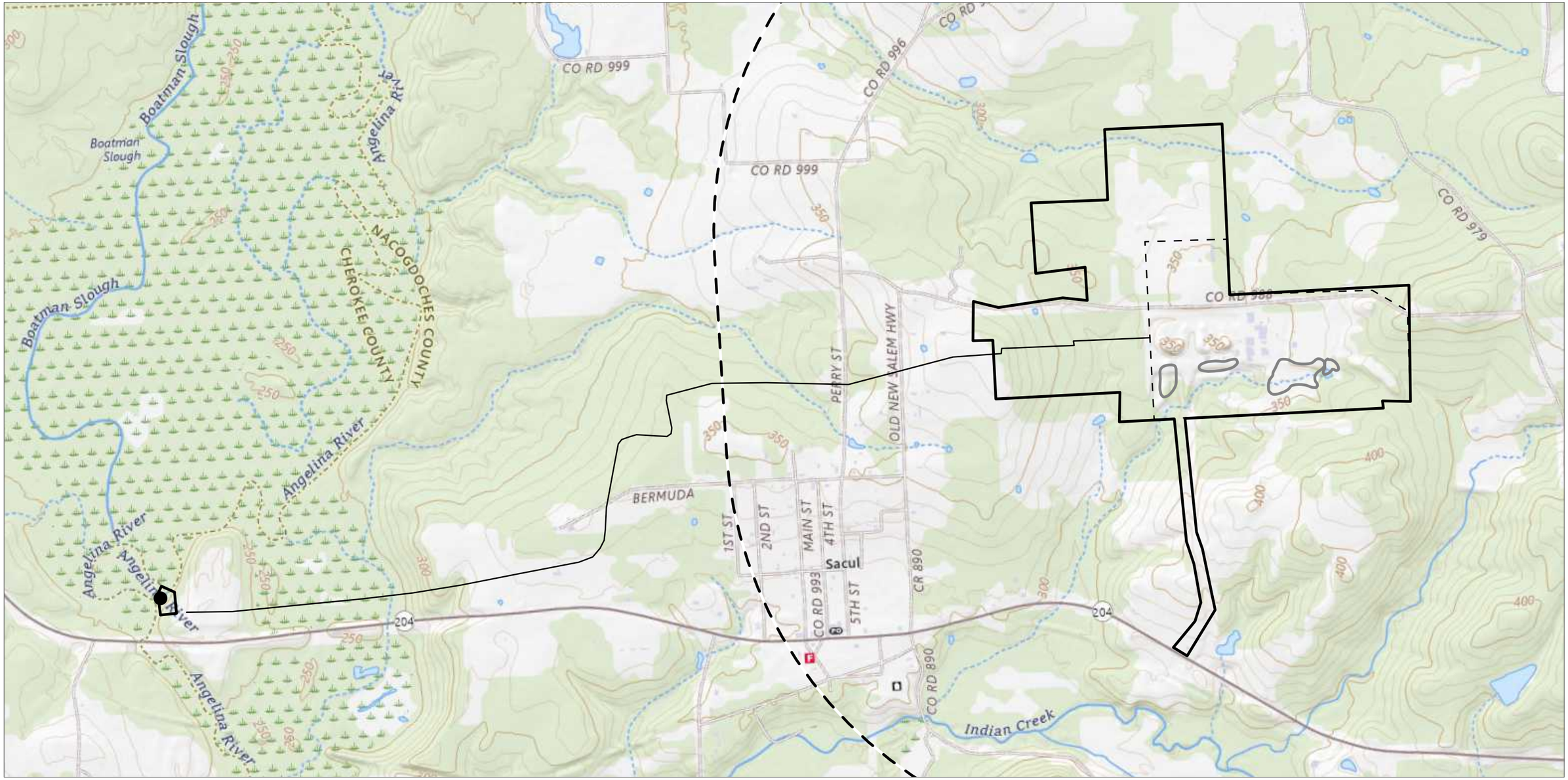
DRAWN BY:	H. GEDDIE	PROJ. NO.:	606438
CHECKED BY:	B. TRACY		
APPROVED BY:	NAME		
DATE:	APRIL 2025		

FIGURE C.1

TRC
505 EAST HUNTLAND DRIVE
SUITE #250
AUSTIN, TX 78752
PHONE: 512.329.6080

FILE: 606438_NAES_TPDES_PERMIT_RENEWAL

-- SAVED BY: HGEDDIE ON 4/4/2025, 09:25:24 AM; FILE PATH: \\EMPLOYEES\GIS\ARCGISPRO\1-PROJECTS\NAES_CORP\606438_TPDES_PERMIT_RENEWAL\2-APRX\606438_NAES_TPDES_PERMIT_RENEWAL.APRX; LAYOUT NAME: FIG 2 TOPO
EM: NAD 1983 2011 STATEPLANE TEXAS CENTRAL FIPS 4203 FT US; MAP ROTATION: 0



LEGEND

- OUTFALL 001
- 6" DIA PIPELINE FROM FACILITY TO OUTFALL 001
- FACILITY BOUNDARY
- APPLICANT'S PROPERTY BOUNDARY
- STORMWATER PONDS
- ONE MILE BUFFER

N

0 625 1,250 FEET

1:15,000 1" = 1,250'



PROJECT:
CITY AUSTIN
NACOGDOCHES GENERATING FACILITY
TPDES PERMIT RENEWAL APPLICATION

TITLE:
NACOGDOCHES GENERATING FACILITY

DRAWN BY:	A. CLINE	PROJ. NO.:	606438
CHECKED BY:	B. TRACY	**Attachment C.2**	
APPROVED BY:	M. MILLER		
DATE:	APRIL 2025		

TRC
505 EAST HUNTLAND DRIVE
SUITE #250
AUSTIN, TX 78752
PHONE: 512.329.6080

FILE: 606438_NAES_TPDES_PERMIT_RENEWAL.APRX

Coordinate System: NAD 1983 StatePlane Texas Central FIPS 4203 Feet; Map Rotation: 0
Saved By: ACLINE on 4/22/2025 09:45:10 AM File Path: T:\PROJECTS\NAES_Corp\606438_TPDES_Permit_Renewal\2-A\APRX\606438_NAES_TPDES_Permit_Renewal.aprx; Layout Name: C.2

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

INDUSTRIAL WASTEWATER PERMIT APPLICATION TECHNICAL REPORT 1.0

The following information **is required** for all applications for a TLAP or an individual TPDES discharge permit.

For **additional information** or clarification on the requested information, please refer to the Instructions for Completing the Industrial Wastewater Permit Application[1] available on the TCEQ website. Please contact the Industrial Permits Team at 512-239-4671 with any questions about this form.

If more than one outfall is included in the application, provide applicable information for each individual outfall. **If an item does not apply to the facility, enter N/A** to indicate that the item has been considered. Include separate reports or additional sheets as **clearly cross-referenced attachments** and provide the attachment number in the space provided for the item the attachment addresses.

NOTE: This application is for an industrial wastewater permit only. Additional authorizations from the TCEQ Waste Permits Division or the TCEQ Air Permits Division may be needed.

Item 1. Facility/Site Information (Instructions, Page 39)

a. Describe the general nature of the business and type(s) of industrial and commercial activities. Include all applicable SIC codes (up to 4).

The facility is a 100-megawatt wood-fired steam electric power generating plant. SIC Code 4911, NAICS Code 221117

b. Describe all wastewater-generating processes at the facility.

Waste streams that are covered under this TPDES permit include cooling tower blowdown and low volume wastes. Additional facility information is provided in Attachment D.

[1] https://www.tceq.texas.gov/permitting/wastewater/industrial/TPDES_industrial_wastewater_steps.html

c. Provide a list of raw materials, major intermediates, and final products handled at the facility.

Materials List

Raw Materials	Intermediate Products	Final Products
Woodchips	Steam	Electricity
Water		

Attachment: N/A

d. Attach a facility map (drawn to scale) with the following information:

- Production areas, maintenance areas, materials-handling areas, waste-disposal areas, and water intake structures.
- The location of each unit of the WWTP including the location of wastewater collection sumps, impoundments, outfalls, and sampling points, if significantly different from outfall locations.

Attachment: E

e. Is this a new permit application for an existing facility?

☐ Yes ☒ No

If **yes**, provide background discussion: N/A

f. Is/will the treatment facility/disposal site be located above the 100-year frequency flood level.

☒ Yes ☐ No

List source(s) used to determine 100-year frequency flood plain: FEMA FIRM Panel 48347C0025C

If **no**, provide the elevation of the 100-year frequency flood plain and describe what protective measures are used/proposed to prevent flooding (including tail water and rainfall run-on controls) of the treatment facility and disposal area: N/A

Attachment: N/A

g. For **new** or **major amendment** permit applications, will any construction operations result in a discharge of fill material into a water in the state?

☐ Yes ☐ No ☒ N/A (renewal only)

h. If **yes** to Item 1.g, has the applicant applied for a USACE CWA Chapter 404 Dredge and Fill permit?

☐ Yes ☐ No

If **yes**, provide the permit number: N/A

If **no**, provide an approximate date of application submittal to the USACE: N/A

Item 2. Treatment System (Instructions, Page 40)

a. List any physical, chemical, or biological treatment process(es) used/proposed to treat wastewater at this facility. Include a description of each treatment process, starting with initial treatment and finishing with the outfall/point of disposal.

See Attachment D

b. Attach a flow schematic **with a water balance** showing all sources of water and wastewater flow into the facility, wastewater flow into and from each treatment unit, and wastewater flow to each outfall/point of disposal.

Attachment: F

Item 3. Impoundments (Instructions, Page 40)

Does the facility use or plan to use any wastewater impoundments (e.g., lagoons or ponds?)

☐ Yes ☒ No

If **no**, proceed to Item 4. If **yes**, complete **Item 3.a** for **existing** impoundments and **Items 3.a - 3.e** for **new or proposed** impoundments. **NOTE:** See instructions, Pages 40-42, for additional information on the attachments required by Items 3.a – 3.e.

a. Complete the table with the following information for each existing, new, or proposed impoundment. Attach additional copies of the Impoundment Information table, if needed.

Use Designation: Indicate the use designation for each impoundment as Treatment (**T**), Disposal (**D**), Containment (**C**), or Evaporation (**E**).

Associated Outfall Number: Provide an outfall number if a discharge occurs or will occur.

Liner Type: Indicate the liner type as Compacted clay liner (**C**), In-situ clay liner (**I**), Synthetic/plastic/rubber liner (**S**), or Alternate liner (**A**). **NOTE:** See instructions for further detail on liner specifications. If an alternate liner (A) is selected, include an attachment that provides a description of the alternate liner and any additional technical information necessary for an evaluation.

Leak Detection System: If any leak detection systems are in place/planned, enter **Y** for yes. Otherwise, enter **N** for no.

Groundwater Monitoring Wells and Data: If groundwater monitoring wells are in place/planned, enter **Y** for yes. Otherwise, enter **N** for no. Attach any existing groundwater monitoring data.

Dimensions: Provide the dimensions, freeboard, surface area, storage capacity of the impoundments, and the maximum depth (not including freeboard). For impoundments with irregular shapes, submit surface area instead of length and width.

Compliance with 40 CFR Part 257, Subpart D: If the impoundment is required to be in compliance with 40 CFR Part 257, Subpart D, enter **Y** for yes. Otherwise, enter **N** for no.

Date of Construction: Enter the date construction of the impoundment commenced (mm/dd/yy).

Impoundment Information

Parameter	**Pond #**	**Pond #**	**Pond #**	**Pond #**
Use Designation: (T) (D) (C) or (E)				
Associated Outfall Number				
Liner Type (C) (I) (S) or (A)				
Alt. Liner Attachment Reference				
Leak Detection System, Y/N				
Groundwater Monitoring Wells, Y/N				
Groundwater Monitoring Data Attachment				
Pond Bottom Located Above The Seasonal High-Water Table, Y/N				
Length (ft)				
Width (ft)				
Max Depth From Water Surface (ft), Not Including Freeboard				
Freeboard (ft)				
Surface Area (acres)				
Storage Capacity (gallons)				
40 CFR Part 257, Subpart D, Y/N				
Date of Construction				

Attachment: Click to enter text.

The following information (**Items 3.b – 3.e**) is required only for **new or proposed** impoundments.

b. For new or proposed impoundments, attach any available information on the following items. If attached, check **yes** in the appropriate box. Otherwise, check **no** or **not yet designed**.

1. Liner data

☐ Yes ☐ No ☐ Not yet designed

2. Leak detection system or groundwater monitoring data

☐ Yes ☐ No ☐ Not yet designed

3. Groundwater impacts

☐ Yes ☐ No ☐ Not yet designed

NOTE: Item b.3 is required if the bottom of the pond is not above the seasonal high-water table in the shallowest water-bearing zone.

Attachment: N/A

For TLAP applications: Items 3.c – 3.e are **not required**, continue to Item 4.

c. Attach a USGS map or a color copy of original quality and scale which accurately locates and identifies all known water supply wells and monitor wells within ½-mile of the impoundments.

Attachment: N/A

d. Attach copies of State Water Well Reports (e.g., driller's logs, completion data, etc.), and data on depths to groundwater for all known water supply wells including a description of how the depths to groundwater were obtained.

Attachment: N/A

e. Attach information pertaining to the groundwater, soils, geology, pond liner, etc. used to assess the potential for migration of wastes from the impoundments or the potential for contamination of groundwater or surface water.

Attachment: N/A

Item 4. Outfall/Disposal Method Information (Instructions, Page 42)

Complete the following tables to describe the location and wastewater discharge or disposal operations for each outfall for discharge, and for each point of disposal for TLAP operations.

If there are more outfalls/points of disposal at the facility than the spaces provided, copies of pages 6 and/0r numbered accordingly (i.e., page 6a, 6b, etc.) may be used to provide information on the additional outfalls.

For TLAP applications: Indicate the disposal method and each individual irrigation area **I**, evaporation pond **E**, or subsurface drainage system **S** by providing the appropriate letter designation for the disposal method followed by a numerical designation for each disposal area in the space provided for **Outfall** number (e.g. **E1** for evaporation pond 1, **I2** for irrigation area No. 2, etc.).

Outfall Longitude and Latitude

Outfall No.	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)
001	31.824173˚	-94.946393˚
101	31.832819˚	-94.899769˚

Outfall Location Description

Outfall No.	Location Description
001	Outfall 001 is located approximately 50 meters upstream of SH 204 on the Angelina River on the Nacogdoches/Cherokee County border. See Attachment E
101	On the project site just east of the cooling tower. See Attachment E

Description of Sampling Point(s) (if different from Outfall location)

Outfall No.	Description of sampling point
001	The sampling point is located at Outfall 001, where cooling tower blowdown and previously monitored effluent are discharged and prior to entering the Angelina River.
101	The sampling point is located at Outfall 101, where low volume waste and contact storm water discharge and prior to comingling with any other waters.

Outfall Flow Information – Permitted and Proposed

Outfall No.	Permitted Daily Avg Flow (MGD)	Permitted Daily Max Flow (MGD)	Proposed Daily Avg Flow (MGD)	Proposed Daily Max Flow (MGD)	Anticipated Discharge Date (mm/dd/yy)
001	1.75	2.5	1.75	2.5	Currently Discharging
101	Variable	Variable	Variable	Variable	Currently Discharging

Outfall Discharge – Method and Measurement

Outfall No.	Pumped Discharge? Y/N	Gravity Discharge? Y/N	Type of Flow Measurement Device Used
001	Y	N	In-line flow meter
101	Y	N	Estimated for reporting

Outfall Discharge – Flow Characteristics

Outfall No.	Intermittent Discharge? Y/N	Continuous Discharge? Y/N	Seasonal Discharge? Y/N	Discharge Duration (hrs/day)	Discharge Duration (days/mo)	Discharge Duration (mo/yr)
001	Y	N	N	Varies	Varies	Varies
101	Y	N	N	Varies	Varies	Varies

Outfall Wastestream Contributions

Outfall No. 001

Contributing Wastestream	Volume (MGD)	Percent (%) of Total Flow
Cooling tower blowdown	0.038	26
Previously monitored effluent (from Outfall 101)	0.108	74

Outfall No. 101

Contributing Wastestream	Volume (MGD)	Percent (%) of Total Flow
Contact storm water	0.0054	5
Low volume waste	0.1026	95

Outfall No. Click to enter text.

Contributing Wastestream	Volume (MGD)	Percent (%) of Total Flow

Contributing Wastestream	Volume (MGD)	Percent (%) of Total Flow

Attachment: Click to enter text.

Item 5. Blowdown and Once-Through Cooling Water Discharges (Instructions, Page 43)

a. Indicate if the facility currently or proposes to:

☒ Yes ☐ No Use cooling towers that discharge blowdown or other wastestreams

☒ Yes ☐ No Use boilers that discharge blowdown or other wastestreams

☐ Yes ☒ No Discharge once-through cooling water

NOTE: If the facility uses or plans to use cooling towers or once-through cooling water, Item 12 **is required**.

b. If **yes** to any of the above, attach an SDS with the following information for each chemical additive.

- Manufacturers Product Identification Number
- Product use (e.g., biocide, fungicide, corrosion inhibitor, etc.)
- Chemical composition including CASRN for each ingredient
- Classify product as non-persistent, persistent, or bioaccumulative
- Product or active ingredient half-life
- Frequency of product use (e.g., 2 hours/day once every two weeks)
- Product toxicity data specific to fish and aquatic invertebrate organisms
- Concentration of whole product or active ingredient, as appropriate, in wastestream.

In addition to each SDS, attach a summary of the above information for each specific wastestream and the associated chemical additives. Specify which outfalls are affected.

Attachment: G

c. Cooling Towers and Boilers

If the facility currently or proposes to use cooling towers or boilers that discharge blowdown or other wastestreams to the outfall(s), complete the following table.

Cooling Towers and Boilers

Type of Unit	Number of Units	Daily Avg Blowdown (gallons/day)	Daily Max Blowdown (gallons/day)
Cooling Towers	1	130,000	210,000
Boilers	1	83,000	97,000

Item 6. Stormwater Management (Instructions, Page 44)

Will any existing/proposed outfalls discharge stormwater associated with industrial activities, as defined at *40 CFR § 122.26(b)(14)*, commingled with any other wastestream?

☒ Yes ☐ No

If **yes**, briefly describe the industrial processes and activities that occur outdoors or in a manner which may result in exposure of the activities or materials to stormwater: See Attachment D

Item 7. Domestic Sewage, Sewage Sludge, and Septage Management and Disposal (Instructions, Page 44)

Domestic Sewage - Waste and wastewater from humans or household operations that is discharged to a wastewater collection system or otherwise enters a treatment works.

a. Check the box next to the appropriate method of domestic sewage and domestic sewage sludge treatment or disposal. Complete Worksheet 5.0 or Item 7.b if directed to do so.

☐ Domestic sewage is routed (i.e., connected to or transported to) to a WWTP permitted to receive domestic sewage for treatment, disposal, or both. Complete Item 7.b.

☒ Domestic sewage disposed of by an on-site septic tank and drainfield system. Complete Item 7.b.

☐ Domestic and industrial treatment sludge ARE commingled prior to use or disposal.

☐ Industrial wastewater and domestic sewage are treated separately, and the respective sludge IS NOT commingled prior to sludge use or disposal. Complete Worksheet 5.0.

☐ Facility is a POTW. Complete Worksheet 5.0.

☐ Domestic sewage is not generated on-site.

☐ Other (e.g., portable toilets), specify and Complete Item 7.b: Click to enter text.

b. Provide the name and TCEQ, NPDES, or TPDES Permit No. of the waste-disposal facility which receives the domestic sewage/septage. If hauled by motorized vehicle, provide the name and TCEQ Registration No. of the hauler.

Domestic Sewage Plant/Hauler Name

Plant/Hauler Name	Permit/Registration No.
Reliable Wastewater	Sludge Registration 21130 No. 1744168 (original Septic System) No. 1744871 (additional Septic System added in 2017)

Plant/Hauler Name	Permit/Registration No.

Item 8. Improvements or Compliance/Enforcement Requirements (Instructions, Page 45)

a. Is the permittee currently required to meet any implementation schedule for compliance or enforcement?

☐ Yes ☒ No

b. Has the permittee completed or planned for any improvements or construction projects?

☐ Yes ☒ No

c. If **yes** to either 8.a **or** 8.b, provide a brief summary of the requirements and a status update: N/A

Item 9. Toxicity Testing (Instructions, Page 45)

Have any biological tests for acute or chronic toxicity been made on any of the discharges or on a receiving water in relation to the discharge within the last three years?

☒ Yes ☐ No

If **yes**, identify the tests and describe their purposes: Chronic and acute WET testing are required by the existing TPDES permit.

Additionally, attach a copy of all tests performed which **have not** been submitted to the TCEQ or EPA. **Attachment:** N/A - Results of all WET testing have been submitted to the TCEQ.

Item 10. Off-Site/Third Party Wastes (Instructions, Page 45)

a. Does or will the facility receive wastes from off-site sources for treatment at the facility, disposal on-site via land application, or discharge via a permitted outfall?

☐ Yes ☒ No

If **yes**, provide responses to Items 10.b through 10.d below.

If **no**, proceed to Item 11.

b. Attach the following information to the application:

- List of wastes received (including volumes, characterization, and capability with on-site wastes).
- Identify the sources of wastes received (including the legal name and addresses of the generators).
- Description of the relationship of waste source(s) with the facility's activities.

Attachment: N/A

c. Is or will wastewater from another TCEQ, NPDES, or TPDES permitted facility commingled with this facility's wastewater after final treatment and prior to discharge via the final outfall/point of disposal?

☐ Yes ☐ No

If **yes**, provide the name, address, and TCEQ, NPDES, or TPDES permit number of the contributing facility and a copy of any agreements or contracts relating to this activity.

Attachment: N/A

d. Is this facility a POTW that accepts/will accept process wastewater from any SIU and has/is required to have an approved pretreatment program under the NPDES/TPDES program?

☐ Yes ☐ No

If **yes**, **Worksheet 6.0** of this application **is required**.

Item 11. Radioactive Materials (Instructions, Page 46)

a. Are/will radioactive materials be mined, used, stored, or processed at this facility?

☐ Yes ☒ No

If **yes**, use the following table to provide the results of one analysis of the effluent for all radioactive materials that may be present. Provide results in pCi/L.

Radioactive Materials Mined, Used, Stored, or Processed

Radioactive Material Name	Concentration (pCi/L)

b. Does the applicant or anyone at the facility have any knowledge or reason to believe that radioactive materials may be present in the discharge, including naturally occurring radioactive materials in the source waters or on the facility property?

☐ Yes ☐ No

If **yes**, use the following table to provide the results of one analysis of the effluent for all radioactive materials that may be present. Provide results in pCi/L. Do not include information provided in response to Item 11.a.

Radioactive Materials Present in the Discharge

Radioactive Material Name	Concentration (pCi/L)

Item 12. Cooling Water (Instructions, Page 46)

a. Does the facility use or propose to use water for cooling purposes?

☒ Yes

☐ No

☐ Decommissioned: Click to enter text.

☐ To Be Decommissioned: Click to enter text.

If **yes**, complete Items 12.b thru 12.f. If **no**, stop here.

If **decommissioned**, provide the date operation ceased and stop here.

If to **be decommissioned**, provide the date operation is anticipated to cease and stop here.

b. Cooling water is/will be obtained from a groundwater source (e.g., on-site well).

☐ Yes ☒ No

If **yes**, stop here. If **no**, continue.

c. Cooling Water Supplier

1. Provide the name of the owner(s) and operator(s) for the CWIS that supplies or will supply water for cooling purposes to the facility.

Cooling Water Intake Structure(s) Owner(s) and Operator(s)

CWIS ID	1	N/A	N/A	N/A
Owner	Angelina Nacogdoches Water Control Improvement District #1 (ANWCID)	N/A	N/A	N/A
Operator	City of Austin	N/A	N/A	N/A

2. Cooling water is/will be obtained from a Public Water Supplier (PWS)

☒ No ☐ Yes; PWS No.: Click to enter text.

If **no**, continue. If **yes**, provide the PWS Registration No. and stop here.

3. Cooling water is/will be obtained from a reclaimed water source?

☒ No ☐ Yes; Auth No.: Click to enter text.

If **no**, continue. If **yes**, provide the Reuse Authorization No. and stop here.

4. Cooling water is/will be obtained from an Independent Supplier

☒ No ☐ Yes; AIF: Click to enter text.

If **no**, proceed to Item 12.d. If **yes**, provide the actual intake flow of the Independent Supplier's CWIS that is/will be used to provide water for cooling purposes and proceed.

d. 316(b) General Criteria

1. The CWIS(s) used to provide water for cooling purposes to the facility has or will have a cumulative design intake flow of 2 MGD or greater.

☒ Yes ☐ No

2. At least 25% of the total water withdrawn by the CWIS(s) is/will be used at the facility exclusively for cooling purposes on an annual average basis.

☒ Yes ☐ No

3. The CWIS(s) withdraw(s)/propose(s) to withdraw water for cooling purposes from surface waters that meet the definition of Waters of the United States in *40 CFR § 122.2*.

   ☒ Yes ☐ No. Explanation: Click to enter text.

   If **no**, provide an explanation of how the waterbody does not meet the definition of Waters of the United States in *40 CFR § 122.2*.

If **yes** to all three questions in Item 12.d, the facility **meets** the minimum criteria to be subject to the full requirements of Section 316(b) of the CWA. Proceed to **Item 12.f**.

If **no** to any of the questions in Item 12.d, the facility **does not meet** the minimum criteria to be subject to the full requirements of Section 316(b) of the CWA; however, a determination is required based upon BPJ. Proceed to **Item 12.e**.

e. The facility does not meet the minimum requirements to be subject to the fill requirements of Section 316(b) **and uses**/proposes **to use cooling towers**.

   ☐ Yes ☐ No

   If **yes**, stop here. If **no**, complete Worksheet 11.0, Items 1.a, 1.b.1-3 and 6, 2.b.1, and 3.a to allow for a determination based upon BPJ.

f. Oil and Gas Exploration and Production

   1. The facility is subject to requirements at 40 CFR Part 435, Subparts A or D.

      ☐ Yes ☒ No

      If **yes**, continue. If **no**, skip to Item 12.g.

   2. The facility is an existing facility as defined at 40 CFR § 125.92(k) or a new unit at an existing facility as defined at 40 CFR § 125.92(u).

      ☒ Yes ☐ No

      If **yes**, complete Worksheet 11.0, Items 1.a, 1.b.1-3 and 6, 2.b.1, and 3.a to allow for a determination based upon BPJ. If **no**, skip to Item 12.g.3.

g. Compliance Phase and Track Selection

   1. Phase I – New facility subject to 40 CFR Part 125, Subpart I

      ☒ Yes ☐ No

      If **yes**, check the box next to the compliance track selection, attach the requested information, and complete Worksheet 11.0, Items 2 and 3, and Worksheet 11.2.

      ☒ Track I – AIF greater than 2 MGD, but less than 10 MGD

      - Attach information required by *40 CFR §§ 125.86(b)(2)-(4)*.

      ☐ Track I – AIF greater than 10 MGD

      - Attach information required by *40 CFR § 125.86(b)*.

      ☐ Track II

      - Attach information required by *40 CFR § 125.86(c)*.

      Attachment: H

2. Phase II – Existing facility subject to 40 CFR Part 125, Subpart J

   ☒ Yes ☐ No

   If **yes**, complete Worksheets 11.0 through 11.3, as applicable.

3. Phase III – New facility subject to 40 CFR Part 125, Subpart N

   ☐ Yes ☒ No

   If **yes**, check the box next to the compliance track selection and provide the requested information.

   ☐ Track I – Fixed facility

   - Attach information required by 40 CFR § 125.136(b) and complete Worksheet 11.0, Items 2 and 3, and Worksheet 11.2.

   ☐ Track I – Not a fixed facility

   - Attach information required by 40 CFR § 125.136(b) and complete Worksheet 11.0, Item 2 (except CWIS latitude/longitude under Item 2.a).

   ☐ Track II – Fixed facility

   - Attach information required by 40 CFR § 125.136(c) and complete Worksheet 11.0, Items 2 and 3.

   Attachment: Click to enter text.

Item 13. Permit Change Requests (Instructions, Page 48)

This item is only applicable to existing permitted facilities.

a. Is the facility requesting a **major amendment** of an existing permit?

   ☐ Yes ☒ No

   If **yes**, list each request individually and provide the following information: 1) detailed information regarding the scope of each request and 2) a justification for each request. Attach any supplemental information or additional data to support each request.

N/A

b. Is the facility requesting any **minor amendments** to the permit?

   ☐ Yes ☒ No

   If **yes**, list and describe each change individually.

N/A

c. Is the facility requesting any **minor modifications** to the permit?

☐ Yes ☒ No

If **yes**, list and describe each change individually.

N/A

Item 14. Laboratory Accreditation (Instructions, Page 49)

All laboratory tests performed must meet the requirements of *30 TAC Chapter 25, Environmental Testing Laboratory Accreditation and Certification*, which includes the following general exemptions from National Environmental Laboratory Accreditation Program (NELAP) certification requirements:

- The laboratory is an in-house laboratory and is:
  - periodically inspected by the TCEQ; or
  - located in another state and is accredited or inspected by that state; or
  - performing work for another company with a unit located in the same site; or
  - performing pro bono work for a governmental agency or charitable organization.
- The laboratory is accredited under federal law.
- The data are needed for emergency-response activities, and a laboratory accredited under the Texas Laboratory Accreditation Program is not available.
- The laboratory supplies data for which the TCEQ does not offer accreditation.

The applicant should review *30 TAC Chapter 25* for specific requirements.

The following certification statement shall be signed and submitted with every application. See the *Signature Page* section in the Instructions, for a list of designated representatives who may sign the certification.

CERTIFICATION:

I certify that all laboratory tests submitted with this application meet the requirements of *30 TAC Chapter 25, Environmental Testing Laboratory Accreditation and Certification.*

Printed Name: Kathleen Garrett

Title: Director of Environmental, Health and Safety

Signature: _____

Date: _____

INDUSTRIAL WASTEWATER PERMIT APPLICATION WORKSHEET 1.0: EPA CATEGORICAL EFFLUENT GUIDELINES

This worksheet **is required** for all applications for TPDES permits for discharges of wastewaters subject to EPA categorical effluent limitation guidelines (ELGs).

Item 1. Categorical Industries (Instructions, Page 53)

Is this facility subject to any 40 CFR categorical ELGs outlined on page 53 of the instructions?

☐ Yes ☒ No

If **no**, this worksheet is not required. If **yes**, provide the appropriate information below.

40 CFR Effluent Guideline

Industry	40 CFR Part

Item 2. Production/Process Data (Instructions, Page 54)

NOTE: For all TPDES permit applications requesting individual permit coverage for discharges of oil and gas exploration and production wastewater (discharges into or adjacent to water in the state, falling under the Oil and Gas Extraction Effluent Guidelines – 40 CFR Part 435), see Worksheet 12.0, Item 2 instead.

a. Production Data

Provide appropriate data for effluent guidelines with production-based effluent limitations.

Production Data

Subcategory	Actual Quantity/Day	Design Quantity/Day	Units

b. Organic Chemicals, Plastics, and Synthetic Fibers Manufacturing Data (40 CFR Part 414)

Provide each applicable subpart and the percent of total production. Provide data for metal-bearing and cyanide-bearing wastestreams, as required by *40 CFR Part 414, Appendices A and B*.

Percentage of Total Production

Subcategory	Percent of Total Production	Appendix A and B - Metals	Appendix A - Cyanide

c. Refineries (40 CFR Part 419)

Provide the applicable subcategory and a brief justification.

Click to enter text.

Item 3. Process/Non-Process Wastewater Flows (Instructions, Page 54)

Provide a breakdown of wastewater flow(s) generated by the facility, including both process and non-process wastewater flow(s). Specify which wastewater flows are to be authorized for discharge under this permit and the disposal practices for wastewater flows, excluding domestic, which are not to be authorized for discharge under this permit.

Click to enter text.

Item 4. New Source Determination (Instructions, Page 54)

Provide a list of all wastewater-generating processes subject to EPA categorical ELGs, identify the appropriate guideline Part and Subpart, and provide the date the process/construction commenced.

Wastewater Generating Processes Subject to Effluent Guidelines

Process	EPA Guideline Part	EPA Guideline Subpart	Date Process/ Construction Commenced

INDUSTRIAL WASTEWATER PERMIT APPLICATION WORKSHEET 2.0: POLLUTANT ANALYSIS

Worksheet 2.0 **is required** for all applications submitted for a TPDES permit. Worksheet 2.0 is not required for applications for a permit to dispose of all wastewater by land disposal or for discharges solely of stormwater associated with industrial activities.

Item 1. General Testing Requirements (Instructions, Page 55)

a. Provide the date range of all sampling events conducted to obtain the analytical data submitted with this application (e.g., 05/01/2018-05/30/2018): 12/11/2024 – 6/25/2025

b. ☒ Check the box to confirm all samples were collected no more than 12 months prior to the date of application submittal.

c. Read the general testing requirements in the instructions for important information about sampling, test methods, and MALs. If a contact laboratory was used, attach a list which includes the name, contact information, and pollutants analyzed for each laboratory/firm. **Attachment:** I

Item 2. Specific Testing Requirements (Instructions, Page 56)

Attach correspondence from TCEQ approving submittal of less than the required number of samples, if applicable. **Attachment:** N/A

TABLE 1 and TABLE 2 (Instructions, Page 58)

Completion of Tables 1 and 2 is required for all external outfalls for all TPDES permit applications.

Table 1 for Outfall No.: 001 **Samples are (check one): ☒ Composite ☒ Grab**

Pollutant	Sample 1 (mg/L)	Sample 2 (mg/L)	Sample 3 (mg/L)	Sample 4 (mg/L)
BOD (5-day)	2.81	3.29	4.89	4.28
CBOD (5-day)	3.48	<2.00	<2.00	2.52
Chemical oxygen demand	85.6	62.4	39.3	75.1
Total organic carbon	43.8	11.7	25.5	44.2
Dissolved oxygen	11	9.2	9.2	9.8
Ammonia nitrogen	0.16	0.025	0.100	0.222
Total suspended solids	3.9	7.10	2.30	2.30
Nitrate nitrogen	0.923	0.646	0.611	0.731
Total organic nitrogen	2.79	1.735	0.940	<0.050
Total phosphorus	3.62	3.29	3.86	4.25
Oil and grease	<4.35	<4.49	<4.40	<4.94
Total residual chlorine	0.040	<0.05	0.02	0.01

Pollutant	Sample 1 (mg/L)	Sample 2 (mg/L)	Sample 3 (mg/L)	Sample 4 (mg/L)
Total dissolved solids	1020	680	552	810
Sulfate	166	115	72.9	101
Chloride	238	263	144	210
Fluoride	0.538	<0.5	<0.5	<0.5
Total alkalinity (mg/L as CaCO3)	48.7	40.6	50.8	49.8
Temperature (˚F)	14	21	14	16
pH (standard units)	7.2	7.9	7.4	7.3

Table 2 for Outfall No.: 001 **Samples are (check one): ☒ Composite ☒ Grab**

Pollutant	Sample 1 (µg/L)	Sample 2 (µg/L)	Sample 3 (µg/L)	Sample 4 (µg/L)	MAL (µg/L)
Aluminum, total	0.234	0.644	0.927	1.19	2.5
Antimony, total	0.0211	0.0189	0.0192	0.015	5
Arsenic, total	0.00695	0.00828	0.00681	0.00614	0.5
Barium, total	0.218	0.190	0.130	0.188	3
Beryllium, total	<0.0005	<0.0005	<0.001	0.000261	0.5
Cadmium, total	<0.0005	<0.001	<0.001	<0.0005	1
Chromium, total	0.00214	0.00211	0.0027	0.00359	3
Chromium, hexavalent	<3.00	<3.00	<3.00	0.00359	3
Chromium, trivalent	<0.003	<0.003	<0.003	0.00059	N/A
Copper, total	0.0348	0.0313	0.0318	0.0233	2
Cyanide, available	<0.005	<0.005	0.0002	<0.005	2/10
Lead, total	0.00119	0.00175	0.00155	0.00159	0.5
Mercury, total	<5.32	<4.26	<4.26	<4.26	0.005/0.0005
Nickel, total	0.00635	0.00885	0.00615	0.0068	2
Selenium, total	<0.002	<0.002	<0.005	<0.005	5
Silver, total	<0.000226	<0.000226	<0.001	<0.0002	0.5
Thallium, total	0.000364	<0.000106	<0.001	<0.000966	0.5
Zinc, total	0.0627	0.0463	0.0014	0.0577	5.0

TABLE 3 (Instructions, Page 58)

Completion of Table 3 **is required** for all **external outfalls** which discharge process wastewater.

Partial completion of Table 3 **is required** for all **external outfalls** which discharge non-process wastewater and stormwater associated with industrial activities commingled with other wastestreams (see instructions for additional guidance).

Table 3 for Outfall No.: 001 **Samples are (check one): ☒ Composite ☒ Grab**

Pollutant	Sample 1 (µg/L)*	Sample 2 (µg/L)*	Sample 3 (µg/L)*	Sample 4 (µg/L)*	MAL (µg/L)*
Acrylonitrile	<2.00	<2.00	<2.00	<1.00	50
Anthracene	<0.981	<1.04	<7.95	<0.999	10
Benzene	<1.00	<1.00	<1.00	<1.00	10
Benzidine	<19.6	<1.56	<19.9	<20.0	50
Benzo(a)anthracene	<0.981	<1.04	<0.994	<0.999	5
Benzo(a)pyrene	<0.981	<1.04	<0.994	<0.999	5
Bis(2-chloroethyl)ether	<0.981	<1.04	<0.994	<0.999	10
Bis(2-ethylhexyl)phthalate	<7.36	<7.79	<7.46	<7.49	10
Bromodichloromethane [Dichlorobromomethane]	<1.00	<1.00	<1.00	<1.00	10
Bromoform	<2.00	<2.00	<2.00	<1.00	10
Carbon tetrachloride	<1.00	<1.00	<1.00	<1.00	2
Chlorobenzene	<1.00	<1.00	<1.00	<1.00	10
Chlorodibromomethane [Dibromochloromethane]	<1.00	<1.00	<1.00	<1.00	10
Chloroform	1.88	<1.00	<1.00	4.03	10
Chrysene	<0.981	<1.04	<0.994	<0.999	5
m-Cresol [3-Methylphenol]	<6.08	<8.31	<6.16	<6.19	10
o-Cresol [2-Methylphenol]	<5.10	<10.0	<5.17	<5.19	10
p-Cresol [4-Methylphenol]	<6.08	<8.31	<6.16	<6.19	10
1,2-Dibromoethane	<1.00	<1.00	<1.00	<1.00	10
m-Dichlorobenzene [1,3-Dichlorobenzene]	<1.00	<1.00	<1.00	<1.00	10
o-Dichlorobenzene [1,2-Dichlorobenzene]	<1.00	<1.00	<1.00	<1.00	10
p-Dichlorobenzene [1,4-Dichlorobenzene]	<1.00	<1.00	<1.00	<1.00	10
3,3'-Dichlorobenzidine	<4.91	<2.08	<4.97	<5.00	5
1,2-Dichloroethane	<1.00	<1.00	<1.00	<1.00	10

Pollutant	Sample 1 (µg/L)*	Sample 2 (µg/L)*	Sample 3 (µg/L)*	Sample 4 (µg/L)*	MAL (µg/L)*
1,1-Dichloroethene [1,1-Dichloroethylene]	<1.00	<1.00	<1.00	<1.00	10
Dichloromethane [Methylene chloride]	<2.00	<2.00	<2.00	<1.02	20
1,2-Dichloropropane	<1.01	<1.01	<1.01	<1.00	10
1,3-Dichloropropene [1,3-Dichloropropylene]	<1.00	<1.00	<1.00	<1.00	10
2,4-Dimethylphenol	<2.36	<1.04	<2.39	<2.40	10
Di-n-Butyl phthalate	<7.36	<7.79	<7.46	<7.49	10
Epichlorohydrin (1-Chloro-2,3-epoxypropane)	<20.0	<20.0	<20.0	<20.0	---
Ethylbenzene	<1.00	<1.00	<1.00	<1.00	10
Ethylene Glycol	<50.0	<50.0	<50.0	<50.0	---
Fluoride	0.538	<0.5	<0.5	<0.5	500
Hexachlorobenzene	<0.981	<1.04	<0.994	<0.999	5
Hexachlorobutadiene	<0.981	<1.07	<0.994	<0.999	10
Hexachlorocyclopentadiene	<8.83	<1.04	<8.95	<8.99	10
Hexachloroethane	<0.981	<2.08	<0.994	<0.999	20
4,4'-Isopropylidenediphenol (bisphenol A)	<9.62	<10.1	<9.68	<9.87	1
Methyl ethyl ketone	<10.0	<10.0	<10.0	<1.00	50
Methyl tert-butyl ether (MTBE)	<1.00	<1.0	<1.0	<1.0	---
Nitrobenzene	<0.981	<1.04	<0.994	<0.999	10
N-Nitrosodiethylamine	<0.981	<1.04	<0.994	<0.999	20
N-Nitroso-di-n-butylamine	<0.981	<1.04	<0.994	<0.999	20
Nonylphenol	<34.5	<28.5	<36.7	<37.4	333
Pentachlorobenzene	<0.981	<1.04	<0.994	<0.999	20
Pentachlorophenol	<0.981	<5.00	<0.994	<0.999	5
Phenanthrene	<0.981	<1.04	<0.994	<0.999	10
Polychlorinated biphenyls (PCBs) (**)	<0.200	<0.200	<0.199	<0.200	0.2
Pyridine	<5.30	<1.40	<5.37	<5.39	20
1,2,4,5-Tetrachlorobenzene	<0.981	<1.07	<0.994	<0.999	20
1,1,2,2-Tetrachloroethane	<2.00	<2.00	<2.00	<1.00	10
Tetrachloroethene [Tetrachloroethylene]	<1.00	<1.00	<1.00	<1.00	10

Pollutant	Sample 1 (µg/L)*	Sample 2 (µg/L)*	Sample 3 (µg/L)*	Sample 4 (µg/L)*	MAL (µg/L)*
Toluene	<1.00	<1.00	<1.00	<1.00	10
1,1,1-Trichloroethane	<1.00	<1.00	<1.00	<1.00	10
1,1,2-Trichloroethane	<2.00	<2.00	<2.00	<1.00	10
Trichloroethene [Trichloroethylene]	<1.00	<1.00	<1.00	<1.00	10
2,4,5-Trichlorophenol	<0.981	<5.19	<0.994	<0.999	50
TTHM (Total trihalomethanes)	0.00188	<0.002	<0.002	0.00403	10
Vinyl chloride	<1.04	<1.04	<1.04	<1.00	10

(*) Indicate units if different from µg/L.

(**) Total of detects for PCB-1242, PCB-1254, PCB-1221, PCB-1232, PCB-1248, PCB-1260, and PCB-1016. If all non-detects, enter the highest non-detect preceded by a "<".

TABLE 4 (Instructions, Pages 58-59)

Partial completion of Table 4 **is required** for each **external outfall** based on the conditions below.

a. **Tributyltin**

Is this facility an industrial/commercial facility which currently or proposes to directly dispose of wastewater from the types of operations listed below or a domestic facility which currently or proposes to receive wastewater from the types of industrial/commercial operations listed below?

☐ Yes ☒ No

If **yes**, check the box next to each of the following criteria which apply and provide the appropriate testing results in Table 4 below (check all that apply).

☐ Manufacturers and formulators of tributyltin or related compounds.

☐ Painting of ships, boats and marine structures.

☐ Ship and boat building and repairing.

☐ Ship and boat cleaning, salvage, wrecking and scaling.

☐ Operation and maintenance of marine cargo handling facilities and marinas.

☐ Facilities engaged in wood preserving.

☐ Any other industrial/commercial facility for which tributyltin is known to be present, or for which there is any reason to believe that tributyltin may be present in the effluent.

b. **Enterococci (discharge to saltwater)**

This facility discharges/proposes to discharge directly into saltwater receiving waters **and** Enterococci bacteria are expected to be present in the discharge based on facility processes.

☐ Yes ☒ No

Domestic wastewater is/will be discharged.

☐ Yes ☒ No

If **yes to either** question, provide the appropriate testing results in Table 4 below.

c. E. coli (discharge to freshwater)

This facility discharges/proposes to discharge directly into freshwater receiving waters **and** *E. coli* bacteria are expected to be present in the discharge based on facility processes.

☐ Yes ☒ No

Domestic wastewater is/will be discharged.

☐ Yes ☒ No

If **yes to either** question, provide the appropriate testing results in Table 4 below.

Table 4 for Outfall No.: Click to enter text. **Samples are (check one):** ☐ **Composite** ☐ **Grab**

Pollutant	**Sample 1**	**Sample 2**	**Sample 3**	**Sample 4**	**MAL**
Tributyltin (µg/L)	N/A	N/A	N/A	N/A	0.010
Enterococci (cfu or MPN/100 mL)	N/A	N/A	N/A	N/A	N/A
E. coli (cfu or MPN/100 mL)	N/A	N/A	N/A	N/A	N/A

TABLE 5 (Instructions, Page 59)

Completion of Table 5 **is required** for all **external outfalls** which discharge process wastewater from a facility which manufactures or formulates pesticides or herbicides or other wastewaters which may contain pesticides or herbicides.

If this facility does not/will not manufacture or formulate pesticides or herbicides and does not/will not discharge other wastewaters that may contain pesticides or herbicides, check N/A.

☒ N/A

Table 5 for Outfall No.: Click to enter text. **Samples are (check one):** ☐ **Composite** ☐ **Grab**

Pollutant	**Sample 1 (µg/L)***	**Sample 2 (µg/L)***	**Sample 3 (µg/L)***	**Sample 4 (µg/L)***	**MAL (µg/L)***
Aldrin	N/A	N/A	N/A	N/A	0.01
Carbaryl	N/A	N/A	N/A	N/A	5
Chlordane	N/A	N/A	N/A	N/A	0.2
Chlorpyrifos	N/A	N/A	N/A	N/A	0.05
4,4'-DDD	N/A	N/A	N/A	N/A	0.1
4,4'-DDE	N/A	N/A	N/A	N/A	0.1
4,4'-DDT	N/A	N/A	N/A	N/A	0.02
2,4-D	N/A	N/A	N/A	N/A	0.7
Danitol [Fenpropathrin]	N/A	N/A	N/A	N/A	—
Demeton	N/A	N/A	N/A	N/A	0.20
Diazinon	N/A	N/A	N/A	N/A	0.5/0.1

Pollutant	**Sample 1 (µg/L)***	**Sample 2 (µg/L)***	**Sample 3 (µg/L)***	**Sample 4 (µg/L)***	**MAL (µg/L)***
Dicofol [Kelthane]	N/A	N/A	N/A	N/A	1
Dieldrin	N/A	N/A	N/A	N/A	0.02
Diuron	N/A	N/A	N/A	N/A	0.090
Endosulfan I (*alpha*)	N/A	N/A	N/A	N/A	0.01
Endosulfan II (*beta*)	N/A	N/A	N/A	N/A	0.02
Endosulfan sulfate	N/A	N/A	N/A	N/A	0.1
Endrin	N/A	N/A	N/A	N/A	0.02
Guthion [Azinphos methyl]	N/A	N/A	N/A	N/A	0.1
Heptachlor	N/A	N/A	N/A	N/A	0.01
Heptachlor epoxide	N/A	N/A	N/A	N/A	0.01
Hexachlorocyclohexane (*alpha*)	N/A	N/A	N/A	N/A	0.05
Hexachlorocyclohexane (*beta*)	N/A	N/A	N/A	N/A	0.05
Hexachlorocyclohexane (*gamma*) [Lindane]	N/A	N/A	N/A	N/A	0.05
Hexachlorophene	N/A	N/A	N/A	N/A	10
Malathion	N/A	N/A	N/A	N/A	0.1
Methoxychlor	N/A	N/A	N/A	N/A	2.0
Mirex	N/A	N/A	N/A	N/A	0.02
Parathion (ethyl)	N/A	N/A	N/A	N/A	0.1
Toxaphene	N/A	N/A	N/A	N/A	0.3
2,4,5-TP [Silvex]	N/A	N/A	N/A	N/A	0.3

* Indicate units if different from µg/L.

TABLE 6 (Instructions, Page 59)

Completion of Table 6 **is required** for all **external outfalls**.

Table 6 for Outfall No.: 001 **Samples are (check one): ☒ Composite ☐ Grab**

Pollutants	Believed Present	Believed Absent	Sample 1 (mg/L)	Sample 2 (mg/L)	Sample 3 (mg/L)	Sample 4 (mg/L)	MAL (µg/L)*
Bromide	☒	☐	2.72	1.46	1.43	4.42	400
Color (PCU)	☒	☐	600	280	180	280	—
Nitrate-Nitrite (as N)	☒	☐	0.923	0.646	0.611	0.731	—
Sulfide (as S)	☒	☐	0.0224	0.0701	0.0253	0.0608	—
Sulfite (as SO3)	☐	☒	<2.00	<2.00	<2.00	<2.00	—
Surfactants	☐	☒	<0.200	0.271	0.807	0.555	—
Boron, total	☒	☐	0.266	0.262	0.12	0.182	20
Cobalt, total	☒	☐	0.000567	0.00126	<0.001	0.000853	0.3
Iron, total	☒	☐	2.46	6.33	5.09	6.07	7
Magnesium, total	☒	☐	18.4	15.8	8.5	13.9	20
Manganese, total	☒	☐	0.0797	0.133	0.0888	0.0623	0.5
Molybdenum, total	☒	☐	0.0149	0.0226	0.0266	0.0143	1
Tin, total	☒	☐	0.00183	<0.001	0.0014	0.00209	5
Titanium, total	☒	☐	<0.030	<0.400	0.0485	<0.030	30

TABLE 7 (Instructions, Page 60)

Check the box next to any of the industrial categories applicable to this facility. If no categories are applicable, check N/A. If GC/MS testing is required, check the box provided to confirm the testing results for the appropriate parameters are provided with the application.

☒ N/A

Table 7 for Applicable Industrial Categories

Industrial Category	40 CFR Part	Volatiles Table 8	Acids Table 9	Bases/ Neutrals Table 10	Pesticides Table 11
☐ Adhesives and Sealants		☐ Yes	☐ Yes	☐ Yes	No
☐ Aluminum Forming	467	☐ Yes	☐ Yes	☐ Yes	No
☐ Auto and Other Laundries		☐ Yes	☐ Yes	☐ Yes	☐ Yes
☐ Battery Manufacturing	461	☐ Yes	No	☐ Yes	No
☐ Coal Mining	434	No	No	No	No
☐ Coil Coating	465	☐ Yes	☐ Yes	☐ Yes	No
☐ Copper Forming	468	☐ Yes	☐ Yes	☐ Yes	No
☐ Electric and Electronic Components	469	☐ Yes	☐ Yes	☐ Yes	☐ Yes
☐ Electroplating	413	☐ Yes	☐ Yes	☐ Yes	No
☐ Explosives Manufacturing	457	No	☐ Yes	☐ Yes	No
☐ Foundries		☐ Yes	☐ Yes	☐ Yes	No
☐ Gum and Wood Chemicals - Subparts A,B,C,E	454	☐ Yes	☐ Yes	No	No
☐ Gum and Wood Chemicals - Subparts D,F	454	☐ Yes	☐ Yes	☐ Yes	No
☐ Inorganic Chemicals Manufacturing	415	☐ Yes	☐ Yes	☐ Yes	No
☐ Iron and Steel Manufacturing	420	☐ Yes	☐ Yes	☐ Yes	No
☐ Leather Tanning and Finishing	425	☐ Yes	☐ Yes	☐ Yes	No
☐ Mechanical Products Manufacturing		☐ Yes	☐ Yes	☐ Yes	No
☐ Nonferrous Metals Manufacturing	421,471	☐ Yes	☐ Yes	☐ Yes	☐ Yes
☐ Oil and Gas Extraction - Subparts A, D, E, F, G, H	435	☐ Yes	☐ Yes	☐ Yes	No
☐ Ore Mining - Subpart B	440	No	☐ Yes	No	No
☐ Organic Chemicals Manufacturing	414	☐ Yes	☐ Yes	☐ Yes	☐ Yes
☐ Paint and Ink Formulation	446,447	☐ Yes	☐ Yes	☐ Yes	No
☐ Pesticides	455	☐ Yes	☐ Yes	☐ Yes	☐ Yes
☐ Petroleum Refining	419	☐ Yes	No	No	No
☐ Pharmaceutical Preparations	439	☐ Yes	☐ Yes	☐ Yes	No
☐ Photographic Equipment and Supplies	459	☐ Yes	☐ Yes	☐ Yes	No
☐ Plastic and Synthetic Materials Manufacturing	414	☐ Yes	☐ Yes	☐ Yes	☐ Yes
☐ Plastic Processing	463	☐ Yes	No	No	No
☐ Porcelain Enameling	466	No	No	No	No
☐ Printing and Publishing		☐ Yes	☐ Yes	☐ Yes	☐ Yes
☐ Pulp and Paperboard Mills - Subpart C	430	☐ *	☐ Yes	☐ *	☐ Yes
☐ Pulp and Paperboard Mills - Subparts F, K	430	☐ *	☐ Yes	☐ *	☐ *
☐ Pulp and Paperboard Mills - Subparts A, B, D, G, H	430	☐ Yes	☐ Yes	☐ *	☐ *
☐ Pulp and Paperboard Mills - Subparts I, J, L	430	☐ Yes	☐ Yes	☐ *	☐ Yes
☐ Pulp and Paperboard Mills - Subpart E	430	☐ Yes	☐ Yes	☐ Yes	☐ *
☐ Rubber Processing	428	☐ Yes	☐ Yes	☐ Yes	No
☐ Soap and Detergent Manufacturing	417	☐ Yes	☐ Yes	☐ Yes	No
☐ Steam Electric Power Plants	423	☐ Yes	☐ Yes	No	No
☐ Textile Mills (Not Subpart C)	410	☐ Yes	☐ Yes	☐ Yes	No
☐ Timber Products Processing	429	☐ Yes	☐ Yes	☐ Yes	☐ Yes

* Test if believed present.

TABLES 8, 9, 10, and 11 (Instructions, Page 60)

Completion of Tables 8, 9, 10, and 11 **is required** as specified in Table 7 for all **external outfalls** that contain process wastewater.

Completion of Tables 8, 9, 10, and 11 **may be required** for types of industry not specified in Table 7 for specific parameters that are believed to be present in the wastewater.

Table 8 for Outfall No.: N/A **Samples are (check one): ☐ Composite ☐ Grab**

Pollutant	Sample 1 (µg/L)*	Sample 2 (µg/L)*	Sample 3 (µg/L)*	Sample 4 (µg/L)*	MAL (µg/L)
Acrolein	N/A	N/A	N/A	N/A	50
Acrylonitrile	N/A	N/A	N/A	N/A	50
Benzene	N/A	N/A	N/A	N/A	10
Bromoform	N/A	N/A	N/A	N/A	10
Carbon tetrachloride	N/A	N/A	N/A	N/A	2
Chlorobenzene	N/A	N/A	N/A	N/A	10
Chlorodibromomethane	N/A	N/A	N/A	N/A	10
Chloroethane	N/A	N/A	N/A	N/A	50
2-Chloroethylvinyl ether	N/A	N/A	N/A	N/A	10
Chloroform	N/A	N/A	N/A	N/A	10
Dichlorobromomethane [Bromodichloromethane]	N/A	N/A	N/A	N/A	10
1,1-Dichloroethane	N/A	N/A	N/A	N/A	10
1,2-Dichloroethane	N/A	N/A	N/A	N/A	10
1,1-Dichloroethylene [1,1-Dichloroethene]	N/A	N/A	N/A	N/A	10
1,2-Dichloropropane	N/A	N/A	N/A	N/A	10
1,3-Dichloropropylene [1,3-Dichloropropene]	N/A	N/A	N/A	N/A	10
Ethylbenzene	N/A	N/A	N/A	N/A	10
Methyl bromide [Bromomethane]	N/A	N/A	N/A	N/A	50
Methyl chloride [Chloromethane]	N/A	N/A	N/A	N/A	50
Methylene chloride [Dichloromethane]	N/A	N/A	N/A	N/A	20
1,1,2,2-Tetrachloroethane	N/A	N/A	N/A	N/A	10
Tetrachloroethylene [Tetrachloroethene]	N/A	N/A	N/A	N/A	10
Toluene	N/A	N/A	N/A	N/A	10
1,2-Trans-dichloroethylene [1,2-Trans-dichloroethene]	N/A	N/A	N/A	N/A	10

Pollutant	Sample 1 (µg/L)*	Sample 2 (µg/L)*	Sample 3 (µg/L)*	Sample 4 (µg/L)*	MAL (µg/L)
1,1,1-Trichloroethane	N/A	N/A	N/A	N/A	10
1,1,2-Trichloroethane	N/A	N/A	N/A	N/A	10
Trichloroethylene [Trichloroethene]	N/A	N/A	N/A	N/A	10
Vinyl chloride	N/A	N/A	N/A	N/A	10

* Indicate units if different from µg/L.

Table 9 for Outfall No.: N/A **Samples are (check one): ☐ Composite ☐ Grab**

Pollutant	Sample 1 (µg/L)*	Sample 2 (µg/L)*	Sample 3 (µg/L)*	Sample 4 (µg/L)*	MAL (µg/L)
2-Chlorophenol	N/A	N/A	N/A	N/A	10
2,4-Dichlorophenol	N/A	N/A	N/A	N/A	10
2,4-Dimethylphenol	N/A	N/A	N/A	N/A	10
4,6-Dinitro-o-cresol	N/A	N/A	N/A	N/A	50
2,4-Dinitrophenol	N/A	N/A	N/A	N/A	50
2-Nitrophenol	N/A	N/A	N/A	N/A	20
4-Nitrophenol	N/A	N/A	N/A	N/A	50
p-Chloro-m-cresol	N/A	N/A	N/A	N/A	10
Pentachlorophenol	N/A	N/A	N/A	N/A	5
Phenol	N/A	N/A	N/A	N/A	10
2,4,6-Trichlorophenol	N/A	N/A	N/A	N/A	10

* Indicate units if different from µg/L.

Table 10 for Outfall No.: N/A **Samples are (check one): ☐ Composite ☐ Grab**

Pollutant	Sample 1 (µg/L)*	Sample 2 (µg/L)*	Sample 3 (µg/L)*	Sample 4 (µg/L)*	MAL (µg/L)
Acenaphthene	N/A	N/A	N/A	N/A	10
Acenaphthylene	N/A	N/A	N/A	N/A	10
Anthracene	N/A	N/A	N/A	N/A	10
Benzidine	N/A	N/A	N/A	N/A	50
Benzo(a)anthracene	N/A	N/A	N/A	N/A	5
Benzo(a)pyrene	N/A	N/A	N/A	N/A	5
3,4-Benzofluoranthene [Benzo(b)fluoranthene]	N/A	N/A	N/A	N/A	10
Benzo(ghi)perylene	N/A	N/A	N/A	N/A	20
Benzo(k)fluoranthene	N/A	N/A	N/A	N/A	5
Bis(2-chloroethoxy)methane	N/A	N/A	N/A	N/A	10

Pollutant	Sample 1 (µg/L)*	Sample 2 (µg/L)*	Sample 3 (µg/L)*	Sample 4 (µg/L)*	MAL (µg/L)
Bis(2-chloroethyl)ether	N/A	N/A	N/A	N/A	10
Bis(2-chloroisopropyl)ether	N/A	N/A	N/A	N/A	10
Bis(2-ethylhexyl)phthalate	N/A	N/A	N/A	N/A	10
4-Bromophenyl phenyl ether	N/A	N/A	N/A	N/A	10
Butylbenzyl phthalate	N/A	N/A	N/A	N/A	10
2-Chloronaphthalene	N/A	N/A	N/A	N/A	10
4-Chlorophenyl phenyl ether	N/A	N/A	N/A	N/A	10
Chrysene	N/A	N/A	N/A	N/A	5
Dibenzo(a,h)anthracene	N/A	N/A	N/A	N/A	5
1,2-Dichlorobenzene [o-Dichlorobenzene]	N/A	N/A	N/A	N/A	10
1,3-Dichlorobenzene [m-Dichlorobenzene]	N/A	N/A	N/A	N/A	10
1,4-Dichlorobenzene [p-Dichlorobenzene]	N/A	N/A	N/A	N/A	10
3,3'-Dichlorobenzidine	N/A	N/A	N/A	N/A	5
Diethyl phthalate	N/A	N/A	N/A	N/A	10
Dimethyl phthalate	N/A	N/A	N/A	N/A	10
Di-n-butyl phthalate	N/A	N/A	N/A	N/A	10
2,4-Dinitrotoluene	N/A	N/A	N/A	N/A	10
2,6-Dinitrotoluene	N/A	N/A	N/A	N/A	10
Di-n-octyl phthalate	N/A	N/A	N/A	N/A	10
1,2-Diphenylhydrazine (as Azobenzene)	N/A	N/A	N/A	N/A	20
Fluoranthene	N/A	N/A	N/A	N/A	10
Fluorene	N/A	N/A	N/A	N/A	10
Hexachlorobenzene	N/A	N/A	N/A	N/A	5
Hexachlorobutadiene	N/A	N/A	N/A	N/A	10
Hexachlorocyclopentadiene	N/A	N/A	N/A	N/A	10
Hexachloroethane	N/A	N/A	N/A	N/A	20
Indeno(1,2,3-cd)pyrene	N/A	N/A	N/A	N/A	5
Isophorone	N/A	N/A	N/A	N/A	10
Naphthalene	N/A	N/A	N/A	N/A	10
Nitrobenzene	N/A	N/A	N/A	N/A	10
N-Nitrosodimethylamine	N/A	N/A	N/A	N/A	50

Pollutant	Sample 1 (µg/L)*	Sample 2 (µg/L)*	Sample 3 (µg/L)*	Sample 4 (µg/L)*	MAL (µg/L)
N-Nitrosodi-n-propylamine	N/A	N/A	N/A	N/A	20
N-Nitrosodiphenylamine	N/A	N/A	N/A	N/A	20
Phenanthrene	N/A	N/A	N/A	N/A	10
Pyrene	N/A	N/A	N/A	N/A	10
1,2,4-Trichlorobenzene	N/A	N/A	N/A	N/A	10

* Indicate units if different from µg/L.

Table 11 for Outfall No.: N/A **Samples are (check one): ☐ Composite ☐ Grab**

Pollutant	Sample 1 (µg/L)*	Sample 2 (µg/L)*	Sample 3 (µg/L)*	Sample 4 (µg/L)*	MAL (µg/L)
Aldrin	N/A	N/A	N/A	N/A	0.01
alpha-BHC [alpha-Hexachlorocyclohexane]	N/A	N/A	N/A	N/A	0.05
beta-BHC [beta-Hexachlorocyclohexane]	N/A	N/A	N/A	N/A	0.05
gamma-BHC [gamma-Hexachlorocyclohexane]	N/A	N/A	N/A	N/A	0.05
delta-BHC [delta-Hexachlorocyclohexane]	N/A	N/A	N/A	N/A	0.05
Chlordane	N/A	N/A	N/A	N/A	0.2
4,4'-DDT	N/A	N/A	N/A	N/A	0.02
4,4'-DDE	N/A	N/A	N/A	N/A	0.1
4,4'-DDD	N/A	N/A	N/A	N/A	0.1
Dieldrin	N/A	N/A	N/A	N/A	0.02
Endosulfan I (alpha)	N/A	N/A	N/A	N/A	0.01
Endosulfan II (beta)	N/A	N/A	N/A	N/A	0.02
Endosulfan sulfate	N/A	N/A	N/A	N/A	0.1
Endrin	N/A	N/A	N/A	N/A	0.02
Endrin aldehyde	N/A	N/A	N/A	N/A	0.1
Heptachlor	N/A	N/A	N/A	N/A	0.01
Heptachlor epoxide	N/A	N/A	N/A	N/A	0.01
PCB 1242	N/A	N/A	N/A	N/A	0.2
PCB 1254	N/A	N/A	N/A	N/A	0.2
PCB 1221	N/A	N/A	N/A	N/A	0.2
PCB 1232	N/A	N/A	N/A	N/A	0.2
PCB 1248	N/A	N/A	N/A	N/A	0.2

Pollutant	Sample 1 (µg/L)*	Sample 2 (µg/L)*	Sample 3 (µg/L)*	Sample 4 (µg/L)*	MAL (µg/L)
PCB 1260	N/A	N/A	N/A	N/A	0.2
PCB 1016	N/A	N/A	N/A	N/A	0.2
Toxaphene	N/A	N/A	N/A	N/A	0.3

* Indicate units if different from µg/L.

Attachment: Click to enter text.

TABLE 12 (DIOXINS/FURAN COMPOUNDS)

Complete of Table 12 **is required** for **external outfalls**, as directed below. (Instructions, Pages 59-60)

Indicate which compound(s) are manufactured or used at the facility and provide a brief description of the conditions of its/their presence at the facility (check all that apply).

- ☐ 2,4,5-trichlorophenoxy acetic acid (2,4,5-T) CASRN 93-76-5
- ☐ 2-(2,4,5-trichlorophenoxy) propanoic acid (Silvex, 2,4,5-TP) CASRN 93-72-1
- ☐ 2-(2,4,5-trichlorophenoxy) ethyl 2,2-dichloropropionate (Erbon) CASRN 136-25-4
- ☐ 0,0-dimethyl 0-(2,4,5-trichlorophenyl) phosphorothioate (Ronnel) CASRN 299-84-3
- ☐ 2,4,5-trichlorophenol (TCP) CASRN 95-95-4
- ☐ hexachlorophene (HCP) CASRN 70-30-4
- ☒ None of the above

Description: N/A

Does the applicant or anyone at the facility know or have any reason to believe that 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) or any congeners of TCDD may be present in the effluent proposed for discharge?

☐ Yes ☒ No

Description: N/A

If **yes** to either Items a **or** b, complete Table 12 as instructed.

Table 12 for Outfall No.: Click to enter text. **Samples are (check one):** ☐ **Composite** ☐ **Grab**

Compound	Toxicity Equivalent Factors	Wastewater Concentration (ppq)	Wastewater Toxicity Equivalents (ppq)	Sludge Concentration (ppt)	Sludge Toxicity Equivalents (ppt)	MAL (ppq)
2,3,7,8-TCDD	1	N/A	N/A	N/A	N/A	10
1,2,3,7,8-PeCDD	1.0	N/A	N/A	N/A	N/A	50
2,3,7,8-HxCDDs	0.1	N/A	N/A	N/A	N/A	50
1,2,3,4,6,7,8-HpCDD	0.01	N/A	N/A	N/A	N/A	50

Compound	Toxicity Equivalent Factors	Wastewater Concentration (ppq)	Wastewater Toxicity Equivalents (ppq)	Sludge Concentration (ppt)	Sludge Toxicity Equivalents (ppt)	MAL (ppq)
2,3,7,8-TCDF	0.1	N/A	N/A	N/A	N/A	10
1,2,3,7,8-PeCDF	0.03	N/A	N/A	N/A	N/A	50
2,3,4,7,8-PeCDF	0.3	N/A	N/A	N/A	N/A	50
2,3,7,8-HxCDFs	0.1	N/A	N/A	N/A	N/A	50
2,3,4,7,8-HpCDFs	0.01	N/A	N/A	N/A	N/A	50
OCDD	0.0003	N/A	N/A	N/A	N/A	100
OCDF	0.0003	N/A	N/A	N/A	N/A	100
PCB 77	0.0001	N/A	N/A	N/A	N/A	500
PCB 81	0.0003	N/A	N/A	N/A	N/A	500
PCB 126	0.1	N/A	N/A	N/A	N/A	500
PCB 169	0.03	N/A	N/A	N/A	N/A	500
Total		N/A	N/A	N/A	N/A	

TABLE 13 (HAZARDOUS SUBSTANCES)

Complete Table 13 **is required** for all **external outfalls** as directed below. (Instructions, Pages 60-61)

Are there any pollutants listed in the instructions (pages 55-62) believed present in the discharge?

☐ Yes ☒ No

Are there pollutants listed in Item 1.c. of Technical Report 1.0 which are believed present in the discharge and have not been analytically quantified elsewhere in this application?

☐ Yes ☒ No

If **yes** to either Items a **or** b, complete Table 13 as instructed.

Table 13 for Outfall No.: Click to enter text. **Samples are (check one):** ☐ **Composite** ☐ **Grab**

Pollutant	CASRN	Sample 1 (µg/L)	Sample 2 (µg/L)	Sample 3 (µg/L)	Sample 4 (µg/L)	Analytical Method
N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A

INDUSTRIAL WASTEWATER PERMIT APPLICATION WORKSHEET 3.0: LAND APPLICATION OF EFFLUENT

This worksheet **is required** for all applications for a permit to disposal of wastewater by land application (i.e., TLAP)).

Item 1. Type of Disposal System (Instructions, Page 69)

Check the box next to the type of land disposal requested by this application:

- ☐ Irrigation
- ☐ Evaporation
- ☐ Evapotranspiration beds
- ☐ Drip irrigation system
- ☐ Subsurface application
- ☐ Subsurface soils absorption
- ☐ Surface application
- ☐ Other, specify: Click to enter text.

Item 2. Land Application Area (Instructions, Page 69)

Land Application Area Information

Effluent Application (gallons/day)	Irrigation Acreage (acres)	Describe land use & indicate type(s) of crop(s)	Public Access? (Y/N)

Item 3. Annual Cropping Plan (Instructions, Page 69)

Attach the required cropping plan that includes each of the following:

- Cool and warm season plant species
- Breakdown of acreage and percent of total acreage for each crop
- Crop growing season
- Harvesting method/number of harvests
- Minimum/maximum harvest height
- Crop yield goals
- Soils map
- Nitrogen requirements per crop
- Additional fertilizer requirements
- Supplemental watering requirements
- Crop salt tolerances
- Justification for not removing existing vegetation to be irrigated

Attachment:

Item 4. Well and Map Information (Instructions, Page 70)

a. Check each box to confirm the required information is shown and labeled on the attached USGS map:

☐ The exact boundaries of the land application area

☐ On-site buildings

☐ Waste-disposal or treatment facilities

☐ Effluent storage and tailwater control facilities

☐ Buffer zones

☐ All surface waters in the state onsite and within 500 feet of the property boundaries

☐ All water wells within ½-mile of the disposal site, wastewater ponds, or property boundaries

☐ All springs and seeps onsite and within 500 feet of the property boundaries

Attachment: Click to enter text.

b. List and cross reference all water wells located on or within 500 feet of the disposal site, wastewater ponds, or property boundaries in the following table. Attach additional pages as necessary to include all of the wells.

Well and Map Information Table

Well ID	Well Use	Producing? Y/N/U	Open, cased, capped, or plugged?	Proposed Best Management Practice

Attachment: Click to enter text.

c. Groundwater monitoring wells or lysimeters are/will be installed around the land application site or wastewater ponds.

☐ Yes ☐ No

If **yes**, provide the existing/proposed location of the monitoring wells or lysimeters on the site map attached for Item 4.a. Additionally, attach information on the depth of the wells or lysimeters, sampling schedule, and monitoring parameters for TCEQ review, possible modification, and approval.

Attachment: Click to enter text.

d. Attach a short groundwater technical report using *30 TAC § 309.20(a)(4)* as guidance.
Attachment:

Item 5. Soil Map and Soil Information (Instructions, Page 71)

Check each box to confirm that the following information is attached:

a. ☐ USDA NRCS Soil Survey Map depicting the area to be used for land application with the locations identified by fields and crops.

b. ☐ Breakdown of acreage and percent of total acreage for each soil type.

c. ☐ Copies of laboratory soil analyses. **Attachment:** Click to enter text.

Item 6. Effluent Monitoring Data (Instructions, Page 72)

a. Completion of Table 14 **is required** for all **renewal** and **major amendment** applications. Complete the table with monitoring data for the previous two years for all parameters regulated in the current permit. An additional table has been provided with blank headers for parameters regulated in the current permit which are not listed in Table 14.

Table 14 for Outfall No.: Click to enter text. **Samples are (check one):** ☐ **Composite** ☐ **Grab**

Date (mo/yr)	Daily Avg Flow (gpd)	BOD5 (mg/L)	TSS (mg/L)	Nitrogen (mg/L)	Conductivity (mmhos/cm)	Total acres irrigated	Hydraulic Application rate (acre-feet/month)

Date (mo/yr)	Daily Avg Flow (gpd)	BOD5 (mg/L)	TSS (mg/L)	Nitrogen (mg/L)	Conductivity (mmhos/cm)	Total acres irrigated	Hydraulic Application rate (acre-feet/month)

b. Use this table to provide effluent analysis for parameters regulated in the current permit which are not listed in Table 14.

Additional Parameter Effluent Analysis

Date (mo/yr)							

c. Attach an explanation of all persistent excursions to permitted parameters and corrective actions taken. **Attachment:** Click to enter text.

Item 7. Pollutant Analysis (Instructions, Page 72)

a. Provide the date range of all sampling events conducted to obtain the analytical data submitted with this application (e.g., 05/01/2018-05/30/2018): Click to enter text.

b. ☐ Check the box to confirm all samples were collected no more than 12 months prior to the date of application submittal.

c. Complete Tables 15 and 16.

Table 15 for Outfall No.: Click to enter text. **Samples are (check one):** ☐ **Composite** ☐ **Grab**

Pollutant	**Sample 1 (mg/L)**	**Sample 2 (mg/L)**	**Sample 3 (mg/L)**	**Sample 4 (mg/L)**
BOD (5-day)				
CBOD (5-day)				
Chemical oxygen demand				
Total organic carbon				
Dissolved oxygen				
Ammonia nitrogen				
Total suspended solids				
Nitrate nitrogen				
Total organic nitrogen				
Total phosphorus				
Oil and grease				
Total residual chlorine				
Total dissolved solids				
Sulfate				
Chloride				
Fluoride				
Total alkalinity (mg/L as CaCO3)				
Temperature (˚F)				
pH (standard units)				

Table 16 for Outfall No.: Click to enter text. **Samples are (check one):** ☐ **Composite** ☐ **Grab**

Pollutant	**Sample 1 (µg/L)**	**Sample 2 (µg/L)**	**Sample 3 (µg/L)**	**Sample 4 (µg/L)**	**MAL (µg/L)**
Aluminum, total					2.5
Antimony, total					5
Arsenic, total					0.5
Barium, total					3

Pollutant	Sample 1 (µg/L)	Sample 2 (µg/L)	Sample 3 (µg/L)	Sample 4 (µg/L)	MAL (µg/L)
Beryllium, total					0.5
Cadmium, total					1
Chromium, total					3
Chromium, hexavalent					3
Chromium, trivalent					N/A
Copper, total					2
Cyanide, available					2/10
Lead, total					0.5
Mercury, total					0.005/0.0005
Nickel, total					2
Selenium, total					5
Silver, total					0.5
Thallium, total					0.5
Zinc, total					5.0

INDUSTRIAL WASTEWATER PERMIT APPLICATION WORKSHEET 3.1: SURFACE LAND APPLICATION AND APPLICATION

This worksheet **is required** for all applications for a permit to disposal of wastewater by surface land application or evaporation.

Item 1. Edwards Aquifer (Instructions, Page 73)

a. Is the facility subject to *30 TAC Chapter 213*, Edwards Aquifer Rules?

☐ Yes ☐ No

If **no**, proceed to Item 2. If **yes**, complete Items 1.b **and** 1.c.

b. Check the box next to the subchapter applicable to the facility.

☐ 30 TAC Chapter 213, Subchapter A

☐ 30 TAC Chapter 213, Subchapter B

c. If *30 TAC Chapter 213, Subchapter A* applies, attach **either**: 1) a Geologic Assessment (if conducted in accordance with *30 TAC § 213.5*) **or** 2) a report that contains the following:

- A description of the surface geological units within the proposed land application site and wastewater pond area.
- The location and extent of any sensitive recharge features in the land application site and wastewater pond area
- A list of any proposed BMPs to protect the recharge features.

Attachment: Click to enter text.

Item 2. Surface Spray/Irrigation (Instructions, Page 73)

a. Provide the following information on the irrigation operations:

Area under irrigation (acres): Click to enter text.

Design application rate (acre-ft/acre/yr): Click to enter text.

Design application frequency (hours/day): Click to enter text.

Design application frequency (days/week): Click to enter text.

Design total nitrogen loading rate (lbs nitrogen/acre/year): Click to enter text.

Average slope of the application area (percent): Click to enter text.

Maximum slope of the application area (percent): Click to enter text.

Irrigation efficiency (percent): Click to enter text.

Effluent conductivity (mmhos/cm): Click to enter text.

Soil conductivity (mmhos/cm): Click to enter text.

Curve number: Click to enter text.

Describe the application method and equipment: Click to enter text.

b. Attach a detailed engineering report which includes a water balance, storage volume calculations, and a nitrogen balance. **Attachment:** Click to enter text.

Item 3. Evaporation Ponds (Instructions, Page 74)

a. Daily average effluent flow into ponds: Click to enter text. gallons per day

b. Attach a separate engineering report of evaporation calculations for average long-term and worst-case critical conditions. **Attachment:** Click to enter text.

Item 4. Evapotranspiration Beds (Instructions, Page 74)

a. Provide the following information on the evapotranspiration beds:

Number of beds: Click to enter text.

Area of bed(s) (acres): Click to enter text.

Depth of bed(s) (feet): Click to enter text.

Void ratio of soil in the beds: Click to enter text.

Storage volume within the beds (include units): Click to enter text.

Description of any lining to protect groundwater: Click to enter text.

b. Attach a certification by a licensed Texas professional engineer that the liner meets TCEQ requirements. **Attachment:** Click to enter text.

c. Attach a separate engineering report with water balance, storage volume calculations, and description of the liner. **Attachment:** Click to enter text.

Item 5. Overland Flow (Instructions, Page 74)

a. Provide the following information on the overland flow:

Area used for application (acres): Click to enter text.

Slopes for application area (percent): Click to enter text.

Design application rate (gpm/foot of slope width): Click to enter text.

Slope length (feet): Click to enter text.

Design BOD5 loading rate (lbs BOD5/acre/day): Click to enter text.

Design application frequency (hours/day): Click to enter text.

Design application frequency (days/week): Click to enter text.

b. Attach a separate engineering report with the method of application and design requirements according to *30 TAC § 217.212*. **Attachment:** Click to enter text.

INDUSTRIAL WASTEWATER PERMIT APPLICATION WORKSHEET 3.2: SUBSURFACE IRRIGATION (NON-DRIP)

This worksheet **is required** for all applications for a permit to disposal of wastewater by subsurface land application.

☐ Check the box to confirm the Class V Injection Well Inventory/Authorization Form (Worksheet 9.0) has been submitted to the TCEQ UIC Permits Team as directed.

Item 1. Edwards Aquifer (Instructions, Page 75)

a. The subsurface system is/will be located on the Edwards Aquifer Recharge Zone, as mapped by TCEQ?

☐ Yes ☐ No

b. The subsurface system is/will be located on the Edwards Aquifer Transition Zone, as mapped by TCEQ?

☐ Yes ☐ No

If **yes** to Item 1.a **or** 1.b, the subsurface system may be prohibited by *30 TAC § 213.8*. Contact the Water Quality Assessment Section at (512) 239-4671 for a preapplication meeting.

Item 2. Subsurface Application (Instructions, Page 75)

a. Check the box next to the type of subsurface land disposal system requested:

☐ Conventional drainfield, beds, or trenches

☐ Low pressure dosing

☐ Other: Click to enter text.

b. Provide the following information on the irrigation operations:

Application area (acres): Click to enter text.

Area of drainfield (square feet): Click to enter text.

Application rate (gal/square ft/day): Click to enter text.

Depth to groundwater (feet): Click to enter text.

Area of trench (square feet): Click to enter text.

Dosing duration per area (hours): Click to enter text.

Number of beds: Click to enter text.

Dosing amount per area (inches/day): Click to enter text.

Soil infiltration rate (inches/hour): Click to enter text.

Storage volume (gallons): Click to enter text.

Area of bed(s) (square feet): Click to enter text.

Soil classification: Click to enter text.

c. Attach a separate engineering report using *30 TAC § 309.20, Subchapter C, Land Disposal of Sewage Effluent* as guidance, excluding items b(3)(A) and b(3)(B). Include a description of the schedule of dosing basin rotation. **Attachment:** Click to enter text.

INDUSTRIAL WASTEWATER PERMIT APPLICATION WORKSHEET 3.3: SUBSURFACE AREA DRIP DISPERSAL SYSTEMS

This worksheet **is required** for all applications for a permit to dispose of wastewater using a subsurface area drip dispersal system (SADDS).

☐ Check the box to confirm the Class V Injection Well Inventory/Authorization Form (Worksheet 9.0) has been submitted to the TCEQ UIC Permits Team as directed.

Item 1. Edwards Aquifer (Instructions, Page 76)

a. The subsurface system is/will be located on the Edwards Aquifer Recharge Zone, as mapped by TCEQ?

☐ Yes ☐ No

b. The subsurface system is/will be located on the Edwards Aquifer Transition Zone, as mapped by TCEQ?

☐ Yes ☐ No

If **yes** to Item 1.a **or** 1.b, the subsurface system may be prohibited by *30 TAC § 213.8*. Contact the Water Quality Assessment Section at (512) 239-4671 for a preapplication meeting.

Item 2. Administrative Information (Instructions, Page 76)

a. Provide the legal name of all corporations or other business entities managed, owned, or otherwise closely related to the owner of the treatment facility: Click to enter text.

b. The owner of the land where the WWTF is/will be located is the same as the owner of the WWTF.

☐ Yes ☐ No

If **no**, provide the legal name of all corporations or other business entities managed, owned, or otherwise closely related to the owner of the land where the WWTF is/will be located: Click to enter text.

c. Provide the legal name of the owner of the SADDS: Click to enter text.

d. The owner of the SADDS is the same as the owner of the WWTF or the site where the WWTF is/will be located.

☐ Yes ☐ No

If **no**, identify the legal name of all corporations or other business entities managed, owned, or otherwise closely related to the entity identified in Item 1.c: Click to enter text.

e. Provide the legal name of the owner of the land where the SADDS is located: Click to enter text.

f. The owner of the land where the SADDS is/will be located is the same as owner of the WWTF, the site where the WWTF is located, or the owner of the SADDS.

☐ Yes ☐ No

If **no**, provide the legal name of all corporations or other business entities managed, owned, or otherwise closely related to the entity identified in item 1.e: Click to enter text.

Item 3. SADDS (Instructions, Page 77)

a. Check the box next to the type SADDS requested by this application:

☐ Subsurface drip/trickle irrigation

☐ Surface drip irrigation

☐ Other: Click to enter text.

b. Attach a description of the SADDS proposed/used by the facility (see instructions for guidance). **Attachment:** Click to enter text.

c. Provide the following information on the SADDS:

Application area (acres): Click to enter text.

Soil infiltration rate (inches/hour): Click to enter text.

Average slope of the application area: Click to enter text.

Maximum slope of the application area: Click to enter text.

Storage volume (gallons): Click to enter text.

Major soil series: Click to enter text.

Depth to groundwater (feet): Click to enter text.

Effluent conductivity (mmhos/cm): Click to enter text.

d. The facility is/will be located west of the boundary shown in *30 TAC § 222.83* **and** using a vegetative cover of non-native grasses over seeded with cool-season grasses.

☐ Yes ☐ No

If **yes**, the facility may propose a hydraulic application rate up to, but not to exceed, 0.1 gal/ft^2/day.

e. The facility is/will be located east of the boundary shown in *30 TAC § 222.83* **or** is the facility proposing any crop other than non-native grasses.

☐ Yes ☐ No

If **yes**, the facility must use the formula in *30 TAC § 222.83* to calculate the maximum hydraulic application rate.

f. The facility has or plans to submit an alternative method to calculate the hydraulic application rate for approval by the ED.

☐ Yes ☐ No

If **yes**, provide the following information on the hydraulic application rates:

- Hydraulic application rate (gal/square foot/day): Click to enter text.
- Nitrogen application rate (gal/square foot/day): Click to enter text.

g. Provide the following dosing information:

Number of doses per day: Click to enter text.

Dosing duration per area (hours): Click to enter text.

Rest period between doses (hours): Click to enter text.

Dosing amount per area (inches/day): Click to enter text.

Number of zones: Click to enter text.

h. The system is/will be a surface drip irrigation system using existing native vegetation as a crop?

☐ Yes ☐ No

If **yes**, attach the following information:

- A vegetation survey by a certified arborist describing the percent canopy cover and relative percentage of major overstory and understory plant species.

  Attachment: Click to enter text.

- Attach a separate engineering report using *30 TAC § 309.20, Subchapter C, Land Disposal of Sewage Effluent* as guidance, excluding items b(3)(A) and b(3)(B). Include a description of the schedule of dosing basin rotation.

  Attachment: Click to enter text.

Item 4. Required Plans (Instructions, Page 78)

a. Attach a Soil Evaluation with all information required in *30 TAC § 222.73*.

Attachment: Click to enter text.

b. Attach a Site Preparation Plan with all information required in *30 TAC § 222.75*.

Attachment: Click to enter text.

c. Attach a Recharge Feature Plan with all information required in *30 TAC § 222.79*.

Attachment: Click to enter text.

d. Provide soil sampling and testing with all information required in *30 TAC § 222.157*.

Attachment: Click to enter text.

Item 5. Flood and Run-On Protection (Instructions, Page 79)

a. Is the existing/proposed SADDS located within the 100-year frequency flood level?

☐ Yes ☐ No

Source: Click to enter text.

If **yes**, describe how the site will be protected from inundation: Click to enter text.

b. Is the existing/proposed SADDS within a designated floodway?

☐ Yes ☐ No

If **yes**, attach either the FEMA flood map or alternate information used to make this determination. **Attachment:** Click to enter text.

Item 6. Surface Waters in The State (Instructions, Page 79)

a. Attach a buffer map which shows the appropriate buffers on surface waters in the state, water wells, and springs/seeps. **Attachment:** Click to enter text.

b. The facility has or plans to request a buffer variance from water wells or waters in the state?

☐ Yes ☐ No

If **yes**, attach the additional information required in *30 TAC § 222.81(c)*. **Attachment:** Click to enter text.

INDUSTRIAL WASTEWATER PERMIT APPLICATION WORKSHEET 4.0: RECEIVING WATERS

This worksheet **is required** for all TPDES permit applications.

Item 1. Domestic Drinking Water Supply (Instructions, Page 80)

a. There is a surface water intake for domestic drinking water supply located within 5 (five) miles downstream from the point/proposed point of discharge.

☐ Yes ☒ No

If **no**, stop here and proceed to Item 2. If **yes**, provide the following information:

1. The legal name of the owner of the drinking water supply intake: Click to enter text.
2. The distance and direction from the outfall to the drinking water supply intake: Click to enter text.

b. Locate and identify the intake on the USGS 7.5-minute topographic map provided for Administrative Report 1.0.

☐ Check this box to confirm the above requested information is provided.

Item 2. Discharge Into Tidally Influenced Waters (Instructions, Page 80)

If the discharge is to tidally influenced waters, complete this section. Otherwise, proceed to Item 3.

a. Width of the receiving water at the outfall: N/A feet

b. Are there oyster reefs in the vicinity of the discharge?

☐ Yes ☐ No

If **yes**, provide the distance and direction from the outfall(s) to the oyster reefs: N/A

c. Are there sea grasses within the vicinity of the point of discharge?

☐ Yes ☐ No

If **yes**, provide the distance and direction from the outfall(s) to the grasses: N/A

Item 3. Classified Segment (Instructions, Page 80)

The discharge is/will be directly into (or within 300 feet of) a classified segment.

☒ Yes ☐ No

If **yes**, stop here and do not complete Items 4 and 5 of this worksheet or Worksheet 4.1.

If **no**, complete Items 4 and 5 and Worksheet 4.1 may be required.

Item 4. Description of Immediate Receiving Waters (Instructions, Page 80)

a. Name of the immediate receiving waters: Click to enter text.

b. Check the appropriate description of the immediate receiving waters:

☐ Lake or Pond

- Surface area (acres): Click to enter text.
- Average depth of the entire water body (feet): Click to enter text.
- Average depth of water body within a 500-foot radius of the discharge point (feet): Click to enter text.

☐ Man-Made Channel or Ditch

☐ Stream or Creek

☐ Freshwater Swamp or Marsh

☐ Tidal Stream, Bayou, or Marsh

☐ Open Bay

☐ Other, specify:

If **Man-Made Channel or Ditch** or **Stream or Creek** were selected above, provide responses to Items 4.c – 4.g below:

c. For **existing discharges**, check the description below that best characterizes the area **upstream** of the discharge.

For **new discharges**, check the description below that best characterizes the area **downstream** of the discharge.

☐ Intermittent (dry for at least one week during most years)

☐ Intermittent with Perennial Pools (enduring pools containing habitat to maintain aquatic life uses)

☐ Perennial (normally flowing)

Check the source(s) of the information used to characterize the area upstream (existing discharge) or downstream (new discharge):

☐ USGS flow records

☐ personal observation

☐ historical observation by adjacent landowner(s)

☐ other, specify: Click to enter text.

d. List the names of all perennial streams that join the receiving water within three miles downstream of the discharge point: Click to enter text.

e. The receiving water characteristics change within three miles downstream of the discharge (e.g., natural or man-made dams, ponds, reservoirs, etc.).

☐ Yes ☐ No

If **yes**, describe how: Click to enter text.

f. General observations of the water body during normal dry weather conditions: Click to enter text.

Date and time of observation: Click to enter text.

g. The water body was influenced by stormwater runoff during observations.

☐ Yes ☐ No

If **yes**, describe how: Click to enter text.

Item 5. General Characteristics of Water Body (Instructions, Page 81)

a. Is the receiving water upstream of the existing discharge or proposed discharge site influenced by any of the following (check all that apply):

☐ oil field activities
☐ agricultural runoff
☐ upstream discharges
☐ urban runoff
☐ septic tanks
☐ other, specify: Click to enter text.

b. Uses of water body observed or evidence of such uses (check all that apply):

☐ livestock watering
☐ non-contact recreation
☐ domestic water supply
☐ contact recreation
☐ fishing
☐ industrial water supply
☐ irrigation withdrawal
☐ navigation
☐ picnic/park activities
☐ other, specify: Click to enter text.

c. Description which best describes the aesthetics of the receiving water and the surrounding area (check only one):

☐ **Wilderness:** outstanding natural beauty; usually wooded or un-pastured area: water clarity exceptional

☐ **Natural Area:** trees or native vegetation common; some development evident (from fields, pastures, dwellings); water clarity discolored

☐ **Common Setting:** not offensive, developed but uncluttered; water may be colored or turbid

☐ **Offensive:** stream does not enhance aesthetics; cluttered; highly developed; dumping areas; water discolored

INDUSTRIAL WASTEWATER PERMIT APPLICATION WORKSHEET 4.1: WATERBODY PHYSICAL CHARACTERISTICS

The following information **is required** for new applications, EPA-designated Major facilities, and major amendment applications requesting to add an outfall if the receiving waters are perennial or intermittent with perennial pools (including impoundments) for a TDPES permit.

Complete the transects downstream of the existing or proposed discharges.

Item 1. Data Collection (Instructions, Page 82)

a. Date of study: Click to enter text. Time of study: Click to enter text.

Waterbody name: Click to enter text.

General location: Click to enter text.

b. Type of stream upstream of an existing discharge or downstream of a proposed discharge (check only one):

☐ perennial ☐ intermittent with perennial pools ☐ impoundment

c. No. of defined stream bends:

Well: Click to enter text. Moderately: Click to enter text. Poorly: Click to enter text.

d. No. of riffles: Click to enter text.

e. Evidence of flow fluctuations (check one):

☐ Minor ☐ Moderate ☐ Severe

f. Provide the observed stream uses and where there is evidence of channel obstructions/modifications: Click to enter text.

g. Complete the following table with information regarding the transect measurements.

Stream Transect Data

Transect Location	Habitat Type*	Water Surface Width (ft)	Stream Depths (ft)**								

* riffle, run, glide, or pool

** channel bed to water surface

Item 2. Summarize Measurements (Instructions, Page 83)

Provide the following information regarding the transect measurements:

Streambed slope of entire reach (from USGS map in ft. /ft.): Click to enter text.

Approximate drainage area above the most downstream transect from USGS map or county highway map (square miles): Click to enter text.

Length of stream evaluated (ft): Click to enter text.

Number of lateral transects made: Click to enter text.

Average stream width (ft): Click to enter text.

Average stream depth (ft): Click to enter text.

Average stream velocity (ft/sec): Click to enter text.

Instantaneous stream flow (ft^3/sec): Click to enter text.

Indicate flow measurement method (VERY IMPORTANT – type of meter, floating chip timed over a fixed distance, etc.): Click to enter text.

Flow fluctuations (i.e., minor, moderate, or severe): Click to enter text.

Size of pools (i.e., large, small, moderate, or none): Click to enter text.

Maximum pool depth (ft): Click to enter text.

Total number of stream bends: Click to enter text.

Number well defined: Click to enter text.

Number moderately defined: Click to enter text.

Number poorly defined: Click to enter text.

Total number of riffles: Click to enter text.

INDUSTRIAL WASTEWATER PERMIT APPLICATION WORKSHEET 5.0: SEWAGE SLUDGE MANAGEMENT AND DISPOSAL

The following information **is required** for all TPDES permit applications that meet the conditions as outlined in Technical Report 1.0, Item 7.

Item 1. Sewage Sludge Solids Management Plan (Instructions, Page 84)

a. Is this a new permit application or an amendment permit application?

☐ Yes ☐ No

b. Does or will the facility discharge in the Lake Houston watershed?

☐ Yes ☐ No

If **yes** to either Item 1.a **or** 1.b, attach a solids management plan. **Attachment:** Click to enter text.

Item 2. Sewage Sludge Management and Disposal (Instructions, Page 84)

a. Check the box next to the sludge disposal method(s) authorized under the facility's existing permit (check all that apply).

☐ Permitted landfill

☐ Marketing and distribution by the permittee, attach Form TCEQ-00551

☐ Registered land application site, attach Form TCEQ-00565

☐ Processed by the permittee, attach Form TCEQ-00744

☐ Surface disposal site (sludge monofill), attach Form TCEQ-00744

☐ Transported to another WWTP

☐ Beneficial land application, attach Form TCEQ-10451

☐ Incineration, attach Form TCEQ-00744

Based on the selection(s) made above, complete and attach the required TCEQ forms as directed. Failure to submit the required TCEQ form will result in delays in processing the application

Attachment: Click to enter text.

b. Provide the following information for each disposal site:

Disposal site name: Click to enter text.

TCEQ Permit/Registration Number: Click to enter text.

County where disposal site is located: Click to enter text.

c. Method of sewage sludge transportation:

☐ truck ☐ train ☐ pipe ☐ other: Click to enter text.

TCEQ Hauler Registration Number: Click to enter text.

d. Sludge is transported as a:

☐ liquid ☐ semi-liquid ☐ semi-solid ☐ solid

e. Purpose of land application: ☐ reclamation ☐ soil conditioning ☐ N/A

f. If sewage sludge is transported to another WWTP for treatment, attach a written statement or copy of contractual agreements confirming that the WWTP identified above will accept and be responsible for the sludge from this facility for the life of the permit (at least 5 years).

Attachment: Click to enter text.

Item 3. Authorization for Sewage Sludge Disposal (Instructions, Page 85)

If this is a new or major amendment application which requests authorization of a new sewage sludge disposal method, check the new sewage disposal method(s) requested for authorization (check all that apply):

☐ Marketing and distribution by the permittee, attach Form TCEQ-00551

☐ Processed by the permittee, attach Form TCEQ-00744

☐ Surface disposal site (sludge monofill), attach Form TCEQ-00744

☐ Beneficial land application, attach Form TCEQ-10451

☐ Incineration, attach Form TCEQ-00744

Based on the selection(s) made above, complete and attach any required TCEQ forms, as directed. Failure to submit the required TCEQ form will result in delays in processing the application.

Attachment: Click to enter text.

NOTE: New authorization for beneficial land application, incineration, processing, or disposal in the TPDES permit or TLAP **requires a major amendment to the permit**. New authorization for composting may require a major amendment to the permit. See the instructions to determine if a major amendment is required or if authorization for composting can be added through the renewal process.

INDUSTRIAL WASTEWATER PERMIT APPLICATION WORKSHEET 6.0: INDUSTRIAL WASTE CONTRIBUTION

The following information **is required** for all applications for publicly-owned treatment works (POTWs).

For an explanation of the terms used in this worksheet, refer to the General Definitions on pages 4-12 and the Definitions Relating to Pretreatment on pages 13-14 of the Instructions.

Item 1. All POTWs (Instructions, Page 86)

a. Complete the following table with the number of each type of industrial users (IUs) that discharge to the POTW and the daily average flows from each.

Industrial User Information

Type of Industrial User	Number of Industrial Users	Daily Average Flow (gallons per day)
CIU		
SIU – Non-categorical		
Other IU		

b. In the past three years, has the POTW experienced treatment plant interference?

☐ Yes ☐ No

If **yes**, identify the date(s), duration, nature of interference, and probable cause(s) and possible source(s) of each interference event. Include the names of the IU(s) that may have caused the interference: Click to enter text.

c. In the past three years, has the POTW experienced pass-through?

☐ Yes ☐ No

If **yes**, identify the date(s), duration, pollutants passing through the treatment plant, and probable cause(s) and possible source(s) of each pass-through event. Include the names of the IU(s) that may have caused the pass-through: Click to enter text.

d. Does the POTW have, or is it required to develop, an approved pretreatment program?

☐ Yes ☐ No

If **yes**, answer all questions in Item 2 and skip Item 3.

If **no**, skip Item 2 and answer all questions in Item 3 for each SIU and CIU.

Item 2. POTWs With Approved Pretreatment Programs or Those Required To Develop A Pretreatment Program (Instructions, Page 86)

a. Have there been any substantial modifications to the POTW's approved pretreatment program that have not been submitted to the Approval Authority (TCEQ) for approval according to *40 CFR § 403.18*?

☐ Yes ☐ No

If **yes**, include an attachment which identifies all substantial modifications that have not been submitted to the TCEQ and the purpose of the modifications.

Attachment: Click to enter text.

b. Have there been any non-substantial modifications to the POTW's approved pretreatment program that have not been submitted to the Approval Authority (TCEQ)?

☐ Yes ☐ No

If **yes**, include an attachment which identifies all non-substantial modifications that have not been submitted to the TCEQ and the purpose of the modification.

Attachment: Click to enter text.

c. List all parameters measured above the MAL in the POTW's effluent monitoring during the last three years:

Effluent Parameters Measured Above the MAL

Pollutant	Concentration	MAL	Units	Date

Attachment: Click to enter text.

d. Has any SIU, CIU, or other IU caused or contributed to any other problems (excluding interference or pass-through) at the POTW in the past three years?

☐ Yes ☐ No

If **yes**, provide a description of each episode, including date(s), duration, description of problems, and probable pollutants. Include the name(s) of the SIU(s)/CIU(s)/other IU(s) that may have caused or contributed to any of the problems: Click to enter text.

Item 3. Significant Industrial User and Categorical Industrial User Information (Instructions, Pages 88-87)

POTWs that **do not** have an approved pretreatment program **are required** to provide the following information for each SIU and CIU:

a. Mr. or Ms.: Click to enter text. First/Last Name: Click to enter text.

Organization Name: Click to enter text. SIC Code: Click to enter text.

Phone number: Click to enter text. Email address: Click to enter text.

Physical Address: Click to enter text. City/State/ZIP Code: Click to enter text.

Attachment: Click to enter text.

b. Describe the industrial processes or other activities that affect or contribute to the SIU(s) or CIU(s) discharge (e.g., process and non-process wastewater): Click to enter text.

c. Provide a description of the principal products(s) or service(s) performed: Click to enter text.

d. Flow rate information

Flow Rate Information

Effluent Type	Discharge Day (gallons per day)	Discharge Frequency (Continuous, batch, or intermittent)
Process Wastewater		
Non-process Wastewater		

e. Pretreatment Standards

1. Is the SIU or CIU subject to technology-based local limits as defined in the application instructions?

   ☐ Yes ☐ No

2. Is the SIU subject to categorical pretreatment standards?

   ☐ Yes ☐ No

If **yes**, provide the category and subcategory or subcategories in the SIUs Subject To Categorical Pretreatment Standards table.

SIUs Subject to Categorical Pretreatment Standards

Category in 40 CFR	Subcategory in 40 CFR	Subcategory in 40 CFR	Subcategory in 40 CFR	Subcategory in 40 CFR

f. Has the SIU or CIU caused or contributed to any problem(s) (e.g., interferences, pass through, odors, corrosion, blockages) at the POTW in the past three years?

☐ Yes ☐ No

If **yes**, provide a description of each episode, including dates, duration, description of problems, and probable pollutants, and include the name(s) of the SIU(s)/CIU(s) that may have caused or contributed to the problem(s): Click to enter text.

INDUSTRIAL WASTEWATER PERMIT APPLICATION WORKSHEET 7.0: STORMWATER DISCHARGES ASSOCIATED WITH INDUSTRIAL ACTIVITIES

This worksheet **is required** for all TPDES permit applications requesting individual permit coverage for discharges consisting of **either**: 1) solely of stormwater discharges associated with industrial activities, as defined in *40 CFR § 122.26(b)(14)(i-xi)*, **or** 2) stormwater discharges associated with industrial activities and any of the listed allowable non-stormwater discharges, as defined in the MSGP (TXR05000), Part II, Section A, Item 6.

Discharges of stormwater as defined in *40 CFR § 122.26 (b)(13)* are not required to obtain authorization under a TPDES permit (see exceptions at *40 CFR §§ 122.26(a)(1)* and *(9)*). Authorization for discharge may be required from a local municipal separate storm sewer system.

Item 1. Applicability (Instructions, Page 89)

Do discharges from any of the existing/proposed outfalls consist either 1) solely of stormwater discharges associated with industrial activities **or** 2) stormwater discharges associated with industrial activities and any of the allowable non-stormwater discharges?

☐ Yes ☐ No

If **no**, stop here. If **yes**, proceed as directed.

Item 2. Stormwater Coverage (Instructions, Page 89)

List each existing/proposed stormwater outfall at the facility and indicate which type of authorization covers or is proposed to cover discharges.

Authorization Coverage

Outfall	Authorization under MSGP	Authorized Under Individual Permit
	☐	☐
	☐	☐
	☐	☐
	☐	☐
	☐	☐
	☐	☐
	☐	☐
	☐	☐

If **all** existing/proposed outfalls which discharge stormwater associated with industrial activities (and any of the allowable non-stormwater discharges) are **authorized under the MSGP**, **stop** here.

If **seeking authorization** for any outfalls which discharge stormwater associated with industrial activities (and any of the allowable non-stormwater discharges) **under an individual permit**, **proceed**.

NOTE: The following information is required for each existing/proposed stormwater outfall for which the facility is seeking individual permit authorization under this application

Item 3. Site Map (Instructions, Page 90)

Attach a site map or maps (drawn to scale) of the entire facility with the following information.

- the location of each stormwater outfall to be covered by the permit
- an outline of the drainage area that is within the facility's boundary and that contributes stormwater to each outfall to be covered by the permit
- connections or discharge points to municipal separate storm sewer systems
- locations of all structures (e.g. buildings, garages, storage tanks)
- structural control devices that are designed to reduce pollution in discharges of stormwater associated with industrial activities
- process wastewater treatment units (including ponds)
- bag house and other air treatment units exposed to stormwater (stormwater runoff, snow melt runoff, and surface runoff and drainage)
- landfills; scrapyards; surface water bodies (including wetlands)
- vehicle and equipment maintenance areas
- physical features of the site that may influence discharges of stormwater associated with industrial activities or contribute a dry weather flow
- locations where spills or leaks of reportable quality (as defined in *30 TAC § 327.4*) have occurred during the three years before this application was submitted to obtain coverage under an individual permit
- processing areas, storage areas, material loading/unloading areas, and other locations where significant materials are exposed to stormwater (stormwater runoff, snow melt runoff, and surface runoff and drainage)

☐ Check the box to confirm all above information was provided on the facility site map(s).

Attachment: Click to enter text.

Item 4. Facility/Site Information (Instructions, Page 90)

a. Provide the area of impervious surface and the total area drained by each stormwater outfall requested for authorization by this permit application.

Impervious Surfaces

Outfall	Area of Impervious Surface (include units)	Total Area Drained (include units)

b. Provide the following local area rainfall information and the source of the information.

Wettest month: Click to enter text.

Average rainfall for wettest month (total inches): Click to enter text.

25-year, 24-hour rainfall (inches): Click to enter text.

Source: Click to enter text.

c. Attach an inventory, or list, of materials currently handled at the facility that may be exposed to precipitation. **Attachment:** Click to enter text.

d. Attach narrative descriptions of the industrial processes and activities involving the materials in the above-listed inventory that occur outdoors or in some manner that may result in exposure of the materials to precipitation or runoff (see instructions for guidance). **Attachment:** Click to enter text.

e. Describe any BMPs and controls the facility uses/proposes to prevent or effectively reduce pollution in stormwater discharges from the facility: Click to enter text.

Item 5. Pollutant Analysis (Instructions, Page 91)

a. Provide the date range of all sampling events conducted to obtain the analytical data submitted with this application (e.g., 05/01/2018-05/30/2018): Click to enter text.

b. ☐ Check the box to confirm all samples were collected no more than 12 months prior to the date of application submittal.

c. Complete Table 17 as directed on page 92 of the Instructions.

Table 17 for Outfall No.: Click to enter text.

Pollutant	Grab Sample* Maximum (mg/L)	Composite Sample** Maximum (mg/L)	Grab Sample* Average (mg/L)	Composite Sample** Average (mg/L)	Number of Storm Events Sampled	MAL (mg/L)
pH (standard units)	(max)	—	(min)	—		—
Total suspended solids						—
Chemical oxygen demand						—
Total organic carbon						—
Oil and grease						—
Arsenic, total						0.0005
Barium, total						0.003
Cadmium, total						0.001
Chromium, total						0.003
Chromium, trivalent						—
Chromium, hexavalent						0.003
Copper, total						0.002

Pollutant	Grab Sample* Maximum (mg/L)	Composite Sample** Maximum (mg/L)	Grab Sample* Average (mg/L)	Composite Sample** Average (mg/L)	Number of Storm Events Sampled	MAL (mg/L)
Lead, total						0.0005
Mercury, total						0.000005
Nickel, total						0.002
Selenium, total						0.005
Silver, total						0.0005
Zinc, total						0.005

* Taken during first 30 minutes of storm event

** Flow-weighted composite sample

d. Complete Table 18 as directed on pages 92-94 of the Instructions.

Table 18 for Outfall No.: Click to enter text.

Pollutant	Grab Sample* Maximum (mg/L)	Composite Sample** Maximum (mg/L)	Grab Sample* Average (mg/L)	Composite Sample** Average (mg/L)	Number of Storm Events Sampled

* Taken during first 30 minutes of storm event

** Flow-weighted composite sample

Attachment: Click to enter text.

Item 6. Storm Event Data (Instructions, Page 93)

Provide the following data for the storm event(s) which resulted in the maximum values for the analytical data submitted:

Date of storm event: Click to enter text.

Duration of storm event (minutes): Click to enter text.

Total rainfall during storm event (inches): Click to enter text.

Number of hours the between beginning of the storm measured and the end of the previous measurable storm event (hours): Click to enter text.

Maximum flow rate during rain event (gallons/minute): Click to enter text.

Total stormwater flow from rain event (gallons): Click to enter text.

Provide a description of the method of flow measurement or estimate:

INDUSTRIAL WASTEWATER PERMIT APPLICATION WORKSHEET 8.0: AQUACULTURE

This worksheet **is required** for all TPDES permit applications requesting individual permit coverage for discharges of aquaculture wastewater.

Item 1. Facility/Site Information (Instructions, Page 94)

a. Complete the following table with information regarding production ponds, raceways, and fabricated tanks at the facility.

Production Pond Descriptions

Number of Ponds	Dimensions (include units)	Area of Each Pond (include units)	Number of Ponds x Area of Ponds (include Units)

Total surface area of all ponds: Click to enter text.

Raceway Descriptions

Number of Raceways	Dimensions (include units)

Fabricated Tank Descriptions

Number of Tanks	Dimensions (include units)

b. Does the facility have a TPWD-approved emergency plan?

☐ Yes ☐ No

If **yes**, attach a copy of the approved plan.

Attachment: Click to enter text.

c. Does the facility have an aquatic plant transplant authorization?

☐ Yes ☐ No

If **yes**, attach a copy of the authorization letter.

Attachment: Click to enter text.

d. Provide the number of aquaculture facilities located within 25-miles of this facility: Click to enter text.

Item 2. Species Identification (Instructions, Page 95)

Complete the following table regarding each species raised, source, origin, and disease status of the stock. Identify and attach copies of any current relevant authorizations or permits that authorize the species.

Stock Species Information

Species	Source of Stock	Origin of Stock	Disease Status	Authorizations

Attachment: Click to enter text.

Item 3. Stock Management Plan (Instructions, Page 95)

Attach a detailed stock management plan: Click to enter text.

Item 4. Water Treatment and Discharge Description (Instructions, Page 96)

Attach a detailed description of the discharge practices and water treatment process(es): Click to enter text.

Item 5. Solid Waste Management (Instructions, Page 96)

Attach a description of the solid waste-disposal practices: Click to enter text.

Item 6. Site Assessment Report (Instructions, Page 96)

All new and expanding commercial shrimp facilities located/to be located within the coastal zone must attach a detailed site assessment report which identifies sensitive aquatic habitats within the coastal zone: Click to enter text.

WORKSHEET 9.0

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

CLASS V INJECTION WELL INVENTORY/AUTHORIZATION FORM

Submit the completed form to:
TCEQ
IUC Permits Team
Radioactive Materials Division
MC-233
PO Box 13087
Austin, Texas 78711-3087
512-239-6466

For TCEQ Use Only
Reg. No._____
Date Received_____
Date Authorized_____

Item 1. General Information (Instructions Page 99)

1. **TCEQ Program Area**

   Program Area (PST, VCP, IHW, etc.): Click to enter text.

   Program ID: Click to enter text.

   Contact Name: Click to enter text.

   Phone Number: Click to enter text.

2. **Agent/Consultant Contact Information**

   Contact Name: Click to enter text.

   Address: Click to enter text.

   City, State, and Zip Code: Click to enter text.

   Phone Number: Click to enter text.

3. **Owner/Operator Contact Information**

   ☐ Owner ☐ Operator

   Owner/Operator Name: Click to enter text.

   Contact Name: Click to enter text.

   Address: Click to enter text.

   City, State, and Zip Code: Click to enter text.

   Phone Number: Click to enter text.

4. **Facility Contact Information**

   Facility Name: Click to enter text.

   Address: Click to enter text.

   City, State, and Zip Code: Click to enter text.

   Location description (if no address is available): Click to enter text.

   Facility Contact Person: Click to enter text.

   Phone Number: Click to enter text.

5. **Latitude and Longitude, in degrees-minutes-seconds**

   Latitude: Click to enter text.

   Longitude: Click to enter text.

   Method of determination (GPS, TOPO, etc.): Click to enter text.

   Attach topographic quadrangle map as attachment A.

6. **Well Information**

   Type of Well Construction, select one:

   - ☐ Vertical Injection
   - ☐ Subsurface Fluid Distribution System
   - ☐ Infiltration Gallery
   - ☐ Temporary Injection Points
   - ☐ Other, Specify: Click to enter text.

   Number of Injection Wells: Click to enter text.

7. **Purpose**

   Detailed Description regarding purpose of Injection System:

   Click to enter text.

   Attach a Site Map as Attachment B (Attach the Approved Remediation Plan, if appropriate.)

8. **Water Well Driller/Installer**

   Water Well Driller/Installer Name: Click to enter text.

   City, State, and Zip Code: Click to enter text.

   Phone Number: Click to enter text.

   License Number: Click to enter text.

Item 2. Proposed Down Hole Design

Attach a diagram signed and sealed by a licensed engineer as Attachment C.

Down Hole Design Table

Name of String	Size	Setting Depth	Sacks Cement/Grout – Slurry Volume – Top of Center	Hole Size	Weight (lbs/ft) PVC/Steel
Casing					
Tubing					
Screen					

Item 3. Proposed Trench System, Subsurface Fluid Distribution System, or Infiltration Gallery

Attach a diagram signed and sealed by a licensed engineer as Attachment D.

System(s) Dimensions: Click to enter text.

System(s) Construction: Click to enter text.

Item 4. Site Hydrogeological and Injection Zone Data

1. Name of Contaminated Aquifer: Click to enter text.
2. Receiving Formation Name of Injection Zone: Click to enter text.
3. Well/Trench Total Depth: Click to enter text.
4. Surface Elevation: Click to enter text.
5. Depth to Ground Water: Click to enter text.
6. Injection Zone Depth: Click to enter text.
7. Injection Zone vertically isolated geologically? ☐ Yes ☐ No

   Impervious Strata between Injection Zone and nearest Underground Source of Drinking Water:

   Name: Click to enter text.

   Thickness: Click to enter text.
8. Attach a list of contaminants and the levels (ppm) in contaminated aquifer as Attachment E.
9. Attach the Horizontal and Vertical extent of contamination and injection plume as Attachment F.
10. Attach Formation (Injection Zone) Water Chemistry (Background levels) TDS, etc., as Attachment G.
11. Injection Fluid Chemistry in PPM at point of injection. Attach as Attachment H.
12. Lowest Known Depth of Ground Water with < 10,000 PPM TDS: Click to enter text.
13. Maximum injection Rate/Volume/Pressure: Click to enter text.
14. Water wells within 1/4 mile radius (attach map as Attachment I): Click to enter text.
15. Injection wells within 1/4 mile radius (attach map as Attachment J): Click to enter text.
16. Monitor wells within 1/4 mile radius (attach drillers logs and map as Attachment K): Click to enter text.
17. Sampling frequency: Click to enter text.
18. Known hazardous components in injection fluid: Click to enter text.

Item 5. Site History

1. Type of Facility: Click to enter text.
2. Contamination Dates: Click to enter text.
3. Original Contamination (VOCs, TPH, BTEX, etc.) and Concentrations. Attach as Attachment L.
4. Previous Remediation. Attach results of any previous remediation as Attachment M.

NOTE: Authorization Form should be completed in detail and authorization given by the TCEQ before construction, operation, and/or conversion can begin. Attach additional pages as necessary.

Item 6. CLASS V INJECTION WELL DESIGNATIONS

5A07 Heat Pump/AC return (IW used for groundwater to heat or cool buildings)

5A19 Industrial Cooling Water Return Flow (IW used to cool industrial process equipment)

5B22 Salt Water Intrusion Barrier (IW used to inject fluids to prevent the intrusion of salt water into an aquifer)

5D02 Stormwater Drainage (IW designed for the disposal of rain water)

5D04 Industrial Stormwater Drainage Wells (IW designed for the disposal of rain water associated with industrial facilities)

5F01 Agricultural Drainage (IW that receive agricultural runoff)

5R21 Aquifer Recharge (IW used to inject fluids to recharge an aquifer)

5S23 Subsidence Control Wells (IW used to control land subsidence caused by groundwater withdrawal)

5W09 Untreated Sewage

5W10 Large Capacity Cesspools (Cesspools that are designed for 5,000 gpd or greater)

5W11 Large Capacity Septic systems (Septic systems designed for 5,000 gpd or greater)

5W12 WTTP disposal

5W20 Industrial Process Waste-disposal Wells

5W31 Septic System (Well Disposal method)

5W32 Septic System Drainfield Disposal

5X13 Mine Backfill (IW used to control subsidence, dispose of mining byproducts, or fill sections of a mine)

5X25 Experimental Wells (Pilot Test) (IW used to test new technologies or tracer dye studies)

5X26 Aquifer Remediation (IW used to clean up, treat, or prevent contamination of a USDW)

5X27 Other Wells

5X28 Motor Vehicle Waste-disposal Wells (IW used to dispose of waste from a motor vehicle site - These are currently banned)

5X29 Abandoned Drinking Water Wells (waste disposal)

INDUSTRIAL WASTEWATER PERMIT APPLICATION WORKSHEET 10.0: QUARRIES IN THE JOHN GRAVES SCENIC RIVERWAY

This worksheet **is required** for all applications for individual permits for a municipal solid waste facility or mining facility located within a Water Quality Protection Area in the John Graves Scenic Riverway. **Note: Review 30 TAC §§ 311.71-311.82 thoroughly prior to completing any portion of this worksheet.**

Item 1. Exclusions (Instructions, Page 100)

a. Is this a municipal solid waste facility?

☐ Yes ☐ No

b. Has this quarry been in operation since January 1, 1994 without cessation of operation for more than 30 consecutive days and under the same ownership?

☐ Yes ☐ No

c. Is this a coal mine?

☐ Yes ☐ No

d. Is this facility mining clay and/or shale for use in manufacturing structural clay products?

☐ Yes ☐ No

If **yes** to **any** above question, **stop here**. The facility is required to maintain documentation, as outlined in *30 TAC § 311.72(c)*, at the facility to demonstrate the exclusion(s).

Item 2. Location of the Quarry (Instructions, Page 101)

Check the box next to the distance between the quarry and the nearest navigable water body:

☐ < 200 feet ☐ 200 feet – 1,500 feet ☐ 1,500 feet – 1 mile ☐ > 1 mile

NOTE: The construction or operation of any new quarry or expansion of any existing quarry **is prohibited** within 200 feet of any water body located within a Water Quality Protection Area in the John Graves Scenic Riverway.

Item 3. Additional Requirements (Instructions, Page 101)

Use the table in the Instructions to determine if additional application requirements apply to the facility based on distance between the quarry and the nearest waterway. Attach as appropriate or enter N/A.

a. Attach a Restoration Plan: Click to enter text.

b. Amount of Financial Assurance for Restoration: $ Click to enter text.

Mechanism: Click to enter text.

c. Attach a Technical Demonstration: Click to enter text.

d. Attach a Reclamation Plan: Click to enter text.

e. Amount of Financial Assurance for Reclamation: $ Click to enter text.

Mechanism: Click to enter text.

INDUSTRIAL WASTEWATER PERMIT APPLICATION WORKSHEET 11.0: COOLING WATER SYSTEM INFORMATION

This worksheet **is required** for all TPDES permit applications **that meet the conditions outlined in Technical Report 1.0, Item 12.**

Item 1. Cooling Water System Data (Instructions, Page 104)

a. Complete the following table with information regarding the cooling water system.

Cooling Water System Data

Parameter	Volume (include units)
Total DIF	3.8 MGD
Total AIF	253.6 MG
Intake Flow Use(s) (%)	
Contact cooling	97.10%
Non-contact cooling	0%
Process Wastewater	0%
Other	2.90%

b. Attach the following information:

1. A narrative description of the design and annual operation of the facility's cooling water system and its relationship to the CWIS(s).

2. A scaled map depicting the location of each CWIS, impoundment, intake pipe, and canals, pipes, or waterways used to convey cooling water to, or within, the cooling water system. Provide the latitude and longitude for each CWIS and any intake pipe(s) on the map. Indicate the position of the intake pipe within the water column.

3. A description of water reuse activities, if applicable, reductions in total water withdrawals, if applicable, and the proportion of the source waterbody withdrawn (on a monthly basis).

4. Design and engineering calculations prepared by a qualified professional and data to support the information provided in above item a.

5. Previous year (a minimum of 12 months) of AIF data.

6. A narrative description of existing or proposed impingement and entrainment technologies or operation measures and a summary of their performance, including, but not limited to, reductions in impingement mortality and entrainment due to intake location and reductions in total water withdrawals and usage.

Attachment: J

Item 2. Cooling Water Intake Structure(s) Data (Instructions, Page 105)

a. Complete the following table with information regarding each cooling water intake structure (this includes primary and make-up CWIS(s)).

Cooling Water Intake Structure(s) Data

CWIS ID	**1**	**N/A**	**N/A**	**N/A**
DIF (include units)	3.8 MGD	N/A	N/A	N/A
AIF (include units)	84.1 MG	N/A	N/A	N/A
Intake Flow Use(s) (%)		N/A	N/A	N/A
Contact cooling	0%	N/A	N/A	N/A
Non-contact cooling	97.1%	N/A	N/A	N/A
Process Wastewater	0%	N/A	N/A	N/A
Other	2.9%	N/A	N/A	N/A
Latitude (decimal degrees)	31.934767˚ N	N/A	N/A	N/A
Longitude (decimal degrees)	94.975953˚ W	N/A	N/A	N/A

b. Attach the following information regarding the CWIS(s):

1. A narrative description of the configuration of each CWIS, annual and daily operation, including any seasonal changes, and where it is located in the water body and in the water column.

2. Engineering calculations for each CWIS.

Attachment: J

Item 3. Source Water Physical Data (Instructions, Page 105)

a. Complete the following table with information regarding the CWIS(s) source waterbody (this includes primary and make-up CWIS(s)).

Source Waterbody Data

CWIS ID	**1**	N/A	N/A	N/A
Source Waterbody	Lake Striker	N/A	N/A	N/A
Mean Annual Flow	N/A	N/A	N/A	N/A
Source	https://www.lakestriker.com/	N/A	N/A	N/A

b. Attach the following information regarding the source waterbody.

1. A narrative description of the source water for each CWIS, including areal dimensions, depths, salinity and temperature regimes, and other documentation that supports this determination of the water body type where each cooling water intake structure is located.

2. A narrative description of the source waterbody's hydrological and geomorphological features.

3. Scaled drawings showing the physical configuration of all source water bodies used by the facility, including the source waterbody's hydrological and geomorphological features. **NOTE:** The source waterbody's hydrological and geomorphological features may be included on the map submitted for item 1.b.ii of this worksheet.

4. A description of the methods used to conduct any physical studies to determine the intake's area of influence within the waterbody and the results of such studies.

Attachment: J

Item 4. Operational Status (Instructions, Page 106)

a. Is this application for a power production or steam generation facility?

☒ Yes ☐ No

If **no**, proceed to Item 4.b. If **yes**, provide the following information as an attachment:

1. Describe the operating status of each individual unit, including age, capacity utilization rate (or equivalent) for the previous five years (a minimum of 60 months), and any seasonal changes in operation.

2. Describe any extended or unusual outages or other factors which significantly affect current data for flow, impingement, entrainment.

3. Identify any operating unit with a capacity utilization rate of less than 8 percent averaged over a contiguous period of two years (a minimum of 24 months).

4. Describe any major upgrades completed within the last 15 years, including but not limited to boiler replacement, condenser replacement, turbine replacement, or changes of fuel type.

Attachment: J

b. Process Units

1. Is this application for a facility which has process units that use cooling water (other than for power production or steam generation)?

☐ Yes ☒ No

If **no**, proceed to Item 4.c. If **yes**, continue.

2. Does the facility use or intend to use reductions in flow or changes in operations to meet the requirements of *40 CFR § 125.94(c)*?

☐ Yes ☐ No N/A

If **no**, proceed to Item 4.c. If **yes**, attach descriptions of the following information:

- Individual production processes and product lines
- The operating status, including age of each line and seasonal operation
- Any extended or unusual outages that significantly affect current data for flow, impingement, entrainment, or other factors

- Any major upgrades completed within the last 15 years and plans or schedules for decommissioning or replacement of process units or production processes and product lines.

Attachment: Click to enter text.

c. Is this an application for a nuclear power production facility?

☐ Yes ☒ No

If **no**, proceed to Item 4.d. If **yes**, attach a description of completed, approved, or scheduled upgrades and the Nuclear Regulatory Commission relicensing status for each unit at the facility.

Attachment: Click to enter text.

d. Is this an application for a manufacturing facility?

☐ Yes ☒ No

If **no**, proceed to Worksheet 11.1. If **yes**, attach descriptions of current and future production schedules and any plans or schedules for any new units planned within the next five years (a minimum of 60 mos)

Attachment: Click to enter text.

INDUSTRIAL WASTEWATER PERMIT APPLICATION WORKSHEET 11.1: IMPINGEMENT MORTALITY

This worksheet **is required** for all TPDES permit applications **that meet the conditions outlined in Technical Report 1.0, Item 12.** Complete one copy of this worksheet for **each** individual CWIS the facility uses or proposes to use.

CWIS ID: 1

Item 1. Impingement Compliance Technology Selection (Instructions, Page 107)

Check the box next to the method of compliance for the Impingement Mortality Standard selected by the facility.

- ☐ Closed-cycle recirculating system(CCRS) [*40 CFR § 125.94(c)(1)*]
- ☒ 0.5 ft/s Through-Screen Design Velocity [*40 CFR § 125.94(c)(2)*] – Proceed to Worksheet 11.2
- ☐ 0.5 ft/s Through Screen Actual Velocity [*40 CFR § 125.94(c)(3)*]
- ☐ Existing offshore velocity cap [*40 CFR § 125.94(c)(4)*] – Proceed to Worksheet 11.2
- ☐ Modified traveling screens [*40 CFR § 125.94(c)(5)*]
- ☐ System of technologies [*40 CFR § 125.94(c)(6)*]
- ☐ Impingement mortality performance standard [*40 CFR § 125.94(c)(7)*]
- ☐ De minimis rate of impingement [*40 CFR § 125.94(c)(11)*]
- ☐ Low capacity utilization power-generation facilities [*40 CFR § 125.94(c)(12)*]

If 0.5 ft/s Through-Screen Design Velocity [*40 CFR § 125.94(c)(2)*] or existing offshore velocity cap [*40 CFR § 125.94(c)(4)*] was selected, proceed to Worksheet 11.2. Otherwise, continue to Item 2.

Item 2. Impingement Compliance Technology Information (Instructions, Page 107)

Complete the following sections based on the selection made for item 1 above.

a. CCRS [*40 CFR § 125.94(c)(1)*]

☐ Check this box to confirm the CWS meets the definition of CCRS located at *40 CFR § 125.91(c)* and provide a response to the following questions.

1. Does the facility use or propose to use a CWIS to replenish water losses to the CWS?

   ☐ Yes ☐ No

   If **no**, proceed to item a.2. If **yes**, provide the following information as an attachment and continue.

   - CWIS ID
   - 12 months of intake flow data for any CWIS used for make-up intake flows to replenish cooling water losses, excluding intakes for losses due to blowdown, drift, or evaporation.

- A narrative description of any physical or operational measures taken to minimize make-up withdraws.

Attachment: Click to enter text.

NOTE: Do not complete a separate Worksheet 11.1 for a make-up CWIS.

2. Does the facility use or propose to use cooling towers?

☐ Yes ☐ No

If **no**, proceed to Worksheet 11.2. If **yes**, provide the following information and proceed to Worksheet 11.2.

- Average number of cycles of concentration (COCs) prior to blowdown:

Average COCs Prior to Blowdown

Cooling Tower ID	**N/A**	**N/A**	**N/A**	**N/A**
COCs	N/A	N/A	N/A	N/A

- Attach COC monitoring data for each cooling tower from the previous year (a minimum of 12 months): N/A
- Maximum number of COCs each cooling tower can accomplish based on design of the system.

Calculated COCs Prior to Blowdown

Cooling Tower ID	N/A	N/A	N/A	N/A
COCs	N/A	N/A	N/A	N/A

- Describe conditions that may limit the number of COCs prior to blowdown, if any, including but not limited to permit conditions: Click to enter text.

b. 0.5 ft/s Through Screen Actual Velocity [*40 CFR § 125.94(c)(3)*]

Provide daily intake flow measurement monitoring data from the previous year (a minimum of 12 months) as an attachment and proceed to Worksheet 11.2.

Attachment: Click to enter text.

c. Modified traveling screens [*40 CFR § 125.94(c)(5)*]

Provide the following information as an attachment and proceed to Worksheet 11.2.

1. A description of the modified traveling screens and associated equipment.
2. A site-specific impingement technology performance optimization study that includes a narrative description of the biological data collection methods
3. Biological sampling data from the previous two years (a minimum of 24 months).

Attachment: Click to enter text.

d. System of technologies [*40 CFR § 125.94(c)(6)*] or impingement mortality performance standard [*40 CFR § 125.94(c)(7)]*

Provide the following information as an attachment and proceed to Worksheet 11.2.

1. A description of the system of technologies used or proposed for use by the facility to

achieve compliance with the impingement mortality standard.

2. A site-specific impingement technology performance optimization study that includes a narrative description of the biological data collection methods.

3. Biological sampling data from the previous two years (a minimum of 24 months).

Attachment: Click to enter text.

e. De minimis rate of impingement [*40 CFR § 125.94(c)(11)*]

Provide the following information and proceed to Worksheet 11.2.

1. Attach monitoring data from the previous year (a minimum of 12 months) of intake flow measured at a frequency of 1/day on days of operation.

   Attachment: Click to enter text.

2. If the rate of impingement caused by the CWIS is extremely low (at an organism or age-one equivalent count), attach supplemental information to Worksheet 11.0, item 1.b.6. to support this determination.

   Attachment: Click to enter text.

f. Low capacity utilization power-generation facilities [*40 CFR § 125.94(c)(12)*]

Attach monthly utilization data from the previous 2 years (a minimum of 24 months) for each operating unit and proceed to Worksheet 11.2.

Attachment: Click to enter text.

INDUSTRIAL WASTEWATER PERMIT APPLICATION WORKSHEET 11.2: SOURCE WATER BIOLOGICAL DATA

This worksheet **is required** for all TPDES permit applications that **meet the conditions outlined in Technical Report 1.0, Item 12**. Complete one copy of this worksheet for **each** source waterbody of a CWIS for which a facility has selected an Impingement Mortality Technology Option described at *40 CFR §§ 125.94(c)(1)-(7)*.

Name of source waterbody: Lake Striker

Item 1. Species Management (Instructions, Page 109)

a. The facility has obtained an incidental take permit for its cooling water intake structure(s) from the USFWS or the NMFS.

☐ Yes ☒ No

If yes, attach any information submitted in order to obtain that permit, which may be used to supplement the permit application information requirements of paragraph *40 CFR § 125.95(f)*.

Attachment: N/A

b. Is the facility requesting a waiver from application requirements at *40 CFR § 122.21(r)(4)* in accordance with *40 CFR § 125.95* for any CWIS(s) that withdraw from a man-made reservoir that is stocked and managed by a state or federal natural resources agency or the equivalent?

☐ Yes ☒ No

If **yes**, attach a copy of the most recent managed fisheries report to TPWD, or equivalent.

Attachment: N/A

c. There are no federally listed threatened or endangered species or critical habitat designations within the source water body.

☒ True ☐ False

Item 2. Source Water Biological Data (Instructions, Page 109)

New Facilities (Phase I, Track I and II)

- Provide responses to all items in this section and stop.

Existing Facilities (Phase II)

- If the answer to **1.b.** above was **no**, provide responses to all items in this section and proceed to Worksheet 11.3.
- If the answer to **1.b.** was **yes** and **1.c.** was **true**, do not complete any items in this section and proceed to Worksheet 11.3.
- If the answer to **1.b.** was **yes** and **1.c.** was **false**, attach a response for any item in this section that is not contained within the most recent TPWD, or equivalent and proceed to Worksheet 11.3.

Attachment: K

a. A list of the data requested at *40 CFR § 122.21(r)(4)(ii)* through *(vi)* that are not available, and efforts made to identify sources of the data.

b. Provide a list of species (or relevant taxa) in the vicinity of the CWIS and identify the following information regarding each species listed.
   - all life stages and their relative abundance,
   - identification of all species and life stages that would be most susceptible to impingement and entrainment,
   - forage base,
   - significance to commercial fisheries,
   - significance to recreational fisheries,
   - primary period of reproduction,
   - larval recruitment, and
   - period of peak abundance for relevant taxa.

c. Data representative of the seasonal and daily activities (e.g., feeding and water column migration) of biological organisms in the vicinity of the CWIS(s).

d. Identify all threatened, endangered, and other protected species that might be susceptible to impingement and entrainment at the CWIS(s).

e. Documentation of any public participation or consultation with federal or state agencies undertaken.

The following is required for existing facilities only. Include the following information with the above listed attachment.

f. Identify any protective measures and stabilization activities that have been implemented and provide a description of how these measures and activities affected the baseline water condition in the vicinity of the intake.

g. A list of fragile species, as defined at *40 CFR § 125.92(m)*, at the facility. The applicant need only identify those species not already identified as fragile at *40 CFR § 125.92(m)*.

NOTE: New units at an existing facility are not required to resubmit this information if the cooling water withdrawals for the operation of the new unit are from an existing intake.

INDUSTRIAL WASTEWATER PERMIT APPLICATION WORKSHEET 11.3: ENTRAINMENT

This worksheet **is required** for all TPDES permit applications that **meet the conditions outlined in Technical Report 1.0, Item 12**. Complete one copy of this worksheet for **each** individual CWIS the facility uses or proposes to use.

CWIS ID: 1

Item 1. Applicability (Instructions, Page 111)

Is the AIF of the CWIS identified above greater than, or equal to, 125 MGD?

☐ Yes ☒ No

- If **no** or the facility has selected **CCRS** [*40 CFR § 125.94(c)(1)*] for the impingement mortality compliance method, complete Item 2 and stop here.
- If **yes** and the facility is **seeking a waiver** from application requirements in accordance with *40 CFR § 125.95* for any CWIS(s) that withdraw from a man-made reservoir that is stocked and managed by a state or federal natural resources agency or the equivalent, complete item 2 and stop.
- If **yes** and the facility is **not seeking a waiver** from application requirements in accordance *with 40 CFR § 125.95*, complete item 2 and provide any required and completed studies listed in item 3. For any required studies in item 3 that are not complete, provide a detailed explanation for the delay and an anticipated schedule for completion and submittal.

Item 2. Existing Entrainment Performance Studies (Instructions, Page 111)

Attach any previously conducted studies or studies obtained from other facilities addressing technology efficacy, through-facility entrainment survival, and other entrainment studies.

Attachment: L

Item 3. Facility Entrainment Performance Studies (Instructions, Page 111)

a. Attach an entrainment characterization study, as described at *40 CFR § 122.21(r)(9)*: N/A

b. Attach a comprehensive feasibility study, as described as *40 CFR § 122.21(r)(10)*: N/A

c. Attach a benefits valuation study, as described as *40 CFR § 122.21(r)(11)*: N/A

d. Attach a non-water quality environmental and other impacts study, as described as *40 CFR § 122.21(r)(12)*: N/A

e. Attach a peer review analysis, as described as *40 CFR § 122.21(r)(13)*: N/A

INDUSTRIAL WASTEWATER PERMIT APPLICATION WORKSHEET 12.0: OIL AND GAS EXPLORATION, DEVELOPMENT, AND PRODUCTION WASTEWATER DISCHARGES

This worksheet **is required** for all TPDES permit applications that are subject to Effluent Limitation Guidelines in 40 CFR Part 435.

Item 1. Operational Information (Instructions, Page 112)

a. Is the wastewater from an oil and gas exploration, development, or production facility located west of the 98th meridian?

☐ Yes ☐ No

If yes, continue to the next question. If no, skip to Item 2 relating to Production/Process Data.

b. Provide justification for how the wastewater is/will be used for agriculture or wildlife propagation.

Click to enter text.

Item 2. Production/Process Data (Instructions, Page 112)

a. Provide the applicable 40 CFR Part 435 Subpart(s).

Click to enter text.

b. Describe if the permit being sought is for discharges from exploration, development, production, or for a combination of more than one of those activities.

Click to enter text.

c. Provide information on all waste-streams generated and specify which waste-streams you are requesting to be authorized for discharge.

Wastestreams Generated

Wastestream	Requesting authorization to discharge? (Yes/No)	Volume (MGD)	% of Total Flow

d. Describe how the facility will manage wastestreams for which discharge authorization is not being sought.

Click to enter text.

Attachment: Click to enter text.

e. Provide information on miscellaneous discharges.

Click to enter text.

Attachment: Click to enter text.

f. List of chemicals that are in use, or will be used, downhole. Provide the category, concentration used/to be used, and purpose of using the chemical. Attach a safety data sheet for each chemical listed.

Chemicals List

Category	Chemical Name	Concentration (include units)	Purpose

Attachment: Click to enter text.

g. **List of chemicals that are in use, or will be used, to treat the wastewater to be discharged under this authorization. Provide the concentration used/to be used and purpose of using the chemical. Attach a safety data sheet for each chemical listed.**

Water Treatment Chemicals List

Category	Chemical Name	Concentration (include units)	Purpose

Attachment: Click to enter text.

Item 3. Pollutant Analysis (Instructions, Page 113)

Tables 1, 2, 6, and 7 located in Worksheet 2.0 are required. In addition, Table 19 below is required and must be completed for each outfall and submitted with this application. The remaining tables in Worksheet 2.0, are required as applicable.

a. Provide the date range of all sampling events conducted to obtain the analytical data submitted with this application (e.g., 05/01/2018-05/30/2018): Click to enter text.

b. ☐ Check the box to confirm all samples were collected no more than 12 months prior to the date of application submittal.

c. Read the general testing requirements in the instructions for important information about sampling, test methods, and MALs. If a contact laboratory was used, attach a list which includes the name, contact information, and pollutants analyzed for each laboratory/firm. **Attachment:** Click to enter text.

d. Attach correspondence from TCEQ approving submittal of less than the required number of samples, if applicable. **Attachment:** Click to enter text.

Table 19 for Outfall No.: Click to enter text. **Samples are (check one):** ☐ **Composite** ☐ **Grab**

Pollutant	**Sample 1 (mg/L)***	**Sample 2 (mg/L)***	**Sample 3 (mg/L)***	**Sample 4 (mg/L)***
Calcium				
Potassium				
Sodium				

*Indicate units if different from mg/L.

ATTACHMENT F

Flow Schematic with Water Balance
Technical Report
Item 2.b

City of Austin
Austin Energy
Town Lake Center • 721 Barton Springs Road • Austin, Texas 78704 - 1145

April 21, 2022

Industrial Permits Team
Wastewater Permitting Section
TCEQ Water Quality Division (MC 148)
P.O. Box 13087
Austin, Texas 78711-3087

Re: City of Austin, Nacogdoches Generating Facility (CN600135198, RN103219127)
Texas Pollutant Discharge Elimination System (TPDES) Permit No. WQ0004414000
Revision to Process Flow Diagram

To Whom It May Concern:

The City of Austin provides the enclosed revised process flow diagrams to supplement Attachment F as provided in the TPDES permit renewal application submitted on January 22, 2021. The application was approved, and the permit was issued on September 23, 2021. There are no proposed changes that would impact or alter the water quality of the water being discharged via Outfall 001, therefore this update does not require an amendment to the TPDES permit.

The Original Flow Diagram is provided as Enclosure A. original. The diagram shows flows from the raw water ultrafiltration (RWU) to the clarifier, thence to the cooling tower collection sump.

The facility has an equalization (EQ) tank between the RWU and the clarifier. When the EQ tank is in use, the clarifier is bypassed, and there are two possible flow routes from the EQ tank:

- Option 1 includes flows from the EQ tank being routed into the make-up water pipe (lake water) that goes directly to the cooling tower. This is the preferred option. The flow diagram for Option 1 is provided as Enclosure B.

- Option 2 includes flows from the EQ tank being routed directly to cooling tower collection sump, thence to the 101 Outfall tank. The flow diagram for Option 2 is provided as Enclosure C.

The Plant reserves the option of changing between Option 1 and Option 2

If you have any questions or comments on this submittal, please do not hesitate to contact me directly at Ravi.Joseph@austinenergy.com or (512) 963-3200.

Sincerely,

City of Austin
Austin Energy Environmental Services



Ravi Joseph, P.E., CIH
Consulting Engineer
Austin Energy

Enclosures (3): Original and Revised Process Flow Diagrams

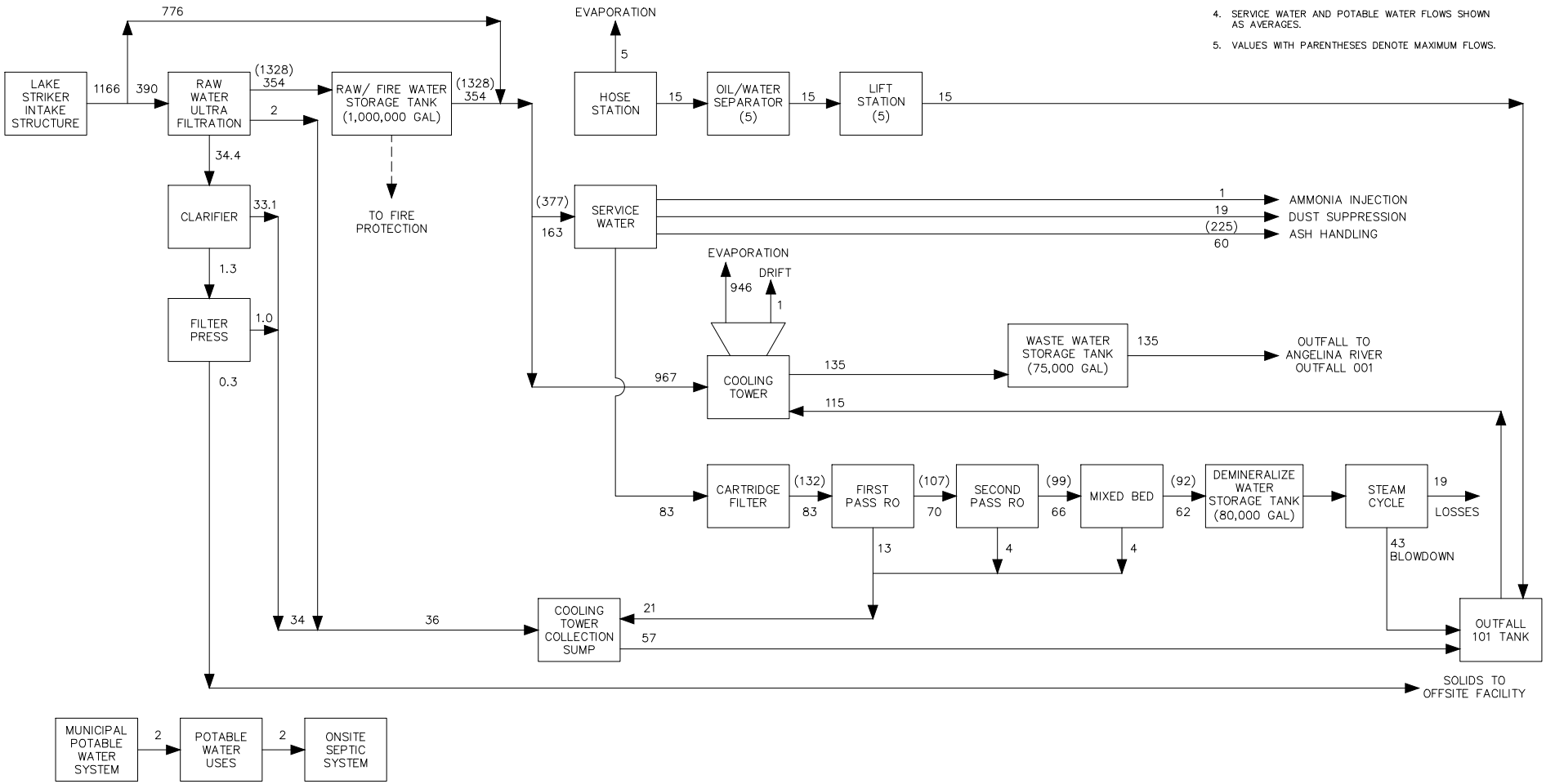
cc: Mr. Tres Koenings, Senior Project Manager, Plummer
Mr. Thomas Johnston, Compliance Manager, NAES: Nacogdoches Generating Facility

ENCLOSURE A
Original Process Flow Diagram

PLUMMER

NOTES:

1. ALL VALUES IN GPM UNLESS OTHERWISE NOTED.
2. DASHED LINES INDICATE THAT THE FLOW IS EXPECTED TO BE INTERMITTENT.
3. COOLING TOWER BLOWDOWN BASED ON EIGHT CYCLES OF CONCENTRATION.
4. SERVICE WATER AND POTABLE WATER FLOWS SHOWN AS AVERAGES.
5. VALUES WITH PARENTHESES DENOTE MAXIMUM FLOWS.



ATTACHMENT F
CITY OF AUSTIN
NACOGDOCHES GENERATING FACILITY
TPDES PERMIT RENEWAL APPLICATION
PROCESS FLOW DIAGRAM

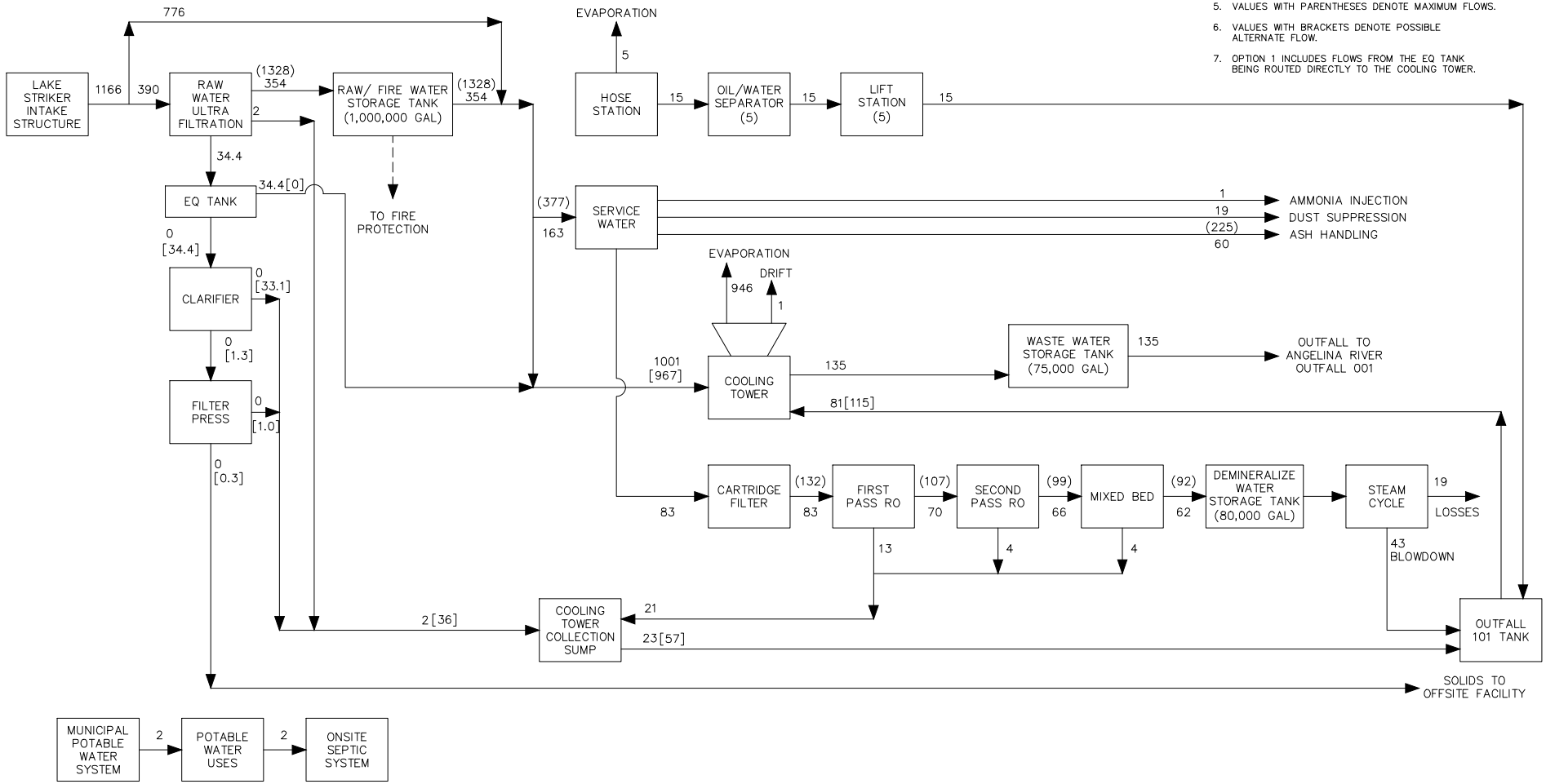
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1/14/2021 3:06 PM M:\Projects\3516\001-01\2-0 Wrk Prod\2-1 ACAD\FIGURES\ATT-Process Flow.dwg Briand

ENCLOSURE B
Process Flow Diagram Option 1

PLUMMER

NOTES:

1. ALL VALUES IN GPM UNLESS OTHERWISE NOTED.
2. DASHED LINES INDICATE THAT THE FLOW IS EXPECTED TO BE INTERMITTENT.
3. COOLING TOWER BLOWDOWN BASED ON EIGHT CYCLES OF CONCENTRATION.
4. SERVICE WATER AND POTABLE WATER FLOWS SHOWN AS AVERAGES.
5. VALUES WITH PARENTHESES DENOTE MAXIMUM FLOWS.
6. VALUES WITH BRACKETS DENOTE POSSIBLE ALTERNATE FLOW.
7. OPTION 1 INCLUDES FLOWS FROM THE EQ TANK BEING ROUTED DIRECTLY TO THE COOLING TOWER.



ATTACHMENT F
CITY OF AUSTIN
NACOGDOCHES GENERATING FACILITY
TPDES PERMIT RENEWAL APPLICATION
PROCESS FLOW DIAGRAM – OPTION 1

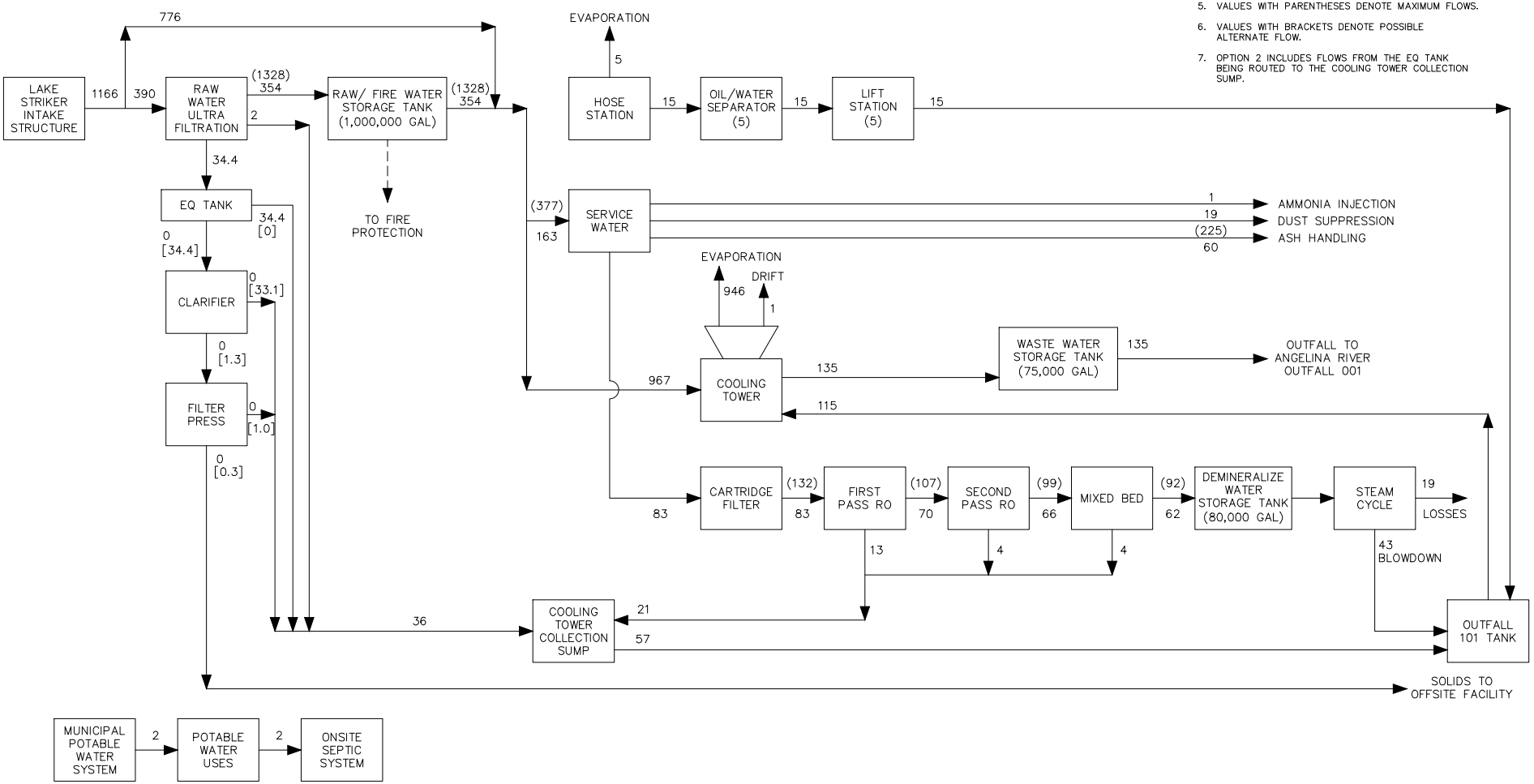
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4/14/2022 3:22 PM M:\Projects\3516\001-01\2-0 Wrk Prod\2-1 ACAD\FIGURES\ATT-Process Flow.dwg Kholzer9096

ENCLOSURE C
Process Flow Diagram Option 2

PLUMMER

NOTES:

1. ALL VALUES IN GPM UNLESS OTHERWISE NOTED.
2. DASHED LINES INDICATE THAT THE FLOW IS EXPECTED TO BE INTERMITTENT.
3. COOLING TOWER BLOWDOWN BASED ON EIGHT CYCLES OF CONCENTRATION.
4. SERVICE WATER AND POTABLE WATER FLOWS SHOWN AS AVERAGES.
5. VALUES WITH PARENTHESES DENOTE MAXIMUM FLOWS.
6. VALUES WITH BRACKETS DENOTE POSSIBLE ALTERNATE FLOW.
7. OPTION 2 INCLUDES FLOWS FROM THE EQ TANK BEING ROUTED TO THE COOLING TOWER COLLECTION SUMP.



ATTACHMENT F
CITY OF AUSTIN
NACOGDOCHES GENERATING FACILITY
TPDES PERMIT RENEWAL APPLICATION
PROCESS FLOW DIAGRAM – OPTION 2

TEXAS REGISTERED ENGINEERING FIRM F-13
4/14/2022 3:19 PM M:\Projects\3516\001-01\2-0 Wrk Prod\2-1 ACAD\FIGURES\ATT-Process Flow.dwg Kholzer9096

ATTACHMENT A

Adminstrative Report 1.0

Item 4.A: Core Data Form

TCEQ Use Only

TCEQ Core Data Form

For detailed instructions on completing this form, please read the Core Data Form Instructions or call 512-239-5175.

SECTION I: General Information

1. Reason for Submission (*If other is checked please describe in space provided.*)

☐ New Permit, Registration or Authorization (*Core Data Form should be submitted with the program application.*)

☒ Renewal *(Core Data Form should be submitted with the renewal form)*

☐ Other

2. Customer Reference Number *(if issued)*	Follow this link to search for CN or RN numbers in Central Registry**	3. Regulated Entity Reference Number *(if issued)*
CN 600135198		RN 103219127

SECTION II: Customer Information

4. General Customer Information | **5. Effective Date for Customer Information Updates** (mm/dd/yyyy)

☐ New Customer ☐ Update to Customer Information ☐ Change in Regulated Entity Ownership
☐ Change in Legal Name (Verifiable with the Texas Secretary of State or Texas Comptroller of Public Accounts)

The Customer Name submitted here may be updated automatically based on what is current and active with the Texas Secretary of State (SOS) or Texas Comptroller of Public Accounts (CPA).

6. Customer Legal Name *(If an individual, print last name first: eg: Doe, John)*

If new Customer, enter previous Customer below:

City of Austin	Nacogdoches Power LLC

7. TX SOS/CPA Filing Number	8. TX State Tax ID (11 digits)	9. Federal Tax ID (9 digits)	10. DUNS Number *(if applicable)*
N/A	N/A	74-6000085	N/A

11. Type of Customer:

☐ Corporation ☐ Individual Partnership: ☐ General ☐ Limited
Government: ☒ City ☐ County ☐ Federal ☐ Local ☐ State ☐ Other ☐ Sole Proprietorship ☐ Other:

12. Number of Employees

☐ 0-20 ☐ 21-100 ☐ 101-250 ☐ 251-500 ☒ 501 and higher

13. Independently Owned and Operated?

☐ **Yes** ☒ **No**

14. Customer Role (Proposed or Actual) – *as it relates to the Regulated Entity listed on this form. Please check one of the following*

☒ Owner ☐ Operator ☐ Owner & Operator
☐ Occupational Licensee ☐ Responsible Party ☐ VCP/BSA Applicant ☐ Other:

15. Mailing Address:

4815 Mueller Blvd							
City	Austin	**State**	TX	**ZIP**	78723	**ZIP + 4**	1145

16. Country Mailing Information *(if outside USA)*	17. E-Mail Address *(if applicable)*
(512) 963-3200	Ravi.Joseph@austinenergy.com

18. Telephone Number	19. Extension or Code	20. Fax Number *(if applicable)*
( ) -		( ) -

SECTION III: Regulated Entity Information

21. General Regulated Entity Information *(If 'New Regulated Entity" is selected, a new permit application is also required.)*

☐ New Regulated Entity ☐ Update to Regulated Entity Name ☐ Update to Regulated Entity Information

The Regulated Entity Name submitted may be updated, in order to meet TCEQ Core Data Standards (removal of organizational endings such as Inc, LP, or LLC).

22. Regulated Entity Name *(Enter name of the site where the regulated action is taking place.)*

Nacogdoches Generating Facility

23. Street Address of the Regulated Entity: ***(No PO Boxes)***	499 County Road 988							
	City	Cushing	**State**	TX	**ZIP**	75760	**ZIP + 4**	3509
24. County	Nacogdoches							

If no Street Address is provided, fields 25-28 are required.

25. Description to Physical Location:	N/A				
26. Nearest City			**State**	**Nearest ZIP Code**	
Cushing			TX	75760	

Latitude/Longitude are required and may be added/updated to meet TCEQ Core Data Standards. (Geocoding of the Physical Address may be used to supply coordinates where none have been provided or to gain accuracy).

27. Latitude (N) In Decimal:	31.832310°		**28. Longitude (W) In Decimal:**	-94.900900°	
Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
31°	49'	56.33"	94°	54'	3.24"

29. Primary SIC Code (4 digits)	30. Secondary SIC Code (4 digits)	31. Primary NAICS Code (5 or 6 digits)	32. Secondary NAICS Code (5 or 6 digits)
4911		221117	

33. What is the Primary Business of this entity? *(Do not repeat the SIC or NAICS description.)*

100-MW wood-fired electricity plant

34. Mailing Address:	**14780 State Highway 204**							
	City	**Cushing**	**State**	**TX**	**ZIP**	**75760**	**ZIP + 4**	**4388**
35. E-Mail Address:	**Thomas.Johnston@NAES.com**							

36. Telephone Number	37. Extension or Code	38. Fax Number *(if applicable)*
(936) 326-5363		( ) -

39. TCEQ Programs and ID Numbers Check all Programs and write in the permits/registration numbers that will be affected by the updates submitted on this form. See the Core Data Form instructions for additional guidance.

☐ Dam Safety	☐ Districts	☐ Edwards Aquifer	☐ Emissions Inventory Air	☐ Industrial Hazardous Waste
☐ Municipal Solid Waste	☐ New Source Review Air	☐ OSSF	☐ Petroleum Storage Tank	☐ PWS
☐ Sludge	☒ Storm Water	☐ Title V Air	☐ Tires	☐ Used Oil
	TXR05EK41			
☐ Voluntary Cleanup	☒ Wastewater	☐ Wastewater Agriculture	☐ Water Rights	☐ Other:
	WQ0004414000			

SECTION IV: Preparer Information

40. Name:	Michael Bohmfalk, CHMM	**41. Title:**	Senior Project Manager

42. Telephone Number	**43. Ext./Code**	**44. Fax Number**	**45. E-Mail Address**
(512 **)** 925-0662		**( ) -**	mbohmfalk@trccompanies.com

SECTION V: Authorized Signature

46. By my signature below, I certify, to the best of my knowledge, that the information provided in this form is true and complete, and that I have signature authority to submit this form on behalf of the entity specified in Section II, Field 6 and/or as required for the updates to the ID numbers identified in field 39.

Company:	City of Austin	**Job Title:**	
Name *(In Print):*		**Phone:**	**( ) -**
Signature:		**Date:**	

ATTACHMENT B

Additional Administrative Information
Administrative Report 1.0
Items 5, 8, 9

ATTACHMENT B
CITY OF AUSTIN
NACOGDOCHES GENERATING FACLITY
TPDES PERMIT RENEWAL APPLICATION

ADDITIONAL ADMINISTRATIVE INFORMATION

ITEM 5. APPLICATION CONTACT INFORMATION

In addition to the two application contacts listed in Items 5.a and 5.b, please also contact the following individual:

c. Mr. ☒ Ms. ☐ First/Last Name: Thomas Johnston Credential: N/A
Organization Name: NAES: Nacogdoches Generating Facility Title: Compliance Manager
Mailing Address: 14780 State Highway 204 City/State/ZIP Code: Cushing, TX 75760
Phone No.: (936) 326-5363 Fax No.: N/A E-mail: Thomas.Johnston@NAES.com
Check one or both: ☒ Administrative Contact ☒ Technical Contact

ITEM 8. DMR/MER CONTACT INFORMATION

The following two individuals are delegated to receive and submit DMRs or MERs:

a. Mr. ☒ Ms. ☐ First/Last Name: Ravi Joseph Credential: P.E., CIH
Organization Name: Austin Energy, Environmental Services Title: Consulting Engineer
Mailing Address: 4815 Mueller Blvd City/State/ZIP Code: Austin, TX 78723
Phone No.: (512) 963-3200 Fax No.: N/A E-mail: Ravi.Joseph@austinenergy.com

b. Mr. ☒ Ms. ☐ First/Last Name: Thomas Johnston Credential: N/A
Organization Name: NAES: Nacogdoches Generating Facility Title: Compliance Manager
Mailing Address: 14780 State Highway 204 City/State/ZIP Code: Cushing, TX 75760
Phone No.: (936) 326-5363 Fax No.: N/A E-mail: Thomas.Johnston@NAES.com

ITEM 9. NOTICE INFORMATION ITEM 9.c: CONTACT IN THE NOTICE

Please list the following two individuals as contacts in the notices:

a. Mr. ☒ Ms. ☐ First/Last Name: Ravi Joseph Credential: P.E., CIH
Organization Name: Austin Energy, Environmental Services Title: Consulting Engineer
Mailing Address: 4815 Mueller Blvd City/State/ZIP Code: Austin, TX 78723
Phone No.: (512) 963-3200 Fax No.: N/A E-mail: Ravi.Joseph@austinenergy.com

ATTACHMENT B
CITY OF AUSTIN
NACOGDOCHES GENERATING FACLITY
TPDES PERMIT RENEWAL APPLICATION

ADDITIONAL ADMINISTRATIVE INFORMATION

b. Mr. ☒ Ms. ☐ First/Last Name: Thomas Johnston Credential: N/A

Organization Name: NAES: Nacogdoches Generating Facility Title: Compliance Manager

Mailing Address: 14780 State Highway 204 City/State/ZIP Code: Cushing, TX 75760

Phone No.: (936) 326-5363 Fax No.: N/A E-mail: Thomas.Johnston@NAES.com

ITEM 9.d: PUBLIC VIEWING LOCATION

The facility is located in Nacogdoches, and Outfall 001 is located on the border of Nacogdoches County and Cherokee County. Following is the public viewing location information for each county:

Nacogdoches County

Building Name	Nacogdoches County Clerk's Office
Location Within Building	Suite 120 (District Clerk's Office)
Physical Address of Building	101 West Main Street
City	Nacogdoches
Contact Name	Loretta Cammack
Phone Number	936-560-7740
Extension	N/A

Cherokee County

Building Name	Singletary Memorial Library (Rusk Public Library)
Location Within Building	Reference Section
Physical Address of Building	207 E 6th Street
City	Rusk
Contact Name	Christine Camplain - Library Director
Phone Number	903-683-5916
Extension	N/A

ATTACHMENT D

Facility and Site Information
Technical Report 1.0
Item 1.b

ATTACHMENT D
CITY OF AUSTIN
NACOGDOCHES GENERATING FACILITY
TPDES PERMIT RENEWAL APPLICATION

FACILITY AND SITE INFORMATION

FACILITY INFORMATION

The Nacogdoches Generating Facility (Facility) is owned by the City of Austin and operated by NAES. The Facility is formerly known as the Nacogdoches Power Electric Generating Plant, and its ownership and name were changed by an Ownership Transfer dated July 2, 2019. The Facility is a steam electricity generation facility. The Facility consists of a wood fuel storage yard and handling system, a wood-fired boiler, a condensing steam turbine generator, and auxiliary support equipment. This facility is not subject to 40 CFR 423, as the regulation only applies to power generation facilities whose fuel source is a fossil fuel or nuclear energy. Wood fuel is transported from a fuel receiving and handling supply system via conveyors to the steam generator metering bins where fuel is distributed to the combustion zone of the steam generator. A steam turbine generator converts high pressure steam into electricity. Condenser cooling and auxiliary cooling is provided through a mechanical draft-cooling tower, which rejects condenser heat to the atmosphere.

The Facility commenced operation in 2012. Lake Striker is the source of water used for cooling, steam generation, and other industrial purposes. Conditioning of the industrial water includes pre-filtration of raw water. Conditioning may also include chlorination and chemical addition for phosphorus and calcium control. Treatment of the water in the cooling system may include the addition of sulfuric acid for pH control and small amounts of dispersants/antiscalants. The water used in steam generation is treated by filtration and reverse osmosis (RO), with final polishing by demineralization using a mixed bed resin tank or similar process. The Sacul Water District, a public water supply, provides potable water for the Facility.

WASTEWATER GENERATING PROCESSES

Waste Streams

Waste streams generated and managed by the Facility include the following:

- Cooling-tower blowdown
- Low-volume waste
- Non-contact and contact storm water runoff from the Facility footprint
- Solids from the raw water clarification process
- Oil and oily waste from the oil/water separators
- Metal-cleaning wastes
- Sanitary wastes

Of these, cooling-tower blowdown, low-volume waste, and contact storm water are regulated under the Texas Pollutant Discharge Elimination System permit. The other wastes are not discharged from the Facility. Management of the above-listed waste streams is described

below. The flow schematic and water balance for the Facility are provided in Attachment F of this permit application.

Cooling Tower Blowdown

Cooling tower blowdown is the discharge of a portion of recirculating cooling water for the purpose of mitigating excessive buildup of dissolved constituents. Blowdown is discharged via Outfall 001. Blowdown is the largest flow component of the discharge generated by the Facility. The recirculating cooling water is comprised of make-up water primarily from Lake Striker; pre-filtered or raw Lake Striker water is piped directly to the cooling tower basins. A small component of the make-up water may be low-volume waste discharged to the cooling tower via Outfall 101. Low-volume waste is addressed below.

Low-Volume Waste

Low-volume waste is defined in 40 Code of Federal Regulations (CFR) Part 423 and includes wastewaters from various sources within a power plant. For the Facility, low-volume waste includes service water from the oil/water separators, reject water from the RO unit, and boiler blowdown. Low-volume wastewaters from the Facility are collected in a single low-volume wastewater sump. The low-volume wastewater sump (tank) effluent discharged from Outfall 101 is pumped to the cooling tower as part of the make-up for cooling water.

Storm Water Runoff from the Facility Site

The wood fuel stored onsite, the wood fuel conveyance system, and support buildings are exposed to storm water. Storm water runoff flows into one of three ponds adjacent to the Facility, Pond A, Pond B or Pond C. A controlled-discharge outlet structure at each pond allows storm water releases in a controlled manner and maintains the respective pond water level at an elevation that permits an appropriate rate of discharge control. The storm water discharge is permitted under Industrial Multi-Sector General Permit (MSGP) TXR05EK41. Attachment E identifies pond locations.

Storm water runoff from the eastern portion of the Facility is routed directly to storm water Pond A. This pond also receives storm water runoff from undeveloped parts of the Facility site and undeveloped off-site areas. Storm water runoff from the western portion of the Facility is routed directly to storm water Pond B. Storm water runoff from the central portion of the Facility is routed to storm water Pond C.

Solids Processing in the Raw Water Clarification Process

Settled solids from the raw water clarifier are periodically removed for disposal. The solids are processed through a thickener and sludge press to remove and recapture excess water. The pressed solids are stored in a container and hauled from the Facility by truck as needed and disposed of at a permitted municipal solid waste landfill.

Oil and Oily Waste Sludge Handling

Oil and oily sludge removed from the oil-water separators are transported from the Facility by truck and disposed in a permitted off-site management facility capable of accepting such waste. No oily wastes are discharged from the site.

Metal-Cleaning Waste Handling

Metal-cleaning waste, as defined in 40 CFR Part 423, may be generated occasionally at the Facility as part of, but not limited to, the boiler cleaning processes. Metal cleaning waste is transported from the Facility for disposal at an authorized facility. No metal cleaning waste is discharged from the Facility.

Sanitary Wastewater Treatment and Disposal

Sanitary wastewater generated at the Facility is treated and disposed via on-site septic systems. The septic systems were installed in accordance with applicable requirements for on-site sewage disposal. No sanitary wastewater is discharged from the Facility.

DESCRIPTION OF OUTFALLS

Maps that identify the locations of Outfalls 001 and 101 are provided in Attachments C and E of the permit application, respectively. A description of each outfall follows.

Outfall 001

Wastewater discharged to Outfall 001 includes cooling tower blowdown and previously monitored effluent (i.e., low-volume waste). Effluent is pumped via pipeline directly to the Angelina River above Sam Rayburn Reservoir in Segment No. 0611 of the Neches River Basin. The discharge to Outfall 001 is monitored at a location downstream of the final blowdown storage tank and prior to leaving the Facility.

Discharge to Outfall 001 is continuous when the power plant is in operation. The permitted daily average flow is 1.75 million gallons per day (MGD) and permitted daily maximum flow is 2.5 MGD.

Outfall 101

Outfall 101 discharges low-volume waste and contact storm water at the Facility. The discharge is monitored at the 101 tank where low-volume waste and contact storm water discharge and prior to comingling with any other waters. Outfall 101 is an intermittent discharge.

ATTACHMENT G

Summary of Chemicals and SDSs
Technical Report 1.0
Item 5.a

ATTACHMENT G
CITY OF AUSTIN
NACOGDOCHES GENERATING FACILITY
TPDES PERMIT RENEWAL APPLICATION

SDS INFORMATION

The chemicals used at the Nacogdoches Generating Facility are identified below with the corresponding affected outfall(s). Safety Data Sheets for these chemicals are attached.

Sodium Hydroxide Solution 30 - 50%	
Affected Outfalls	101 & 001
Product Identification No.	Skyhawk, SDS 10000001221
Product Use	pH Control
Chemical Composition and CASRNs	Sodium Hydroxide: 1310-73-2, >= 30 - <= 5; Water: 7732-18-5, >= 46 - <= 7
Classification (Non-Persistent, Persistent, or Bioaccumulative)	Non-Persistent
Half-life	Not Available
Frequency of Use	Daily
Aquatic Toxicity	May increase pH of aquatic systems to > pH 10 which may be toxic to aquatic organisms.
Concentration in Waste Stream	<1 µg/L

Ammonium Hydroxide	
Affected Outfalls	101 & 001
Product Identification No.	CAS 1336-21-6; Skyhawk SDS No. 235
Product Use	pH Control
Chemical Composition and CASRNs	Ammonia (NH3), 7664-41-7, 20-30.5% Water, 7732-18-5, Balance
Classification (Non-Persistent, Persistent, or Bioaccumulative)	Not Available
Half-life	Not Available
Frequency of Use	Daily
Aquatic Toxicity	Category 3, harmful to aquatic life.
Concentration in Waste Stream	<1 µg/L

ATTACHMENT G
CITY OF AUSTIN
NACOGDOCHES GENERATING FACILITY
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SDS INFORMATION

Sodium Tripolyphosphate	
Affected Outfalls	101 & 001
Product Identification No.	Reach Registration 01-2119430450-54-0021
Product Use	pH Control
Chemical Composition and CASRNs	Triphosphoric acid, sodium salt, 7758-29-4, >94% Diphosphoric acid, sodium salt, 7722-88-5, <6%
Classification (Non-Persistent, Persistent, or Bioaccumulative)	Not Available
Half-life	Not Available
Frequency of Use	Emergency Use Only
Aquatic Toxicity	Not Available
Concentration in Waste Stream	<1 µg/L

Optisperse HP3100	
Affected Outfalls	101 & 001
Product Identification No.	Not Available
Product Use	pH Control
Chemical Composition and CASRNs	Sodium Hydroxide, 1310-73-2, 3-7%
Classification (Non-Persistent, Persistent, or Bioaccumulative)	Not Available
Half-life	Not Available
Frequency of Use	Emergency Use Only
Aquatic Toxicity	Fathead Minnow 2750 mg/L Daphnia magna 1250 mg/L
Concentration in Waste Stream	<1 µg/L

Kuriverter AC-427	
Affected Outfalls	101 & 001
Product Identification No.	Not Available
Product Use	Water Treatment
Chemical Composition and CASRNs	Metabisulfite salts, CAS Proprietary, 10-<20 Water, 7732-18-5, 70-<80 Sulfite salts, CAS Proprietary, 5-<10
Classification (Non-Persistent, Persistent, or Bioaccumulative)	Not Available
Half-life	Not Available
Frequency of Use	Daily
Aquatic Toxicity	Daphnia, 707 mh/l Freshwater fish, 316 mg/l
Concentration in Waste Stream	<1 µg/L

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CITY OF AUSTIN
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SDS INFORMATION

Spectrus DT1404	
Affected Outfalls	101 & 001
Product Identification No.	SPECTRUS DT1404
Product Use	Water Treatment
Chemical Composition and CASRNs	Sodium bisulphite, 7631-90-5, 40 – 60%
Classification (Non-Persistent, Persistent, or Bioaccumulative)	Chemical Oxygen Demand – 165 mgO2/g No bioaccumulative data available.
Half-life	Not Available
Frequency of Use	Daily
Aquatic Toxicity	Algae (48 mg/l, 72 hour), Crustacea (125 mg/l, 48 hour), Fish (125 mg/l, 96 hour)
Concentration in Waste Stream	<1 µg/L

Sodium Hypochlorite 12.5%	
Affected Outfalls	101 & 001
Product Identification No.	Harcros Chemicals Inc, Product No. 701767-13
Product Use	Water Treatment Biocide
Chemical Composition and CASRNs	Sodium Hypochlorite, 7681-52-9 Sodium Hydroxide, 1310-73-2
Classification (Non-Persistent, Persistent, or Bioaccumulative)	Not Available
Half-life	Not Available
Frequency of Use	Weekly
Aquatic Toxicity	Very toxic to aquatic life Water flea 24 hr EC50 = 0.006 mg/L
Concentration in Waste Stream	<200 µg/L

Sulfuric Acid >50%	
Affected Outfalls	101 & 001
Product Identification No.	Harcros Chemicals Inc, Product No. 104457-08
Product Use	pH Control
Chemical Composition and CASRNs	Sulfuric Acid, 7664-93-9
Classification (Non-Persistent, Persistent, or Bioaccumulative)	Not Available
Half-life	Not Available
Frequency of Use	Daily
Aquatic Toxicity	Pandalus montagui 48 hr LC50 = 42.5 mg/L Gambusia affnis 96 hr LC 50 = 42 mg/L
Concentration in Waste Stream	<1 µg/L

ATTACHMENT G
CITY OF AUSTIN
NACOGDOCHES GENERATING FACILITY
TPDES PERMIT RENEWAL APPLICATION

SDS INFORMATION

Gengard GN-7112	
Affected Outfalls	101 & 001
Product Identification No.	GENGARD GN7112
Product Use	Cooling Tower Treatment Corrosion Inhibitor
Chemical Composition and CASRNs	Phosphoric acid, tripotassium salt (7778-53-2, 10 – 20%) Tetrapotassium pyrophosphate (7320-34-5, 2.5 – 10%) Chlorotolyltriazole sodium salt (202420-04-0, 1 - 2.5%) Potassium hydroxide (1310-58-3, 1 - 2.5%)
Classification (Non-Persistent, Persistent, or Bioaccumulative)	Not Available
Half-life	Not Available
Frequency of Use	Daily
Aquatic Toxicity	Crustacea 500 mg/L, 48 hour (pH adjusted) Fish 125 mg/L, 96 hour (pH adjusted)
Concentration in Waste Stream	< 6 mg/L

AvistaClean P1219 (Replaced Avista MF1000)	
Affected Outfalls	101 & 001
Product Identification No.	AvistaClean™ P1219
Product Use	Ultra Filtration Membrane Treatment
Chemical Composition and CASRNs	Polyphosphate salt (CAS Proprietary) 5- < 10 Citrate salt (CAS Proprietary) 5- < 10 Chelate agent F (CAS Proprietary) 5- < 10 Silicate compound A (CAS Proprietary) 5- < 10 Oxygenated inorganic salt (CAS Proprietary) 5- < 10
Classification (Non-Persistent, Persistent, or Bioaccumulative)	Not Available
Half-life	Not available
Frequency of Use	Annually
Aquatic Toxicity	Not available
Concentration in Waste Stream	<1 µg/L

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CITY OF AUSTIN
NACOGDOCHES GENERATING FACILITY
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SDS INFORMATION

AvistaClean P0327 (Replaced Avista MF3000)	
Affected Outfalls	101 & 001
Product Identification No.	AvistaClean P0327
Product Use	Ultra Filtration Membrane Treatment
Chemical Composition and CASRNs	Polyphosphate salt (CAS Proprietary) 10- < 20 Salt (CAS Proprietary) 10- < 20 Citrate salt (CAS Proprietary) 10- < 20 Organic Acid A (CAS Proprietary) 1- <5 Calcium salt (CAS Proprietary) 1- <5 Flow Control agent (CAS Proprietary) 1- <5 Organic Acid B (77-92-2) 50-<60
Classification (Non-Persistent, Persistent, or Bioaccumulative)	Not Available
Half-life	Not available
Frequency of Use	Annually
Aquatic Toxicity	Shall not be classified as hazardous to the aquatic environment.
Concentration in Waste Stream	<1 µg/L

Avista ROclean P303	
Affected Outfalls	101 & 001
Product Identification No.	Avista Technologies, RoClean P303
Product Use	Reverse Osmosis Membrane Treatment
Chemical Composition and CASRNs	(Proprietary) Organic acid, Polyphosphate, Chelate, Flow control agent
Classification (Non-Persistent, Persistent, or Bioaccumulative)	Not expected to bioaccumulate
Half-life	Not Available
Frequency of Use	Annually
Aquatic Toxicity	Fathead minnow 96 hr LC50 = 854 mg/L Water flew 96 hr LC50 = 325 mg/L
Concentration in Waste Stream	<1 µg/L

ATTACHMENT G
CITY OF AUSTIN
NACOGDOCHES GENERATING FACILITY
TPDES PERMIT RENEWAL APPLICATION

SDS INFORMATION

Kleen MCT113	
Affected Outfalls	101 & 001
Product Identification No.	Avista Technologies, RoClean® P111
Product Use	Reverse Osmosis Membrane Treatment
Chemical Composition and CASRNs	Sodium Percarbonate, 14630-84-4 Soda Ash, 497-19-8 (Proprietary) Polyphosphate, Chelate, Surfactant
Classification (Non-Persistent, Persistent, or Bioaccumulative)	Not expected to bioaccumulate
Half-life	Not Available
Frequency of Use	Annually
Aquatic Toxicity	Fathead minnow LC50 = 342 mg/L Water flea LC50 = 41 mg/L
Concentration in Waste Stream	<1 µg/L

Avista ROclean P111	
Affected Outfalls	101 & 001
Product Identification No.	Avista Technologies, RoClean® P111
Product Use	Reverse Osmosis Membrane Treatment
Chemical Composition and CASRNs	Sodium Percarbonate, 14630-84-4 Soda Ash, 497-19-8 (Proprietary) Polyphosphate, Chelate, Surfactant
Classification (Non-Persistent, Persistent, or Bioaccumulative)	Not expected to bioaccumulate
Half-life	Not Available
Frequency of Use	Annually
Aquatic Toxicity	Fathead minnow LC50 = 342 mg/L Water flea LC50 = 41 mg/L
Concentration in Waste Stream	<1 µg/L

ATTACHMENT G
CITY OF AUSTIN
NACOGDOCHES GENERATING FACILITY
TPDES PERMIT RENEWAL APPLICATION

SDS INFORMATION

Kleen MCT405	
Affected Outfalls	101 & 001
Product Identification No.	KLEEN MCT405
Product Use	Reverse Osmosis Membrane Treatment
Chemical Composition and CASRNs	N-hydroxyethylenediamine triacetic acid trisodium salt (139-89-9, 2.5 – 10%) Sodium alkyl benzene sulphonate (28348-53-0, 2.5 – 10) Sodium carbonate (497-19-8, 2.5 – 10) Sodium dodecylbenzenesulphonate (25155-30-0, 1 - 2.5) Sodium hydroxide (1310-73-2, 1 - 2.5)
Classification (Non-Persistent, Persistent, or Bioaccumulative)	Not Available
Half-life	Not Available
Frequency of Use	Annually
Aquatic Toxicity	Crustacea 313 mg/L, Static Renewal Bioassay, 48 hour, (pH adjusted) Fish 125 mg/L, Static Renewal Bioassay, 96 hour
Concentration in Waste Stream	<1 µg/L

Biomate MBC-2881	
Affected Outfalls	101 & 001
Product Identification No.	BIOMATE MBC2881
Product Use	Reverse Osmosis Biocide
Chemical Composition and CASRNs	2,2-dibromo-3-nitrilopropionamide, 10222-01-2, 20-40%
Classification (Non-Persistent, Persistent, or Bioaccumulative)	Not Available
Half-life	Not Available
Frequency of Use	Daily
Aquatic Toxicity	Algae 1.5 mg/L, 72 hours Crustacea 0.35 mg/L, 21 days (Reproduction NOEL) Fish 2.3 mg/L, 96 hours
Concentration in Waste Stream	<1 µg/L

ATTACHMENT G
CITY OF AUSTIN
NACOGDOCHES GENERATING FACILITY
TPDES PERMIT RENEWAL APPLICATION

SDS INFORMATION

Avista Vitec 3000	
Affected Outfalls	101 & 001
Product Identification No.	Vitec™ 3000
Product Use	Reverse Osmosis Antiscalant
Chemical Composition and CASRNs	Chelate Agent E, CAS No Proprietary, 10 – < 20 Deflocculant & Sequestrant, CAS No Proprietary, 5 – < 10 Water, 7732-18-5, 80 – < 90
Classification (Non-Persistent, Persistent, or Bioaccumulative)	Not Available
Half-life	Not Available
Frequency of Use	Daily
Aquatic Toxicity	Not available
Concentration in Waste Stream	<1 µg/L

Hypersperse MDC714	
Affected Outfalls	101 & 001
Product Identification No.	HYPERSPERSE MDC714
Product Use	Reverse Osmosis Antiscalant
Chemical Composition and CASRNs	Not available
Classification (Non-Persistent, Persistent, or Bioaccumulative)	Not Available
Half-life	Not available
Frequency of Use	Daily
Aquatic Toxicity	Crustacea, 1366 mg/L, 48 hour Fish, 2000 mg/L, 96 hour
Concentration in Waste Stream	<1 µg/L

Cat Floc LS	
Affected Outfalls	101 & 001
Product Identification No.	NALCO, CAT-FLOC® LS
Product Use	Clarifier Polymer
Chemical Composition and CASRNs	(Proprietary) Cationic Polymer
Classification (Non-Persistent, Persistent, or Bioaccumulative)	Not expected to bioaccumulate
Half-life	Not Available
Frequency of Use	Daily
Aquatic Toxicity	LC50 Rainbow Trout: 1.48 mg/l, 96 hrs LC50 Zebra Danio: 10 - 100 mg/l, 96 hrs LC50 Rainbow Trout: 0.24 mg/l, 96 hrs LC50 Daphnia magna: 3.6 mg/l, 48 hrs
Concentration in Waste Stream	<1 µg/L

SAFETY DATA SHEET

Sodium Hydroxide Solution 30 - 54%

Version	Revision Date:	SDS Number:	Date of last issue: 24.05.2021
5.0	19.04.2023	10000001221	Date of first issue: 19.04.2023

Skyhawk Chemicals, Inc. encourages and expects you to read and understand the entire (M)SDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Sodium Hydroxide Solution 30 - 54%

Manufacturer or supplier's details

Company name of s upplier : Skyhawk Chemicals, Inc.
Address : 701 N Post Oak Road, Suite 504
Houston, TX 77024
Telephone : (713) 957-2200
E-mail address : ORDER@SKYHAWKCHEMICALS.COM
24-Hour Emergency Co ntact : 1 800 424 9300 (Chemtrec)
ACCT#CCN721839

Recommended use of the chemical and restrictions on use

Identified uses : Pulp and paper industry (pulping and bleaching, de-inking waste paper, water treatment).
Textile industry (fiber processing and dyeing).
Soaps and detergents industry (saponification of fats and oils, anionic surfactant manufacturing).
Bleach manufacturing.
Petroleum exploration and processing.
Aluminum production.
Chemical processing.
Waste neutralization.
Acid gas scrubbing.
Neutralizing of acids and acid gases.
Recommended use : For industrial use.

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification

Corrosive to metals : Category 1

Acute toxicity (Oral) : Category 4

Skin corrosion : Sub-category 1B

Serious eye damage : Category 1

GHS label elements

Hazard pictograms :



Signal word : Danger

Hazard statements : H290 May be corrosive to metals.
H302 Harmful if swallowed.
H314 Causes severe skin burns and eye damage.

Precautionary statements :

Prevention:

P234 Keep only in original container.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response:

P301 + P312 + P330 IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell. Rinse mouth.
P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.
P304 + P340 + P310 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or doctor/ physician.
P305 + P351 + P338 + P310 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/ physician.
P363 Wash contaminated clothing before reuse.
P390 Absorb spillage to prevent material damage.

Storage:

P405 Store locked up.

Disposal:

P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards

None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Substance
Substance name : Sodium Hydroxide Solution 30 - 54%

CAS-No. : 1310-73-2

Components

Chemical name	CAS-No.	Concentration (% w/w)
Sodium hydroxide	1310-73-2	>= 30 -<= 54
Water	7732-18-5	>= 46 -<= 70

SECTION 4. FIRST AID MEASURES

If inhaled	:	Move person to fresh air; if effects occur, consult a physician.
In case of skin contact	:	Immediate continued and thorough washing in flowing water for at least 30 minutes is imperative while removing contaminated clothing. Prompt medical consultation is essential. Wash clothing before reuse. Properly dispose of leather items such as shoes, belts, and watchbands. Suitable emergency safety shower facility should be immediately available.
In case of eye contact	:	- Wash eyes with plenty of water for 15 minutes at least. Do not forget to remove contact lenses. Washing with water is the only acceptable method of removal of caustic soda (lye) from the eyes and skin. You may have 10 seconds or less to avoid serious permanent injury. Suitable emergency eye wash facility should be immediately available.
If swallowed	:	Do not induce vomiting. Give one cup (8 ounces or 240 ml) of water or milk if available and transport to a medical facility. Do not give anything by mouth unless the person is fully conscious.
Most important symptoms and effects, both acute and delayed	:	Aside from the information found under Description of first aid measures (above), any additional important symptoms and effects are described in Section 11: Toxicology Information.
Protection of first-aiders	:	First Aid responders should pay attention to self-protection and use the recommended protective clothing (chemical resistant gloves, splash protection). If potential for exposure exists refer to Section 8 for specific personal protective equipment.
Notes to physician	:	Eye irrigation may be necessary for an extended period of time to remove as much caustic as possible. Duration of irrigation and treatment is at the discretion of medical personnel. Due to irritant properties, swallowing may result in burns/ulceration of mouth, stomach and lower gastrointestinal tract with subsequent stricture. Aspiration of vomitus may cause lung injury. Suggest endotracheal/esophageal control if lavage is done. If burn is present, treat as any thermal burn, after decontamination. No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media	:	This material does not burn. If exposed to fire from another source, use suitable extinguishing agent for that fire.
Unsuitable extinguishing media	:	Do not use water.
Specific hazards during firefighting	:	Product reacts with water. Reaction may produce heat and/or gases. This reaction may be violent. Violent steam generation or eruption may occur upon application of direct water stream to hot liquids.
Hazardous combustion products	:	Not applicable

Specific extinguishing methods	:	Keep people away. Isolate fire and deny unnecessary entry. Water is not recommended, but may be applied in large quantities as a fine spray when other extinguishing agents are not available. This material does not burn. Fight fire for other material that is burning.
Special protective equipment for firefighters	:	Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots, and gloves). Avoid contact with this material during fire fighting operations. If contact is likely, change to full chemical resistant fire fighting clothing with self-contained breathing apparatus. If this is not available, wear full chemical resistant clothing with self-contained breathing apparatus and fight fire from a remote location. For protective equipment in post-fire or non-fire clean-up situations, refer to the relevant sections.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Evacuate area. Only trained and properly protected personnel must be involved in clean-up operations. Refer to section 7, Handling, for additional precautionary measures. Keep upwind of spill. Ventilate area of leak or spill. See Section 10 for more specific information. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection. Keep away from sources of ignition.
Environmental precautions	:	Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information.
Methods and materials for containment and cleaning up	:	Contain spilled material if possible. Small spills: Dilute with water. Large spills: Dike area to contain spill. Collect in suitable and properly labeled containers. Attempt to neutralize by adding materials such as Acetic acid See Section 13, Disposal Considerations, for additional information.

SECTION 7. HANDLING AND STORAGE

Advice on safe handling	:	Do not get in eyes, on skin, on clothing. Do not swallow. Avoid breathing mist. Wash thoroughly after handling. Keep container closed.

Use with adequate ventilation.
ALWAYS add caustic soda solution to water with constant agitation. NEVER add water to the caustic soda solution.
2. The water should be lukewarm (27-38°C or 80-100°F). NEVER start with hot or cold water. The addition of caustic soda to liquid will cause a rise in temperature. If caustic soda becomes concentrated in one area, is added too rapidly, or is added to hot or cold liquid, a rapid temperature increase can result in DANGEROUS mists, boiling or spattering which may cause an immediate VIOLENT ERUPTION.
See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION.

Conditions for safe storage : Keep container closed.
Do not store in:
Zinc.
Aluminum.
Brass.
Tin.
See Section 10 for more specific information.

Recommended storage temperature : > 16 °C

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
Sodium hydroxide	1310-73-2	VLE-P	2 mg/m3	NOM-010-STPS-2014
		C	2 mg/m3	ACGIH

Engineering measures : Use engineering controls to maintain airborne level below exposure limit requirements or guidelines.
If there are no applicable exposure limit requirements or guidelines, use only with adequate ventilation.
Local exhaust ventilation may be necessary for some operations.

Personal protective equipment

Respiratory protection : Respiratory protection should be worn when there is a potential to exceed the exposure limit requirements or guidelines.
If there are no applicable exposure limit requirements or guidelines, wear respiratory protection when adverse effects, such as respiratory irritation or discomfort have been experienced, or where indicated by your risk assessment process.
In misty atmospheres, use an approved particulate respirator.

Filter type : The following should be effective types of air-purifying respirators: Particulate filter.

Hand protection

Remarks : Use gloves chemically resistant to this material. Examples of preferred glove barrier materials include: Butyl rubber. Chlorinated polyethylene. Natural rubber ("latex"). Neoprene. Nitrile/butadiene rubber ("nitrile" or "NBR"). Polyethylene.

		Ethyl vinyl alcohol laminate ("EVAL"). Polyvinyl chloride ("PVC" or "vinyl"). Styrene/butadiene rubber. Viton. Avoid gloves made of: Polyvinyl alcohol ("PVA"). NOTICE: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.
Eye protection	:	Use chemical goggles.
Skin and body protection	:	Use protective clothing chemically resistant to this material. Selection of specific items such as face shield, boots, apron, or full body suit will depend on the task.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	Liquid above freezing point
Colour	:	Colorless
Odour	:	Odorless
Odour Threshold	:	No test data available
pH	:	14 Method: Literature
Pour point	:	
Softening point		
Boiling point/boiling range	:	Method: ASTM D1120
Flash point	:	Method: Literature None
Evaporation rate	:	No test data available
Flammability (solid, gas)	:	No
Upper explosion limit / Upper flammability limit	:	Not applicable
Lower explosion limit / Lower flammability limit	:	Not applicable
Vapour pressure	:	23.67 mmHg (25 °C) Method: Literature
Relative vapour density	:	Not applicable
Relative density	:	1.353 - 1.528 (20 °C) Method: Literature
Solubility(ies)		
Water solubility	:	completely miscible

Partition coefficient: n-octanol/water	:	No data available.
Auto-ignition temperature	:	Not applicable
Decomposition temperature	:	No test data available
Viscosity		
Viscosity, dynamic	:	No data available
Viscosity, kinematic	:	Method: No information available.
Explosive properties	:	No
Oxidizing properties	:	No
Molecular weight	:	No test data available

Note: These are the Reference Points for these Physical Properties listed above, unless otherwise noted in their respective Physical Property value information: Boiling Point at 760 mmHg; Evaporation Rate Butyl Acetate = 1; Relative Vapor Density Air = 1; and Relative Density Water = 1.
NOTE: The physical data presented above are typical values and should not be construed as a specification.

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	No data available
Chemical stability	:	Stable under recommended storage conditions. See Storage, Section 7.
Possibility of hazardous reactions	:	Polymerization will not occur.
Conditions to avoid	:	Avoid moisture. Product absorbs carbon dioxide from the air.
Incompatible materials	:	Heat is generated when mixed with water. Spattering and boiling can occur. Caustic soda solution reacts readily with various reducing sugars (i.e. fructose, galactose, maltose, dry whey solids) to produce CO. Take precautions including monitoring the tank atmosphere for CO to ensure safety of personnel before vessel entry. Avoid contact with: Acids. Glycols. Halogenated organics. Organic nitro compounds. Flammable hydrogen may be generated from contact with metals such as: Zinc. Aluminum. Tin. Brass.
Hazardous decomposition products	:	Does not decompose.

SECTION 11. TOXICOLOGICAL INFORMATION

Acute toxicity

Product:

Acute oral toxicity : Remarks: Moderate toxicity if swallowed.
Swallowing may result in burns of the mouth and throat.
Swallowing may result in gastrointestinal irritation or ulceration.

Remarks: Single dose oral LD50 has not been determined.

Acute inhalation toxicity : Remarks: Mist may cause severe irritation of upper respiratory tract (nose and throat).

Remarks: As product:
The LC50 has not been determined.

Acute dermal toxicity : Remarks: Prolonged skin contact is unlikely to result in absorption of harmful amounts.

Remarks: The dermal LD50 has not been determined.

Components:

Sodium hydroxide:

Acute oral toxicity : LD50 (Rabbit): 336 mg/kg
Method: Estimated.

Acute inhalation toxicity : Remarks: The LC50 has not been determined.

Acute dermal toxicity : Remarks: The dermal LD50 has not been determined.

Skin corrosion/irritation

Product:

Result : Causes burns.
Remarks : Brief contact may cause skin burns. Symptoms may include pain, severe local redness and tissue damage.

Components:

Sodium hydroxide:

Result : Causes severe burns.
Remarks : Brief contact may cause severe skin burns. Symptoms may include pain, severe local redness and tissue damage.

Serious eye damage/eye irritation

Product:

Remarks : Due to the pH of the material, it is assumed that exposure may cause severe irritation with corneal injury which may result in permanent impairment of vision, even blindness.

Mist may cause eye irritation.

Components:

Sodium hydroxide:

Result : Corrosive
Remarks : May cause severe irritation with corneal injury which may result in permanent impairment of vision, even blindness. Chemical burns may occur.
Dust may irritate eyes.

Respiratory or skin sensitisation

Product:

Remarks : For skin sensitization:
No relevant data found.

Remarks : For respiratory sensitization:
No relevant data found.

Components:

Sodium hydroxide:

Assessment : Does not cause skin sensitisation.
Remarks : Did not cause allergic skin reactions when tested in humans.

Remarks : For respiratory sensitization:
No relevant data found.

Germ cell mutagenicity

Product:

Genotoxicity in vitro : Remarks: For the major component(s):
In vitro genetic toxicity studies were negative.

Components:

Sodium hydroxide:

Genotoxicity in vitro : Remarks: In vitro genetic toxicity studies were negative.

Carcinogenicity

Product:

Remarks : No relevant data found.

Components:

Sodium hydroxide:

Remarks : No relevant data found.

Reproductive toxicity

Product:

Effects on fertility : Remarks: No relevant data found.

Effects on foetal development : Remarks: No relevant data found.

Components:

Sodium hydroxide:

Effects on fertility : Remarks: No relevant data found.

Effects on foetal development : Remarks: No relevant data found.

STOT - single exposure

Product:

Assessment : Material is corrosive. Material is not classified as a respiratory irritant; however, upper respiratory tract irritation or corrosivity may be expected.

Components:

Sodium hydroxide:

Assessment : Available data are inadequate to determine single exposure specific target organ toxicity.

Repeated dose toxicity

Product:

Remarks : Based on available data, repeated exposures are not anticipated to cause additional significant adverse effects.

Components:

Sodium hydroxide:

Remarks : Based on available data, repeated exposures are not anticipated to cause additional significant adverse effects.

Aspiration toxicity

Product:

Aspiration into the lungs may occur during ingestion or vomiting, causing tissue damage or lung injury.

Components:

Sodium hydroxide:

Aspiration into the lungs may occur during ingestion or vomiting, causing tissue damage or lung injury.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Components:

Sodium hydroxide:

Toxicity to fish : Remarks: May increase pH of aquatic systems to > pH 10 which may be toxic to aquatic organisms.

Persistence and degradability

Components:

Sodium hydroxide:

Biodegradability : Remarks: Biodegradability is not applicable to inorganic substances.

Bioaccumulative potential

Components:

Sodium hydroxide:

Partition coefficient: n-octanol/water : Remarks: No bioconcentration is expected because of the relatively high water solubility.

Mobility in soil

Components:

Sodium hydroxide:

Distribution among environmental compartments : Koc: 14
Method: Estimated.
Remarks: Potential for mobility in soil is very high (Koc between 0 and 50).

Other adverse effects

Components:

Sodium hydroxide:

Results of PBT and vPvB assessment : This substance is not considered to be persistent, bioaccumulating and toxic (PBT). This substance is not considered to be very persistent and very bioaccumulating (vPvB).

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues : AS YOUR SUPPLIER, WE HAVE NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL.

THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION: Composition Information.
All disposal practices must be in compliance with all Federal, State/Provincial and local laws and regulations.
Regulations may vary in different locations.
Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator.
DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER.
Empty containers should be recycled or otherwise disposed of by an approved waste management facility.Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator.Do not re-use containers for any purpose.

SECTION 14. TRANSPORT INFORMATION

International Regulations

UNRTDG

UN number	:	UN 1824
Proper shipping name	:	SODIUM HYDROXIDE SOLUTION
Class	:	8
Packing group	:	II
Labels	:	8

IATA-DGR

UN/ID No.	:	UN 1824
Proper shipping name	:	Sodium hydroxide solution
Class	:	8
Packing group	:	II
Labels	:	Corrosive
Packing instruction (cargo aircraft)	:	855
Packing instruction (passenger aircraft)	:	851

IMDG-Code

UN number	:	UN 1824
Proper shipping name	:	SODIUM HYDROXIDE SOLUTION
Class	:	8
Packing group	:	II
Labels	:	8
EmS Code	:	F-A, S-B
Marine pollutant	:	no
Remarks	:	Stowage category AAlkalis

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable for product as supplied.

National Regulations

NOM-002-SCT

UN number	:	UN 1824
Proper shipping name	:	SODIUM HYDROXIDE SOLUTION

Class	:	8
Packing group	:	II
Labels	:	8

Special precautions for user

The transport classification(s) provided herein are for informational purposes only, and solely based upon the properties of the unpackaged material as it is described within this Safety Data Sheet. Transportation classifications may vary by mode of transportation, package sizes, and variations in regional or country regulations.

SECTION 15. REGULATORY INFORMATION

Safety, health and environmental regulations/legislation specific for the substance or mixture

Federal Law for the control of chemical precursors, essential chemical products and machinery for producing capsules, tablets and pills.	:	Not applicable

International Regulations

Montreal Protocol	:	Not applicable
Rotterdam Convention (Prior Informed Consent)	:	Not applicable
Stockholm Convention (Persistent Organic Pollutants)	:	Not applicable

The components of this product are reported in the following inventories:

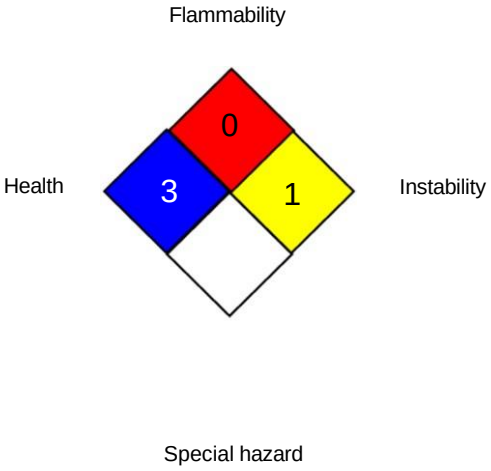
TCSI	:	All intentional components are listed on the inventory, are exempt, or are supplier certified.
TSCA	:	All substances listed as active on the TSCA Inventory or are not required to be listed.
AIIC	:	All intentional components are listed on the inventory, are exempt, or are supplier certified.
DSL	:	All substances contained in this product are listed on the Canadian Domestic Substances List (DSL) or are not required to be listed.
ENCS	:	All intentional components are listed on the inventory, are exempt, or are supplier certified.
ISHL	:	All intentional components are listed on the inventory, are exempt, or are supplier certified.
KECI	:	All intentional components are listed on the inventory, are exempt, or are supplier certified.
PICCS	:	All intentional components are listed on the inventory, are exempt, or are supplier certified.
IECSC	:	All intentional components are listed on the inventory, are exempt, or are supplier certified.
NZIoC	:	All intentional components are listed on the inventory, are exempt, or are supplier certified.
CH INV	:	All intentional components are listed on the inventory, are exempt, or are supplier certified.
TECI	:	All intentional components are listed on the inventory, are exempt, or are supplier certified.

SECTION 16. OTHER INFORMATION

Revision Date	:	19.04.2023
Date format	:	mm/dd/yyyy

Further information

NFPA 704:



Full text of other abbreviations

ACGIH	:	USA. ACGIH Threshold Limit Values (TLV)
NOM-010-STPS-2014	:	Mexico. Norm NOM-010-STPS-2014 on Chemicals Polluting the Work Environment - Identification, Assessment and Control - Appendix 1 Occupational Exposure Limits
ACGIH / C	:	Ceiling limit
NOM-010-STPS-2014 / VLE-P	:	Ceiling value

AIIC - Australian Inventory of Industrial Chemicals; ANTT - National Agency for Transport by Land of Brazil; ASTM - American Society for the Testing of Materials; bw - Body weight; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; Nch - Chilean Norm; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NOM - Official Mexican Norm; NTP - National Toxicology Program; NZIoC - New

Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TDG - Transportation of Dangerous Goods; TECI - Thailand Existing Chemicals Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative; WHMIS - Workplace Hazardous Materials Information System

Skyahwk Chemicals, Inc. urges each customer or recipient of this (M)SDS to study it carefully and consult appropriate expertise, as necessary or appropriate, to become aware of and understand the data contained in this (M)SDS and any hazards associated with the product. The information herein is provided in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given.Regulatory requirements are subject to change and may differ between various locations. It is the buyer's/user's responsibility to ensure that his activities comply with all federal, state, provincial or local laws. The information presented here pertains only to the product as shipped. Since conditions for use of the product are not under the control of the manufacturer, it is the buyer's/user's duty to determine the conditions necessary for the safe use of this product. Due to the proliferation of sources for information such as manufacturer-specific (M)SDSs, we are not and cannot be responsible for (M)SDSs obtained from any source other than ourselves. If you have obtained an (M)SDS from another source or if you are not sure that the (M)SDS you have is current, please contact us for the most current version.

MX / EN

SKYHAWK

SAFETY DATA SHEET

SDS NO. 235
Effective Date: April 12, 2018
Revision Date:

I. Product and Company Information

Product Name(s)	Aqua Ammonia (20 % - 30.5 %)	**Synonym:**	Ammonia Solution
Chemical Name:	Ammonium Hydroxide	**CAS Number:**	1336-21-6

Supplier's Name:
Skyhawk Chemicals, Inc.
701 N Post Oak Rd., Ste. 540
Houston, TX 77024
T: 913-957-2200
E: **order@skyhawkchemicals.com**

Emergency Contacts:

For Chemical Emergency, Spill or Accident
Call CHEMTREC at 1-800-424-9300
CHEMTREC CCN721839

II. Hazard Identification

OSHA HCS / GHS Classification(s):	**Hazard Statement(s):**
Acute Toxicity, Oral (Category 4)	Harmful if swallowed.
Skin Corrosion (Category 1)	Causes severe skin burn.
Serious Eye Damage (Category 1)	Causes serious eye damage.
Specific Target Organ Toxicity (Respiratory - single exposure) - (Category 3)	May cause respiratory irritation.
Simple Asphyxiant	May displace oxygen and cause rapid suffocation.
Acute Aquatic Toxicity (Category 3)	Harmful to aquatic life.

Signal Word:	**Precautionary Statement(s):**	
Danger	**Prevention:**	Wash affected body parts thoroughly after handling.
		Do not eat, drink, or smoke when using this product.
		Wear eye and face protection.
		Wear protective gloves and clothing.
		Do not breathe mist, vapors, or spray.
		Avoid release to the environment.
	Response:	IF SWALLOWED: Rinse mouth. Do not induce vomiting. Immediately seek medical advice.
		IF ON SKIN: Take off immediately all contaminated clothing. Rinse skin with water.
		IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do so. Continue rinsing.
		IF INHALED: Remove victim to fresh air and keep comfortable for breathing.
		Collect spillage: See section VI - Accidential Release Measures.
		For specific treatment: See section IV - First Aid section.

III. Composition / Information on Ingredients

Chemical Name	**CAS Reg #'s**	**%**
Ammonia (NH_3)	7664-41-7	20 - 30.5
Water	7732-18-5	Balance

IV. First Aid Measures	
Eyes:	Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Remove any contact lenses. Seek medical attention, if you feel unwell.
Dermal / Skin:	Remove contaminated clothing and wash exposed area thoroughly with soap and water. Seek medical attention, if you feel unwell.
Inhalation:	Move to fresh air immediately. If breathing is difficult, give oxygen. Seek medical attention, if you feel unwell.
Ingestion:	If swallowed, DO NOT induce vomiting. Rinse mouth. Seek medical attention, if you feel unwell.

V. Fire Fighting Measures				
NFPA Hazard Rating:	Health (Blue)	Fire (Red)	Reactivity (Yellow)	Special Instructions (White)
	3	1	0	None
NFPA Hazard Classification: 0 = Least 1 = Slight 2 = Moderate 3 = High 4 = Extreme				
Extinguishing Media:	Use extinguishing media appropriate for surrounding fire (Not CO_2).			
Special Firefighting Procedure:	Wear full protective clothing and a self-contained breathing apparatus (SCBA) because toxic fumes are emitted. Stop flow if possible. Use water to keep fire-exposed containers cool and to protect persons shutting off flow of liquid. For a serious leak, use fire hose with a fog nozzle and plenty of water to absorb ammonia vapors.			
Unusual Fire and Explosive Hazards:	At elevated temperatures, aqua ammonia will emit ammonia gas and possibly small amounts of nitrogen oxides which have been classified as toxic. Presence of oil or other combustible materials increases the fire hazard of ammonia gas. Ammonia concentrations in the range of 16-25 % by volume in air can be ignited or caused to explode if heated to the auto-ignition temperature.			

VI. Accidental Release Measures	
Precaution if Spilled or Released:	Steps should be taken to contain spilled liquids and prevent discharges to streams or sewer systems. Ventilate spill or leak area to disperse gas. Eliminate all sources of ignition. Stop flow if possible. If small spill, either allow it to vaporize or absorb the vapor in water. If large spill, spray the vapor cloud with water to reduce fire and fume hazard.
Neutralizing Chemicals:	Neutralization with acid not recommended. Flush area with water.

VII. Handling and Storage	
Handling:	Handle all chemicals with respect. Keep separated from incompatible substances. Handle only with equipment, materials, and supplies specified by their manufacturer as being compatible and appropriate for use with this product.
Storage:	Storage in specially designated areas outside or in detached structure is preferred. Store inside only in a cool, well-ventilated area free from combustibles and away from all sources of ignition. Protect containers from corrosion and mechanical damage. Containers should have safety relief valves. Separate from other chemicals, particularly oxidizing gases, organic materials, chlorine, bromine, iodine, mercury, and acids. Post readily visible warning signs in the storage area listing emergency measures. Water hoses should be readily available to knock down vapors from spill.

VIII. Exposure Control / Personal Protective Equipment

Component Workplace Control Parameters:

Components:	CAS-No.	Value	Parameters	Basis
Ammonia NH_3	7664-41-7	TWA	25 ppm	as Ammonia NH_3 (ACGIH)

Engineering Controls:	Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.
General Hygiene:	Practice good personal hygiene after using this material, especially before eating, drinking, smoking, or using the toilet.
Personal Protection Equipment:	
Eye:	Wear chemical goggles and face shield unless protected by a respirator with a full face piece. Do not wear contact lenses as they may trap fumes against the eyes and can make flushing ineffective.
Skin:	The use of gloves, boots, and aprons impermeable to the specific material handled (for Ammonia, includes Butyl, Teflon, Neoprene, and Viton) is advised to prevent skin contact, possible irritation, and skin damage.
Respiratory:	None required under normal conditions. When conditions warrant a respirator, use NIOSH approved respirator and cartridge for particulates and ammonia.
Other Protective Items:	Where splash is possible, full chemically resistant protective clothing and boots are required. Ensure that eyewash stations and safety showers are proximal to the work-station location.

	Health (Blue)	Flammability (Red)	Physical Hazard (Yellow)	PPE (White)
HMIS Classification:	3	1	0	See Above

Hazard Classification: 0 = Minimal 1= Slight 2 = Moderate 3 = Serious 4 = Severe

IX. Physical and Chemical Properties

Physical State:	Liquid	**pH:**	>12
Appearance:	Clear, colorless liquid	**Molecular Weight:**	35.05
Odor:	Pungent odor	**Odor Threshold:**	1-50 ppm
Specific Gravity:(H_2O=1)	0.93 (20 % Solution); 0.91 (25 % Solution); 0.89 (30.5 % Solution) @ 60 °F (15.5 °C)	**Weight per Gallon:**	7.76 (20 % Solution); 7.60 (25 % Solution); 7.43 (30.5 %Solution) lbs @ 60 °F (15.5 °C)
Vapor Density: (Air=1)	0.60 @ 32 °F (0 °C)	**Vapor Pressure:**	272 mm Hg (20 %) 460 mm Hg (25 %) 705 mm Hg (30.5 %) @ 77 °F (25 °C)
Boiling Point: at 14.7 psia	78 °F (25.5 °C) for (30.5 %) 118 °F (47.8 °C) for (20 %)	**Freezing/Melting Point:**	-36 °F (-38 °C) for (20 %) -120 °F (-84 °C) for (30.5 %)
Lower Explosive Limit:	16 % by volume of Ammonia gas	**Upper Explosive Limit:**	25 % by volume of Ammonia gas
Flash Point:	N/A	**Autoignition Temp:**	1,204 °F (651 °C) (vapor)
Solubility in water:	100 %		
Other:			

X. Stability and Reactivity Data

Chemical Stability:	Product is stable under normal or expected use.
Conditions To Avoid:	Heat, sunlight, incompatibles, sources of ignition.
Incompatible Materials:	Corrosive to copper, brass, silver, zinc, aluminum alloys, and galvanized steel. Boils when mixed with acids and is dangerous. Forms explosive compounds with calcium hypochlorite, bleaches, gold, mercury, silver, chlorine, and other halogens.
Hazardous products of Decomposition:	Burning may produce ammonia and nitrogen oxides.

XI. Toxicological Information

Routes of Entry:	☒ Eyes ☒ Skin ☒ Ingestion ☒ Inhalation
Sign and symptoms of Exposure:	Burning of the eyes, conjunctivitis, skin irritations, swelling of the eyelids and lips, dry red mouth and tongue, burning in the throat, and coughing. In more severe cases of exposure, difficulty in breathing, signs and symptoms of lung congestion, and, ultimately, death from respiratory failure due to pulmonary edema may occur.
Eye Contact:	Vapor is irritating to the eyes. Liquid will cause burns.
Ingestion:	Ingestion causes burning pain in mouth, throat, stomach, and thorax, constriction of throat, and coughing. This is soon followed by vomiting of blood or by passage of loose stools containing blood. Ingestion of 3-4 mL may be fatal.
Skin Contact:	Absorption: Because of its alkalinity and water solubility ammonia tends to break down and disrupt the outer cell layers, permitting rapid penetration; however, ammonia is not a systemic poison and the effects will be limited to local effects. Contact: Causes smarting of the skin and first-degree burns on short exposure. May cause second-degree burns on long exposure.
Inhalation:	Ammonia vapors are highly irritating to the throat at approximately 400 ppm. Causes edema, dyspnoea, bronchospasm, chest pain, pink frothy sputum. Inhalation of ≥500 ppm ammonia is considered immediately dangerous to life and health (OSHA).

Carcinogenicity:	**NPT**	Not Listed	**IARC**	Not Listed	**OSHA**	Not Regulated

Ingredient Name:	**Species**	**Test**	**Period**	**Results**
Ammonium Hydroxide	Rat	350 mg/kg	oral	LD50

Comments:	

XII. Ecological Information

Ingredient Name:	**Species**	**Test**	**Period**	**Results**
Ammonium Hydroxide	Daphnia magna	32 mg/L	50 hrs	LC50

Comments:	Ammonia dissipates relatively quickly in ambient air and rapidly returns to the soil via combination with sulfate ions or washout by rainfall. Ammonia strongly adsorbs to soil, sediment particles, and colloids in water under aerobic conditions. Biodegradation of ammonia to nitrate occurs in water under aerobic conditions which results in a biological oxygen demand (BOD).

XIII. Disposal Considerations

Waste Disposal:	Always dispose of material in accordance with local, state, and federal regulations.

XIV. Transportation Information

Proper Shipping Name:	Ammonium Hydroxide, with more than 10 % but not more than 35 % as ammonia. Marine pollutant.				
DOT Classification:	8				
Identification Number:	UN 2672	**Packing Group:**	III	**Other Labels:**	Corrosive
Comments:					

XV. Regulatory Information

Inventory Status:		**US Regulations:**	
U. S. TSCA	Yes	SARA 302 TPQ	500 lbs as ammonia NH_3
Europe EINECS	Yes	SARA 304 RQ	100 lbs as ammonia NH_3
Canadian DSL	Yes	SARA 313 List	Listed
Japan ENCS	Yes	CERCLA (RQ)	1,000 lbs for pure ammonium hydroxide
Korean KECI	Yes	RCRA 261.33	Not Listed
Philippines PICCS	Yes	CAA-112r (RMP)	20,000 lbs as ammonia NH_3
Australian AICS	Yes	DHS CFATS	Chemical Facility Antiterrorism Standards (6 CFR 27)
		SARA 311/312	☒ Acute ☐ Chronic ☐ Fire ☐ Release of Pressure ☐ Reactive

International Regulations:			**Other Regulations:**	
EINECS	231-635-3	as Anhydrous Ammonia	California PROP 65	No
EINECS	215-647-6	as Aqua Ammonia		

XVI. Other Information

NSF Certification:	Aqua Ammonia manufactured at Lake Charles, LA is NSF/ ANSI-60 certified. Maximum use in potable water is 10 mg/L.
Other:	_____
Revision Notes:	
MSDS Replacements:	

SALES OFFICE

For Product Information:
TEL: 662-494-3055
FAX: 662-494-2828

Post Office Drawer 1217
West Point, MS 39773

To Place An Order:
TEL: 800-953-3585
FAX: 800-953-3588

IMPORTANT

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SAFETY DATA SHEET

SODIUM TRIPOLYPHOSPHATE

Prepared to U.S. OSHA, CMA, ANSI, Canadian WHMIS Standards, Australian WorkSafe, Japanese Industrial Standard JIS Z 7250:2000, and European Directives

SECTION 1. PRODUCT IDENTIFICATION

1.1 TRADE NAME (AS LABELED): ***Sodium Tripolyphosphate***

SYNONYMS: Pentasodium Triphosphate; STPP; Tripoly

CAS#: Mixture

EC NUMBER: Mixture

REACH REGISTRATION #: 01-2119430450-54-0021

1.2 PRODUCT USE: Food applications for meat and seafood. A wide variety of processed food products including dairy and meat processing. Water Treatment. Sequestrant for alkaline metals, scale control, corrosion control, softening, lead control, red and black water control.

1.3 MANUFACTURER'S NAME: **Innophos, Inc.**

ADDRESS: 259 Prospect Plains Rd. Bldg A, Cranbury, NJ 08512

BUSINESS PHONE: 1-609-495-2495

WEB SITE INFORMATION: www.innophos.com

RESPONSIBLE PARTY - EU
Labcorp Development S.A.U.
Parque Empresarial Las Tablas
Edificio 1
Calle Federico Mompou
5-5ª planta
28050 Madrid, Spain
Tel: +34 915 901 664
Email: or-eu@labcorp.com

1.4 EMERGENCY PHONE NUMBERS:
800-424-9300 (CHEMTREC U.S. and Canada – 24 Hrs)
+1 703-527-3887 (CHEMTREC outside the USA and Canada – 24 Hrs)
615-386-7816 – Innophos Emergency Communication Team (ECT)
01-800-00214 00 (SETIQ in Mexico – 24 hrs)

DATE OF PRIOR REVISION: April 5, 2020

DATE OF LATEST REVISION: February 3, 2023

SECTION 2. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW: This product is a white granule solid with no odor.
Health Hazards: May cause irritation the eyes, skin, and respiratory system.
Flammability Hazards: This product is not flammable.
Reactivity Hazards: None.
Environmental Hazards: No data available.

2.1 GHS LABELING AND CLASSIFICATION:

This product does meet the definition of a hazardous substance or preparation as defined by 29 CFR 1910. 1200 and regulation (EU) No. 2020/878 and regulation (EC) No. 1272/2008.

Index Number:

EC# 231-838-7 is not listed in Annex VI

EC# 231-767-1 is not listed in Annex VI

Substances not listed either individually or in group entries must be self-classified.

Component(s) Contributing to Classification(s)

Triphosphoric acid, sodium salt (1:5), Diphosphoric acid, sodium salt (1:4)

2.2 LABEL ELEMENTS

EUROPEAN and (GHS) Hazard Symbol(s)



Signal Word: **Warning!**

GHS Hazard Classification(s):
Skin Irritation Category 2
Eye Irritation Category 2A

Hazard Statement(s):
H315: Causes skin irritation
H319: Causes serious eye irritation

Prevention Statement(s):
P264: Wash skin thoroughly after handling.
P280: Use protective gloves/protective clothing/eye protection/face protection.

Response Statement(s):
P302 + P352: IF ON SKIN: Wash with plenty of water.
P321: Specific treatment (See Section 4 of this SDS).
P332+P313: If skin irritation occurs: Get medical advice / attention.
P362 + P364: Take off contaminated clothing and wash it before reuse.
P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337+P313: If eye irritation persists: Get medical advice / attention.

Storage Statement(s):
None applicable

Disposal Statement(s):
None applicable

2.3 OTHER HAZARDS:
Endocrine Disruptor Information: This product does not contain chemicals on the Candidate List of substances of very high concern for Authorisation.

SECTION 3. COMPOSITION AND INFORMATION ON INGREDIENTS

Hazardous Ingredients:	WT%	CAS#	EINECS #	Hazard Classification
Triphosphoric acid, sodium salt (1:5)	>94%	7758-29-4	231-838-7	Skin irritation 2, Eye Irritation 2A
Diphosphoric acid, sodium salt (1:4)	<6%	7722-88-5	231-767-1	Eye Irritation 2A, Acute Toxicity 4 (Oral)

4. FIRST-AID MEASURES

4.1 DESCRIPTION OF FIRST AID MEASURES:
EYE CONTACT: If product enters the eyes, open eyes while under gentle running water for several minutes. Remove contact lenses if present and easy to do. Continue rinseing for at least 15 minutes. Seek medical attention.

SKIN CONTACT: Wash skin thoroughly after handling. Seek medical attention if irritation develops and persists. Remove contaminated clothing. Launder before re-use.

INHALATION: If breathing becomes difficult, remove victim to fresh air. If necessary, use artificial respiration to support vital functions. Seek medical attention.

INGESTION: If product is swallowed, call physician or poison control center for most current information. If professional advice is not available, do not induce vomiting. Never induce vomiting or give diluents (milk or water) to someone who is unconscious, having convulsions, or who cannot swallow. Seek medical advice. Take a copy of the label and/or SDS with the victim to the health professional.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Pre-existing skin, respiratoy system or eye problems may be aggravated.

4.2 SYMPTOMS AND EFFECTS, BOTH ACUTE AND DELAYED:
May cause irritation the eyes and skin.

4.3 RECOMMENDATIONS TO PHYSICIANS:
Treat symptoms and eliminate overexposure.

SECTION 5. FIRE-FIGHTING MEASURES

5.1 FIRE EXTINGUISHING MATERIALS:
Use fire extinguishing methods below:

Water Spray:	Yes	Carbon Dioxide:	Yes
Foam:	Yes	Dry Chemical:	Yes
Halon:	Yes	Other:	Any “C” Class

5.2 UNUSUAL FIRE AND EXPLOSION HAZARDS:

None anticipated.

Explosion Sensitivity to Mechanical Impact: No

Explosion Sensitivity to Static Discharge: No

5.3 SPECIAL FIRE-FIGHTING PROCEDURES:

Incipient fire responders should wear eye protection. Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment. Isolate materials not yet involved in the fire and protect personnel. Move containers from fire area if this can be done without risk; otherwise, cool with carefully applied water spray. If possible, prevent runoff water from entering storm drains, bodies of water, or other environmentally sensitive areas.

SECTION 6. ACCIDENTAL RELEASE MEASURES

6.1 PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT AND EMERGENCY PROCEDURES:

To prevent skin and eye contact under the foreseeable conditions of use, wear appropriate protective clothing and safety eyewear. When handling, do not eat, drink, or smoke. Wash thoroughly after handling. Handle in a well-ventilated work area.

6.2 ENVIRONMENTAL PRECAUTIONS:

If possible, prevent entry to sewers, storm drains, surface waters, and soils.

6.3 SPILL AND LEAK RESPONSE:

Spilled product should be removed immediately to avoid formation of dust. Remove by mechanical means (i.e. vacuuming). Dilute remainder with plenty of water (avoid formation of aerosols). Ensure sufficient ventilation. Wash contaminated clothing.

SECTION 7. HANDLING and STORAGE

7.1 PRECAUTIONS FOR SAFE HANDLING:

To prevent skin and eye contact under the foreseeable conditions of use, wear appropriate protective clothing and safety eyewear. When handling, do not eat, drink, or smoke. Wash thoroughly after handling. Handle in a well-ventilated work area.

7.2 STORAGE AND HANDLING PRACTICES:

Keep away from incompatible materials. Keep in a dry, well-ventilated area in closed containers. Protect containers from physical damage.

7.3 SPECIFIC USES:

See Section 1.2.

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 EXPOSURE PARAMETERS:

Chemical Name	CAS#	ACGIH TLV	OSHA TWA	EH40 TWA
Triphosphoric acid, sodium salt (1:5)	7758-29-4	10 mg/m3 TWA (inhalable particles, recommended); 3 mg/m3 TWA (respirable particles, recommended)	Not Listed	Not Listed
Diphosphoric acid, sodium salt (1:4)	7722-88-5	Not Listed	Not Listed	5 mg/m3

PARTICULATES NOT OTHERWISE REGULATED RESPIRABLE FRACTION

	TWA		TWA
OSHA	5 mg/m^3	NOM 010 STPS 2015	3 mg/m3

PARTICULATES NOT OTHERWISE REGULATED TOTAL DUST

	TWA		TWA
OSHA	15 mg/m^3	NOM 010 STPS 2015	10 mg/m3

8.2 EXPOSURE CONTROLS:

VENTILATION AND ENGINEERING CONTROLS: Use with adequate ventilation to ensure exposure levels are maintained below the limits provided above.

The following information on appropriate Personal Protective Equipment is provided to assist employers in complying with OSHA regulations found in 29 CFR Subpart I (beginning at 1910.132) or equivalent standard of Canada, or standards of EU member states (including EN 149 for respiratory PPE, and EN 166 for face/eye protection), and those of Japan. Please reference applicable regulations and standards for relevant details.

RESPIRATORY PROTECTION: Not required for properly ventilated areas. Maintain airborne contaminant concentrations below guidelines listed above, if applicable. If necessary, use only respiratory protection authorized in the U.S. Federal OSHA Respiratory Protection Standard (29 CFR 1910.134), equivalent U.S. State standards, Canadian CSA Standard Z94.4-93, the European Standard EN149, or EU member states.

EYE PROTECTION: Safety glasses or goggles are recommended. If necessary, refer to U.S. OSHA 29 CFR 1910.133, Canadian Standards, and the European Standard EN166, Australian Standards, or relevant Japanese Standards.

HAND PROTECTION: Gloves are recommended to prevent skin contact. If necessary, refer to U.S. OSHA 29 CFR 1910.138, the European Standard DIN EN 374, the appropriate Standards of Canada, Australian Standards, or relevant Japanese Standards.

BODY PROTECTION: Use body protect appropriate to task being performed. If necessary, refer to appropriate Standards of Canada, or appropriate Standards of the EU, Australian Standards, or relevant Japanese Standards. If a hazard of injury to the feet exists due to falling objects, rolling objects, where objects may pierce the soles of the feet or where employee's feet may be exposed to electrical hazards, use foot protection, as described in U.S. OSHA 29 CFR 1910.136.

SECTION 9. PHYSICAL and CHEMICAL PROPERTIES

9.1 INFORMATION ON BASIC PHYSICAL AND CHEMICAL PROPERTIES:

APPEARANCE (Physical State) and COLOR: This product is a white granular solid
ODOR: No odor
ODOR THRESHOLD: Not Available
pH: 9.5-10.2
MELTING/FREEZING POINT: > 622°C (> 1151.6°F)
BOILING POINT: Not Available
FLASH POINT: Not Available
EVAPORATION RATE (n-BuAc=1): Not Available
FLAMMABILITY (SOLID, GAS): Not Available
UPPER/LOWER FLAMMABILITY OR EXPLOSION LIMITS: Not Available
VAPOR PRESSURE (mm Hg @ 20°C (68°F): Not Available
VAPOR DENSITY: Not Available
RELATIVE DENSITY: Not Available
SPECIFIC GRAVITY: Not Available
SOLUBILITY IN WATER: Not Available
WEIGHT PER GALLON: Not Available
PARTITION COEFFICENT (n-octanol/water): Not Available
AUTO-IGNITION TEMPERATURE: Not Available
DECOMPOSITION TEMPERATURE: Not Available
VISCOSITY: Not Available
OXIDIZING PROPERTIES: Not an Oxidizer
EXPLOSIVE PROPERTIES: Not Available

9.2.1 INFORMATION WITH REGARD TO PHYSICAL HAZARD CLASSES

EXPLOSIVES: Not Available
FLAMMABLE GASES: Not Available
AEROSOLS: Not Available
OXIDISING GASES: Not Available
GASES UNDER PRESSURE: Not Available
FLAMMABLE LIQUIDS: Not Available
FLAMMABLE SOLIDS: Not Available
SELF-REACTIVE SUBSTANCES AND MIXTURES: Not Available
PYROPHORIC LIQUIDS: Not Available
PYROPHORIC SOLIDS: Not Available
SELF-HEATING SUBSTANCES AND MIXTURES: Not Available
SUBSTANCES AND MIXTURES, WHICH EMIT FLAMMABLE GASES IN CONTACT WITH WATER: Not Available
OXIDISING LIQUID: Not Available
OXIDISING SOLID: Not Available
ORGANIC PEROXIDES: Not Available
CORROSIVE TO METALS: Not Available
DESENSITISED EXPLOSIVES: Not Available
GASES UNDER PRESSURE: Not Available

9.2.2 OTHER SAFETY CHARACTERISTICS

MECHANICAL SENSTIVITY: Not Available
SELF-ACCELERATING POLYMERISATION TEMPERATURE: Not Available
FORMATION OF EXPLOSIBLE DUST/AIR MIXTURES: Not Available
ACID/ALKALINE RESERVE: Not Available
EVAPORATION RATE: Not Available
MISCIBILITY: Not Available
CONDUCTIVTY: Not Available
CORROSIVENESS: Not Available
GAS GROUP: Not Available
REDOX POTENTIAL: Not Available
RADICAL FORMATION POTENTIAL: Not Available
PHOTOCATALYTIC PROPERTIES: Not Available

SECTION 10. STABILITY and REACTIVITY

10.1 REACTIVITY:
No data available
10.2 STABILITY:
Stable under conditions of normal storage and use.
10.3 POSSIBILITY OF HAZARDOUS REACTIONS:
Will not occur.
10.4 CONDITIONS TO AVOID:
Dusting conditions, moisture, excess heat.
10.5 MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE:
Strong acids, oxidizing agents.
10.6 HAZARDOUS DECOMPOSITION PRODUCTS:
None known.

SECTION 11. TOXICOLOGICAL INFORMATION

11.1 INFORMATION ON TOXICOLOGICAL EFFECTS:

TOXICITY DATA:

Triphosphoric acid, sodium salt (1:5) CAS# 7758-29-4	LD50 Oral, Rat 3120 mg/kg LD50 Dermal, Rabbit >4640 mg/kg
Diphosphoric acid, sodium salt (1:4) CAS# 7722-88-5	LD50 Oral, Rat 300-2000 mg/kg LD50 Dermal, Rabbit 7940 mg/kg

Acute toxicity	Based on available data, the classification criteria are not met
Skin corrosion / irritation	Skin Irritation Category 2
Serious eye damage / irritation	Eye Irritation Category 2A
Respiratory or skin sensitization	Based on available data, the classification criteria are not met
Germ cell mutagenicity	Based on available data, the classification criteria are not met
Carcinogenicity	Based on available data, the classification criteria are not met
Reproductive toxicity	Based on available data, the classification criteria are not met
STOT-single exposure	Based on available data, the classification criteria are not met
STOT-repeated exposure	Based on available data, the classification criteria are not met
Aspiration hazard	Based on available data, the classification criteria are not met

ROUTE OF EXPOSURE: The most significant routes of overexposure for this product are by contact with the skin or eyes. The symptoms of overexposure are described in the following paragraphs.

ACUTE:

INHALATION: May cause respiratory irritation.
CONTACT WITH SKIN: Exposure to skin may cause irritation.
EYE CONTACT: Contact with the eyes may cause irritation.
INGESTION: Ingestion of large quantities may cause abdominal cramps, nausea, vomiting, diarrhea
CHRONIC: No data available.

TARGET ORGANS: **Acute:** Skin, Eyes
Chronic: No data available.

SUSPECTED CANCER AGENT: Ingredients within this product are not found on the following lists: FEDERAL OSHA Z LIST, NTP, IARC, or CAL/OSHA and therefore are not considered to be, nor suspected to be, cancer-causing agents by these agencies.

IRRITANCY OF PRODUCT: This product may be irritating to the skin, eyes, and respiratory system.
SENSITIZATION TO THE PRODUCT: No information available for this product
REPRODUCTIVE TOXICITY INFORMATION: No specific information is available concerning the effects of this product and its components on the human reproductive system.
SPECIFIC TARGET ORGAN TOXICITY – SINGLE EXPOSURE: May cause respiratory irritation.
SPECIFIC TARGET ORGAN TOXICITY – REPEATED EXPOSURE: Data not sufficient for classification.
ASPIRATION HAZARD: None

11.2 INFORMATION ON OTHER HAZARD CLASSES WHICH RELATES TO ENDOCIRNE DISRUPTING PROPERTIES:
No specific data available for this product.

SECTION 12. ECOLOGICAL INFORMATION

12.1 TOXICITY:
No specific data available on this product.
12.2 PERSISTENCE AND DEGRADABILITY:
No specific data available on this product.
12.3 BIOACCUMULATIVE POTENTIAL:
No specific data available on this product.
12.4 MOBILITY IN SOIL:
No specific data available on this product.
12.5 RESULTS OF PBT AND vPvB ASSESSMENT:
No specific data available on this product.
12.6 ENDOCRINE DISRUPTING PROPERTIES:
No specific data available on this product.
12.7 OTHER ADVERSE EFFECTS:
No specific data available on this product.
12.8 WATER ENDANGERMENT CLASS:
May be water endangering in accordance with EU Guideline 91/155-EWG. Do not allow product to reach ground water, water course or sewage system. At present there are no ecotoxicological assessments for this product.

SECTION 13. DISPOSAL CONSIDERATIONS

13.1 WASTE TREATMENT METHODS:
Waste disposal must be in accordance with appropriate U.S. Federal, State, and local regulations, those of Canada, Australia, EU Member States and Japan.
13.2 EU WASTE CODE:
Not determined.

SECTION 14. TRANSPORTATION INFORMATION

US DOT, IATA, IMO, ADR:
14.1 U.S. DEPARTMENT OF TRANSPORTATION (DOT) SHIPPING REGULATIONS: This product is classified (per 49 CFR 172.101) by the U.S. Department of Transportation, as follows.

UN IDENTIFICATION NUMBER:	None
PROPER SHIPPING NAME:	Non-Regulated Material
HAZARD CLASS NUMBER and DESCRIPTION:	None
PACKING GROUP:	None
DOT LABEL(S) REQUIRED:	None

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER: None

RQ QUANTITY:	None
NOTE:	None

MARINE POLLUTANT: The components of this product are not designated by the Department of Transportation to be Marine Pollutants (49 CFR 172.101, Appendix B).

INTERNATIONAL AIR TRANSPORT ASSOCIATION SHIPPING INFORMATION (IATA): This product is not considered as dangerous goods.

INTERNATIONAL MARITIME ORGANIZATION SHIPPING INFORMATION (IMO):

UN IDENTIFICATION NUMBER:	None
PROPER SHIPPING NAME:	Non-Regulated Material
HAZARD CLASS NUMBER and DESCRIPTION:	None
PACKING GROUP:	None

EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY ROAD (ADR): This product is not considered by the United Nations Economic Commission for Europe to be dangerous goods.

SECTION 15. REGULATORY INFORMATION

15.1 SAFETY, HEALTH AND ENVIRONMENTAL REGULATIONS SPECIFIC FOR THE SUBSTANCE OR MIXTURE: UNITED STATES REGULATIONS:

U.S. SARA REPORTING REQUIREMENTS: The components of this product are subject to the reporting requirements of Sections 302, 304, and 313 of Title III of the Superfund Amendments and Reauthorization Act as follows: None
U.S. SARA 311/312: Acute Health Hazard.
U.S. SARA THRESHOLD PLANNING QUANTITY: None
U.S. CERCLA REPORTABLE QUANTITY (RQ): None
U.S. TSCA INVENTORY STATUS: The components of this product are listed on the TSCA Inventory or are exempted from listing.
OTHER U.S. FEDERAL REGULATIONS: None known
CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): This product does not contain ingredients on the Proposition 65 Lists.

15.2 CANADIAN REGULATIONS:

CANADIAN DSL/NDSL INVENTORY STATUS: Components are DSL Listed, NDSL Listed and/or are exempt from listing.
OTHER CANADIAN REGULATIONS: Not applicable.
CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITIES SUBSTANCES LISTS:
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the SDS contains all of the information required by those regulations.
CANADIAN WHMIS CLASSIFICATION and SYMBOLS: This product is classified per 2015 WHMIS Hazardous Product Regulations.

15.3 EUROPEAN ECONOMIC COMMUNITY INFORMATION:

This product does meet the definition of a hazardous substance or preparation as defined by the European Union Council Directives 67/548/EEC, 1999/45/EC, 1272/2008/EC and subsequent Directives.
See Section 2 for Details
CHEMICAL SAFETY ASSESSMENT :
No Chemical Safety Assessment has been carried out for this substance/mixture by the supplier.

15.4 AUSTRALIAN INFORMATION FOR PRODUCT: Components of this product are listed on the International Chemical Inventory list.

15.5 JAPANESE INFORMATION FOR PRODUCT:

JAPAN INDUSTRIAL SAFETY AND HEALTH LAW: This product has been classified per the Japan Industrial Safety and Health Law. See Section 2 for the GHS Classification.

15.6 INTERNATIONAL CHEMICAL INVENTORIES:

Listing of the components on individual country Chemical Inventories is as follows:
Asia-Pac: Listed
Australian Inventory of Chemical Substances (AICS): Listed
Korean Existing Chemicals List (ECL): Listed
Japanese Existing National Inventory of Chemical Substances (ENCS): Listed
Philippines Inventory of Chemicals and Chemical Substances (PICCS): Listed
Swiss Giftliste List of Toxic Substances: Not Listed
U.S. TSCA: Listed
Mexican Inventory of chemical substances (NOM 010 STPS 2015): Not Listed

SECTION 16. OTHER INFORMATION

HMIS Rating (Scale 0-4)	**NFPA Rating (Scale 0-4)**
Health hazard: 1	Health hazard: 1
Flammability: 0	Flammability: 0
Physical Hazard: 0	Physical Hazard: 0

Abbreviations and acronyms

ACGIH	*American Conference of Governmental Industrial Hygienists*
CFR	*Code of Federal Regulations*
DOT	*Federal Department of Transportation*
GHS	*The Globally Harmonized System of Classification and Labelling of Chemicals*

HMIS	*Hazardous Material Identification System*
HCS	*Hazard Communication Standard*
IARC	*International Agency for Research on Cancer*
IATA	*The International Air Transport Association*
ICAO	The *International Civil Aviation Organization*
IMDG	*International Maritime Dangerous Goods*
IMO	*International Maritime Organization*
LD50/LC50	*Lethal Concentration/Dose, 50 percent*
NFPA	*National Fire Protection Association*
NIOSH	*National Institute for Occupational Safety and Health*
NTP	*National Toxicology Program*
OSHA	*Occupational Safety and Health*
PEL	*Permissible Exposure Limit*
SARA	*Superfund Amendments and Reauthorization Act*
TLV	*ACGIH Threshold Limit Value*
TWA	*Time-Weighted Average*

PREPARED BY: Chris Eigbrett

MSDS to GHS Compliance
www.MSDStoGHS.com

The information contained herein is believed to be accurate but is not warranted to be so. Data and calculations are based on information furnished by the manufacturer of the product and manufacturers of the components of the product. Users are advised to confirm in advance of the need that information is current, applicable and suited to the circumstances of use. Innophos, Inc. assumes no responsibility for injury to vendee or third party person proximately caused by the material if reasonable safety procedures are no adhered to as stipulated in the data sheet. Furthermore, Innophos, Inc. assumes no responsibility for injury caused by abnormal use of this material even if reasonable safety procedures are followed.

REVISION HISTORY

February 3, 2023 - Updated to comply with 2020/878. Updates to Section 2, 9, 11, 12, 16.

END OF SDS SHEET

SAFETY DATA SHEET
OPTISPERSE* HP3100

1. Identification

Product identifier	**OPTISPERSE HP3100**
Other means of identification	None.
Version #	5.0
Prepared by	This SDS has been prepared by SUEZ Regulatory Department (1-215-355-3300).
Revision date	Jan-25-2019
Supersedes date	May-26-2018
Recommended use	Water based internal boiler treatment chemical.
Recommended restrictions	None known.

Company/undertaking identification

SUEZ Water Technologies & Solutions Canada
3239 Dundas Street West
Oakville, Ontario, L6M 4B2
T 905-465-3030

Emergency telephone

(800) 877-1940

2. Hazard identification

Physical hazards	Not classified.	
Health hazards	Skin corrosion/irritation	Category 1A
	Serious eye damage/eye irritation	Category 1
	Specific target organ toxicity, single exposure	Category 3 respiratory tract irritation

Label elements



Signal word	Danger
Hazard statement	Causes severe skin burns and eye damage. Causes serious eye damage. May cause respiratory irritation.
Precautionary statement	
Prevention	Do not breathe mist or vapor. Wash thoroughly after handling. Use only outdoors or in a well-ventilated area. Wear protective gloves/protective clothing/eye protection/face protection.
Response	If swallowed: Rinse mouth. Do NOT induce vomiting. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. If inhaled: Remove person to fresh air and keep comfortable for breathing. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center/doctor. Wash contaminated clothing before reuse.
Storage	Store in a well-ventilated place. Keep container tightly closed. Store locked up.
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.
Other hazards	None known.

Supplemental information None.

3. Composition/information on ingredients

Mixtures

Components	CAS #	Percent (wt/wt)
Sodium hydroxide	1310-73-2	3 - 7

Composition comments The exact concentrations of the above listed chemicals are being withheld as confidential business information. Information for specific product ingredients as required by the WHMIS Regulations is listed. Refer to additional sections of this SDS for our assessment of the potential hazards of this formulation.

4. First-aid measures

Inhalation Remove victim to fresh air and keep at rest in a position comfortable for breathing. For breathing difficulties, oxygen may be necessary. Call a POISON CENTER or doctor/physician if you feel unwell.

Skin contact Take off immediately all contaminated clothing. Rinse skin with water/shower. Call a physician or poison control center immediately. Chemical burns must be treated by a physician. Wash contaminated clothing before reuse.

Eye contact Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a physician or poison control center immediately.

Ingestion Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Rinse mouth. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Get medical attention if symptoms occur.

Most important symptoms/effects, acute and delayed Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. May cause respiratory irritation.

Indication of immediate medical attention and special treatment needed Provide general supportive measures and treat symptomatically. Chemical burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. Keep victim under observation. Symptoms may be delayed.

General information If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire-fighting measures

Suitable extinguishing media Water fog. Carbon dioxide (CO2).

Unsuitable extinguishing media Do not use water jet as an extinguisher, as this will spread the fire.

Specific hazards arising from the chemical During fire, gases hazardous to health may be formed.

Special protective equipment and precautions for firefighters Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask.

Fire fighting equipment/instructions In case of fire and/or explosion do not breathe fumes. Use standard firefighting procedures and consider the hazards of other involved materials. Move containers from fire area if you can do so without risk. Cool containers / tanks with water spray.

Specific methods Use standard firefighting procedures and consider the hazards of other involved materials.

General fire hazards No unusual fire or explosion hazards noted.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Wear appropriate protective equipment and clothing during clean-up. Do not breathe mist or vapor. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained.

Methods and materials for containment and cleaning up Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. Absorb in vermiculite, dry sand or earth and place into containers. Following product recovery, flush area with water.

Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.

Never return spills to original containers for re-use.

Environmental precautions Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling

Do not mix with acidic material. Do not breathe mist or vapor. Do not get in eyes, on skin, or on clothing. Avoid prolonged exposure. Provide adequate ventilation. Wear appropriate personal protective equipment. Observe good industrial hygiene practices. Use care in handling/storage.

Conditions for safe storage, including any incompatibilities

Avoid freezing. If frozen, thaw completely and mix thoroughly prior to use. Store locked up. Store in original tightly closed container. Store in accordance with local/regional/national/international regulation.

8. Exposure controls/personal protection

Occupational exposure limits

US. ACGIH Threshold Limit Values

Components	Type	Value
Sodium hydroxide (CAS 1310-73-2)	Ceiling	2 mg/m3

Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2)

Components	Type	Value
Sodium hydroxide (CAS 1310-73-2)	Ceiling	2 mg/m3

Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended)

Components	Type	Value
Sodium hydroxide (CAS 1310-73-2)	Ceiling	2 mg/m3

Canada. Manitoba OELs (Reg. 217/2006, The Workplace Safety And Health Act)

Components	Type	Value
Sodium hydroxide (CAS 1310-73-2)	Ceiling	2 mg/m3

Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents)

Components	Type	Value
Sodium hydroxide (CAS 1310-73-2)	Ceiling	2 mg/m3

Canada. Quebec OELs. (Ministry of Labor - Regulation respecting occupational health and safety)

Components	Type	Value
Sodium hydroxide (CAS 1310-73-2)	Ceiling	2 mg/m3

Canada. Saskatchewan OELs (Occupational Health and Safety Regulations, 1996, Table 21)

Components	Type	Value
Sodium hydroxide (CAS 1310-73-2)	Ceiling	2 mg/m3

Biological limit values

No biological exposure limits noted for the ingredient(s).

Appropriate engineering controls

Eye wash facilities and emergency shower must be available when handling this product. Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Individual protection measures, such as personal protective equipment

Eye/face protection

Wear safety glasses with side shields (or goggles) and a face shield.

Skin protection

Hand protection

The choice of an appropriate glove does not only depend on its material but also on other quality features and is different from one producer to the other. Suitable gloves can be recommended by the glove supplier. Glove selection must take into account any solvents and other hazards present.

Other

Wear appropriate chemical resistant clothing.

Respiratory protection

If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn.

Thermal hazards

Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations

Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance	Liquid
Color	Colorless to light yellow
Odor	Odorless
Odor threshold	Not available.
pH (concentrated product)	> 13 Neat
pH in aqueous solution	12.4 (2.5% Solution)
Melting point/freezing point	21 °F (-6 °C)
Initial boiling point and boiling range	210 °F (99 °C)
Flash point	Not available.
Evaporation rate	Slower than Ether
Flammability (solid, gas)	Not applicable.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	18 mmHg
Vapor pressure temp.	70 °F (21 °C)
Vapor density	< 1
Relative density	1.11
Relative density temperature	70 °F (21 °C)
Solubility(ies)	
Solubility (water)	100 %
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	12 mPa.s
Viscosity temperature	70 °F (21 °C)
Other information	
Explosive properties	Not explosive.
Oxidizing properties	Not oxidizing.
Pour point	26 °F (-3 °C)
Specific gravity	1.113
VOC	0 % CALCULATED

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Contact with incompatible materials. None under normal conditions. Protect from freezing.
Incompatible materials	Strong acids. Strong oxidizing agents.
Hazardous decomposition products	Oxides of carbon, nitrogen, phosphorus, and sulphur evolved in fire.

11. Toxicological information

Information on likely routes of exposure

Inhalation	May cause irritation to the respiratory system. Prolonged inhalation may be harmful. Inhalation of vapors/mists/aerosols may cause eye, nose, throat and lung irritation.
Skin contact	No adverse effects due to skin contact are expected.
Eye contact	Causes serious eye damage.
Ingestion	Ingestion may cause severe irritation of the mouth, the esophagus and the gastrointestinal tract.
Symptoms related to the physical, chemical and toxicological characteristics	Symptoms on skin may develop from redness and itching with development to burns due to corrosion. Symptoms on eyes may develop from tearing with development into severe irritation and/or burns due to corrosion. Permanent eye damage including blindness could result. Symptoms on ingestion may develop from discomfort with development into severe irritation and/or burns due to corrosion. Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. May cause respiratory irritation.

Information on toxicological effects

Acute toxicity May cause respiratory irritation.

Product	Species	Test Results
OPTISPERSE HP3100 (CAS Mixture)		
Acute		
Dermal		
LD50	Rabbit	> 5000 mg/kg, (Calculated according to GHS additivity formula)
Oral		
LD50	Rat	> 5000 mg/kg, (Calculated according to GHS additivity formula)

Components	Species	Test Results
Sodium hydroxide (CAS 1310-73-2)		
Acute		
Dermal		
LD50	Rabbit	1350 mg/kg
Oral		
LD50	Rabbit	> 500 mg/kg

* Estimates for product may be based on additional component data not shown.

Skin corrosion/irritation Causes skin burns.

Serious eye damage/eye irritation Causes severe eye burns.

Respiratory or skin sensitization

Canada - Alberta OELs: Irritant

Sodium hydroxide (CAS 1310-73-2) Irritant

Respiratory sensitization This product is not expected to cause respiratory sensitization.

Skin sensitization This product is not expected to cause skin sensitization.

Germ cell mutagenicity No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

Carcinogenicity Not classified.

Reproductive toxicity This product is not expected to cause reproductive or developmental effects.

Specific target organ toxicity - single exposure May cause respiratory irritation.

Specific target organ toxicity - repeated exposure Not available.

Aspiration hazard Based on available data, the classification criteria are not met. Aspiration of this product may cause the same corrosiveness/irritation impacts as if it were ingested.

Chronic effects Prolonged inhalation may be harmful.

12. Ecological information

Ecotoxicity

Product		Species	Test Results
OPTISPERSE HP3100 (CAS Mixture)			
	LC50	Fathead Minnow	5020 mg/L, Static Renewal Bioassay, 96 hour, (pH adjusted)
	NOEL	Fathead Minnow	2750 mg/L, Static Renewal Bioassay, 96 hour, (pH adjusted)
Aquatic			
Crustacea	LC50	Daphnia magna	3300 mg/L, Static Renewal Bioassay, 48 hour, (pH adjusted)
	NOEL	Daphnia magna	1250 mg/L, Static Renewal Bioassay, 48 hour, (pH adjusted)

Bioaccumulative potential No data available.

Mobility in soil No data available.

Other adverse effects Not available.

Persistence and degradability

- COD (mgO2/g) No information available.

13. Disposal considerations

Disposal instructions Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Dispose of contents/container in accordance with local/regional/national/international regulations.

Local disposal regulations Dispose in accordance with all applicable regulations.

Waste from residues / unused products Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

Contaminated packaging Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

TDG

UN number UN1824
UN proper shipping name SODIUM HYDROXIDE SOLUTION
Transport hazard class(es)
Class 8
Subsidiary risk -
Packing group II
Environmental hazards Not available.

The goods described above have been classified using a combination of testing, technical data, calculations and manufacturer knowledge in accordance with Part 2, Classification. TDG Classification is valid for road or rail transport only. For shipment by air or water, refer to IATA or IMDG regulations.

DOT

UN number UN1824
UN proper shipping name Sodium hydroxide solution, RQ
Transport hazard class(es)
Class 8
Packing group II
ERG number 154

Some containers may be exempt from Dangerous Goods/Hazmat Transport Regulations, please check BOL for exact container classification.

IMDG

UN number UN1824
UN proper shipping name Sodium hydroxide solution, RQ
Transport hazard class(es)
Class 8
Subsidiary risk -
Packing group II

Environmental hazards

Marine pollutant	No.
EmS	F-A, S-B
Special precautions for user	Not available.

IATA

UN number	UN1824
UN proper shipping name	Sodium hydroxide solution
Transport hazard class(es)	
Class	8
Subsidiary risk	-
Packing group	II
Environmental hazards	No.
ERG Code	154
Special precautions for user	Not available.

DOT



IATA; IMDG; TDG



15. Regulatory information

Canadian regulations

Controlled Drugs and Substances Act

Not regulated.

Export Control List (CEPA 1999, Schedule 3)

Not listed.

Greenhouse Gases

Not listed.

Precursor Control Regulations

Not regulated.

Inventory status

Country(s) or region	Inventory name	On inventory (yes/no)*
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

NSF Registered and/or meets USDA (according to 1998 guidelines):

Registration No. – 146608
Category Code(s):
G5 Cooling and retort water treatment products
G6 Boiler treatment products, steam line products – food contact

16. Other information

Issue date	Mar-17-2016
Revision date	Jan-25-2019
Version #	5.0
NFPA ratings	Health: 3 Flammability: 0 Instability: 0
NFPA ratings	
List of abbreviations	CAS: Chemical Abstract Service Registration Number ACGIH: American Conference of Governmental Industrial Hygienists TWA: Time Weighted Average STEL: Short Term Exposure Limit LD50: Lethal Dose, 50% LC50: Lethal Concentration, 50% NOEL: No Observed Effect Level COD: Chemical Oxygen Demand BOD: Biochemical Oxygen Demand TOC: Total Organic Carbon TLV: Threshold Limit Value IATA: International Air Transport Association IMDG: International Maritime Dangerous Goods Code TSRN indicates a Trade Secret Registry Number is used in place of the CAS number.
References:	No data available
Disclaimer	The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.
Revision information	Composition / Information on Ingredients: Disclosure Overrides Composition/information on ingredients: Composition comments Handling and storage: Conditions for safe storage, including any incompatibilities Physical and chemical properties: Appearance Physical and chemical properties: Odor Stability and reactivity: Conditions to avoid Transport Information: Material Transportation Information

* Trademark of SUEZ. May be registered in one or more countries.

Safety Data Sheet

Kuriverter™ AC-427

Date of compilation: 2023-10-30

SECTION 1: Identification

1.1 Product identifier

Trade name **Kuriverter™ AC-427**

CAS number none

1.2 Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses Water treatment chemical
RO Reverse Osmosis

1.3 Details of the supplier of the safety data sheet

Avista Technologies, Inc.
140 Bosstick Blvd.
92069 San Marcos
United States

Telephone: +1 (760) 744 0536
e-mail: regulatory@avistatech.com
Website: AvistaMembraneSolutions.com

1.4	**Emergency telephone number**	Emergency Number (USA, Canada): 1 (800) 424-9300 (ChemTrec) Emergency Number (International): 1 (703) 527-3887 (International Collect)

1.5 Registration

CERTIFIED BY NSF INTERNATIONAL TO NSF/ANSI 60 AS A STANDARD DRINKING WATER TREATMENT CHEMICAL FOR USE IN REVERSE OSMOSIS SYSTEMS AT A MAXIMUM LEVEL OF 8 mg/L

SECTION 2: Hazard(s) identification

2.1 Classification of the substance or mixture

Classification acc. to OSHA "Hazard Communication Standard" (29 CFR 1910.1200)

Hazard class	*Category*	*Hazard statement*
acute toxicity (oral)	4	H302

For full text of abbreviations: see SECTION 16.

2.2 Label elements

Signal word warning

Pictograms

GHS07



Hazard statements

H302 Harmful if swallowed.

Precautionary statements

P264	Wash thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P301+P312	If swallowed: Call a poison center/doctor if you feel unwell.
P330	Rinse mouth.
P501	Dispose of contents/container to industrial combustion plant.

2.3 Other hazards

Hazards not otherwise classified

Contact with acids liberates toxic gas.
May be harmful in contact with skin (GHS category 5: acutely toxic - dermal).
May be harmful if inhaled (GHS category 5: acutely toxic - inhalation).

Results of PBT and vPvB assessment

This mixture does not contain any substances that are assessed to be a PBT or a vPvB.

SECTION 3: Composition/information on ingredients

3.1 Mixtures

Hazardous ingredients

Name of substance	*Identifier*	*Wt%*	*Classification acc. to GHS*
Metabisulfite salts	CAS No Proprietary EC No Proprietary	10 – < 20	Acute Tox. 4 / H302 Eye Dam. 1 / H318
Water	7732-18-5	70 – < 80	Not established
Sulfite salts	Proprietary	5 – < 10	Not established

For full text of abbreviations: see SECTION 16.
Specific chemical identity and concentration of some ingredients are protected as Trade Secret information.

Canada HMIRA Registration Number: 3510325 Registration date: 27 September 2023.

SECTION 4: First-aid measures

4.1 Description of first-aid measures

General notes

In case of unconsciousness place person in the recovery position. Never give anything by mouth.

Following inhalation

Provide fresh air.

Following skin contact

Rinse skin with water/shower. In all cases of doubt, or when symptoms persist, seek medical advice.

Following eye contact

Irrigate copiously with clean, fresh water for at least 15 minutes, holding the eyelids apart. Remove contact lenses, if present and easy to do. Continue rinsing.

Following ingestion

Rinse mouth with water (only if the person is conscious). Do NOT induce vomiting. Immediately call a doctor.

4.2 Most important symptoms and effects, both acute and delayed

Symptoms and effects are not known to date.

4.3 Indication of any immediate medical attention and special treatment needed

No specific antidote is known. Treatment of the symptoms.

SECTION 5: Fire-fighting measures

5.1 Extinguishing media

Suitable extinguishing media

Non-combustible. Coordinate firefighting measures to the fire surroundings. Water spray, Alcohol resistant foam, Fire extinguishing powder, Carbon dioxide (CO2)

Unsuitable extinguishing media

None

5.2 Special hazards arising from the substance or mixture

none

Hazardous combustion products

Sulfur oxides (SOx)

5.3 Advice for firefighters

Keep containers cool with water spray. In case of fire and/or explosion do not breathe fumes. Do not allow firefighting water to enter drains or water courses. Collect contaminated firefighting water separately. Fight fire with normal precautions from a reasonable distance.

Special protective equipment for firefighters

Use suitable breathing apparatus

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Aqueous solutions or powders that become wet produce extremely slippery conditions.

For non-emergency personnel

Follow emergency procedures such as the need to evacuate the danger area or to consult an expert. Remove persons to safety. Prevent skin contact. Avoid inhaling sprayed product. Aqueous solutions or powders that become wet produce extremely slippery conditions.

For emergency responders

Wear breathing apparatus if exposed to vapors/dust/aerosols/gases. Wear personal protective equipment/face protection. Aqueous solutions or powders that become wet produce extremely slippery conditions. Special danger of slipping by leaking/spilling product.

Suitable fabric for personal protective clothing

PE: polyethylene, NR: natural rubber, latex, CR: chloroprene (chlorobutadiene) rubber

6.2 Environmental precautions

Keep away from drains, surface and ground water. Retain contaminated washing water and dispose of it. If substance has entered a water course or sewer, inform the responsible authority. Disposal considerations: see section 13. Chemicals generally shouldn't reach surface water.

6.3 Methods and material for containment and cleaning up

Advice on how to contain a spill

Covering of drains

Advice on how to clean up a spill

Wipe up with absorbent material (e.g. cloth, fleece). Collect spillage: Absorbent material (e.g. sand, diatomaceous earth, acid binder, universal binder, sawdust, etc.)

Appropriate containment techniques

Neutralization techniques. Decontamination techniques. Use of adsorbent materials. Vacuuming techniques.

Equipment required for containment/clean-up

Approved industrial vacuum cleaner, Absorbent material (e.g. sand, diatomaceous earth, acid binder, universal binder, sawdust, etc.), Sweeping compounds (oil absorbing), Shovel, Drain seal, Collecting container, Protective gloves, Eye protection (e.g. protective goggles), Personal protective equipment: see section 8

Other information relating to spills and releases

Place in appropriate containers for disposal. Ventilate affected area.

6.4 Reference to other sections

Section 7: Handling and storage. See also to sections 8 and 13 of the safety data sheet.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Recommendations

Measures to prevent fire as well as aerosol and dust generation

Use local and general ventilation.

Handling of incompatible substances or mixtures

Do not mix with other chemicals.

Keep away from

Strong oxidizers, Other chemicals

Measures to protect the environment

Do not empty into drains; dispose of this material and its container at hazardous or special waste collection point.

Advice on general occupational hygiene

Wash hands after use. Do not eat, drink and smoke in work areas. Remove contaminated clothing and protective equipment before entering eating areas. Never keep food or drink in the vicinity of chemicals. Never place chemicals in containers that are normally used for food or drink. Keep away from food, drink and animal feedingstuffs.

7.2 Conditions for safe storage, including any incompatibilities

Consideration of other advice Store between 5°C and 40°C. Avoid freezing.

Specific designs for storage rooms or vessels

No special measures are necessary. Keep container tightly closed.

Packaging compatibilities

Keep only in original container.

7.3 Specific end use(s)

Water treatment chemical. RO Reverse Osmosis.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

National limit values

Occupational Exposure Limits: PELs, TLVs, etc

These information are not available.

8.2 Exposure controls

Appropriate engineering controls

General ventilation.

Individual protection measures (personal protective equipment)

Eye/face protection

Wear eye/face protection.

Skin protection

Chemical resistant protective clothing.

Hand protection

Wear suitable gloves. Chemical protection gloves are suitable, which are tested according to EN 374. Check leak-tightness/impermeability prior to use. For special purposes, it is recommended to check the resistance to chemicals of the protective gloves mentioned above together with the supplier of these gloves. In case of spray contact at least protection index 2 recommended, according to more than 30 min. penetration time (EN 374).
Layer thickness of gloves at least: 0.4 mm
In case of prolonged and intensive contact protection index 6 recommended, according to more than 480 min. penetration time (EN 374).
Layer thickness of gloves at least: 0.7 mm.

Type of material

PVC: polyvinyl chloride, PE: polyethylene, CR: chloroprene (chlorobutadiene) rubber, NBR: acrylonitrile-butadiene rubber, IIR: isobutene-isoprene (butyl) rubber, FKM: fluoro-elastomer

Breakthrough times of the glove material

Breakthrough times and swelling properties of the material must be taken into consideration

Other protection measures

Wash hands thoroughly after handling.

Respiratory protection

Not necessary under normal conditions and provided good general ventilation. In case of inadequate ventilation wear respiratory protection. Type : E (against acidic gases like sulfur dioxide or hydrogen chloride, color code: Yellow).

Environmental exposure controls

Disposal considerations: see section 13.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance

Physical state	liquid
Color	colorless - light yellow
Odor	like sulfur
Odor threshold	no data available

Other safety parameters

pH (value)	ca. 5 – 6.4 (25 °C)
Melting point/freezing point	ca. 0 – 2.2 °C at 1 atm
Initial boiling point and boiling range	not determined
Flash point	not applicable
Evaporation rate	not determined
Flammability (solid, gas)	not applicable
Upper/lower flammability or explosive limits	not determined
Vapor pressure	ca. 21 mmHg at 20 °C
Vapor density	this information is not available
Density	not determined
Relative density	1.1 – 1.35 at 25 °C (water = 1)

Solubility(ies)

Water solubility	miscible in any proportion

Partition coefficient

-n-Octanol/water (log KOW)	this information is not available
Auto-ignition temperature	not determined not applicable
Decomposition temperature	not determined
Viscosity	not determined
Explosive properties	none

Oxidizing properties	none

9.2 Other information

There is no additional information.

SECTION 10: Stability and reactivity

10.1 Reactivity

This material is not reactive under normal ambient conditions.

10.2 Chemical stability

The material is stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

10.3 Possibility of hazardous reactions

No known hazardous reactions.

10.4 Conditions to avoid

Incompatible materials.

10.5 Incompatible materials

Release of toxic materials with:

Acids

10.6 Hazardous decomposition products

Reasonably anticipated hazardous decomposition products produced as a result of use, storage, spill and heating are not known. Hazardous combustion products: see section 5.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Test data are not available for the complete mixture.

Classification procedure

The method for classification of the mixture is based on ingredients of the mixture (additivity formula).

Acute toxicity

Harmful if swallowed.

Acute toxicity of components of the mixture

Name of substance	*Exposure route*	*Endpoint*	*Value*	*Species*
Sulfite salts	oral	LD50	2,610 $^{mg}/_{kg}$	rat
Sulfite salts	inhalation: dust/ mist	LC50	>5.5 $^{mg}/_{l}$/4h	rat
Sulfite salts	dermal	LD50	>2,000 $^{mg}/_{kg}$	rat

Skin corrosion/irritation

Shall not be classified as corrosive/irritant to skin.

Serious eye damage/eye irritation

Shall not be classified as seriously damaging to the eye or eye irritant.

Respiratory or skin sensitization

Shall not be classified as a respiratory or skin sensitizer.

Germ cell mutagenicity

Shall not be classified as germ cell mutagenic.

Carcinogenicity

Shall not be classified as carcinogenic.

Reproductive toxicity

Shall not be classified as a reproductive toxicant.

Specific target organ toxicity - single exposure

Shall not be classified as a specific target organ toxicant (single exposure).

Specific target organ toxicity - repeated exposure

Shall not be classified as a specific target organ toxicant (repeated exposure).

Aspiration hazard

Shall not be classified as presenting an aspiration hazard.

SECTION 12: Ecological information

12.1 Toxicity

Shall not be classified as hazardous to the aquatic environment.

Aquatic toxicity (acute)

Endpoint	*Value*	*Species*	*Exposure time*
LC50	707 $^{mg}/_{l}$	daphnia	48 h
LC50	316 $^{mg}/_{l}$	freshwater fish	96 h

Aquatic toxicity (acute) of components of the mixture

Name of substance	*Endpoint*	*Exposure time*	*Value*	*Species*	*Source*
Sulfite salts	LC50	96 h	<464 $^{mg}/_{l}$	fish	European Chemicals Agency, http://echa.europa.eu/
Sulfite salts	EC50	48 h	89 $^{mg}/_{l}$	aquatic invertebrates	European Chemicals Agency, http://echa.europa.eu/
Sulfite salts	ErC50	72 h	43.8 $^{mg}/_{l}$	algae	European Chemicals Agency, http://echa.europa.eu/

12.2 Persistence and degradability

Data are not available.

12.3 Bioaccumulative potential

Data are not available.

12.4 Mobility in soil

Data are not available.

12.5 Results of PBT and vPvB assessment

Not applicable.

12.6 Other adverse effects

Data are not available.

Remarks

Do not empty into drains or surface water.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Do not empty into drains; dispose of this material and its container at hazardous or special waste collection point. Dispose of waste according to applicable legislation.

Waste treatment of containers/packages

Completely emptied packages can be recycled. Handle contaminated packages in the same way as the substance itself.

Remarks

Please consider the relevant national or regional provisions. Waste shall be separated into the categories that can be handled separately by the local or national waste management facilities. Avoid release to the environment.

SECTION 14: Transport information

14.1 UN number	**not subject to transport regulations**
14.2 UN proper shipping name	not relevant
Technical name (hazardous ingredients)	contains:
14.3 Transport hazard class(es)	
Class	-
14.4 Packing group	not relevant
14.5 Environmental hazards	non-environmentally hazardous acc. to the dangerous goods regulations

14.6 Special precautions for user

There is no additional information.

14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code

The cargo is not intended to be carried in bulk.

Information for each of the UN Model Regulations

Transport of dangerous goods by road or rail (49 CFR US DOT)

Not subject to transport regulations.

International Maritime Dangerous Goods Code (IMDG)

Not subject to IMDG.

International Civil Aviation Organization (ICAO-IATA/DGR)

Not subject to ICAO-IATA.

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations specific for the product in question

National regulations (United States)

Toxic Substance Control Act (TSCA) all ingredients are listed or exempt from listing

Superfund Amendment and Reauthorization Act (SARA TITLE III)

The List of Extremely Hazardous Substances and Their Threshold Planning Quantities (EPCRA Section 302, 304)

none of the ingredients are listed

Specific Toxic Chemical Listings (EPCRA Section 313)

none of the ingredients are listed

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

List of Hazardous Substances and Reportable Quantities (CERCLA section 102a) (40 CFR 302.4)

none of the ingredients are listed

Clean Air Act

none of the ingredients are listed

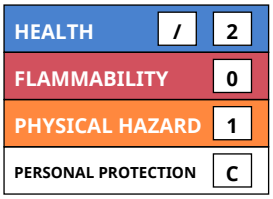
California Environmental Protection Agency (Cal/EPA): Proposition 65 - Safe Drinking Water and Toxic Enforcement Act of 1987

none of the ingredients are listed

Industry or sector specific available guidance(s)

NPCA-HMIS® III

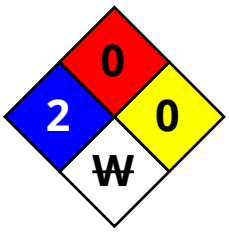
Hazardous Materials Identification System. American Coatings Association.



A "*" on the health line indicates a chronic health hazard is present.

NFPA® 704

National Fire Protection Association: Standard System for the Identification of the Hazards of Materials for Emergency Response (United States).



Additional information

Substance is listed in the following national inventories:
The contained substances are listed in the following national inventories:
AICS (Australia)
ASIA-PAC (Asia-Pacific Region)
DSL (Canada)
NDSL (Canada)
DSL/NDSL (Canada)
IECSC (China)
EINECS/ELINCS/NLP (Europe)
EINECS (European Union)
REACH (Europe)
ENCS, class 1 and 2 (MITI-inventory, Japan)
CSCL-ENCS (Japan)
ISHA-ENCS (Japan)
KECL (Republic of Korea)
INSQ (Mexico)
NZIoC (New Zealand)
PICCS (Philippines)
CICR (Turkey)
TCSI (Taiwan)
TSCA (United States)

15.2 Chemical Safety Assessment

Chemical Safety Assessment: No.

SECTION 16: Other information, including date of preparation or last revision

Abbreviations and acronyms

Abbr.	*Descriptions of used abbreviations*
49 CFR US DOT	49 CFR U.S. Department of Transportation
Acute Tox.	Acute toxicity
CAS	Chemical Abstracts Service (service that maintains the most comprehensive list of chemical substances)
DGR	Dangerous Goods Regulations (see IATA/DGR)
EC50	Effective Concentration 50 %. The EC50 corresponds to the concentration of a tested substance causing 50 % changes in response (e.g. on growth) during a specified time interval
EC No	The EC Inventory (EINECS, ELINCS and the NLP-list) is the source for the seven-digit EC number, an identifier of substances commercially available within the EU (European Union)
EINECS	European Inventory of Existing Commercial Chemical Substances

Abbr.	*Descriptions of used abbreviations*
ELINCS	European List of Notified Chemical Substances
ErC50	≡ EC50: in this method, that concentration of test substance which results in a 50 % reduction in either growth (EbC50) or growth rate (ErC50) relative to the control
Eye Dam.	Seriously damaging to the eye
Eye Irrit.	Irritant to the eye
GHS	"Globally Harmonized System of Classification and Labelling of Chemicals" developed by the United Nations
IATA	International Air Transport Association
IATA/DGR	Dangerous Goods Regulations (DGR) for the air transport (IATA)
ICAO	International Civil Aviation Organization
IMDG	International Maritime Dangerous Goods Code
LC50	Lethal Concentration 50%: the LC50 corresponds to the concentration of a tested substance causing 50 % lethality during a specified time interval
LD50	Lethal Dose 50 %: the LD50 corresponds to the dose of a tested substance causing 50 % lethality during a specified time interval
MARPOL	International Convention for the Prevention of Pollution from Ships (abbr. of "Marine Pollutant")
NLP	No-Longer Polymer
NPCA-HMIS® III	National Paint and Coatings Association: Hazardous Materials Identification System - HMIS® III, Third Edition
OSHA	Occupational Safety and Health Administration (United States)
PBT	Persistent, Bioaccumulative and Toxic
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals
vPvB	Very Persistent and very Bioaccumulative

Key literature references and sources for data

ECHA: European Chemicals Agency, http://echa.europa.eu/.

OSHA Hazard Communication Standard (HCS), 29 CFR 1910.1200.

Transport of dangerous goods by road or rail (49 CFR US DOT). International Maritime Dangerous Goods Code (IMDG). Dangerous Goods Regulations (DGR) for the air transport (IATA).

Classification procedure

Physical and chemical properties: The classification is based on tested mixture.
Health hazards, Environmental hazards: The method for classification of the mixture is based on ingredients of the mixture (additivity formula).

List of relevant phrases (code and full text as stated in section 2 and 3)

Code	*Text*
H302	Harmful if swallowed.
H318	Causes serious eye damage.

Disclaimer

This information is based upon the present state of our knowledge. This SDS has been compiled and is solely intended for this product.

SAFETY DATA SHEET
SPECTRUS* DT1404

1. Identification

Product identifier **SPECTRUS DT1404**

Other means of identification None.

Recommended use Chemical cleaning compound

Recommended restrictions None known.

Company/undertaking identification

Veolia WTS USA, Inc.
3600 Horizon Blvd.
Trevose, PA 19053
T 215 355 3300, F 215 953 5524

Emergency telephone

(800) 877 1940

2. Hazard(s) identification

Physical hazards Not classified.

Health hazards

Serious eye damage/eye irritation	Category 2B
Specific target organ toxicity, single exposure	Category 3 respiratory tract irritation

OSHA defined hazards Not classified.

Label elements



Signal word Warning

Hazard statement Causes eye irritation. May cause respiratory irritation.

Precautionary statement

Prevention Avoid breathing mist or vapor. Wash thoroughly after handling. Use only outdoors or in a well-ventilated area.

Response If inhaled: Remove person to fresh air and keep comfortable for breathing. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a poison center/doctor if you feel unwell. If eye irritation persists: Get medical advice/attention.

Storage Store in a well-ventilated place. Keep container tightly closed. Store locked up.

Disposal Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC) None known.

Supplemental information None.

3. Composition/information on ingredients

Mixtures

Components	CAS #	Percent
Sodium bisulphite	7631-90-5	40 - 60

Composition comments Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this SDS for our assessment of the potential hazards of this formulation.

4. First-aid measures

Inhalation Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell.

Skin contact Wash off with soap and water. Get medical attention if irritation develops and persists.

Eye contact Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention if irritation develops and persists.

Ingestion Rinse mouth. Get medical attention if symptoms occur.

Most important symptoms/effects, acute and delayed Irritation of eyes. Exposed individuals may experience eye tearing, redness, and discomfort. May cause respiratory irritation.

Indication of immediate medical attention and special treatment needed Provide general supportive measures and treat symptomatically. Keep victim under observation. Symptoms may be delayed.

General information If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire-fighting measures

Suitable extinguishing media Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2).

Unsuitable extinguishing media Do not use water jet as an extinguisher, as this will spread the fire.

Specific hazards arising from the chemical During fire, gases hazardous to health may be formed.

Special protective equipment and precautions for firefighters Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask.

Fire fighting equipment/instructions In case of fire and/or explosion do not breathe fumes. Use standard firefighting procedures and consider the hazards of other involved materials. Move containers from fire area if you can do so without risk. Cool containers / tanks with water spray.

Specific methods Use standard firefighting procedures and consider the hazards of other involved materials.

General fire hazards No unusual fire or explosion hazards noted.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Wear appropriate protective equipment and clothing during clean-up. Avoid breathing mist or vapor. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained.

Methods and materials for containment and cleaning up Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. Absorb in vermiculite, dry sand or earth and place into containers. Following product recovery, flush area with water.

Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.

Never return spills to original containers for re-use.

Environmental precautions Avoid discharge into drains, water courses or onto the ground. Water contaminated with this product may be sent to a sanitary sewer treatment facility, or a permitted waste treatment facility, in accordance with any local agreements.

7. Handling and storage

Precautions for safe handling Vent carefully before opening. Sulfur dioxide can be formed during the normal use and handling of this product. Avoid breathing mist or vapor. Avoid contact with eyes. Avoid prolonged exposure. Provide adequate ventilation. Wear appropriate personal protective equipment. Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities Store in original tightly closed container. Store containers closed when not in use. Protect from freezing. If frozen, thaw completely and mix thoroughly prior to use. Shelf life 270 days. Store locked up.

8. Exposure controls/personal protection

Occupational exposure limits

US. ACGIH Threshold Limit Values

Components	Type	Value
Sodium bisulphite (CAS 7631-90-5)	TWA	5 mg/m3

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
Sodium bisulphite (CAS 7631-90-5)	TWA	5 mg/m3

Biological limit values No biological exposure limits noted for the ingredient(s).

Appropriate engineering controls Provide adequate ventilation. Provide eyewash station. Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Individual protection measures, such as personal protective equipment

Eye/face protection Wear safety glasses with side shields (or goggles).

Skin protection

Hand protection Wear appropriate chemical resistant gloves. The choice of an appropriate glove does not only depend on its material but also on other quality features and is different from one producer to the other. Suitable gloves can be recommended by the glove supplier. Glove selection must take into account any solvents and other hazards present.

Other Wear appropriate chemical resistant clothing.

Respiratory protection In case of insufficient ventilation, wear suitable respiratory equipment. A respiratory protection program that meets OSHA's 29 CFR 1910.34 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant a respirator's use.

Thermal hazards Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance Liquid

Physical state Liquid.

Form Not available.

Color Yellowish to green

Odor Mild

Odor threshold Not available.

pH (concentrated product) 3.8 Neat

Melting point/freezing point 39 °F (4 °C)

Initial boiling point and boiling range Not available.

Flash point > 199 °F (> 93 °C) P-M(CC)

Evaporation rate Slower than Ether

Flammability (solid, gas) Not applicable.

Upper/lower flammability or explosive limits

Explosive limit - lower (%) Not available.

Explosive limit - upper (%) Not available.

Vapor pressure 18 mmHg

Vapor pressure temp. 70 °F (21 °C)

Vapor density < 1

Relative density 1.36

Relative density temperature 70 °F (21 °C)

Solubility(ies)

Solubility (water)	100 %
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	18 mPa.s
Viscosity temperature	70 °F (21 °C)

Other information

Explosive properties	Not explosive.
Oxidizing properties	Not oxidizing.
pH in aqueous solution	4 (5% Solution)
Pour point	32 °F (0 °C)
VOC	0 % ESTIMATED

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Avoid temperatures exceeding the flash point. Contact with incompatible materials.
Incompatible materials	Avoid contact with strong oxidizers. and Amines.
Hazardous decomposition products	No hazardous decomposition products are known.

11. Toxicological information

Information on likely routes of exposure

Inhalation	May cause irritation to the respiratory system. Prolonged inhalation may be harmful.
Skin contact	No adverse effects due to skin contact are expected.
Eye contact	Causes eye irritation.
Ingestion	Expected to be a low ingestion hazard.
Symptoms related to the physical, chemical and toxicological characteristics	Irritation of eyes. Exposed individuals may experience eye tearing, redness, and discomfort. May cause respiratory irritation.

Information on toxicological effects

Acute toxicity May cause respiratory irritation.

Product	Species	Test Results
SPECTRUS DT1404		
Acute		
Dermal		
LD50	Rabbit	> 5000 mg/kg (Calculated according to GHS additivity formula)
Inhalation		
Mist		
LC50	Rat	> 5.5 mg/l, 4 Hours (Calculated according to GHS additivity formula)
Oral		
LD50	Rat	3550 mg/kg (Calculated according to GHS additivity formula)

Components	Species	Test Results
Sodium bisulphite (CAS 7631-90-5)		
Acute		
Dermal		
LD50	Rabbit	> 2000 mg/kg

Components	Species	Test Results
Inhalation		
LC50	Rat	> 5.5 mg/l, 4 Hour
Oral		
LD50	Rat	1420 mg/kg

Skin corrosion/irritation Prolonged skin contact may cause temporary irritation.

Serious eye damage/eye irritation Causes eye irritation.

Respiratory or skin sensitization

Respiratory sensitization This product is not expected to cause respiratory sensitization. Not a respiratory sensitizer.

Skin sensitization This product is not expected to cause skin sensitization.

Germ cell mutagenicity No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

Carcinogenicity Not classified.

IARC Monographs. Overall Evaluation of Carcinogenicity

Sodium bisulphite (CAS 7631-90-5) 3 Not classifiable as to carcinogenicity to humans.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not listed.

US. National Toxicology Program (NTP) Report on Carcinogens

Not listed.

Reproductive toxicity This product is not expected to cause reproductive or developmental effects.

Specific target organ toxicity - single exposure May cause respiratory irritation.

Specific target organ toxicity - repeated exposure Not classified.

Aspiration hazard Based on available data, the classification criteria are not met. Not an aspiration hazard.

Chronic effects Prolonged inhalation may be harmful.

12. Ecological information

Ecotoxicity

Product		Species	Test Results
Aquatic			
Algae	EC50	Scenedesmus (algae)	48 mg/l, 72 hour
Crustacea	LC50	Daphnia magna	175 mg/l, 48 hour
	NOEL	Daphnia magna	125 mg/l, 48 hour
Fish	LC50	Fathead Minnow	175 mg/l, 96 hour
		Rainbow Trout	330 mg/l, 96 hour (pH adjusted)
	NOEL	Fathead Minnow	125 mg/l, 96 hour
		Rainbow Trout	125 mg/l, 96 hour (pH adjusted)

Persistence and degradability

- COD (mgO2/g) 165

Bioaccumulative potential No data available.

Mobility in soil No data available.

Other adverse effects Not available.

13. Disposal considerations

Disposal instructions Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Dispose of contents/container in accordance with local/regional/national/international regulations.

Local disposal regulations Dispose in accordance with all applicable regulations.

Hazardous waste code The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions). Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner.
Contaminated packaging	Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

UN number	UN3082
UN proper shipping name	Environmentally hazardous substance, liquid, n.o.s. (SODIUM BISULFITE), RQ(SODIUM BISULFITE)
Transport hazard class(es)	
Class	9
Subsidiary risk	-
Packing group	III
Special precautions for user	Not available.
ERG number	171

Some containers may be exempt from Dangerous Goods/Hazmat Transport Regulations, please check BOL for exact container classification.

IATA

Not regulated as dangerous goods.

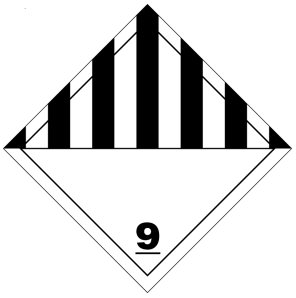
IMDG

UN number	UN3082
UN proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (SODIUM BISULFITE), RQ(SODIUM BISULFITE)
Transport hazard class(es)	
Class	9
Subsidiary risk	-
Packing group	III
Environmental hazards	
Marine pollutant	No.
EmS	F-A, S-F
Special precautions for user	Not available.

DOT



IMDG



15. Regulatory information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Toxic Substances Control Act (TSCA)

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Sodium bisulphite (CAS 7631-90-5) Listed.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not listed.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical Yes

Classified hazard categories Serious eye damage or eye irritation
Specific target organ toxicity (single or repeated exposure)

SARA 313 (TRI reporting)

Not regulated.

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

sulphur dioxide (CAS 7446-09-5)

Safe Drinking Water Act (SDWA) Contains component(s) regulated under the Safe Drinking Water Act.

Inventory status

Country(s) or region	Inventory name	On inventory (yes/no)*
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

US state regulations

California Proposition 65



WARNING: WARNING: This product can expose you to sulphur dioxide, which is known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

US - California Proposition 65 - CRT: Listed date/Carcinogenic substance

No ingredient listed.

US - California Proposition 65 - CRT: Listed date/Developmental toxin

sulphur dioxide (CAS 7446-09-5) Listed: July 29, 2011

US - California Proposition 65 - CRT: Listed date/Female reproductive toxin

No ingredient listed.

US - California Proposition 65 - CRT: Listed date/Male reproductive toxin

No ingredient listed.

16. Other information, including date of preparation or last revision

Issue date Nov-19-2014

Revision date Feb-11-2023

Version # 3.1

NFPA ratings Health: 2
Flammability: 0
Instability: 0

NFPA ratings



List of abbreviations

CAS: Chemical Abstract Service Registration Number
TWA: Time Weighted Average
STEL: Short Term Exposure Limit
LD50: Lethal Dose, 50%
LC50: Lethal Concentration, 50%
NOEL: No Observed Effect Level
COD: Chemical Oxygen Demand
BOD: Biochemical Oxygen Demand
TOC: Total Organic Carbon
IATA: International Air Transport Association
IMDG: International Maritime Dangerous Goods Code
ACGIH: American Conference of Governmental Industrial Hygienists
TSRN indicates a Trade Secret Registry Number is used in place of the CAS number.

References:

No data available

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Revision information

Exposure controls/personal protection: Appropriate engineering controls
Disposal considerations: Contaminated packaging
Disposal considerations: Disposal instructions
Other information, including date of preparation or last revision: Prepared by

Prepared by

This SDS has been prepared by Veolia Water Technologies & Solutions' Regulatory Department (1-215-355-3300).

* Trademark of Veolia. May be registered in one or more countries.

Safety Data Sheet

according to 29 CFR 1910.1200 and 1907/2006/EC, Article 31

Date Printed: 02/24/2020 Version 4 Date Reviewed: 02/24/2020

* Section 1: Identification of the Substance/Mixture and of the Company/Undertaking

· **Product Identifier:** **Sodium Hypochlorite Solution (10%, 12.5%, 12.5% MUP, 15.5%)**

· **Synonyms:** Bleach

· **Product Use:**
Cleaning agent/ Cleaner
Chlorination reagent
Disinfectant

· **Manufacturer/Supplier:**
Skyhawk Chemicals, Inc.
701 N Post Oak Rd., Ste. 540
Houston, TX 77024
713-957-2200
order@skyhawkchemicals.com

· **Emergency Telephone Number:**
In case of a chemical emergency, contact CHEMTREC (24 hrs) at:
+1 (800) 424-9300 (United States, Canada, Puerto Rico, Virgin Islands)
Acct# CCN721839

* Section 2: Hazards Identification

· **Hazard Classification:**



GHS09

Aquatic Acute 2 H401 Toxic to aquatic life.



GHS05

Skin Corr. 1A H314 Causes severe skin burns and eye damage.
Eye Dam. 1 H318 Causes serious eye damage.

· **Signal Word:** DANGER

· **Precautionary Statements:**

P260	Do not breathe mist/vapors/spray.
P264	Wash thoroughly after handling.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P301+P330+P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303+P361+P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304+P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P315	Get immediate medical attention.
P405	Store locked up.
P501	Dispose of contents/container in accordance with local regulations.

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(Contd. from Page 1)

· **Additional Precautionary Statements for U.S.A. and Canada:**
P363 Wash contaminated clothing before reuse.

· **NFPA Ratings (scale 0 - 4):**



Health = 3
Fire = 0
Reactivity = 1

· **Additional Information:**
If you do not understand the hazards or safety precautions described in this data sheet, contact your supervisor or safety administrator before handling this product.

Section 3: Composition/Information on Ingredients

· **Dangerous Components:**
· **CAS No. Description**

7681-52-9 sodium hypochlorite, solution 10-20%
Skin Corr. 1B, H314; Aquatic Acute 1, H400

1310-73-2 sodium hydroxide ≤5%
Skin Corr. 1A, H314; Acute Tox. 4, H302

*

Section 4: First Aid Measures

· **General information:**
Rescue personnel must wear appropriate protective equipment during removal of victims from contaminated areas.

· **After Inhalation:**
Remove victim to fresh air.
Administer oxygen if breathing is difficult.
Administer artifical respiration if breathing has stopped.
Onset of symptoms may be delayed up to 48 hours.
Get immediate medical attention.

· **After Skin Contact:**
Remove contaminated clothing and shoes. Wash affected area with soap and water.
Use caution to avoid spreading contamination while washing.
Delayed skin damage is possible if product is not completely washed off.
Get immediate medical attention.

· **After Eye Contact:**
In case of accidental contact, immediately flush eyes with water.
Hold eyelids open to ensure adequate flushing.
Remove contact lenses, if present and easy to do. Continue rinsing.
Get immediate medical attention.

· **After Swallowing:**
Rinse mouth.
Administer 1-2 glasses of water to dilute ingested material.
Do NOT induce vomiting.

(Contd. on Page 3)

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(Contd. from Page 2)

Never give anything by mouth to an unconscious person.
Get immediate medical attention.

· **Information for Doctor:** Probable mucosal damage may contraindicate the use of gastric lavage.

· **Most Important Symptoms and Effects:** No further relevant information available.

Section 5: Firefighting Measures

· **Suitable Extinguishing Agents:**
CO2, extinguishing powder or water spray. Fight larger fires with water spray.

· **Special Firefighting Hazards:**
Decomposes when heated. Decomposition products may cause containers to rupture or explode. May react vigorously with organic materials. Depending on temperature and concentration, decomposition products may include hypochlorous acid, sodium oxide, chlorine gas, sodium chlorate and oxygen. Sodium chlorate crystals may cause fire or explosion if subjected to friction or impact.

· **Protective Equipment:**
In the event of a fire, wear a NIOSH (USA) or CEN (EU) approved self-contained breathing apparatus (SCBA) and full protective clothing.

· **Additional Information:** Evacuate all non-essential personnel from the danger area.

Section 6: Accidental Release Measures

· **Personal Precautions, Protective Equipment and Emergency Procedures:**
In case of a spill or other accidental release of this material, contact your supervisor, safety administrator, or emergency response team immediately.
Restrict access to keep out unauthorized or unprotected personnel.
Stay upwind of spilled material.
Wear appropriate personal protective equipment during all clean-up activities. See Section 8 for more information.
Avoid inhalation and direct contact.
All clean-up personnel must be properly trained.

· **Environmental Precautions:**
Keep spilled material out of sewage/drainage systems and waterways.
This product contains a U.S. EPA Reportable Quantity (RQ) substance. If amounts exceeding the Reportable Quantity are released, notification of the National Response Center +1 (800) 424-8802 is required. See Section 15 for more information.

· **Methods for Containment and Clean-Up:**
Ensure adequate ventilation.
Secure the source of the leak if conditions are safe.
Use neutralizing agent.
Collect using an appropriate absorbent material such as clay or sand.
Place waste in an appropriate container for disposal.
Use care during clean-up to avoid exposure to the material and injury from broken containers.

Section 7: Handling and Storage

· **Precautions for Safe Handling:**
Ensure adequate ventilation.

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Avoid inhalation and direct contact.
Wear appropriate personal protective equipment.
Do not mix with water without dilution and agitation to prevent potentially violent reaction.
Do not mix with acids, ammonia, alcohol, ethers or hydrocarbons.

· **Protection Against Fires and Explosions:** No special measures required.

· **Conditions for Safe Storage:**
Store in closed, properly labeled containers.
Protect containers from heat, physical damage, ignition sources and incompatible materials.
Have emergency equipment for fires and spills readily available.

· **Additional Information:**
If you do not understand the hazards or safety precautions described in this data sheet, contact your supervisor or safety administrator before handling this product.

Section 8: Exposure Controls/Personal Protection

· **Occupational Exposure Limits:**

7681-52-9 sodium hypochlorite, solution
WEEL (USA) Short-Term Value: 2 mg/m³

1310-73-2 sodium hydroxide
PEL (USA) Eight-Hour Value: 2 mg/m³
REL (USA) Ceiling Limit Value: 2 mg/m³
TLV (USA) Ceiling Limit Value: 2 mg/m³

· **Exposure Controls:**
Use local exhaust ventilation during open transfers.
Check ventilation for proper operation before starting work.
Ensure emergency eyewash and shower facilities are available.

· **General Protective and Hygienic Measures:**
Wash thoroughly after handling.
Use only outdoors or in a well-ventilated area.
Follow all safety precautions, posted signs and warnings.
Do not inhale gases / fumes / aerosols.
Avoid contact with the eyes and skin.

· **Respiratory Protection:**
An industrial hygiene risk assessment is required to determine appropriate respiratory protection.
An air-purifying respirator may be appropriate under limited exposure conditions.
Perform a respirator fit/seal check after donning.
Protection provided by air-purifying respirators is limited.
Wear a self-contained breathing apparatus (SCBA) if there is a potential for uncontrolled release, exposure levels are not known, or in other circumstances where air-purifying respirators may not provide adequate protection.

· **Hand Protection:**



Chemical resistant gloves.

Work gloves may be worn over chemical resistant gloves.

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Wear a second pair of chemical resistant gloves for added protection.
Tape gloves to coveralls or suit, if worn.
Use caution when removing gloves to avoid exposure to hazardous chemicals.

· **Eye/Face Protection:**



Safety glasses with side shields.

Splash goggles/mono-goggles recommended during tasks with high potential for exposure.

· **Body Protection:**
Lab coat recommended for small scale operations.
Tasks with a high probability for splashing or skin contact may require:
Chemical resistant coveralls or apron.
Heavy duty chemical resistant boots.

· **Additional Information:**
If unusual exposures are expected, an industrial hygiene review of work practices, engineering controls and personal protective equipment is recommended.

Section 9: Physical/Chemical Properties

· **Form:**	Liquid
· **Color:**	Light yellow
· **Odor:**	Pungent
· **Odor Threshold:**	Not determined.
· **pH Value at 20 °C (68 °F):**	12.5
· **Melting Point:**	Not determined.
· **Boiling Point:**	Not determined.
· **Flash Point:**	Not applicable.
· **Autoignition Temperature:**	Not determined.
· **Decomposition Temperature:**	Not determined.
· **Lower Explosive Limit (LEL):**	Not determined.
· **Upper Explosive Limit (UEL):**	Not determined.
· **Vapor Pressure at 20 °C (68 °F):**	20 hPa (15 mm Hg)
· **Density:**	Not determined.
· **Vapor Density at 20 °C (68 °F):**	2.6 g/cm³ (21.7 lbs/gal) (air = 1)
· **Evaporation Rate:**	Not determined.
· **Solubility in Water:**	Not determined.
· **Partition Coefficient (n-octanol/water):**	Not determined.

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· **Viscosity:** Not determined.

*
Section 10: Stability and Reactivity

· **Chemical Stability/Reactivity:** Stable if used and stored according to the specifications listed below.

· **Conditions to Avoid:**
Decomposes with age.
Keep away from heat, sparks and open flames.
Keep away from incompatible materials.
Do not mix with water without dilution and agitation to prevent potentially violent reaction.
Do not mix with acids, ammonia, alcohol, ethers or hydrocarbons.

· **Possibility of Hazardous Reactions/Incompatible Materials:**
Keep away from strong acids and bases.
Keep away from strong oxidizers.
Contact with acids releases toxic gases.

· **Hazardous Decomposition Products:**
Decomposes when heated. Decomposition products may cause containers to rupture or explode. May react vigorously with organic materials. Depending on temperature and concentration, decomposition products may include hypochlorous acid, sodium oxide, chlorine gas, sodium chlorate and oxygen. Sodium chlorate crystals may cause fire or explosion if subjected to friction or impact.

· **Additional Information:**
Expiration Date for 15.5% (High Strength) Sodium Hypochlorite: Use within 3 days of manufacture or withinin minimum assay of 15/3% sodium hypochlorite. If product is not within minimum assay, return to manufacturer.

Section 11: Toxicological Information

· **Acute Toxicity:** No data available.

· **Relevant LD/LC50 Values:**

7681-52-9 sodium hypochlorite, solution
Oral LD50 5800 mg/kg (mouse)

1310-73-2 sodium hydroxide
Oral LD50 2000 mg/kg (rat)

· **Skin Irritation:**
Causes severe skin burns and eye damage.

· **Eye Irritation:**
Causes severe skin burns and eye damage.
Causes serious eye damage.

· **Respiratory Irritation:** May cause respiratory irritation.

· **Sensitization/Allergic Reaction:** No data available.

· **Subchronic/Chronic Toxicity:** No data available.

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Section 12: Ecological Information

· **Aquatic Toxicity:** Toxic to aquatic life.

· **Persistence and Degradability:** No data available.

· **Bioaccumulative Potential:** No data available.

Section 13: Disposal Considerations

· **Disposal Instructions:**
Keep spilled material out of sewage/drainage systems and waterways.
Maximize product recovery for reuse or recycling.
Waste materials may be hazardous due to the pH/corrosivity.
Dispose of waste in accordance with applicable laws and regulations.

· **Additional Information:**
It is the responsiblity of the product user to determine at the time of disposal whether a material containing or derived from this product should be classified as hazardous waste.

Section 14: Transport Information

· **UN Number:**

· **DOT, ADR, IMDG, IATA** UN1791

· **UN Proper Shipping Name:**

· **DOT:** RQ Hypochlorite solutions

· **ADR:** 1791 Hypochlorite solutions

· **IMDG:** HYPOCHLORITE SOLUTION, MARINE POLLUTANT

· **IATA:** HYPOCHLORITE SOLUTION

· **Transport Hazard Class(es):**

· **DOT:**



· **Class:** 8 Corrosive substances

· **Label:** 8

· **ADR, IMDG**



· **Class:** 8 Corrosive substances

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· **Label:** 8

· **IATA:**



· **Class:** 8 Corrosive substances

· **Label:** 8

· **Packing Group:**

· **DOT, ADR, IMDG, IATA** III

· **Environmental Hazards:**

· **Marine Pollutant:** Yes
Symbol (fish and tree)

· **Special Marking (ADR):** Symbol (fish and tree)

· **Special Precautions:** Warning: Corrosive substances

· **EMS Number:** F-A,S-B

· **Segregation Groups:** Hypochlorites

· **Additional Information:**

· **DOT:**

· **Remarks:** This product contains a U.S. EPA Reportable Quantity (RQ) substance. If amounts exceeding the Reportable Quantity are released, notification of the National Response Center +1 (800) 424-8802 is required. See Section 15 for more information.
.
Shippers must consult transportation regulations for packaging instructions, quantity limitations and other regulatory information applicable to the desired mode of transport.

Section 15: Regulatory Information

· **U.S. Superfund Amendments & Reauthorization Act (SARA) 355 (Extremely Hazardous Substances):**
None of the ingredients are listed.

· **U.S. Superfund Amendments & Reauthorization Act (SARA) 313 (Specific Toxic Chemical Listings):**
None of the ingredients is listed.

· **U.S. Environmental Protection Agency Reportable Quantity:**
7681-52-9 sodium hypochlorite, solution: 100 lbs.

1310-73-2 sodium hydroxide: 1,000 lbs.

· **U.S. Toxic Substances Control Act (TSCA):**
7681-52-9 sodium hypochlorite, solution

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(Contd. from Page 8)

1310-73-2 sodium hydroxide

· **California Proposition 65 Carcinogens:**

None of the ingredients is listed.

· **Canadian Domestic Substances List (DSL):**

All ingredients are listed.

· **Canadian Ingredient Disclosure List (limit 0.1%)**

None of the ingredients are listed.

· **Canadian Ingredient Disclosure List (limit 1%):**

All ingredients are listed.

· **Container Labeling:** The product is classified and labeled according to the CLP regulation.

· **Hazard Pictograms:**



GHS09



GHS05

· **Signal Word:** DANGER

· **Hazard Statements:**

H401 Toxic to aquatic life.
H314 Causes severe skin burns and eye damage.

· **Precautionary Statements:**

P260	Do not breathe mist/vapors/spray.
P264	Wash thoroughly after handling.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P301+P330+P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303+P361+P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304+P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P315	Get immediate medical attention.
P405	Store locked up.
P501	Dispose of contents/container in accordance with local regulations.

· **Additional Precautionary Statements for U.S.A. and Canada:** See Section 2.

Section 16: Other Information

This information is furnished without warranty, expressed or implied, except that it is accurate to the best knowledge of Skyhawk Chemicals, Inc. at the time it was prepared. Skyhawk Chemicals, Inc. does not assume any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may

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present unknown hazards and should be used with caution. Although certain hazards are described herein, Skyhawk Chemicals, Incand its subsidiaries cannot guarantee that these are the only hazards that exist. Skyhawk Chemicals, Inc assumes no legal responsibility for loss, damage or expense arising out of, or in any way connected with, the handling, storage, use or disposal of this product.

· **Department Issuing Safety Data Sheet:** Corporate Environment, Health & Safety

· **Sources & References:**

* - Indicates that data has been updated from the previous version.
This Safety Data Sheet conforms to regulation 1907/2006/EC (REACH). This product has been classified in accordance with European CLP regulations (1272/2008/EC) and the U.S. Hazard Communication standard (29 CFR 1910.1200).

SAFETY DATA SHEET

according to 29 CFR 1910.1200(g)

Sulfuric Acid 93-98 Percent

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY

Product Name:	Sulfuric Acid 93-98 Percent
Product Code:	SA93/98
Formula:	H2SO4
Synonyms:	Oil of Vitriol
Intended Use of the Product:	Inorganic Acid. For industrial use only.
Supplier:	Skyhawk Chemicals, Inc 701 N Post Oak Rd Ste 500 Houston, TX 77024 Phone:713-957-2200 / 800-535-2847 Fax: 713-957-0345 order@skyhawkchemicals.com
Emergency number:	CHEMTREC 800-424-9300 ACCT#: CCN721839

SECTION 2: HAZARDS IDENTIFICATION

Classification (GHS-US):	Skin Corr. 1A H314 Eye Dam. 1 H318 Carc. 1A H350
Label Elements: GHS-US Labeling Hazard Pictograms (GHS-US)	 GHS05 GHS08
Signal Word (GHS-US)	Danger.
Hazard Statements (GHS-US)	H314 - Causes severe skin burns and eye damage. H318 - Causes serious eye damage. H350 - May cause cancer (Inhalation).
Precautionary Statements (GHS-US)	P201 - Obtain special instructions before use. P202 - Do not handle until all safety precautions have been read and understood. P260 - Do not breathe fume, mist, vapors, spray. P264 - Wash hands and forearms thoroughly after handling. P280 - Wear eye protection, face protection, protective gloves, protective clothing. P301+P330+P331 - IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. P303+P361+P353 - IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. P304+P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing. P305+P351+P338 - If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P308+P313 - If exposed or concerned: Get medical advice/attention. P310 - Immediately call a POISON CENTER or doctor. P321 - Specific treatment (see Section 4). P363 - Wash contaminated clothing before reuse.

SECTION 2: HAZARDS IDENTIFICATION (CONTINUED)

Precautionary Statements (GHS-US)	P405 - Store locked up. P501 - Dispose of contents/container according to local, regional, national, territorial, provincial, and international regulations.
Other Hazards:	Not available
Unknown Acute Toxicity (GHS-US):	Not available

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Mixture

Name	Product identifier	% (w/w)	Classification (GHS-US)
Sulfuric acid	(CAS No) 7664-93-9	93-98	Skin Corr. 1A, H314 Eye Dam. 1, H318 Carc. 1A, H350
Water	(CAS No) 7732-18-5	7-2	Not classified

Full text of H-phrases: see section 16

SECTION 4: FIRST AID MEASURES

General: Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label if possible).

Inhalation:	Using proper respiratory protection, immediately move the exposed person to fresh air. Keep at rest and in a position comfortable for breathing. Give oxygen or artificial respiration if necessary. Seek immediate medical advice.
Skin Contact:	Remove contaminated clothing. Drench affected area with water for at least 15 minutes. Immediately call a POISON CENTER or doctor/physician. Wash contaminated clothing before reuse.
Eye Contact:	Immediately rinse with water for a prolonged period (at least 15 minutes) while holding the eyelids wide open. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/physician.
Ingestion:	If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label. Rinse mouth.

Most Important Symptoms and Effects Both Acute and Delayed

General: Corrosive. Causes burns.

Inhalation:	Causes severe respiratory irritation if inhaled. Symptoms may include: burning of nose and throat, constriction of airway, difficulty breathing, shortness of breath, bronchial spasms, chest pain, and pink frothy sputum. May cause pulmonary edema. Symptoms may be delayed.
Skin Contact:	Contact may cause immediate severe irritation progressing quickly to chemical burns. Highly corrosive to skin.
Eye Contact:	Contact may cause immediate severe irritation progressing quickly to chemical burns. Can cause blindness.
Ingestion:	May cause burns or irritation of the linings of the mouth, throat, and gastrointestinal tract. Swallowing a small quantity of this material will result in serious health hazard.
Chronic Symptoms:	Prolonged and frequent exposure through inhalation may cause cancer.

SECTION 4: FIRST AID MEASURES (CONTINUED)

Indication of Any Immediate Medical Attention and Special Treatment Needed
If medical advice is needed, have product container or label at hand.

SECTION 5: FIREFIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media: Use extinguishing media appropriate for surrounding fire.
Unsuitable Extinguishing Media: Do not get water inside containers. Do not apply water stream directly at source of leak. A direct water stream will cause violent splattering and generation of heat.

Special Hazards Arising From the Substance or Mixture

Fire Hazard: Not flammable but reacts exothermically with incompatibles, releasing heat and increasing risk of fire or explosion.
Explosion Hazard: Risk of fire and explosion on contact with combustible substances or reducing agents.
Reactivity: Reacts exothermically with (some) bases. Violent exothermic reaction with water: release of corrosive gases/vapors.

Advice for Firefighters

Precautionary Measures Fire: Exercise caution when fighting any chemical fire.
Firefighting Instructions: Do not get water inside containers. Do not apply water stream directly at source of leak.
Protection During Firefighting: Do not enter fire area without proper protective equipment, including respiratory protection.
Hazardous Combustion Products: Sulphur oxides.
Other information: Do not allow run-off from fire fighting to enter drains or water courses.

Reference to Other Sections:

Refer to section 9 for flammability properties.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures

General Measures: Do not get in eyes, on skin, or on clothing. Do not breathe vapor or mist.

For Non-Emergency Personnel

Protective Equipment: Use recommended respiratory protection. Wear suitable protective clothing, gloves and eye/face protection.
Emergency Procedures: Stop leak if safe to do so. Eliminate ignition sources. Evacuate unnecessary personnel.

For Emergency Personnel

Protective Equipment: Use recommended respiratory protection. Wear suitable protective clothing, gloves and eye/face protection.
Emergency Procedures: Stop leak if safe to do so. Eliminate ignition sources. Ventilate area.

Environmental Precautions

Do not allow to enter drains or water courses. Avoid release to the environment.

Methods and Material for Containment and Cleaning Up

For Containment: Liquid spill: neutralize with powdered limestone or sodium bicarbonate. Contain any spills with dikes or absorbents to prevent migration and entry into sewers or streams. Do not absorb with combustible material such as: saw dust or cellulosic material.

SECTION 6: ACCIDENTAL RELEASE MEASURES (CONTINUED)

Methods for Cleaning Up: Ventilate area. Collect absorbed material and place into a sealed, labelled container for proper disposal.

Reference to Other Sections

See section 8, Exposure Controls and Personal Protection

SECTION 7: HANDLING AND STORAGE

Precautions for Safe Handling

Hygiene Measures: Handle in accordance with good industrial hygiene and safety procedures. Wash hands and other exposed areas with mild soap and water before eating, drinking, or smoking and again when leaving work.

Conditions for Safe Storage, Including Any Incompatibilities

Technical Measures: Ensure all national/local regulations are observed.

Storage Conditions: Store in original container or corrosive resistant and/or lined container. May be stored in stainless steel containers. Store in an area having corrosion resistant concrete floor. Store in a dry, cool and well-ventilated place. Store away from other materials. **Incompatible**

Materials: Reducing agents, organic materials, alkalis, moisture.

Specific End Use(s)

Inorganic Acid. For industrial use only.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

Sulfuric acid (7664-93-9)

Mexico	OEL TWA (mg/m³)	1 mg/m³
USA ACGIH	ACGIH TWA (mg/m³)	0.2 mg/m³
USA OSHA	OSHA PEL (TWA) (mg/m³)	1 mg/m³
USA NIOSH	NIOSH REL (TWA) (mg/m³)	1 mg/m³
USA IDLH	US IDLH (mg/m³)	15 mg/m³
Alberta	OEL STEL (mg/m³)	3 mg/m³
Alberta	OEL TWA (mg/m³)	1 mg/m³
British Columbia	OEL TWA (mg/m³)	0.2 mg/m³ (Thoracic, contained in strong inorganic acid mists)
Manitoba	OEL TWA (mg/m³)	0.2 mg/m³
New Brunswick	OEL STEL (mg/m³)	3 mg/m³
New Brunswick	OEL TWA (mg/m³)	1 mg/m³
Newfoundland & Labrador	OEL TWA (mg/m³)	0.2 mg/m³
Nova Scotia	OEL TWA (mg/m³)	0.2 mg/m³
Nunavut	OEL STEL (mg/m³)	3 mg/m³
Nunavut	OEL TWA (mg/m³)	1 mg/m³
Northwest Territories	OEL STEL (mg/m³)	3 mg/m³

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION (CONTINUED)

Sulfuric acid (7664-93-9)

Northwest Territories	OEL TWA (mg/m³)	1 mg/m³
Ontario	OEL TWA (mg/m³)	0.2 mg/m³
Prince Edward Island	OEL TWA (mg/m³)	0.2 mg/m³
Québec	VECD (mg/m³)	3 mg/m³
Québec	VEMP (mg/m³)	1 mg/m³
Saskatchewan	OEL STEL (mg/m³)	0.6 mg/m³
Saskatchewan	OEL TWA (mg/m³)	0.2 mg/m³
Yukon	OEL STEL (mg/m³)	1 mg/m³
Yukon	OEL TWA (mg/m³)	1 mg/m³

Exposure Controls

Appropriate Engineering Controls: Ensure adequate ventilation, especially in confined areas. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Ensure all national/local regulations are observed.

Personal Protective Equipment:



Materials for Protective Clothing: Acid-resistant clothing.

Hand Protection: Wear chemically resistant protective gloves.

Eye Protection: A full face shield is recommended. Chemical goggles or safety glasses. **Skin and Body Protection:** Chemical resistant suit. Rubber apron, boots.

Respiratory Protection: Use a NIOSH-approved respirator or self-contained breathing apparatus whenever exposure may exceed established Occupational Exposure Limits.

Thermal Hazard Protection: If material is hot, wear thermally resistant protective gloves.

SECTION 9: PHYSICAL & CHEMICAL PROPERTIES

Information on Basic Physical & Chemical Properties

Physical State:	Liquid
Appearance:	Clear
Odor:	Pungent, irritating
Odor Threshold:	Not available
pH:	< 1
Relative Evaporation Rate (butylacetate=1):	Not available

SECTION 9: PHYSICAL & CHEMICAL PROPERTIES (CONTINUED)

Melting Point:	1 °C (30 °F)
Freezing Point:	- 1 °C (30 °F)
Boiling Point:	327 °C (621 °F)
Flash Point:	Not available
Auto-ignition Temperature:	Not available
Decomposition Temperature:	Not available
Flammability (solid, gas):	Not available
Lower Flammable Limit:	Not available
Upper Flammable Limit:	Not available
Vapor Pressure:	0.002 mm Hg at 40 °C (104 °F)
Relative Vapor Density at 20 °C:	3.4 (air = 1)
Relative Density:	1.84 at 15.55 °C (60 °F) (water = 1)
Density:	15.35 lb/gal at 15.55°C (60°F)
Solubility:	Miscible
Log Pow:	Not available
Log Kow:	Not available
Viscosity, Kinematic:	Not available
Viscosity, Dynamic:	26.7 cP at 20 °C (68 °F)
Explosion Data – Sensitivity to Mechanical Impact:	Not available
Explosion Data – Sensitivity to Static Discharge:	Not available

SECTION 10: STABILITY AND REACTIVITY

Reactivity:	Reacts exothermically with (some) bases. Violent exothermic reaction with water (moisture): release of corrosive gases/vapours.
Chemical Stability:	Stable at standard temperature and pressure.
Possibility of Hazardous Reactions:	Hazardous polymerization will not occur.
Conditions to Avoid:	Protect from moisture. Water. Keep away from (strong) bases. Contact with metallic substances.

SECTION 10: STABILITY AND REACTIVITY (CONTINUED)	
Incompatible Materials:	Reducing agents, water, combustible materials, bases, organic materials, metals.
Hazardous Decomposition Products:	Under conditions of fire this material may produce sulphur oxides.

SECTION 11: TOXICOLOGICAL INFORMATION	Information on Toxicological Effects - Product
Acute Toxicity:	Not classified
LD50 and LC50 Data:	See below and Section 12
Skin Corrosion/Irritation:	Causes severe skin burns and eye damage (pH: < 1)
Serious Eye Damage/Irritation:	Causes serious eye damage (pH: < 1)
Respiratory or Skin Sensitization:	Not classified
Germ Cell Mutagenicity:	Not classified
Teratogenicity:	Not available
Carcinogenicity:	May cause cancer (Inhalation)
Specific Target Organ Toxicity (Repeated Exposure):	Not classified
Reproductive Toxicity:	Not classified
Specific Target Organ Toxicity (Single Exposure):	Not classified
Aspiration Hazard:	Not classified
Symptoms/Injuries After Inhalation:	Causes severe respiratory irritation if inhaled. Symptoms may include: Burning of nose and throat, constriction of airway, difficulty breathing, shortness of breath, bronchial spasms, chest pain, and pink frothy sputum. May cause pulmonary edema. Symptoms may be delayed.
Symptoms/Injuries After Skin Contact:	Contact may cause immediate severe irritation progressing quickly to chemical burns. Highly corrosive to skin.
Symptoms/Injuries After Eye Contact:	Contact may cause immediate severe irritation progressing quickly to chemical burns. Can cause blindness.
Symptoms/Injuries After Ingestion:	May cause burns or irritation of the linings of the mouth, throat, and gastrointestinal tract. Swallowing a small quantity of this material will result in serious health hazard.
Chronic Symptoms:	Prolonged and frequent exposure through inhalation may cause cancer.

Information on Toxicological Effects - Ingredient(s) - LD50 and LC50 Data	
Sulfuric acid (7664-93-9)	
LD50 Oral Rat	2140 mg/kg
LC50 Inhalation Rat (mg/l)	510 mg/m³ (Exposure time: 2 h)
ATE (oral)	2140 mg/kg body weight
ATE (dust, mist)	510 mg/l/4h
Sulfuric acid (7664-93-9)	
IARC Group	1 (inorganic acid mist)

SECTION 12: ECOLOGICAL INFORMATION

Toxicity	
Sulfuric acid (7664-93-9)	
LC50 Fish 1	500 mg/l (Exposure time: 96 h - Species: Brachydanio rerio [static])
EC50 Daphnia 1	29 mg/l (Exposure time: 24 h - Species: Daphnia magna)

Persistence and Degradability	
Sulfuric Acid 98 Percent	
Persistence and Degradability	Product is biodegradable.

Bioaccumulative Potential	
Sulfuric Acid 98 Percent	
Bioaccumulative Potential	Not expected to bioaccumulate.
Sulfuric acid (7664-93-9)	
BCF fish 1	(no bioaccumulation)

Mobility in Soil:	Not available
Other Adverse Effects	Not available

SECTION 13: DISPOSAL CONSIDERATIONS

Waste Disposal Recommendations: Dispose of waste material in accordance with all local, regional, national, provincial, territorial and international regulations.

SECTION 14: TRANSPORT INFORMATION

In Accordance With ICAO/IATA/DOT/TDG

DOT UN No.:	UN 1830
DOT Proper Shipping Name:	Sulfuric acid
Department of Transportation (DOT) Hazard Classes:	Class 8 - Corrosive
DOT Symbols:	None
Packing group (DOT)	II

SECTION 14: TRANSPORT INFORMATION (CONTINUED)

In Accordance With ICAO/IATA/DOT/TDG

DOT Special Provisions	See 49 C.F.R. 172.102
DOT Reportable Quantity (RQ)	1,000 lb
USCG CHRIS Code	SFA

SECTION 15: REGULATORY INFORMATION

US Federal Regulations

Sulfuric Acid 93 Percent

SARA Section 311/312 Hazard Classes Immediate (acute) health hazard Delayed (chronic) health hazard

Sulfuric acid (7664-93-9)

United States TSCA (Toxic Substances Control Act) inventory	Yes.
EPCRA (SARA) § 313 Toxic Release Inventory (TRI)	Yes – Aerosol forms only.
EPCRA (SARA) § 302 Extremely Hazardous Substance (EHS)	Yes
EPCRA (SARA) § 302 Threshold Planning Quantity (TPQ)	1,000 lb.
EPCRA (SARA) § 302 EHS Reportable Quantity (RQ)	1,000 lb.
CERCLA Reportable Quantity (RQ)	1,000 lb.
CERCLA Hazardous Substance	Yes.

Water (7732-18-5)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

Sulfuric acid (7664-93-9)

U.S. - California - SCAQMD - Toxic Air Contaminants - Non-Cancer Acute

U.S. - California - SCAQMD - Toxic Air Contaminants - Non-Cancer Chronic

U.S. - California - Toxic Air Contaminant List (AB 1807, AB 2728)

U.S. - Connecticut - Hazardous Air Pollutants - HLVs (30 min)

U.S. - Connecticut - Hazardous Air Pollutants - HLVs (8 hr)

U.S. - Delaware - Pollutant Discharge Requirements - Reportable Quantities

U.S. - Idaho - Non-Carcinogenic Toxic Air Pollutants - Acceptable Ambient Concentrations

U.S. - Idaho - Non-Carcinogenic Toxic Air Pollutants - Emission Levels (ELs)

U.S. - Idaho - Occupational Exposure Limits - TWAs

U.S. - Illinois - Toxic Air Contaminant Carcinogens

U.S. - Illinois - Toxic Air Contaminants

U.S. - Louisiana - Reportable Quantity List for Pollutants

SECTION 15: REGULATORY INFORMATION (CONTINUED)

US State Regulations

Sulfuric acid (7664-93-9)

U.S. - Maine - Air Pollutants - Hazardous Air Pollutants
U.S. - Massachusetts - Allowable Ambient Limits (AALs)
U.S. - Massachusetts - Allowable Threshold Concentrations (ATCs)
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 1 U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 2 U.S. - Massachusetts - Oil & Hazardous Material List - Reportable Quantity
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 1 U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 2 U.S. - Massachusetts - Right To Know List
U.S. - Massachusetts - Threshold Effects Exposure Limits (TELs)
U.S. - Massachusetts - Toxics Use Reduction Act
U.S. - Michigan - Occupational Exposure Limits - TWAs
U.S. - Michigan - Polluting Materials List
U.S. - Minnesota - Chemicals of High Concern
U.S. - Minnesota - Hazardous Substance List
U.S. - Minnesota - Permissible Exposure Limits - TWAs
U.S. - New Hampshire - Regulated Toxic Air Pollutants - Ambient Air Levels (AALs) - 24-Hour U.S. - New Hampshire - Regulated Toxic Air Pollutants - Ambient Air Levels (AALs) - Annual U.S. - New Jersey - Discharge Prevention - List of Hazardous Substances
U.S. - New Jersey - Environmental Hazardous Substances List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - New Jersey - Special Health Hazards Substances List U.S. - New York - Occupational Exposure Limits - TWAs
U.S. - New York - Reporting of Releases Part 597 - List of Hazardous Substances U.S. - North Carolina - Control of Toxic Air Pollutants
U.S. - North Dakota - Air Pollutants - Guideline Concentrations - 8-Hour
U.S. - Ohio - Extremely Hazardous Substances - Threshold Quantities
U.S. - Oregon - Permissible Exposure Limits - TWAs
U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List U.S. - Pennsylvania - RTK (Right to Know) List
U.S. - Rhode Island - Air Toxics - Acceptable Ambient Levels - 1-Hour
U.S. - Rhode Island - Air Toxics - Acceptable Ambient Levels - Annual
U.S. - South Carolina - Toxic Air Pollutants - Maximum Allowable Concentrations

SECTION 15: REGULATORY INFORMATION (CONTINUED)

US State Regulations

Sulfuric acid (7664-93-9)

U.S. - South Carolina - Toxic Air Pollutants - Pollutant Categories

U.S. - Tennessee - Occupational Exposure Limits - TWAs

U.S. - Texas - Effects Screening Levels - Long Term

U.S. - Texas - Effects Screening Levels - Short Term

U.S. - Vermont - Permissible Exposure Limits - TWAs

U.S. - Washington - Permissible Exposure Limits - STELs

U.S. - Washington - Permissible Exposure Limits - TWAs

U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights 25 Feet to Less Than 40 Feet

U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights 40 Feet to Less Than 75 Feet

U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights 75 Feet or Greater

U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights Less Than 25 Feet

Canadian Regulations

Sulfuric acid 93-98 Percent (7664-93-9)

WHMIS Classification	Class D Division 2 Subdivision A - Very toxic material causing other toxic effects Class E - Corrosive Material



Sulfuric acid (7664-93-9)

Listed on the Canadian DSL (Domestic Substances List) inventory. Listed on the Canadian Ingredient Disclosure List	
WHMIS Classification	Class D Division 1 Subdivision A - Very toxic material causing immediate and serious toxic effects Class E - Corrosive Material

Water (7732-18-5)

Listed on the Canadian DSL (Domestic Substances List) inventory.	
WHMIS Classification	Uncontrolled product according to WHMIS classification criteria

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by CPR.

SECTION 16: OTHER INFORMATION

Indication of Changes:	11/20/2013
Other Information:	This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200
GHS Full Text Phrases:	
Carc. 1A	Carcinogenicity Category 1A
Eye Dam. 1	Serious eye damage/eye irritation Category 1
Skin Corr. 1A	Skin corrosion/irritation Category 1A
H314	Causes severe skin burns and eye damage
H318	Causes serious eye damage
H350	May cause cancer

The information contained in this Material Safety Data Sheet (MSDS) relates only to the specific product(s) designated herein. The information and recommendations are based upon data believed to be current as of the date of this MSDS and was obtained from sources believed to be accurate. However, this information is furnished without warranty, representations, or license of any kind, express or implied, with respect to accuracy, correctness, or completeness and neither Skyhawk Chemicals, Inc. nor its marketing affliates assume any legal responsibility for use or reliance upon same.

North America GHS US 2012 & WHMIS

VEOLIA

SAFETY DATA SHEET
GENGARD* GN7112

1. Identification

Product identifier	**GENGARD GN7112**
Other means of identification	None.
Recommended use	Corrosion inhibitor
Recommended restrictions	None known.

Company/undertaking identification

Veolia WTS USA, Inc.
3600 Horizon Blvd.
Trevose, PA 19053
T 215 355 3300, F 215 953 5524

Emergency telephone

(800) 877 1940

2. Hazard(s) identification

Physical hazards	Corrosive to metals	Category 1
Health hazards	Skin corrosion/irritation	Category 1B
	Serious eye damage/eye irritation	Category 1
	Specific target organ toxicity, single exposure	Category 3 respiratory tract irritation
OSHA defined hazards	Not classified.	

Label elements



Signal word	Danger
Hazard statement	May be corrosive to metals. Causes severe skin burns and eye damage. Causes serious eye damage. May cause respiratory irritation.
Precautionary statement	
Prevention	Keep only in original container. Do not breathe mist or vapor. Wash hands thoroughly after handling. Use only outdoors or in a well-ventilated area. Wear eye protection/face protection.
Response	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water. IF INHALED: Remove person to fresh air and keep comfortable for breathing. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor. Wash contaminated clothing before reuse. Absorb spillage to prevent material-damage.
Storage	Store in a well-ventilated place. Keep container tightly closed. Store locked up.
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.
Hazard(s) not otherwise classified (HNOC)	None known.
Supplemental information	None.

3. Composition/information on ingredients

Mixtures

Components	CAS #	Percent
Phosphoric acid, tripotassium salt	7778-53-2	10 - 20
Tetrapotassium pyrophosphate	7320-34-5	2.5 - 10
Chlorotolyltriazole sodium salt	202420-04-0	1 - 2.5
Potassium hydroxide	1310-58-3	1 - 2.5

Composition comments Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this SDS for our assessment of the potential hazards of this formulation.

4. First-aid measures

Inhalation Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a poison center or doctor/physician if you feel unwell. If nasal, throat or lung irritation develops - remove to fresh air and get medical attention.

Skin contact Take off immediately all contaminated clothing. Rinse skin with water/shower. Call a physician or poison control center immediately. Chemical burns must be treated by a physician. Wash contaminated clothing before reuse.

Eye contact Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a physician or poison control center immediately.

Ingestion Call a physician or poison control center immediately. Rinse mouth. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.

Most important symptoms/effects, acute and delayed Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. May cause respiratory irritation.

Indication of immediate medical attention and special treatment needed Provide general supportive measures and treat symptomatically. Chemical burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. Keep victim under observation. Symptoms may be delayed.

General information If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire-fighting measures

Suitable extinguishing media Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2).

Unsuitable extinguishing media Do not use water jet as an extinguisher, as this will spread the fire.

Specific hazards arising from the chemical During fire, gases hazardous to health may be formed.

Special protective equipment and precautions for firefighters Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask.

Fire fighting equipment/instructions In case of fire and/or explosion do not breathe fumes. Use standard firefighting procedures and consider the hazards of other involved materials. Cool containers / tanks with water spray.

Specific methods Use standard firefighting procedures and consider the hazards of other involved materials.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures Keep unnecessary personnel away. Wear appropriate protective equipment and clothing during clean-up. Do not breathe mist or vapor. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.

Methods and materials for containment and cleaning up Absorb spillage to prevent material damage. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Following product recovery, flush area with water.

Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.

Environmental precautions Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling Do not get in eyes, on skin, or on clothing. Avoid prolonged exposure. Provide adequate ventilation. Wear appropriate personal protective equipment. Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities

Store locked up. Do not store at elevated temperatures. Store in corrosive resistant container with a resistant inner liner. Keep only in the original container. Store in a cool, dry place out of direct sunlight. Store in accordance with local/regional/national/international regulation. Protect from freezing. Store in tightly closed container. Store away from incompatible materials (see Section 10 of the SDS). If frozen, thaw completely and mix thoroughly prior to use.

8. Exposure controls/personal protection

Occupational exposure limits

US. ACGIH Threshold Limit Values

Components	Type	Value
Potassium hydroxide (CAS 1310-58-3)	Ceiling	2 mg/m3

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
Potassium hydroxide (CAS 1310-58-3)	Ceiling	2 mg/m3

Biological limit values No biological exposure limits noted for the ingredient(s).

Appropriate engineering controls Eye wash facilities and emergency shower must be available when handling this product. Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Individual protection measures, such as personal protective equipment

Eye/face protection Wear safety glasses with side shields (or goggles) and a face shield.

Skin protection

Hand protection Wear appropriate chemical resistant gloves. The choice of an appropriate glove does not only depend on its material but also on other quality features and is different from one producer to the other. Glove selection must take into account any solvents and other hazards present.

Other Wear appropriate chemical resistant clothing.

Respiratory protection If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. A respiratory protection program that meets OSHA's 29 CFR 1910.34 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant a respirator's use.

Thermal hazards Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance Liquid

Physical state Liquid.

Form Not available.

Color Amber to brown

Odor Slight ammonia odor

Odor threshold Not available.

pH (concentrated product) > 13 Neat

Melting point/freezing point -11 °F (-24 °C)

Initial boiling point and boiling range 219 °F (104 °C)

Flash point Not Applicable

Evaporation rate Slower than Ether

Flammability (solid, gas) Not applicable.

Upper/lower flammability or explosive limits

Explosive limit - lower (%) Not available.

Explosive limit - upper (%) Not available.

Vapor pressure 18 mmHg

Vapor pressure temp.	70 °F (21 °C)
Vapor density	< 1
Relative density	1.4
Relative density temperature	70 °F (21 °C)
Solubility(ies)	
Solubility (water)	100 %
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	60 mPa.s
Viscosity temperature	70 °F (21 °C)
Other information	
Explosive properties	Not explosive.
Oxidizing properties	Not oxidizing.
pH in aqueous solution	12.3 (5% Solution)
Pour point	-6 °F (-21 °C)
VOC	0 % ESTIMATED

10. Stability and reactivity

Reactivity	May be corrosive to metals.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Contact with incompatible materials. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources.
Incompatible materials	Avoid contact with acids and oxidizing substances. Metals.
Hazardous decomposition products	Ammonia, hydrogen chloride, oxides of carbon, nitrogen, sulphur, and phosphorus evolved in fire.

11. Toxicological information

Information on likely routes of exposure

Inhalation	May cause irritation to the respiratory system. Prolonged inhalation may be harmful.
Skin contact	Causes severe skin burns.
Eye contact	Causes serious eye damage.
Ingestion	Causes digestive tract burns.
Symptoms related to the physical, chemical and toxicological characteristics	Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. May cause respiratory irritation.

Information on toxicological effects

Acute toxicity

Product	Species	Test Results
GENGARD GN7112		
Acute		
Dermal		
LD50	Rabbit	> 5000 mg/kg (Calculated according to GHS additivity formula)
Oral		
LD50	Rat	> 5000 mg/kg (Calculated according to GHS additivity formula)

Components	Species	Test Results
Chlorotolyltriazole sodium salt (CAS 202420-04-0)		
Acute		
Dermal		
LD50	Rat	> 5000 mg/kg
Oral		
LD50	Rat	3100 mg/kg
Phosphoric acid, tripotassium salt (CAS 7778-53-2)		
Acute		
Dermal		
LD50	Rabbit	> 4640 mg/kg
Oral		
LD50	Rat	> 4640 mg/kg
Potassium hydroxide (CAS 1310-58-3)		
Acute		
Oral		
LD50	Rat	333 mg/kg
Tetrapotassium pyrophosphate (CAS 7320-34-5)		
Acute		
Dermal		
LD50	Rabbit	> 2000 mg/kg
Oral		
LD50	Rat	2440 mg/kg

Skin corrosion/irritation Causes severe skin burns and eye damage.

Serious eye damage/eye irritation Causes serious eye damage.

Respiratory or skin sensitization

Respiratory sensitization This product is not expected to cause respiratory sensitization. Not a respiratory sensitizer.

Skin sensitization This product is not expected to cause skin sensitization.

Germ cell mutagenicity No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

Carcinogenicity Not classified.

IARC Monographs. Overall Evaluation of Carcinogenicity

Not listed.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not listed.

US. National Toxicology Program (NTP) Report on Carcinogens

Not listed.

Reproductive toxicity This product is not expected to cause reproductive or developmental effects.

Specific target organ toxicity - single exposure May cause respiratory irritation.

Specific target organ toxicity - repeated exposure Not classified.

Aspiration hazard Aspiration of this product may cause the same corrosiveness/irritation impacts as if it were ingested. Based on available data, the classification criteria are not met.

Chronic effects Prolonged inhalation may be harmful.

12. Ecological information

Ecotoxicity

Product		Species	Test Results
Aquatic			
Crustacea	LC50	Daphnia magna	911 mg/L, 48 hour (pH adjusted)
	NOEL	Daphnia magna	500 mg/L, 48 hour (pH adjusted)

Product		Species	Test Results
Fish	LC50	Fathead Minnow	201 mg/L, 96 hour (pH adjusted)
		Rainbow Trout	176.8 mg/L, 96 hour (pH adjusted)
	NOEL	Fathead Minnow	125 mg/L, 96 hour (pH adjusted)
		Rainbow Trout	125 mg/L, 96 hour (pH adjusted)

Persistence and degradability

- **COD (mgO2/g)** 168 (calculated data)
- **BOD 5 (mgO2/g)** 6 (calculated data)
- **BOD 28 (mgO2/g)** 16 (calculated data)
- **Closed Bottle Test (% Degradation in 28 days)** 10 (calculated data)
- **TOC (mg C/g)** 50 (calculated data)

Bioaccumulative potential

Mobility in soil No data available.

Other adverse effects Not available.

13. Disposal considerations

Disposal instructions Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Incinerate the material under controlled conditions in an approved incinerator. Dispose of contents/container in accordance with local/regional/national/international regulations.

Local disposal regulations Dispose in accordance with all applicable regulations.

Hazardous waste code D002: Waste Corrosive material [pH <=2 or =>12.5, or corrosive to steel]
The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions). Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner.

Contaminated packaging Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

UN number UN1760
UN proper shipping name Corrosive liquids, n.o.s. (POTASSIUM HYDROXIDE, CHLOROTOLYLTRIAZOLE SODIUM SALT)
Transport hazard class(es)
Class 8
Subsidiary risk -
Packing group II
Special precautions for user Read safety instructions, SDS and emergency procedures before handling.
ERG number 154
Some containers may be exempt from Dangerous Goods/Hazmat Transport Regulations, please check BOL for exact container classification.

IATA

UN number UN1760
UN proper shipping name Corrosive liquid, n.o.s. (POTASSIUM HYDROXIDE, CHLOROTOLYLTRIAZOLE SODIUM SALT)
Transport hazard class(es)
Class 8
Subsidiary risk -
Packing group II
Environmental hazards No.
ERG Code 154
Special precautions for user Read safety instructions, SDS and emergency procedures before handling.

IMDG

UN number UN1760

UN proper shipping name	CORROSIVE LIQUID, N.O.S. (POTASSIUM HYDROXIDE, CHLOROTOLYLTRIAZOLE SODIUM SALT)
Transport hazard class(es)	
Class	8
Subsidiary risk	-
Packing group	II
Environmental hazards	
Marine pollutant	No.
EmS	F-A, S-B
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

DOT



IATA; IMDG



15. Regulatory information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Toxic Substances Control Act (TSCA)

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Potassium hydroxide (CAS 1310-58-3) Listed.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not listed.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical	Yes
Classified hazard categories	Corrosive to metal Skin corrosion or irritation Serious eye damage or eye irritation Specific target organ toxicity (single or repeated exposure)

SARA 313 (TRI reporting)

Not regulated.

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Contains component(s) regulated under the Safe Drinking Water Act.

Inventory status

Country(s) or region	Inventory name	On inventory (yes/no)*
Canada	Domestic Substances List (DSL)	No
Canada	Non-Domestic Substances List (NDSL)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

NSF Registered and/or meets USDA (according to 1998 guidelines): Registration No. – 146605
Category Code(s):
G5 Cooling and retort water treatment products
G7 Boiler, steam line treatment products – nonfood contact

US state regulations

California Proposition 65

California Safe Drinking Water and Toxic Enforcement Act of 2016 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins. For more information go to www.P65Warnings.ca.gov.

US - California Proposition 65 - CRT: Listed date/Carcinogenic substance

No ingredient listed.

US - California Proposition 65 - CRT: Listed date/Developmental toxin

No ingredient listed.

US - California Proposition 65 - CRT: Listed date/Female reproductive toxin

No ingredient listed.

US - California Proposition 65 - CRT: Listed date/Male reproductive toxin

No ingredient listed.

16. Other information, including date of preparation or last revision

Issue date Nov-16-2014

Revision date Feb-19-2023

Version # 2.1

NFPA ratings Health: 3
Flammability: 0
Instability: 0

NFPA ratings



List of abbreviations

OSHA: Occupational Safety & Health Administration.
CAS: Chemical Abstract Service Registration Number
TWA: Time Weighted Average
STEL: Short Term Exposure Limit
LD50: Lethal Dose, 50%
LC50: Lethal Concentration, 50%
NOEL: No Observed Effect Level
COD: Chemical Oxygen Demand
BOD: Biochemical Oxygen Demand
TOC: Total Organic Carbon
IATA: International Air Transport Association
IMDG: International Maritime Dangerous Goods Code
ACGIH: American Conference of Governmental Industrial Hygienists
TSRN indicates a Trade Secret Registry Number is used in place of the CAS number.
NFPA: National Fire Protection Association

References: No data available

Disclaimer	The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.
Revision information	This document has undergone significant changes and should be reviewed in its entirety.
Prepared by	This SDS has been prepared by Veolia Water Technologies & Solutions' Regulatory Department (1-215-355-3300).

* Trademark of Veolia. May be registered in one or more countries.

Safety Data Sheet

AvistaClean™ P1219

Revision: 2023-10-30

SECTION 1: Identification

1.1 Product identifier

Trade name **AvistaClean™ P1219**

CAS number none

1.2 Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses Water treatment chemical
RO Reverse Osmosis

1.3 Details of the supplier of the safety data sheet

Avista Technologies, Inc.
140 Bosstick Blvd.
92069 San Marcos
United States

Telephone: +1 (760) 744 0536
e-mail: regulatory@avistatech.com
Website: AvistaMembraneSolutions.com

1.4 **Emergency telephone number**	Emergency Number (USA, Canada): 1 (800) 424-9300 (ChemTrec) Emergency Number (International): 1 (703) 527-3887 (International Collect)

1.5 Registration

This product is designed to be used off-line and is to be flushed out prior to using the system for drinking water, following the manufacturer's use instructions.

SECTION 2: Hazard(s) identification

2.1 Classification of the substance or mixture

Classification acc. to OSHA "Hazard Communication Standard" (29 CFR 1910.1200)

Hazard class	*Category*	*Hazard statement*
acute toxicity (inhal.)	4	H332
skin corrosion/irritation	1	H314
serious eye damage/eye irritation	2A	H319
specific target organ toxicity - single exposure (respiratory tract irritation)	3	H335

For full text of abbreviations: see SECTION 16.

2.2 Label elements

Signal word danger

Pictograms

GHS05, GHS07



Hazard statements

H314	Causes severe skin burns and eye damage.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H335	May cause respiratory irritation.

Precautionary statements

P260	Do not breathe dusts or mists.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear eye protection/face protection.
P301+P330+P331	If swallowed: Rinse mouth. Do NOT induce vomiting.
P303+P361+P353	If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304+P340	If inhaled: Remove person to fresh air and keep comfortable for breathing.
P305+P351+P338	If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a poison center/doctor.
P363	Wash contaminated clothing before reuse.
P403+P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/container to industrial combustion plant.

2.3 Other hazards

Hazards not otherwise classified

May be harmful if swallowed (GHS category 5: acutely toxic - oral).

Results of PBT and vPvB assessment

This mixture does not contain any substances that are assessed to be a PBT or a vPvB.

SECTION 3: Composition/information on ingredients

3.1 Mixtures

Hazardous ingredients

Name of substance	*Identifier*	*Wt%*	*Classification acc. to GHS*
Polyphosphate salt	CAS No Proprietary EC No Proprietary	5 – < 10	Acute Tox. 2 / H330
Citrate salt	CAS No Proprietary EC No Proprietary	5 – < 10	

Name of substance	*Identifier*	*Wt%*	*Classification acc. to GHS*
Chelate agent F	CAS No Proprietary	< 1	Acute Tox. 4 / H302 Acute Tox. 4 / H332 Eye Dam. 1 / H318 STOT RE 2 / H373
Silicate compound A	1344-09-8	70 – < 80	Acute Tox. 3 / H331 Skin Irrit. 2 / H315 Eye Irrit. 2 / H319 STOT SE 3 / H335
Oxygenated inorganic salt	15630-89-4	10 – < 20	Acute Tox. 4 / H302 Eye Dam. 1 / H318 Ox. Sol. 2 / H272

For full text of abbreviations: see SECTION 16.
Specific chemical identity and concentration of some ingredients are protected as Trade Secret information.

SECTION 4: First-aid measures

4.1 Description of first-aid measures

General notes

Do not leave affected person unattended. Remove victim out of the danger area. Keep affected person warm, still and covered. Take off immediately all contaminated clothing. In case of unconsciousness place person in the recovery position. Never give anything by mouth.

Following inhalation

In case of respiratory tract irritation, consult a physician. In all cases of doubt, or when symptoms persist, seek medical advice.

Following skin contact

Brush off loose particles from skin. Rinse skin with water/shower. After contact with skin, take off immediately all contaminated clothing, and wash immediately with plenty of water. Immediately call a doctor. In all cases of doubt, or when symptoms persist, seek medical advice.

Following eye contact

Irrigate copiously with clean, fresh water for at least 15 minutes, holding the eyelids apart. Remove contact lenses, if present and easy to do. Continue rinsing. Call a physician immediately.

Following ingestion

Rinse mouth with water (only if the person is conscious). Do NOT induce vomiting. Immediately call a doctor.

4.2 Most important symptoms and effects, both acute and delayed

Causes severe skin burns and eye damage. Splashes cause strong tearing, pain, may cause permanent visual impairment. Prolonged contact may cause dryness, redness, burns, blistering and ulceration. Can be partially absorbed by the skin. Ingestion causes pain, burns, abdominal pain, possible general impact (shock).

4.3 Indication of any immediate medical attention and special treatment needed

No specific antidote is known. Treatment of the symptoms.

SECTION 5: Fire-fighting measures

5.1 Extinguishing media

Suitable extinguishing media

Non-combustible. Coordinate firefighting measures to the fire surroundings. Water, Foam, Alcohol resistant foam, Fire extinguishing powder, ABC-powder

Unsuitable extinguishing media

None

5.2 Special hazards arising from the substance or mixture

Deposited combustible dust has considerable explosion potential.

Hazardous combustion products

Carbon monoxide (CO), Carbon dioxide (CO2)

5.3 Advice for firefighters

Keep containers cool with water spray. In case of fire and/or explosion do not breathe fumes. Do not allow firefighting water to enter drains or water courses. Collect contaminated firefighting water separately. Fight fire with normal precautions from a reasonable distance.

Special protective equipment for firefighters

Chemical protection suit, Use suitable breathing apparatus

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Aqueous solutions or powders that become wet produce extremely slippery conditions.

For non-emergency personnel

Follow emergency procedures such as the need to evacuate the danger area or to consult an expert. Remove persons to safety. Prevent skin contact. Avoid inhaling sprayed product. Aqueous solutions or powders that become wet produce extremely slippery conditions.

For emergency responders

Wear breathing apparatus if exposed to vapors/dust/aerosols/gases. Wear personal protective equipment/face protection. Do not breathe dust. Aqueous solutions or powders that become wet produce extremely slippery conditions. Special danger of slipping by leaking/spilling product.

Suitable fabric for personal protective clothing

PE: polyethylene, NR: natural rubber, latex, CR: chloroprene (chlorobutadiene) rubber

6.2 Environmental precautions

Keep away from drains, surface and ground water. Retain contaminated washing water and dispose of it. If substance has entered a water course or sewer, inform the responsible authority. Disposal considerations: see section 13. Chemicals generally shouldn't reach surface water.

6.3 Methods and material for containment and cleaning up

Advice on how to contain a spill

Covering of drains, Take up mechanically

Advice on how to clean up a spill

Take up mechanically. Collect spillage: Material for neutralising like diluted acetic acid. Control of dust.

Appropriate containment techniques

Neutralization techniques. Decontamination techniques. Use of adsorbent materials. Vacuuming techniques.

Equipment required for containment/clean-up

Approved industrial vacuum cleaner, Absorbent material (e.g. sand, diatomaceous earth, acid binder, universal binder, sawdust, etc.), Sweeping compounds (oil absorbing), Shovel, Drain seal, Collecting container, Protective gloves, Eye protection (e.g. protective goggles), Personal protective equipment: see section 8

Other information relating to spills and releases

Place in appropriate containers for disposal. Ventilate affected area.

6.4 Reference to other sections

Section 7: Handling and storage. See also to sections 8 and 13 of the safety data sheet.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Recommendations

Avoid dust formation. Avoid breathing dust.

Measures to prevent fire as well as aerosol and dust generation

Take precautionary measures against static discharge. Use local and general ventilation.

Handling of incompatible substances or mixtures

Do not mix with acids. Do not mix with other chemicals.

Keep away from

Acids, Strong oxidizers, Other chemicals

Measures to protect the environment

Do not empty into drains; dispose of this material and its container at hazardous or special waste collection point.

Advice on general occupational hygiene

Wash hands after use. Do not eat, drink and smoke in work areas. Remove contaminated clothing and protective equipment before entering eating areas. Never keep food or drink in the vicinity of chemicals. Never place chemicals in containers that are normally used for food or drink. Keep away from food, drink and animal feedingstuffs.

7.2 Conditions for safe storage, including any incompatibilities

Consideration of other advice Store between 5°C and 40°C. Avoid freezing.

Ventilation requirements

Keep any substance that emits harmful vapors or gases in a place that allows these to be permanently extracted. Use local and general ventilation.

Specific designs for storage rooms or vessels

No special measures are necessary. Keep container tightly closed.

Packaging compatibilities

Keep only in original container.

7.3 Specific end use(s)

Water treatment chemical. RO Reverse Osmosis.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

National limit values

Occupational Exposure Limits: PELs, TLVs, etc

Occupational exposure limit values (Workplace Exposure Limits)

Name of substance	*Identifier*	*TWA [ppm]*	*TWA [mg/m³]*	*STEL [ppm]*	*STEL [mg/m³]*
Dust and particulates	REL	Not established	Not established	Not established	Not established
Dust and particulates	PEL	1,766	15	Not established	Not established
Dust and particulates	PEL	529.5	5	Not established	Not established
Dust and particulates	PEL (CA)	Not established	10	Not established	Not established
Dust and particulates	PEL (CA)	Not established	5	Not established	Not established

Notation

STEL short-term exposure limit: a limit value above which exposure should not occur and which is related to a 15-minute period (unless otherwise specified)

TWA time-weighted average (long-term exposure limit): measured or calculated in relation to a reference period of 8 hours time-weighted average (unless otherwise specified

8.2 Exposure controls

Appropriate engineering controls

Exhaust ventilation.

Individual protection measures (personal protective equipment)

Guarantee that the eye flushing systems and safety showers are closely located to the working place.

Eye/face protection

Wear eye/face protection.

Skin protection

Chemical resistant protective clothing.

Hand protection

In case of spray contact at least protection index 2 recommended, according to more than 30 min. penetration time (EN 374).
Layer thickness of gloves at least: 0.4 mm
In case of prolonged and intensive contact protection index 6 recommended, according to more than 480 min. penetration time (EN 374).
Layer thickness of gloves at least: 0.7 mm.

Type of material

PVC: polyvinyl chloride, PE: polyethylene, NBR: acrylonitrile-butadiene rubber, IIR: isobutene-isoprene (butyl) rubber

Breakthrough times of the glove material

Breakthrough times and swelling properties of the material must be taken into consideration

Other protection measures

Wash hands thoroughly after handling.

Respiratory protection

Not necessary under normal conditions and provided good general ventilation. In case of inadequate ventilation wear respiratory protection. Particulate filter device (EN 143). Type : E (against acidic gases like sulfur dioxide or hydrogen chloride, color code: Yellow).

Environmental exposure controls

Disposal considerations: see section 13.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance

Physical state	solid (powder, granular)
Color	white

Odor	pungent
Odor threshold	no data available

Other safety parameters

pH (value)	ca. 11.5 – 12.9 (in aqueous solution: 1 wt%, 25 °C) (base)
Melting point/freezing point	not determined
Initial boiling point and boiling range	not determined
Flash point	not applicable not applicable
Evaporation rate	not determined
Flammability (solid, gas)	not applicable
Explosion limits of dust clouds	not determined
Vapor pressure	not applicable
Vapor density	this information is not available
Density	not determined
Relative density	information on this property is not available

Solubility(ies)

Water solubility	miscible in any proportion

Partition coefficient

-n-Octanol/water (log KOW)	this information is not available

Auto-ignition temperature	not determined not applicable
Decomposition temperature	not determined
Viscosity	not relevant (solid matter)
Explosive properties	none
Oxidizing properties	none

9.2 Other information

There is no additional information.

SECTION 10: Stability and reactivity

10.1 Reactivity

This material is not reactive under normal ambient conditions.

10.2 Chemical stability

The material is stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

10.3 Possibility of hazardous reactions

Dangerous/dangerous reactions with Acids.

10.4 Conditions to avoid

Incompatible materials.

Hints to prevent fire or explosion

The product in the delivered form is not dust explosion capable; the enrichment of fine dust however leads to the danger of dust explosion.

10.5 Incompatible materials

Acids, Oxidizers

10.6 Hazardous decomposition products

Reasonably anticipated hazardous decomposition products produced as a result of use, storage, spill and heating are not known. Hazardous combustion products: see section 5.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Test data are not available for the complete mixture.

Classification procedure

The method for classification of the mixture is based on ingredients of the mixture (additivity formula).

Acute toxicity

Harmful if inhaled.

Acute toxicity of components of the mixture				
Name of substance	*Exposure route*	*Endpoint*	*Value*	*Species*
Silicate compound A	inhalation: dust/ mist	LC50	>4 $^{mg}/_{l}$/4h	rat
Silicate compound A	inhalation: dust/ mist	LC0	>2.06 $^{mg}/_{l}$/4h	rat
Silicate compound A	oral	LD50	3,400 $^{mg}/_{kg}$	rat
Silicate compound A	inhalation: vapor	LC50	>2.06 $^{mg}/_{l}$/4h	rat
Silicate compound A	dermal	LD50	>5,000 $^{mg}/_{kg}$	rat
sodium carbonate peroxyhydrate	oral	LD50	1,034 $^{mg}/_{kg}$	rat
sodium carbonate peroxyhydrate	dermal	LD50	>2,000 $^{mg}/_{kg}$	rabbit

Skin corrosion/irritation

Causes severe skin burns and eye damage.

Serious eye damage/eye irritation

Causes serious eye damage. Causes serious eye irritation.

Respiratory or skin sensitization

Shall not be classified as a respiratory or skin sensitizer.

Germ cell mutagenicity

Shall not be classified as germ cell mutagenic.

Carcinogenicity

Shall not be classified as carcinogenic.

Reproductive toxicity

Shall not be classified as a reproductive toxicant.

Specific target organ toxicity - single exposure

May cause respiratory irritation.

Specific target organ toxicity - repeated exposure

Shall not be classified as a specific target organ toxicant (repeated exposure).

Aspiration hazard

Shall not be classified as presenting an aspiration hazard.

SECTION 12: Ecological information

12.1 Toxicity

Shall not be classified as hazardous to the aquatic environment.

Aquatic toxicity (acute)			
Endpoint	*Value*	*Species*	*Exposure time*
LC50	342 $^{mg}/_{l}$	fathead minnow	48 h
LC50	41 $^{mg}/_{l}$	water flea (Daphnia)	48 h
LC50		(top) predators	48 h

Aquatic toxicity (acute) of components of the mixture

Name of substance	*Endpoint*	*Exposure time*	*Value*	*Species*	*Source*
Silicate compound A	LC50	96 h	310 $^{mg}/_{l}$	fish	European Chemicals Agency, http://echa.europa.eu/
Silicate compound A	EC50	48 h	1,700 $^{mg}/_{l}$	aquatic invertebrates	European Chemicals Agency, http://echa.europa.eu/
Silicate compound A	ErC50	72 h	>345.4 $^{mg}/_{l}$	algae	European Chemicals Agency, http://echa.europa.eu/
sodium carbonate peroxyhydrate	LC50	48 h	70.7 $^{mg}/_{l}$	fish	European Chemicals Agency, http://echa.europa.eu/
sodium carbonate peroxyhydrate	EC50	48 h	4.9 $^{mg}/_{l}$	aquatic invertebrates	European Chemicals Agency, http://echa.europa.eu/

12.2 Persistence and degradability

Data are not available.

12.3 Bioaccumulative potential

Data are not available.

12.4 Mobility in soil

Data are not available.

12.5 Results of PBT and vPvB assessment

Not applicable.

12.6 Other adverse effects

Data are not available.

Remarks

Do not empty into drains or surface water.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Do not empty into drains; dispose of this material and its container at hazardous or special waste collection point. Dispose of waste according to applicable legislation.

Waste treatment of containers/packages

Only packagings which are approved (e.g. acc. to DOT) may be used. Completely emptied packages can be recycled. Handle contaminated packages in the same way as the substance itself.

Remarks

Please consider the relevant national or regional provisions. Waste shall be separated into the categories that can be handled separately by the local or national waste management facilities. Avoid release to the environment.

SECTION 14: Transport information

14.1 UN number	3262
14.2 UN proper shipping name	Corrosive solid, basic, inorganic, n.o.s.
Technical name (hazardous ingredients)	contains: (sodium hydroxysilanoylolate) (sodium carbonate peroxyhydrate)
14.3 Transport hazard class(es)	
Class	8
14.4 Packing group	II
14.5 Environmental hazards	non-environmentally hazardous acc. to the dangerous goods regulations

14.6 Special precautions for user

There is no additional information.

14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code

The cargo is not intended to be carried in bulk.

Information for each of the UN Model Regulations

Transport of dangerous goods by road or rail (49 CFR US DOT)

Index number	3262
Proper shipping name	Corrosive solid, basic, inorganic, n.o.s.
Particulars in the shipper's declaration	UN3262, Corrosive solid, basic, inorganic, n.o.s., (sodium hydroxysilanoylolate, sodium carbonate peroxyhydrate), 8, II
Class	8
Packing group	II
Danger label(s)	8



Special provisions (SP)	IB8, IP2, IP4, T3, TP33

ERG No	154
International Maritime Dangerous Goods Code (IMDG)	
UN number	3262
Proper shipping name	CORROSIVE SOLID, BASIC, INORGANIC, N.O.S.
Particulars in the shipper's declaration	UN3262, CORROSIVE SOLID, BASIC, INORGANIC, N.O.S., (sodium hydroxysilanoylolate, sodium carbonate peroxyhydrate), 8, II
Class	8
Marine pollutant	-
Packing group	II
Danger label(s)	8



EmS	F-A, S-B
Segregation group	18 - Alkalis
Segregation codes	SG35
International Civil Aviation Organization (ICAO-IATA/DGR)	
UN number	3262
Proper shipping name	Corrosive solid, basic, inorganic, n.o.s.
Particulars in the shipper's declaration	UN3262, Corrosive solid, basic, inorganic, n.o.s., (sodium hydroxysilanoylolate, sodium carbonate peroxyhydrate), 8, II
Class	8
Environmental hazards	no
Packing group	II
Danger label(s)	8



SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations specific for the product in question

National regulations (United States)

Toxic Substance Control Act (TSCA) all ingredients are listed or exempt from listing

Superfund Amendment and Reauthorization Act (SARA TITLE III)

The List of Extremely Hazardous Substances and Their Threshold Planning Quantities (EPCRA Section 302, 304)

none of the ingredients are listed

Specific Toxic Chemical Listings (EPCRA Section 313)

none of the ingredients are listed

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

List of Hazardous Substances and Reportable Quantities (CERCLA section 102a) (40 CFR 302.4)

none of the ingredients are listed

Clean Air Act

none of the ingredients are listed

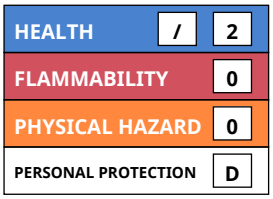
California Environmental Protection Agency (Cal/EPA): Proposition 65 - Safe Drinking Water and Toxic Enforcement Act of 1987

none of the ingredients are listed

Industry or sector specific available guidance(s)

NPCA-HMIS® III

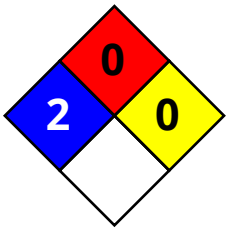
Hazardous Materials Identification System. American Coatings Association.



A "*" on the health line indicates a chronic health hazard is present.

NFPA® 704

National Fire Protection Association: Standard System for the Identification of the Hazards of Materials for Emergency Response (United States).



Additional information

Substance is listed in the following national inventories:
The contained substances are listed in the following national inventories:
AICS (Australia)
ASIA-PAC (Asia-Pacific Region)
DSL (Canada)
NDSL (Canada)
DSL/NDSL (Canada)
IECSC (China)
EINECS/ELINCS/NLP (Europe)
EINECS (European Union)
REACH (Europe)
ENCS, class 1 and 2 (MITI-inventory, Japan)
CSCL-ENCS (Japan)
ISHA-ENCS (Japan)
KECL (Republic of Korea)
INSQ (Mexico)
NZIoC (New Zealand)
PICCS (Philippines)
CICR (Turkey)
TCSI (Taiwan)
TSCA (United States)

15.2 Chemical Safety Assessment

Chemical Safety Assessment: No.

SECTION 16: Other information, including date of preparation or last revision

Abbreviations and acronyms

Abbr.	*Descriptions of used abbreviations*
49 CFR US DOT	49 CFR U.S. Department of Transportation
Acute Tox.	Acute toxicity
CAS	Chemical Abstracts Service (service that maintains the most comprehensive list of chemical substances)
DGR	Dangerous Goods Regulations (see IATA/DGR)
DOT	Department of Transportation (USA)
EC50	Effective Concentration 50 %. The EC50 corresponds to the concentration of a tested substance causing 50 % changes in response (e.g. on growth) during a specified time interval
EC No	The EC Inventory (EINECS, ELINCS and the NLP-list) is the source for the seven-digit EC number, an identifier of substances commercially available within the EU (European Union)
EINECS	European Inventory of Existing Commercial Chemical Substances
ELINCS	European List of Notified Chemical Substances
EmS	Emergency Schedule
ErC50	≡ EC50: in this method, that concentration of test substance which results in a 50 % reduction in either growth (EbC50) or growth rate (ErC50) relative to the control
ERG No	Emergency Response Guidebook - Number
Eye Dam.	Seriously damaging to the eye
Eye Irrit.	Irritant to the eye
GHS	"Globally Harmonized System of Classification and Labelling of Chemicals" developed by the United Nations
IATA	International Air Transport Association
IATA/DGR	Dangerous Goods Regulations (DGR) for the air transport (IATA)
ICAO	International Civil Aviation Organization
IMDG	International Maritime Dangerous Goods Code
LC50	Lethal Concentration 50%: the LC50 corresponds to the concentration of a tested substance causing 50 % lethality during a specified time interval
LD50	Lethal Dose 50 %: the LD50 corresponds to the dose of a tested substance causing 50 % lethality during a specified time interval
MARPOL	International Convention for the Prevention of Pollution from Ships (abbr. of "Marine Pollutant")
NLP	No-Longer Polymer
NPCA-HMIS® III	National Paint and Coatings Association: Hazardous Materials Identification System - HMIS® III, Third Edition
OSHA	Occupational Safety and Health Administration (United States)
Ox. Sol.	Oxidizing solid

Abbr.	*Descriptions of used abbreviations*
PBT	Persistent, Bioaccumulative and Toxic
PEL	Permissible exposure limit
ppm	Parts per million
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals
Skin Corr.	Corrosive to skin
Skin Irrit.	Irritant to skin
STEL	Short-term exposure limit
STOT RE	Specific target organ toxicity - repeated exposure
STOT SE	Specific target organ toxicity - single exposure
TWA	Time-weighted average
vPvB	Very Persistent and very Bioaccumulative

Key literature references and sources for data

ECHA: European Chemicals Agency, http://echa.europa.eu/.

OSHA Hazard Communication Standard (HCS), 29 CFR 1910.1200.

Transport of dangerous goods by road or rail (49 CFR US DOT). International Maritime Dangerous Goods Code (IMDG). Dangerous Goods Regulations (DGR) for the air transport (IATA).

Classification procedure

Physical and chemical properties: The classification is based on tested mixture.
Health hazards, Environmental hazards: The method for classification of the mixture is based on ingredients of the mixture (additivity formula).

List of relevant phrases (code and full text as stated in section 2 and 3)

Code	*Text*
H272	May intensify fire; oxidizer.
H302	Harmful if swallowed.
H314	Causes severe skin burns and eye damage.
H315	Causes skin irritation.
H318	Causes serious eye damage.
H319	Causes serious eye irritation.
H330	Fatal if inhaled.
H331	Toxic if inhaled.
H332	Harmful if inhaled.
H335	May cause respiratory irritation.
H373	May cause damage to organs through prolonged or repeated exposure.

Disclaimer

This information is based upon the present state of our knowledge. This SDS has been compiled and is solely intended for this product.

Safety Data Sheet

AvistaClean™ P0327

Date of compilation: 2023-10-30

SECTION 1: Identification

1.1 Product identifier

Trade name **AvistaClean™ P0327**

CAS number none

1.2 Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses Water treatment chemical
MF/UF Microfiltration/Ultrafiltration

1.3 Details of the supplier of the safety data sheet

Avista Technologies, Inc.
140 Bosstick Blvd.
92069 San Marcos
United States

Telephone: +1 (760) 744 0536
e-mail: regulatory@avistatech.com
Website: AvistaMembraneSolutions.com

1.4	**Emergency telephone number**	Emergency Number (USA, Canada): 1 (800) 424-9300 (ChemTrec) Emergency Number (International): 1 (703) 527-3887 (International Collect)

1.5 Registration

This product is designed to be used off-line and is to be flushed out prior to using the system for drinking water, following the manufacturer's use instructions.

SECTION 2: Hazard(s) identification

2.1 Classification of the substance or mixture

Classification acc. to OSHA "Hazard Communication Standard" (29 CFR 1910.1200)

Hazard class	*Category*	*Hazard statement*
acute toxicity (inhal.)	4	H332
skin corrosion/irritation	1B	H314
serious eye damage/eye irritation	1	H318
specific target organ toxicity - single exposure (respiratory tract irritation)	3	H335

For full text of abbreviations: see SECTION 16.

2.2 Label elements

Signal word danger

Pictograms

GHS05, GHS07



Hazard statements

H314	Causes severe skin burns and eye damage.
H332	Harmful if inhaled.
H335	May cause respiratory irritation.

Precautionary statements

P260	Do not breathe dusts or mists.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear eye protection/face protection.
P301+P330+P331	If swallowed: Rinse mouth. Do NOT induce vomiting.
P303+P361+P353	If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304+P340	If inhaled: Remove person to fresh air and keep comfortable for breathing.
P305+P351+P338	If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a poison center/doctor.
P363	Wash contaminated clothing before reuse.
P403+P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/container to industrial combustion plant.

2.3 Other hazards

Hazards not otherwise classified

May be harmful in contact with skin (GHS category 5: acutely toxic - dermal).

Results of PBT and vPvB assessment

This mixture does not contain any substances that are assessed to be a PBT or a vPvB.

SECTION 3: Composition/information on ingredients

3.1 Mixtures

Hazardous ingredients

Name of substance	*Identifier*	*Wt%*	*Classification acc. to GHS*
Polyphosphate salt	CAS No Proprietary EC No Proprietary	10 – < 20	Acute Tox. 2 / H330
Salt	CAS No Proprietary EC No Proprietary	10 – < 20	
Citrate salt	CAS No Proprietary EC No Proprietary	10 – < 20	

Name of substance	*Identifier*	*Wt%*	*Classification acc. to GHS*
Organic acid A	CAS No Proprietary EC No Proprietary	1 – < 5	Skin Corr. 1 / H314 Eye Dam. 1 / H318
Calcium salt	CAS No Proprietary EC No Proprietary	1 – < 5	Eye Irrit. 2 / H319
Flow control agent A	CAS No Proprietary EC No Proprietary	1 – < 5	
Organic acid B	77-92-9	50 – < 60	Not established

For full text of abbreviations: see SECTION 16.
Specific chemical identity and concentration of some ingredients are protected as Trade Secret information.

SECTION 4: First-aid measures

4.1 Description of first-aid measures

General notes

Do not leave affected person unattended. Remove victim out of the danger area. Keep affected person warm, still and covered. Take off immediately all contaminated clothing. In case of unconsciousness place person in the recovery position. Never give anything by mouth.

Following inhalation

In case of respiratory tract irritation, consult a physician. In all cases of doubt, or when symptoms persist, seek medical advice.

Following skin contact

Brush off loose particles from skin. Rinse skin with water/shower. After contact with skin, take off immediately all contaminated clothing, and wash immediately with plenty of water. Immediately call a doctor. In all cases of doubt, or when symptoms persist, seek medical advice.

Following eye contact

Irrigate copiously with clean, fresh water for at least 15 minutes, holding the eyelids apart. Remove contact lenses, if present and easy to do. Continue rinsing. Call a physician immediately.

Following ingestion

Rinse mouth with water (only if the person is conscious). Do NOT induce vomiting. Immediately call a doctor.

4.2 Most important symptoms and effects, both acute and delayed

Causes severe skin burns and eye damage. Splashes cause strong tearing, pain, may cause permanent visual impairment. Prolonged contact may cause dryness, redness, burns, blistering and ulceration. Can be partially absorbed by the skin. Ingestion causes pain, burns, abdominal pain, possible general impact (shock).

4.3 Indication of any immediate medical attention and special treatment needed

No specific antidote is known. Treatment of the symptoms.

SECTION 5: Fire-fighting measures

5.1 Extinguishing media

Suitable extinguishing media

Non-combustible. Coordinate firefighting measures to the fire surroundings. Water, Foam, Alcohol resistant foam, Fire extinguishing powder, ABC-powder

Unsuitable extinguishing media

None

5.2 Special hazards arising from the substance or mixture

Deposited combustible dust has considerable explosion potential.

Hazardous combustion products

Carbon monoxide (CO), Carbon dioxide (CO2)

5.3 Advice for firefighters

Keep containers cool with water spray. In case of fire and/or explosion do not breathe fumes. Do not allow firefighting water to enter drains or water courses. Collect contaminated firefighting water separately. Fight fire with normal precautions from a reasonable distance.

Special protective equipment for firefighters

Chemical protection suit, Use suitable breathing apparatus

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Aqueous solutions or powders that become wet produce extremely slippery conditions.

For non-emergency personnel

Follow emergency procedures such as the need to evacuate the danger area or to consult an expert. Remove persons to safety. Prevent skin contact. Avoid inhaling sprayed product. Aqueous solutions or powders that become wet produce extremely slippery conditions.

For emergency responders

Wear breathing apparatus if exposed to vapors/dust/aerosols/gases. Wear personal protective equipment/face protection. Do not breathe dust. Aqueous solutions or powders that become wet produce extremely slippery conditions. Special danger of slipping by leaking/spilling product.

Suitable fabric for personal protective clothing

PE: polyethylene, NR: natural rubber, latex, CR: chloroprene (chlorobutadiene) rubber

6.2 Environmental precautions

Keep away from drains, surface and ground water. Retain contaminated washing water and dispose of it. If substance has entered a water course or sewer, inform the responsible authority. Disposal considerations: see section 13. Chemicals generally shouldn't reach surface water.

6.3 Methods and material for containment and cleaning up

Advice on how to contain a spill

Covering of drains, Take up mechanically

Advice on how to clean up a spill

Take up mechanically. Collect spillage: Control of dust.

Appropriate containment techniques

Neutralization techniques. Decontamination techniques. Use of adsorbent materials. Vacuuming techniques.

Equipment required for containment/clean-up

Approved industrial vacuum cleaner, Absorbent material (e.g. sand, diatomaceous earth, acid binder, universal binder, sawdust, etc.), Sweeping compounds (oil absorbing), Shovel, Drain seal, Collecting container, Protective gloves, Eye protection (e.g. protective goggles), Personal protective equipment: see section 8

Other information relating to spills and releases

Place in appropriate containers for disposal. Ventilate affected area.

6.4 Reference to other sections

Section 7: Handling and storage. See also to sections 8 and 13 of the safety data sheet.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Recommendations

Avoid dust formation. Avoid breathing dust.

Measures to prevent fire as well as aerosol and dust generation

Take precautionary measures against static discharge. Use local and general ventilation.

Handling of incompatible substances or mixtures

Do not mix with other chemicals.

Keep away from

Bases, Alkalis, Strong oxidizers, Other chemicals

Measures to protect the environment

Do not empty into drains; dispose of this material and its container at hazardous or special waste collection point.

Advice on general occupational hygiene

Wash hands after use. Do not eat, drink and smoke in work areas. Remove contaminated clothing and protective equipment before entering eating areas. Never keep food or drink in the vicinity of chemicals. Never place chemicals in containers that are normally used for food or drink. Keep away from food, drink and animal feedingstuffs.

7.2 Conditions for safe storage, including any incompatibilities

Consideration of other advice Store between 5°C and 40°C. Avoid freezing.

Ventilation requirements

Keep any substance that emits harmful vapors or gases in a place that allows these to be permanently extracted. Use local and general ventilation.

Specific designs for storage rooms or vessels

No special measures are necessary. Keep container tightly closed.

Packaging compatibilities

Keep only in original container.

7.3 Specific end use(s)

Water treatment chemical. MF/UF Microfiltration/Ultrafiltration.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

National limit values

Occupational Exposure Limits: PELs, TLVs, etc

Occupational exposure limit values (Workplace Exposure Limits)

Name of substance	*Identifier*	*TWA [ppm]*	*TWA [mg/m³]*	*STEL [ppm]*	*STEL [mg/m³]*
Dust and particulates	REL	Not established	Not established	Not established	Not established
Dust and particulates	PEL	1,766	15	Not established	Not established
Dust and particulates	PEL	529.5	5	Not established	Not established
Dust and particulates	PEL (CA)	Not established	10	Not established	Not established
Dust and particulates	PEL (CA)	Not established	5	Not established	Not established

Notation

STEL short-term exposure limit: a limit value above which exposure should not occur and which is related to a 15-minute period (unless otherwise specified)

TWA time-weighted average (long-term exposure limit): measured or calculated in relation to a reference period of 8 hours time-weighted average (unless otherwise specified

8.2 Exposure controls

Appropriate engineering controls

Exhaust ventilation.

Individual protection measures (personal protective equipment)

Guarantee that the eye flushing systems and safety showers are closely located to the working place.

Eye/face protection

Wear eye/face protection.

Skin protection

Chemical resistant protective clothing.

Hand protection

In case of spray contact at least protection index 2 recommended, according to more than 30 min. penetration time (EN 374).
Layer thickness of gloves at least: 0.4 mm
In case of prolonged and intensive contact protection index 6 recommended, according to more than 480 min. penetration time (EN 374).
Layer thickness of gloves at least: 0.7 mm.

Type of material

PVC: polyvinyl chloride, PE: polyethylene, CR: chloroprene (chlorobutadiene) rubber, NBR: acrylonitrile-butadiene rubber, IIR: isobutene-isoprene (butyl) rubber, FKM: fluoro-elastomer

Breakthrough times of the glove material

Breakthrough times and swelling properties of the material must be taken into consideration

Other protection measures

Wash hands thoroughly after handling.

Respiratory protection

Not necessary under normal conditions and provided good general ventilation. In case of inadequate ventilation wear respiratory protection. Particulate filter device (EN 143). Type : E (against acidic gases like sulfur dioxide or hydrogen chloride, color code: Yellow).

Environmental exposure controls

Disposal considerations: see section 13.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance

Physical state	solid (powder, granular)
Color	white

Odor	odorless
Odor threshold	not applicable

Other safety parameters

pH (value)	ca. 2.5 – 3.5 (in aqueous solution: 2 wt%, 25 °C)
Melting point/freezing point	not determined
Initial boiling point and boiling range	not determined
Flash point	not applicable not applicable
Evaporation rate	not determined
Flammability (solid, gas)	not applicable
Explosion limits of dust clouds	not determined
Vapor pressure	not applicable
Vapor density	this information is not available
Density	not determined
Relative density	information on this property is not available

Solubility(ies)

Water solubility	miscible in any proportion

Partition coefficient

-n-Octanol/water (log KOW)	this information is not available

Auto-ignition temperature	not determined not applicable
Decomposition temperature	not determined
Viscosity	not relevant (solid matter)
Explosive properties	none
Oxidizing properties	none

9.2 Other information

There is no additional information.

SECTION 10: Stability and reactivity

10.1 Reactivity

This material is not reactive under normal ambient conditions.

10.2 Chemical stability

The material is stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

10.3 Possibility of hazardous reactions

No known hazardous reactions.

10.4 Conditions to avoid

Incompatible materials.

Hints to prevent fire or explosion

The product in the delivered form is not dust explosion capable; the enrichment of fine dust however leads to the danger of dust explosion.

10.5 Incompatible materials

Oxidizers

10.6 Hazardous decomposition products

Reasonably anticipated hazardous decomposition products produced as a result of use, storage, spill and heating are not known. Hazardous combustion products: see section 5.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Test data are not available for the complete mixture.

Classification procedure

The method for classification of the mixture is based on ingredients of the mixture (additivity formula).

Acute toxicity

Harmful if inhaled.

Acute toxicity of components of the mixture				
Name of substance	*Exposure route*	*Endpoint*	*Value*	*Species*
Organic acid B	oral	LD50	5,400 $^{mg}/_{kg}$	mouse
Organic acid B	dermal	LD50	>2,000 $^{mg}/_{kg}$	rat

Skin corrosion/irritation

Causes severe skin burns and eye damage.

Serious eye damage/eye irritation

Causes serious eye damage.

Respiratory or skin sensitization

Shall not be classified as a respiratory or skin sensitizer.

Germ cell mutagenicity

Shall not be classified as germ cell mutagenic.

Carcinogenicity

Shall not be classified as carcinogenic.

Reproductive toxicity

Shall not be classified as a reproductive toxicant.

Specific target organ toxicity - single exposure

May cause respiratory irritation.

Specific target organ toxicity - repeated exposure

Shall not be classified as a specific target organ toxicant (repeated exposure).

Aspiration hazard

Shall not be classified as presenting an aspiration hazard.

SECTION 12: Ecological information

12.1 Toxicity

Shall not be classified as hazardous to the aquatic environment.

Aquatic toxicity (acute) of components of the mixture					
Name of substance	*Endpoint*	*Exposure time*	*Value*	*Species*	*Source*
Organic acid B	LC50	48 h	440 $^{mg}/_{l}$	fish	European Chemicals Agency, http://echa.europa.eu/

12.2 Persistence and degradability

Data are not available.

12.3 Bioaccumulative potential

Data are not available.

12.4 Mobility in soil

Data are not available.

12.5 Results of PBT and vPvB assessment

Not applicable.

12.6 Other adverse effects

Data are not available.

Remarks

Do not empty into drains or surface water.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Do not empty into drains; dispose of this material and its container at hazardous or special waste collection point. Dispose of waste according to applicable legislation.

Waste treatment of containers/packages

Only packagings which are approved (e.g. acc. to DOT) may be used. Completely emptied packages can be recycled. Handle contaminated packages in the same way as the substance itself.

Remarks

Please consider the relevant national or regional provisions. Waste shall be separated into the categories that can be handled separately by the local or national waste management facilities. Avoid release to the environment.

SECTION 14: Transport information

14.1 UN number	3261
14.2 UN proper shipping name	Corrosive solid, acidic, organic, n.o.s.
Technical name (hazardous ingredients)	contains: (2-hydroxypropane-1,2,3-tricarboxylic acid)
14.3 Transport hazard class(es)	
Class	8
14.4 Packing group	II
14.5 Environmental hazards	non-environmentally hazardous acc. to the dangerous goods regulations

14.6 Special precautions for user

There is no additional information.

14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code

The cargo is not intended to be carried in bulk.

Information for each of the UN Model Regulations

Transport of dangerous goods by road or rail (49 CFR US DOT)

Index number	3261
Proper shipping name	Corrosive solid, acidic, organic, n.o.s.

Particulars in the shipper's declaration	UN3261, Corrosive solid, acidic, organic, n.o.s., (2-hydroxypropane-1,2,3-tricarboxylic acid), 8, II
Class	8
Packing group	II
Danger label(s)	8



Special provisions (SP)	IB8, IP2, IP4, T3, TP33
ERG No	154

International Maritime Dangerous Goods Code (IMDG)

UN number	3261
Proper shipping name	CORROSIVE SOLID, ACIDIC, ORGANIC, N.O.S.
Particulars in the shipper's declaration	UN3261, CORROSIVE SOLID, ACIDIC, ORGANIC, N.O.S., (2-hydroxypropane-1,2,3-tricarboxylic acid), 8, II
Class	8
Marine pollutant	-
Packing group	II
Danger label(s)	8



EmS	F-A, S-B
Segregation group	1 - Acids
Segregation codes	SG36, SG49

International Civil Aviation Organization (ICAO-IATA/DGR)

UN number	3261
Proper shipping name	Corrosive solid, acidic, organic, n.o.s.
Particulars in the shipper's declaration	UN3261, Corrosive solid, acidic, organic, n.o.s., (2-hydroxypropane-1,2,3-tricarboxylic acid), 8, II
Class	8
Environmental hazards	no
Packing group	II
Danger label(s)	8



SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations specific for the product in question

National regulations (United States)

Toxic Substance Control Act (TSCA) all ingredients are listed or exempt from listing

Superfund Amendment and Reauthorization Act (SARA TITLE III)

The List of Extremely Hazardous Substances and Their Threshold Planning Quantities (EPCRA Section 302, 304)

none of the ingredients are listed

Specific Toxic Chemical Listings (EPCRA Section 313)

none of the ingredients are listed

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

List of Hazardous Substances and Reportable Quantities (CERCLA section 102a) (40 CFR 302.4)

none of the ingredients are listed

Clean Air Act

none of the ingredients are listed

New Jersey Worker and Community Right to Know Act

none of the ingredients are listed

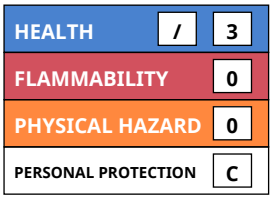
California Environmental Protection Agency (Cal/EPA): Proposition 65 - Safe Drinking Water and Toxic Enforcement Act of 1987

none of the ingredients are listed

Industry or sector specific available guidance(s)

NPCA-HMIS® III

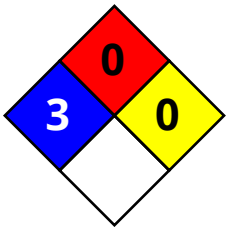
Hazardous Materials Identification System. American Coatings Association.



A "*" on the health line indicates a chronic health hazard is present.

NFPA® 704

National Fire Protection Association: Standard System for the Identification of the Hazards of Materials for Emergency Response (United States).



Additional information

Substance is listed in the following national inventories:
The contained substances are listed in the following national inventories:
AICS (Australia)
ASIA-PAC (Asia-Pacific Region)
DSL (Canada)
NDSL (Canada)
DSL/NDSL (Canada)
IECSC (China)
EINECS/ELINCS/NLP (Europe)
EINECS (European Union)
REACH (Europe)
ENCS, class 1 and 2 (MITI-inventory, Japan)
CSCL-ENCS (Japan)
ISHA-ENCS (Japan)
KECL (Republic of Korea)
INSQ (Mexico)
NZIoC (New Zealand)
PICCS (Philippines)
CICR (Turkey)
TCSI (Taiwan)
TSCA (United States)

15.2 Chemical Safety Assessment

Chemical Safety Assessment: No.

SECTION 16: Other information, including date of preparation or last revision

Abbreviations and acronyms

Abbr.	*Descriptions of used abbreviations*
49 CFR US DOT	49 CFR U.S. Department of Transportation
Acute Tox.	Acute toxicity
CAS	Chemical Abstracts Service (service that maintains the most comprehensive list of chemical substances)
DGR	Dangerous Goods Regulations (see IATA/DGR)
DOT	Department of Transportation (USA)
EC No	The EC Inventory (EINECS, ELINCS and the NLP-list) is the source for the seven-digit EC number, an identifier of substances commercially available within the EU (European Union)
EINECS	European Inventory of Existing Commercial Chemical Substances
ELINCS	European List of Notified Chemical Substances
EmS	Emergency Schedule
ERG No	Emergency Response Guidebook - Number
Eye Dam.	Seriously damaging to the eye
Eye Irrit.	Irritant to the eye
GHS	"Globally Harmonized System of Classification and Labelling of Chemicals" developed by the United Nations
IATA	International Air Transport Association
IATA/DGR	Dangerous Goods Regulations (DGR) for the air transport (IATA)

Abbr.	*Descriptions of used abbreviations*
ICAO	International Civil Aviation Organization
IMDG	International Maritime Dangerous Goods Code
LC50	Lethal Concentration 50%: the LC50 corresponds to the concentration of a tested substance causing 50 % lethality during a specified time interval
LD50	Lethal Dose 50 %: the LD50 corresponds to the dose of a tested substance causing 50 % lethality during a specified time interval
MARPOL	International Convention for the Prevention of Pollution from Ships (abbr. of "Marine Pollutant")
NLP	No-Longer Polymer
NPCA-HMIS® III	National Paint and Coatings Association: Hazardous Materials Identification System - HMIS® III, Third Edition
OSHA	Occupational Safety and Health Administration (United States)
PBT	Persistent, Bioaccumulative and Toxic
PEL	Permissible exposure limit
ppm	Parts per million
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals
Skin Corr.	Corrosive to skin
Skin Irrit.	Irritant to skin
STEL	Short-term exposure limit
TWA	Time-weighted average
vPvB	Very Persistent and very Bioaccumulative

Key literature references and sources for data

ECHA: European Chemicals Agency, http://echa.europa.eu/.

OSHA Hazard Communication Standard (HCS), 29 CFR 1910.1200.

Transport of dangerous goods by road or rail (49 CFR US DOT). International Maritime Dangerous Goods Code (IMDG). Dangerous Goods Regulations (DGR) for the air transport (IATA).

Classification procedure

Physical and chemical properties: The classification is based on tested mixture.
Health hazards, Environmental hazards: The method for classification of the mixture is based on ingredients of the mixture (additivity formula).

List of relevant phrases (code and full text as stated in section 2 and 3)

Code	*Text*
H314	Causes severe skin burns and eye damage.
H318	Causes serious eye damage.
H319	Causes serious eye irritation.
H330	Fatal if inhaled.
H332	Harmful if inhaled.

Code	*Text*
H335	May cause respiratory irritation.

Disclaimer

This information is based upon the present state of our knowledge. This SDS has been compiled and is solely intended for this product.

Safety Data Sheet

RoClean™ P303

Date of compilation: 2023-10-30

SECTION 1: Identification

1.1 Product identifier

Trade name **RoClean™ P303**

CAS number none

1.2 Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses RO Reverse Osmosis

1.3 Details of the supplier of the safety data sheet

Avista Technologies, Inc.
140 Bosstick Blvd.
92069 San Marcos
United States

Telephone: +1 (760) 744 0536
e-mail: regulatory@avistatech.com
Website: AvistaMembraneSolutions.com

1.4 **Emergency telephone number**	Emergency Number (USA, Canada): 1 (800) 424-9300 (ChemTrec) Emergency Number (International): 1 (703) 527-3887 (International Collect)

1.5 Registration

This product is designed to be used off-line and is to be flushed out prior to using the system for drinking water, following the manufacturer's use instructions.

SECTION 2: Hazard(s) identification

2.1 Classification of the substance or mixture

Classification acc. to OSHA "Hazard Communication Standard" (29 CFR 1910.1200)

Hazard class	*Category*	*Hazard statement*
acute toxicity (oral)	4	H302
acute toxicity (inhal.)	4	H332
skin corrosion/irritation	1B	H314
serious eye damage/eye irritation	1	H318
specific target organ toxicity - repeated exposure	2	H373

For full text of abbreviations: see SECTION 16.

2.2 Label elements

Signal word danger

Pictograms

GHS05, GHS07, GHS08



Hazard statements

H302+H332	Harmful if swallowed or if inhaled.
H314	Causes severe skin burns and eye damage.
H373	May cause damage to organs through prolonged or repeated exposure.

Precautionary statements

P260	Do not breathe dusts or mists.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear eye protection/face protection.
P301+P330+P331	If swallowed: Rinse mouth. Do NOT induce vomiting.
P303+P361+P353	If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304+P340	If inhaled: Remove person to fresh air and keep comfortable for breathing.
P305+P351+P338	If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a poison center/doctor.
P363	Wash contaminated clothing before reuse.
P405	Store locked up.
P501	Dispose of contents/container to industrial combustion plant.

2.3 Other hazards

Hazards not otherwise classified

May be harmful in contact with skin (GHS category 5: acutely toxic - dermal).

Results of PBT and vPvB assessment

This mixture does not contain any substances that are assessed to be a PBT or a vPvB.

SECTION 3: Composition/information on ingredients

3.1 Mixtures

Hazardous ingredients

Name of substance	*Identifier*	*Wt%*	*Classification acc. to GHS*
Chelate agent F	CAS No Proprietary	10 – < 20	Acute Tox. 4 / H302 Acute Tox. 4 / H332 Eye Dam. 1 / H318 STOT RE 2 / H373
Flow control agent A	CAS No Proprietary EC No Proprietary	1 – < 5	
Organic acid B	77-92-9	60 – < 70	Not established
Polyphosphate salt	7758-29-4	20 – < 30	Acute Tox. 2 / H330

For full text of abbreviations: see SECTION 16.
Specific chemical identity and concentration of some ingredients are protected as Trade Secret information.

Canada HMIRA Registration Number: 03331683 Registration date: 30 May 2019.

SECTION 4: First-aid measures

4.1 Description of first-aid measures

General notes

Do not leave affected person unattended. Remove victim out of the danger area. Keep affected person warm, still and covered. Take off immediately all contaminated clothing. In case of unconsciousness place person in the recovery position. Never give anything by mouth.

Following inhalation

In case of respiratory tract irritation, consult a physician. In all cases of doubt, or when symptoms persist, seek medical advice.

Following skin contact

Brush off loose particles from skin. Rinse skin with water/shower. Take off contaminated clothing. After contact with skin, take off immediately all contaminated clothing, and wash immediately with plenty of water. Immediately call a doctor. In all cases of doubt, or when symptoms persist, seek medical advice.

Following eye contact

Irrigate copiously with clean, fresh water for at least 15 minutes, holding the eyelids apart. Remove contact lenses, if present and easy to do. Continue rinsing. Call a physician immediately.

Following ingestion

Rinse mouth with water (only if the person is conscious). Do NOT induce vomiting. Immediately call a doctor.

4.2 Most important symptoms and effects, both acute and delayed

Causes severe skin burns and eye damage. Splashes cause strong tearing, pain, may cause permanent visual impairment. Prolonged contact may cause dryness, redness, burns, blistering and ulceration. Can be partially absorbed by the skin. Ingestion causes pain, burns, abdominal pain, possible general impact (shock).

4.3 Indication of any immediate medical attention and special treatment needed

No specific antidote is known. Treatment of the symptoms.

SECTION 5: Fire-fighting measures

5.1 Extinguishing media

Suitable extinguishing media

Non-combustible. Coordinate firefighting measures to the fire surroundings. Water, Foam, Alcohol resistant foam, Fire extinguishing powder, ABC-powder

Unsuitable extinguishing media

None

5.2 Special hazards arising from the substance or mixture

Deposited combustible dust has considerable explosion potential.

Hazardous combustion products

Carbon monoxide (CO), Carbon dioxide (CO2)

5.3 Advice for firefighters

Keep containers cool with water spray. In case of fire and/or explosion do not breathe fumes. Do not allow firefighting water to enter drains or water courses. Collect contaminated firefighting water separately. Fight fire with normal precautions from a reasonable distance.

Special protective equipment for firefighters

Chemical protection suit, Use suitable breathing apparatus

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Aqueous solutions or powders that become wet produce extremely slippery conditions.

For non-emergency personnel

Follow emergency procedures such as the need to evacuate the danger area or to consult an expert. Remove persons to safety. Prevent skin contact. Avoid inhaling sprayed product. Aqueous solutions or powders that become wet produce extremely slippery conditions.

For emergency responders

Wear breathing apparatus if exposed to vapors/dust/aerosols/gases. Wear personal protective equipment/face protection. Do not breathe dust. Aqueous solutions or powders that become wet produce extremely slippery conditions. Special danger of slipping by leaking/spilling product.

Suitable fabric for personal protective clothing

PE: polyethylene, NR: natural rubber, latex, CR: chloroprene (chlorobutadiene) rubber

6.2 Environmental precautions

Keep away from drains, surface and ground water. Retain contaminated washing water and dispose of it. If substance has entered a water course or sewer, inform the responsible authority. Disposal considerations: see section 13. Chemicals generally shouldn't reach surface water.

6.3 Methods and material for containment and cleaning up

Advice on how to contain a spill

Covering of drains, Take up mechanically

Advice on how to clean up a spill

Take up mechanically. Collect spillage: Control of dust.

Appropriate containment techniques

Neutralization techniques. Decontamination techniques. Use of adsorbent materials. Vacuuming techniques.

Equipment required for containment/clean-up

Approved industrial vacuum cleaner, Absorbent material (e.g. sand, diatomaceous earth, acid binder, universal binder, sawdust, etc.), Sweeping compounds (oil absorbing), Shovel, Drain seal, Collecting container, Protective gloves, Eye protection (e.g. protective goggles), Personal protective equipment: see section 8

Other information relating to spills and releases

Place in appropriate containers for disposal. Ventilate affected area.

6.4 Reference to other sections

Section 7: Handling and storage. See also to sections 8 and 13 of the safety data sheet.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Recommendations

Avoid dust formation. Avoid breathing dust.

Measures to prevent fire as well as aerosol and dust generation

Take precautionary measures against static discharge. Use local and general ventilation.

Handling of incompatible substances or mixtures

Do not mix with other chemicals.

Keep away from

Bases, Alkalis, Strong oxidizers, Other chemicals

Measures to protect the environment

Do not empty into drains; dispose of this material and its container at hazardous or special waste collection point.

Advice on general occupational hygiene

Wash hands after use. Do not eat, drink and smoke in work areas. Remove contaminated clothing and protective equipment before entering eating areas. Never keep food or drink in the vicinity of chemicals. Never place chemicals in containers that are normally used for food or drink. Keep away from food, drink and animal feedingstuffs.

7.2 Conditions for safe storage, including any incompatibilities

Consideration of other advice Store between 5°C and 40°C. Avoid freezing.

Ventilation requirements

Keep any substance that emits harmful vapors or gases in a place that allows these to be permanently extracted. Use local and general ventilation.

Specific designs for storage rooms or vessels

No special measures are necessary. Keep container tightly closed.

Storage temperature

Recommended storage temperature: 5 – 30 °C.

Packaging compatibilities

Keep only in original container.

7.3 Specific end use(s)

RO Reverse Osmosis.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

National limit values

Occupational Exposure Limits: PELs, TLVs, etc

Occupational exposure limit values (Workplace Exposure Limits)					
Name of substance	*Identifier*	*TWA [ppm]*	*TWA [mg/m³]*	*STEL [ppm]*	*STEL [mg/m³]*
Dust and particulates	REL	Not established	Not established	Not established	Not established
Dust and particulates	PEL	1,766	15	Not established	Not established
Dust and particulates	PEL	529.5	5	Not established	Not established
Dust and particulates	PEL (CA)	Not established	10	Not established	Not established
Dust and particulates	PEL (CA)	Not established	5	Not established	Not established

Notation

STEL short-term exposure limit: a limit value above which exposure should not occur and which is related to a 15-minute period (unless otherwise specified)

TWA time-weighted average (long-term exposure limit): measured or calculated in relation to a reference period of 8 hours time-weighted average (unless otherwise specified

8.2 Exposure controls

Appropriate engineering controls

Exhaust ventilation.

Individual protection measures (personal protective equipment)

Guarantee that the eye flushing systems and safety showers are closely located to the working place.

Eye/face protection

Wear eye/face protection.

Skin protection

Chemical resistant protective clothing.

Hand protection

In case of spray contact at least protection index 2 recommended, according to more than 30 min. penetration time (EN 374).
Layer thickness of gloves at least: 0.4 mm
In case of prolonged and intensive contact protection index 6 recommended, according to more than 480 min. penetration time (EN 374).
Layer thickness of gloves at least: 0.7 mm.

Type of material

PVC: polyvinyl chloride, PE: polyethylene, CR: chloroprene (chlorobutadiene) rubber, NBR: acrylonitrile-butadiene rubber, IIR: isobutene-isoprene (butyl) rubber, FKM: fluoro-elastomer

Breakthrough times of the glove material

Breakthrough times and swelling properties of the material must be taken into consideration

Other protection measures

Wash hands thoroughly after handling.

Respiratory protection

Not necessary under normal conditions and provided good general ventilation. In case of inadequate ventilation wear respiratory protection. Particulate filter device (EN 143). Type : E (against acidic gases like sulfur dioxide or hydrogen chloride, color code: Yellow).

Environmental exposure controls

Disposal considerations: see section 13.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance

Physical state	solid (powder, granular)
Color	white
Odor	odorless
Odor threshold	not applicable

Other safety parameters

pH (value)	ca. 2.4 – 3.8 (in aqueous solution: 2 wt%, 25 °C)
Melting point/freezing point	not determined
Initial boiling point and boiling range	not determined
Flash point	not applicable not applicable
Evaporation rate	not determined
Flammability (solid, gas)	not applicable
Explosion limits of dust clouds	not determined
Vapor pressure	not applicable
Vapor density	this information is not available
Density	not determined
Relative density	information on this property is not available

Solubility(ies)

Water solubility	miscible in any proportion

Partition coefficient

-n-Octanol/water (log KOW)	this information is not available

Auto-ignition temperature	not determined not applicable
Decomposition temperature	not determined
Viscosity	not relevant (solid matter)
Explosive properties	none
Oxidizing properties	none

9.2 Other information

There is no additional information.

SECTION 10: Stability and reactivity

10.1 Reactivity

This material is not reactive under normal ambient conditions.

10.2 Chemical stability

The material is stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

10.3 Possibility of hazardous reactions

No known hazardous reactions.

10.4 Conditions to avoid

Incompatible materials.

Hints to prevent fire or explosion

The product in the delivered form is not dust explosion capable; the enrichment of fine dust however leads to the danger of dust explosion.

10.5 Incompatible materials

Oxidizers

10.6 Hazardous decomposition products

Reasonably anticipated hazardous decomposition products produced as a result of use, storage, spill and heating are not known. Hazardous combustion products: see section 5.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Test data are not available for the complete mixture.

Classification procedure

The method for classification of the mixture is based on ingredients of the mixture (additivity formula).

Acute toxicity

Harmful if swallowed. Harmful if inhaled.

Acute toxicity of components of the mixture				
Name of substance	*Exposure route*	*Endpoint*	*Value*	*Species*
Organic acid B	oral	LD50	5,400 $^{mg}/_{kg}$	mouse
Organic acid B	dermal	LD50	>2,000 $^{mg}/_{kg}$	rat
Polyphosphate salt	oral	LD50	>2,000 $^{mg}/_{kg}$	rat
Polyphosphate salt	inhalation: dust/ mist	LC50	>0.39 $^{mg}/_{l}$/4h	rat
Polyphosphate salt	dermal	LD50	>4,640 $^{mg}/_{kg}$	rabbit

Skin corrosion/irritation

Causes severe skin burns and eye damage.

Serious eye damage/eye irritation

Causes serious eye damage.

Respiratory or skin sensitization

Shall not be classified as a respiratory or skin sensitizer.

Germ cell mutagenicity

Shall not be classified as germ cell mutagenic.

Carcinogenicity

Shall not be classified as carcinogenic.

Reproductive toxicity

Shall not be classified as a reproductive toxicant.

Specific target organ toxicity - single exposure

Shall not be classified as a specific target organ toxicant (single exposure).

Specific target organ toxicity - repeated exposure

May cause damage to organs through prolonged or repeated exposure.

Aspiration hazard

Shall not be classified as presenting an aspiration hazard.

SECTION 12: Ecological information

12.1 Toxicity

Shall not be classified as hazardous to the aquatic environment.

Aquatic toxicity (acute)			
Endpoint	*Value*	*Species*	*Exposure time*
LC50	854 $^{mg}/_{l}$	fathead minnow	48 h
LC50	325 $^{mg}/_{l}$	water flea (Daphnia)	24 h
LC50	8,944 $^{mg}/_{l}$	Arcatia tonsa	24 h

Aquatic toxicity (acute)			
Endpoint	*Value*	*Species*	*Exposure time*
LC50	210 $^{mg}/_{l}$	marine fish	96 h
EC50	>1,000 $^{mg}/_{l}$	algae (Sceletonema costatum)	72 h

Aquatic toxicity (acute) of components of the mixture					
Name of substance	*Endpoint*	*Exposure time*	*Value*	*Species*	*Source*
Organic acid B	LC50	48 h	440 $^{mg}/_{l}$	fish	European Chemicals Agency, http://echa.europa.eu/
Polyphosphate salt	LC50	24 h	>1,850 $^{mg}/_{l}$	fish	European Chemicals Agency, http://echa.europa.eu/
Polyphosphate salt	EC50	48 h	>100 $^{mg}/_{l}$	aquatic invertebrates	European Chemicals Agency, http://echa.europa.eu/

12.2 Persistence and degradability

Data are not available.

12.3 Bioaccumulative potential

Data are not available.

12.4 Mobility in soil

Data are not available.

12.5 Results of PBT and vPvB assessment

Not applicable.

12.6 Other adverse effects

Data are not available.

Remarks

Do not empty into drains or surface water.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Do not empty into drains; dispose of this material and its container at hazardous or special waste collection point. Dispose of waste according to applicable legislation.

Waste treatment of containers/packages

Only packagings which are approved (e.g. acc. to DOT) may be used. Completely emptied packages can be recycled. Handle contaminated packages in the same way as the substance itself.

Remarks

Please consider the relevant national or regional provisions. Waste shall be separated into the categories that can be handled separately by the local or national waste management facilities. Avoid release to the environment.

SECTION 14: Transport information

14.1 UN number	3261
14.2 UN proper shipping name	Corrosive solid, acidic, organic, n.o.s.
Technical name (hazardous ingredients)	contains: (2-hydroxypropane-1,2,3-tricarboxylic acid) (pentasodium bis(phosphonooxy)phosphinate)
14.3 Transport hazard class(es)	
Class	8
14.4 Packing group	II
14.5 Environmental hazards	non-environmentally hazardous acc. to the dangerous goods regulations

14.6 Special precautions for user

There is no additional information.

14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code

The cargo is not intended to be carried in bulk.

Information for each of the UN Model Regulations

Transport of dangerous goods by road or rail (49 CFR US DOT)

Index number	3261
Proper shipping name	Corrosive solid, acidic, organic, n.o.s.
Particulars in the shipper's declaration	UN3261, Corrosive solid, acidic, organic, n.o.s., (2-hydroxypropane-1,2,3-tricarboxylic acid, pentasodium bis(phosphonooxy)phosphinate), 8, II
Class	8
Packing group	II
Danger label(s)	8



Special provisions (SP)	IB8, IP2, IP4, T3, TP33
ERG No	154

International Maritime Dangerous Goods Code (IMDG)

UN number	3261
Proper shipping name	CORROSIVE SOLID, ACIDIC, ORGANIC, N.O.S.
Particulars in the shipper's declaration	UN3261, CORROSIVE SOLID, ACIDIC, ORGANIC, N.O.S., (2-hydroxypropane-1,2,3-tricarboxylic acid, pentasodium bis(phosphonooxy)phosphinate), 8, II
Class	8

Marine pollutant	-
Packing group	II
Danger label(s)	8



EmS	F-A, S-B
Segregation group	1 - Acids
Segregation codes	SG36, SG49

International Civil Aviation Organization (ICAO-IATA/DGR)

UN number	3261
Proper shipping name	Corrosive solid, acidic, organic, n.o.s.
Particulars in the shipper's declaration	UN3261, Corrosive solid, acidic, organic, n.o.s., (2-hydroxypropane-1,2,3-tricarboxylic acid, pentasodium bis(phosphonooxy)phosphinate), 8, II
Class	8
Environmental hazards	no
Packing group	II
Danger label(s)	8



SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations specific for the product in question

National regulations (United States)

Toxic Substance Control Act (TSCA) all ingredients are listed or exempt from listing

Superfund Amendment and Reauthorization Act (SARA TITLE III)

The List of Extremely Hazardous Substances and Their Threshold Planning Quantities (EPCRA Section 302, 304)

none of the ingredients are listed

Specific Toxic Chemical Listings (EPCRA Section 313)

none of the ingredients are listed

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

List of Hazardous Substances and Reportable Quantities (CERCLA section 102a) (40 CFR 302.4)

none of the ingredients are listed

Clean Air Act

none of the ingredients are listed

New Jersey Worker and Community Right to Know Act

none of the ingredients are listed

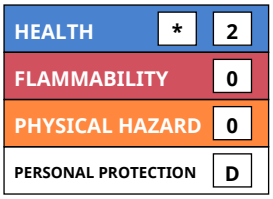
California Environmental Protection Agency (Cal/EPA): Proposition 65 - Safe Drinking Water and Toxic Enforcement Act of 1987

none of the ingredients are listed

Industry or sector specific available guidance(s)

NPCA-HMIS® III

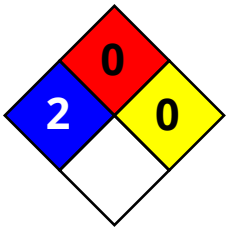
Hazardous Materials Identification System. American Coatings Association.



A "*" on the health line indicates a chronic health hazard is present.

NFPA® 704

National Fire Protection Association: Standard System for the Identification of the Hazards of Materials for Emergency Response (United States).



Additional information

Substance is listed in the following national inventories:
The contained substances are listed in the following national inventories:
AICS (Australia)
ASIA-PAC (Asia-Pacific Region)
DSL (Canada)
NDSL (Canada)
DSL/NDSL (Canada)
IECSC (China)
EINECS/ELINCS/NLP (Europe)
EINECS (European Union)
REACH (Europe)
ENCS, class 1 and 2 (MITI-inventory, Japan)
CSCL-ENCS (Japan)
ISHA-ENCS (Japan)
KECL (Republic of Korea)
INSQ (Mexico)
NZIoC (New Zealand)
PICCS (Philippines)
CICR (Turkey)
TCSI (Taiwan)
TSCA (United States)

15.2 Chemical Safety Assessment

Chemical Safety Assessment: No.

SECTION 16: Other information, including date of preparation or last revision

Abbreviations and acronyms

Abbr.	*Descriptions of used abbreviations*
49 CFR US DOT	49 CFR U.S. Department of Transportation
Acute Tox.	Acute toxicity
CAS	Chemical Abstracts Service (service that maintains the most comprehensive list of chemical substances)
DGR	Dangerous Goods Regulations (see IATA/DGR)
DOT	Department of Transportation (USA)
EC50	Effective Concentration 50 %. The EC50 corresponds to the concentration of a tested substance causing 50 % changes in response (e.g. on growth) during a specified time interval
EC No	The EC Inventory (EINECS, ELINCS and the NLP-list) is the source for the seven-digit EC number, an identifier of substances commercially available within the EU (European Union)
EINECS	European Inventory of Existing Commercial Chemical Substances
ELINCS	European List of Notified Chemical Substances
EmS	Emergency Schedule
ERG No	Emergency Response Guidebook - Number
Eye Dam.	Seriously damaging to the eye
Eye Irrit.	Irritant to the eye
GHS	"Globally Harmonized System of Classification and Labelling of Chemicals" developed by the United Nations
IATA	International Air Transport Association
IATA/DGR	Dangerous Goods Regulations (DGR) for the air transport (IATA)
ICAO	International Civil Aviation Organization
IMDG	International Maritime Dangerous Goods Code
LC50	Lethal Concentration 50%: the LC50 corresponds to the concentration of a tested substance causing 50 % lethality during a specified time interval
LD50	Lethal Dose 50 %: the LD50 corresponds to the dose of a tested substance causing 50 % lethality during a specified time interval
MARPOL	International Convention for the Prevention of Pollution from Ships (abbr. of "Marine Pollutant")
NLP	No-Longer Polymer
NPCA-HMIS® III	National Paint and Coatings Association: Hazardous Materials Identification System - HMIS® III, Third Edition
OSHA	Occupational Safety and Health Administration (United States)
PBT	Persistent, Bioaccumulative and Toxic
PEL	Permissible exposure limit
ppm	Parts per million
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals
STEL	Short-term exposure limit

Abbr.	*Descriptions of used abbreviations*
STOT RE	Specific target organ toxicity - repeated exposure
TWA	Time-weighted average
vPvB	Very Persistent and very Bioaccumulative

Key literature references and sources for data

ECHA: European Chemicals Agency, http://echa.europa.eu/.

OSHA Hazard Communication Standard (HCS), 29 CFR 1910.1200.

Transport of dangerous goods by road or rail (49 CFR US DOT). International Maritime Dangerous Goods Code (IMDG). Dangerous Goods Regulations (DGR) for the air transport (IATA).

Classification procedure

Physical and chemical properties: The classification is based on tested mixture.
Health hazards, Environmental hazards: The method for classification of the mixture is based on ingredients of the mixture (additivity formula).

List of relevant phrases (code and full text as stated in section 2 and 3)

Code	*Text*
H302	Harmful if swallowed.
H314	Causes severe skin burns and eye damage.
H318	Causes serious eye damage.
H330	Fatal if inhaled.
H332	Harmful if inhaled.
H373	May cause damage to organs through prolonged or repeated exposure.

Disclaimer

This information is based upon the present state of our knowledge. This SDS has been compiled and is solely intended for this product.

SAFETY DATA SHEET
KLEEN MCT113

1. Identification

Product identifier **KLEEN MCT113**

Other means of identification None.

Recommended use Membrane cleaner

Recommended restrictions None known.

Company/undertaking identification

SUEZ WTS USA, Inc.
4636 Somerton Road
Trevose, PA 19053
T 215 355 3300, F 215 953 5524

Emergency telephone

(800) 877 1940

2. Hazard(s) identification

Physical hazards	Corrosive to metals	Category 1
Health hazards	Skin corrosion/irritation	Category 1A
	Serious eye damage/eye irritation	Category 1
	Specific target organ toxicity, single exposure	Category 3 respiratory tract irritation

OSHA defined hazards Not classified.

Label elements



Signal word Danger

Hazard statement May be corrosive to metals. Causes severe skin burns and eye damage. Causes serious eye damage. May cause respiratory irritation.

Precautionary statement

Prevention Keep only in original container. Do not breathe mist or vapor. Wash thoroughly after handling. Use only outdoors or in a well-ventilated area. Wear protective gloves/protective clothing/eye protection/face protection.

Response If swallowed: Rinse mouth. Do NOT induce vomiting. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. If inhaled: Remove person to fresh air and keep comfortable for breathing. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center/doctor. Wash contaminated clothing before reuse. Absorb spillage to prevent material damage.

Storage Store in a well-ventilated place. Keep container tightly closed. Store locked up. Store in corrosive resistant container with a resistant inner liner.

Disposal Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC) None known.

Supplemental information None.

3. Composition/information on ingredients

Mixtures

Components	CAS #	Percent
Citric acid	77-92-9	10 - 20
Formic acid	64-18-6	2.5 - 10
Hydroxyacetic acid	79-14-1	2.5 - 10
N-hydroxyethylenediamine triacetic acid trisodium salt	139-89-9	2.5 - 10

Composition comments Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this SDS for our assessment of the potential hazards of this formulation.

4. First-aid measures

Inhalation Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a poison center or doctor/physician if you feel unwell.

Skin contact Take off immediately all contaminated clothing. Rinse skin with water/shower. Call a physician or poison control center immediately. Chemical burns must be treated by a physician. Wash contaminated clothing before reuse.

Eye contact Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a physician or poison control center immediately.

Ingestion Call a physician or poison control center immediately. Rinse mouth. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.

Most important symptoms/effects, acute and delayed Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. May cause respiratory irritation.

Indication of immediate medical attention and special treatment needed Provide general supportive measures and treat symptomatically. Chemical burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. Keep victim under observation. Symptoms may be delayed.

General information If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire-fighting measures

Suitable extinguishing media Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2).

Unsuitable extinguishing media Do not use water jet as an extinguisher, as this will spread the fire.

Specific hazards arising from the chemical During fire, gases hazardous to health may be formed.

Special protective equipment and precautions for firefighters Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask.

Fire fighting equipment/instructions In case of fire and/or explosion do not breathe fumes. Use standard firefighting procedures and consider the hazards of other involved materials. Cool containers / tanks with water spray.

Specific methods Use standard firefighting procedures and consider the hazards of other involved materials.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Wear appropriate protective equipment and clothing during clean-up. Do not breathe mist or vapor. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.

Methods and materials for containment and cleaning up

Prevent entry into waterways, sewer, basements or confined areas.

Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Absorb spillage to prevent material damage. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Following product recovery, flush area with water.

Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.

Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.

Environmental precautions

Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling

Do not get in eyes, on skin, or on clothing. Avoid prolonged exposure. Provide adequate ventilation. Wear appropriate personal protective equipment. Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities

Store locked up. Store in a cool, dry place out of direct sunlight. Store in corrosive resistant container with a resistant inner liner. Store in tightly closed container. Keep only in the original container. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value
Formic acid (CAS 64-18-6)	PEL	9 mg/m3
		5 ppm

US. ACGIH Threshold Limit Values

Components	Type	Value
Formic acid (CAS 64-18-6)	STEL	10 ppm
	TWA	5 ppm

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
Formic acid (CAS 64-18-6)	TWA	9 mg/m3
		5 ppm

Biological limit values

No biological exposure limits noted for the ingredient(s).

Appropriate engineering controls

Provide adequate ventilation. Eye wash facilities and emergency shower must be available when handling this product.

Individual protection measures, such as personal protective equipment

Eye/face protection

Wear safety glasses with side shields (or goggles) and a face shield.

Skin protection

Hand protection

Wear appropriate chemical resistant gloves. The choice of an appropriate glove does not only depend on its material but also on other quality features and is different from one producer to the other. Glove selection must take into account any solvents and other hazards present.

Other

Wear appropriate chemical resistant clothing.

Respiratory protection

In case of insufficient ventilation, wear suitable respiratory equipment. A respiratory protection program that meets OSHA's 29 CFR 1910.34 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant a respirator's use.

Thermal hazards

Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations

Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance

Liquid

Physical state

Liquid.

Form

Not available.

Color	Pale yellow
Odor	Mild
Odor threshold	Not available.
pH (concentrated product)	2.71 Neat
Melting point/freezing point	16 °F (-9 °C)
Initial boiling point and boiling range	Not available.
Flash point	> 239 °F (> 115 °C)
Evaporation rate	Slower than Ether
Flammability (solid, gas)	Not applicable.
Upper/lower flammability or explosive limits	
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	18 mmHg
Vapor pressure temp.	70 °F (21 °C)
Vapor density	< 1
Relative density	1.15
Relative density temperature	70 °F (21 °C)
Solubility(ies)	
Solubility (water)	100 %
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	5 mPa.s
Viscosity temperature	77 °F (25 °C)
Other information	
Explosive properties	Not explosive.
Oxidizing properties	Not oxidizing.
pH in aqueous solution	3.05 (2% Solution)
Pour point	21 °F (-6 °C)
VOC	0 % ESTIMATED

10. Stability and reactivity

Reactivity	May be corrosive to metals.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. Contact with incompatible materials.
Incompatible materials	Strong oxidizing agents. Metals.
Hazardous decomposition products	No hazardous decomposition products are known.

11. Toxicological information

Information on likely routes of exposure

Inhalation	May cause irritation to the respiratory system.
Skin contact	Causes severe skin burns.
Eye contact	Causes serious eye damage.
Ingestion	Causes digestive tract burns.
Symptoms related to the physical, chemical and toxicological characteristics	Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. May cause respiratory irritation.

Information on toxicological effects

Acute toxicity Causes severe skin burns and eye damage.

Product	Species	Test Results
KLEEN MCT113		
Acute		
Dermal		
LD50	Rabbit	> 5000 mg/kg (Calculated according to GHS additivity formula)
Inhalation		
Mist		
LC50	Rat	> 5 mg/l, 4 Hour (Calculated according to GHS additivity formula)
Oral		
LD50	Rat	> 5000 mg/kg (Calculated according to GHS additivity formula)

Components	Species	Test Results
Citric acid (CAS 77-92-9)		
Acute		
Dermal		
LD50	Rabbit	> 2000 mg/kg
Oral		
LD50	Rat	5400 mg/kg
Formic acid (CAS 64-18-6)		
Acute		
Inhalation		
LC50	Rat	15 mg/l, 4 Hour
Oral		
LD50	Rat	1100 mg/kg
Hydroxyacetic acid (CAS 79-14-1)		
Acute		
Inhalation		
LC50	Rat	3.6 mg/L, 4 Hour
Oral		
LD50	Rat	2040 mg/kg
N-hydroxyethylenediamine triacetic acid trisodium salt (CAS 139-89-9)		
Acute		
Inhalation		
LC50	Rat	> 10.05 mg/l, 4 Hour
Oral		
LD50	Rat	1780 mg/kg

Skin corrosion/irritation Causes severe skin burns and eye damage.

Serious eye damage/eye irritation Causes serious eye damage.

Respiratory or skin sensitization

Respiratory sensitization This product is not expected to cause respiratory sensitization.

Skin sensitization This product is not expected to cause skin sensitization.

Germ cell mutagenicity Not classified.

Carcinogenicity Not classified.

IARC Monographs. Overall Evaluation of Carcinogenicity

Not listed.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not listed.

US. National Toxicology Program (NTP) Report on Carcinogens

Not listed.

Reproductive toxicity Not classified.

Specific target organ toxicity - single exposure May cause respiratory irritation.

Specific target organ toxicity - repeated exposure Not classified.

Aspiration hazard Not classified.

12. Ecological information

Ecotoxicity

Product		Species	Test Results
Aquatic			
Crustacea	LC50	Daphnia magna	1265 mg/L, 48 H (pH adjusted)
	NOEL	Daphnia magna	1000 mg/L, 48 H (pH adjusted)
Fish	LC50	Fathead Minnow	2634.3 mg/L, 96 H (pH adjusted)
		Rainbow Trout	3567.6 mg/L, 96 H (pH adjusted)
	NOEL	Fathead Minnow	2000 mg/L, 96 H (pH adjusted)
		Rainbow Trout	1500 mg/L, 96 H (pH adjusted)

Persistence and degradability

- COD (mgO2/g)	232 (calculated data)
- BOD 5 (mgO2/g)	77 (calculated data)
- BOD 28 (mgO2/g)	107 (calculated data)
- Closed Bottle Test (% Degradation in 28 days)	46 (calculated data)
- TOC (mg C/g)	116 (calculated data)

Bioaccumulative potential

Partition coefficient n-octanol / water (log Kow)	
Citric acid	-1.64
Formic acid	-0.54
Bioconcentration factor (BCF)	
Citric acid	3

Mobility in soil No data available.

Other adverse effects Not available.

13. Disposal considerations

Disposal instructions Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Incinerate the material under controlled conditions in an approved incinerator. Dispose of contents/container in accordance with local/regional/national/international regulations.

Local disposal regulations Dispose in accordance with all applicable regulations.

Hazardous waste code D002: Waste Corrosive material [pH <=2 or =>12.5, or corrosive to steel]
The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

Contaminated packaging Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

UN number UN3265

UN proper shipping name Corrosive liquid, acidic, organic, n.o.s. (FORMIC ACID, Hydroxyacetic acid)

Transport hazard class(es)

Class	8
Subsidiary risk	-

Packing group II
Special precautions for user Read safety instructions, SDS and emergency procedures before handling.
ERG number 153
Some containers may be exempt from Dangerous Goods/Hazmat Transport Regulations, please check BOL for exact container classification.

IATA

UN number UN3265
UN proper shipping name Corrosive liquid, acidic, organic, n.o.s. (FORMIC ACID, Hydroxyacetic acid)
Transport hazard class(es)

Class	8
Subsidiary risk	-

Packing group II
Environmental hazards No.
ERG Code 153
Special precautions for user Read safety instructions, SDS and emergency procedures before handling.

IMDG

UN number UN3265
UN proper shipping name CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. (FORMIC ACID, Hydroxyacetic acid)
Transport hazard class(es)

Class	8
Subsidiary risk	-

Packing group II
Environmental hazards

Marine pollutant	No.

EmS F-A, S-B
Special precautions for user Read safety instructions, SDS and emergency procedures before handling.

DOT



IATA; IMDG



15. Regulatory information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Toxic Substances Control Act (TSCA)

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Formic acid (CAS 64-18-6) Listed.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not listed.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical Yes

Classified hazard categories
Corrosive to metal
Skin corrosion or irritation
Serious eye damage or eye irritation
Specific target organ toxicity (single or repeated exposure)

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
Formic acid	64-18-6	2.5 - 10

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Contains component(s) regulated under the Safe Drinking Water Act.

Inventory status

Country(s) or region	Inventory name	On inventory (yes/no)*
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

US state regulations

California Proposition 65

California Safe Drinking Water and Toxic Enforcement Act of 2016 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins. For more information go to www.P65Warnings.ca.gov.

US - California Proposition 65 - CRT: Listed date/Carcinogenic substance

No ingredient listed.

US - California Proposition 65 - CRT: Listed date/Developmental toxin

No ingredient listed.

US - California Proposition 65 - CRT: Listed date/Female reproductive toxin

No ingredient listed.

US - California Proposition 65 - CRT: Listed date/Male reproductive toxin

No ingredient listed.

16. Other information, including date of preparation or last revision

Issue date Dec-20-2018

Revision date Jul-08-2022

Version # 6.0

NFPA ratings Health: 3
Flammability: 0
Instability: 0

NFPA ratings



List of abbreviations

ACGIH: American Conference of Governmental Industrial Hygienists
BOD: Biochemical Oxygen Demand
CAS: Chemical Abstract Service Registration Number
COD: Chemical Oxygen Demand
DOT: Department of Transportation (49 CFR 172.101).
GHS: Globally Harmonized System of Classification and Labeling of Chemicals.
IARC: International Agency for Research on Cancer.
IATA: International Air Transport Association
IMDG: International Maritime Dangerous Goods Code
LC50: Lethal Concentration, 50%
LD50: Lethal Dose, 50%
NOEL: No Observed Effect Level
OSHA: Occupational Safety & Health Administration.
STEL: Short Term Exposure Limit
TOC: Total Organic Carbon
TWA: Time Weighted Average
NFPA: National Fire Protection Association

References:

No data available

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Revision information

This document has undergone significant changes and should be reviewed in its entirety.

Prepared by

This SDS has been prepared by SUEZ Regulatory Department (1-215-355-3300).

Safety Data Sheet

RoClean™ P111

Date of compilation: 2023-10-30

SECTION 1: Identification

1.1 Product identifier

Trade name **RoClean™ P111**

CAS number none

1.2 Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses Water treatment chemical
RO Reverse Osmosis

1.3 Details of the supplier of the safety data sheet

Avista Technologies, Inc.
140 Bosstick Blvd.
92069 San Marcos
United States

Telephone: +1 (760) 744 0536
e-mail: regulatory@avistatech.com
Website: AvistaMembraneSolutions.com

1.4	**Emergency telephone number**	Emergency Number (USA, Canada): 1 (800) 424-9300 (ChemTrec) Emergency Number (International): 1 (703) 527-3887 (International Collect)

1.5 Registration

This product is designed to be used off-line and is to be flushed out prior to using the system for drinking water, following the manufacturer's use instructions.

SECTION 2: Hazard(s) identification

2.1 Classification of the substance or mixture

Classification acc. to OSHA "Hazard Communication Standard" (29 CFR 1910.1200)

Hazard class	*Category*	*Hazard statement*
acute toxicity (oral)	4	H302
acute toxicity (inhal.)	4	H332
skin corrosion/irritation	1B	H314
serious eye damage/eye irritation	2A	H319
specific target organ toxicity - repeated exposure	2	H373

For full text of abbreviations: see SECTION 16.

2.2 Label elements

Signal word danger

Pictograms

GHS05, GHS07, GHS08



Hazard statements

H302+H332	Harmful if swallowed or if inhaled.
H314	Causes severe skin burns and eye damage.
H319	Causes serious eye irritation.
H373	May cause damage to organs through prolonged or repeated exposure.

Precautionary statements

P260	Do not breathe dusts or mists.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear eye protection/face protection.
P301+P330+P331	If swallowed: Rinse mouth. Do NOT induce vomiting.
P303+P361+P353	If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304+P340	If inhaled: Remove person to fresh air and keep comfortable for breathing.
P305+P351+P338	If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a poison center/doctor.
P363	Wash contaminated clothing before reuse.
P405	Store locked up.
P501	Dispose of contents/container to industrial combustion plant.

2.3 Other hazards

Hazards not otherwise classified

May be harmful in contact with skin (GHS category 5: acutely toxic - dermal).

Results of PBT and vPvB assessment

This mixture does not contain any substances that are assessed to be a PBT or a vPvB.

SECTION 3: Composition/information on ingredients

3.1 Mixtures

Hazardous ingredients

Name of substance	*Identifier*	*Wt%*	*Classification acc. to GHS*
Chelate agent F	CAS No Proprietary	20 – < 30	Acute Tox. 4 / H302 Acute Tox. 4 / H332 Eye Dam. 1 / H318 STOT RE 2 / H373
Polyphosphate salt	CAS No Proprietary EC No Proprietary	20 – < 30	Acute Tox. 2 / H330

Oxygenated inorganic salt	Proprietary	20 – < 30	Acute Tox. 4 / H302 Eye Dam. 1 / H318 Ox. Sol. 2 / H272
Carbonate salt	Proprietary	20 – < 30	Eye Irrit. 2 / H319

For full text of abbreviations: see SECTION 16.
Specific chemical identity and concentration of some ingredients are protected as Trade Secret information.

HMIRA Registry Number: 3331682 Date filed: 5/30/2019.

SECTION 4: First-aid measures

4.1 Description of first-aid measures

General notes

Do not leave affected person unattended. Remove victim out of the danger area. Keep affected person warm, still and covered. Take off immediately all contaminated clothing. In case of unconsciousness place person in the recovery position. Never give anything by mouth.

Following inhalation

In case of respiratory tract irritation, consult a physician. In all cases of doubt, or when symptoms persist, seek medical advice.

Following skin contact

Brush off loose particles from skin. Rinse skin with water/shower. Take off contaminated clothing. After contact with skin, take off immediately all contaminated clothing, and wash immediately with plenty of water. Immediately call a doctor. In all cases of doubt, or when symptoms persist, seek medical advice.

Following eye contact

Irrigate copiously with clean, fresh water for at least 15 minutes, holding the eyelids apart. Remove contact lenses, if present and easy to do. Continue rinsing. Call a physician immediately.

Following ingestion

Rinse mouth with water (only if the person is conscious). Do NOT induce vomiting. Immediately call a doctor.

4.2 Most important symptoms and effects, both acute and delayed

Causes severe skin burns and eye damage. Splashes cause strong tearing, pain, may cause permanent visual impairment. Prolonged contact may cause dryness, redness, burns, blistering and ulceration. Can be partially absorbed by the skin. Ingestion causes pain, burns, abdominal pain, possible general impact (shock).

4.3 Indication of any immediate medical attention and special treatment needed

No specific antidote is known. Treatment of the symptoms.

SECTION 5: Fire-fighting measures

5.1 Extinguishing media

Suitable extinguishing media

Non-combustible. Coordinate firefighting measures to the fire surroundings. Water, Foam, Fire extinguishing powder, ABC-powder

Unsuitable extinguishing media

None

5.2 Special hazards arising from the substance or mixture

Deposited combustible dust has considerable explosion potential.

Hazardous combustion products

Carbon monoxide (CO), Carbon dioxide (CO2)

5.3 Advice for firefighters

Keep containers cool with water spray. In case of fire and/or explosion do not breathe fumes. Do not allow firefighting water to enter drains or water courses. Collect contaminated firefighting water separately. Fight fire with normal precautions from a reasonable distance.

Special protective equipment for firefighters

Chemical protection suit, Use suitable breathing apparatus

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Aqueous solutions or powders that become wet produce extremely slippery conditions.

For non-emergency personnel

Follow emergency procedures such as the need to evacuate the danger area or to consult an expert. Remove persons to safety. Prevent skin contact. Avoid inhaling sprayed product. Aqueous solutions or powders that become wet produce extremely slippery conditions.

For emergency responders

Wear breathing apparatus if exposed to vapors/dust/aerosols/gases. Wear personal protective equipment/face protection. Do not breathe dust. Aqueous solutions or powders that become wet produce extremely slippery conditions. Special danger of slipping by leaking/spilling product.

Suitable fabric for personal protective clothing

PE: polyethylene, NR: natural rubber, latex, CR: chloroprene (chlorobutadiene) rubber

6.2 Environmental precautions

Keep away from drains, surface and ground water. Retain contaminated washing water and dispose of it. If substance has entered a water course or sewer, inform the responsible authority. Disposal considerations: see section 13. Chemicals generally shouldn't reach surface water.

6.3 Methods and material for containment and cleaning up

Advice on how to contain a spill

Covering of drains, Take up mechanically

Advice on how to clean up a spill

Take up mechanically. Collect spillage: Material for neutralising like diluted acetic acid. Control of dust.

Appropriate containment techniques

Neutralization techniques. Decontamination techniques. Use of adsorbent materials. Vacuuming techniques.

Equipment required for containment/clean-up

Approved industrial vacuum cleaner, Absorbent material (e.g. sand, diatomaceous earth, acid binder, universal binder, sawdust, etc.), Sweeping compounds (oil absorbing), Shovel, Drain seal, Collecting container, Protective gloves, Eye protection (e.g. protective goggles), Personal protective equipment: see section 8

Other information relating to spills and releases

Place in appropriate containers for disposal. Ventilate affected area.

6.4 Reference to other sections

Section 7: Handling and storage. See also to sections 8 and 13 of the safety data sheet.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Recommendations

Avoid dust formation. Avoid breathing dust.

Measures to prevent fire as well as aerosol and dust generation

Take precautionary measures against static discharge. Use local and general ventilation.

Handling of incompatible substances or mixtures

Do not mix with acids. Do not mix with other chemicals.

Keep away from

Strong oxidizers, Other chemicals

Measures to protect the environment

Do not empty into drains; dispose of this material and its container at hazardous or special waste collection point.

Advice on general occupational hygiene

Wash hands after use. Do not eat, drink and smoke in work areas. Remove contaminated clothing and protective equipment before entering eating areas. Never keep food or drink in the vicinity of chemicals. Never place chemicals in containers that are normally used for food or drink. Keep away from food, drink and animal feedingstuffs.

7.2 Conditions for safe storage, including any incompatibilities

Consideration of other advice Store between 5°C and 40°C. Avoid freezing.

Ventilation requirements

Keep any substance that emits harmful vapors or gases in a place that allows these to be permanently extracted. Use local and general ventilation.

Specific designs for storage rooms or vessels

No special measures are necessary. Keep container tightly closed.

Packaging compatibilities

Keep only in original container.

7.3 Specific end use(s)

Water treatment chemical. RO Reverse Osmosis.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

National limit values

Occupational Exposure Limits: PELs, TLVs, etc

Occupational exposure limit values (Workplace Exposure Limits)

Name of substance	*Identifier*	*TWA [ppm]*	*TWA [mg/m³]*	*STEL [ppm]*	*STEL [mg/m³]*
Dust and particulates	REL	Not established	Not established	Not established	Not established
Dust and particulates	PEL	1,766	15	Not established	Not established

Occupational exposure limit values (Workplace Exposure Limits)					
Name of substance	*Identifier*	*TWA [ppm]*	*TWA [mg/m³]*	*STEL [ppm]*	*STEL [mg/m³]*
Dust and particulates	PEL	529.5	5	Not established	Not established
Dust and particulates	PEL (CA)	Not established	10	Not established	Not established
Dust and particulates	PEL (CA)	Not established	5	Not established	Not established

Notation

STEL short-term exposure limit: a limit value above which exposure should not occur and which is related to a 15-minute period (unless otherwise specified)

TWA time-weighted average (long-term exposure limit): measured or calculated in relation to a reference period of 8 hours time-weighted average (unless otherwise specified

8.2 Exposure controls

Appropriate engineering controls

Exhaust ventilation.

Individual protection measures (personal protective equipment)

Guarantee that the eye flushing systems and safety showers are closely located to the working place.

Eye/face protection

Wear eye/face protection.

Skin protection

Chemical resistant protective clothing.

Hand protection

In case of spray contact at least protection index 2 recommended, according to more than 30 min. penetration time (EN 374).
Layer thickness of gloves at least: 0.4 mm
In case of prolonged and intensive contact protection index 6 recommended, according to more than 480 min. penetration time (EN 374).
Layer thickness of gloves at least: 0.7 mm.

Type of material

PVC: polyvinyl chloride, PE: polyethylene, CR: chloroprene (chlorobutadiene) rubber, NBR: acrylonitrile-butadiene rubber, IIR: isobutene-isoprene (butyl) rubber, FKM: fluoro-elastomer

Breakthrough times of the glove material

Breakthrough times and swelling properties of the material must be taken into consideration

Other protection measures

Wash hands thoroughly after handling.

Respiratory protection

Not necessary under normal conditions and provided good general ventilation. In case of inadequate ventilation wear respiratory protection. Particulate filter device (EN 143). Type : E (against acidic gases like sulfur dioxide or hydrogen chloride, color code: Yellow).

Environmental exposure controls

Disposal considerations: see section 13.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance

Physical state	solid (powder, granular)
Color	white
Odor	odorless
Odor threshold	not applicable

Other safety parameters

pH (value)	ca. 10.5 – 11.5 (in aqueous solution: 2 wt%, 25 °C)
Melting point/freezing point	not determined
Initial boiling point and boiling range	not determined
Flash point	not applicable not applicable
Evaporation rate	not determined
Flammability (solid, gas)	not applicable
Explosion limits of dust clouds	not determined
Vapor pressure	not applicable
Vapor density	this information is not available
Density	not determined
Relative density	information on this property is not available
Solubility(ies)	not determined

Partition coefficient

-n-Octanol/water (log KOW)	this information is not available
Auto-ignition temperature	not determined not applicable
Decomposition temperature	not determined
Viscosity	not relevant (solid matter)
Explosive properties	none

Oxidizing properties	none

9.2 Other information

There is no additional information.

SECTION 10: Stability and reactivity

10.1 Reactivity

This material is not reactive under normal ambient conditions.

10.2 Chemical stability

The material is stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

10.3 Possibility of hazardous reactions

Dangerous/dangerous reactions with Acids.

10.4 Conditions to avoid

Incompatible materials.

Hints to prevent fire or explosion

The product in the delivered form is not dust explosion capable; the enrichment of fine dust however leads to the danger of dust explosion.

10.5 Incompatible materials

Oxidizers

10.6 Hazardous decomposition products

Reasonably anticipated hazardous decomposition products produced as a result of use, storage, spill and heating are not known. Hazardous combustion products: see section 5.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Test data are not available for the complete mixture.

Classification procedure

The method for classification of the mixture is based on ingredients of the mixture (additivity formula).

Acute toxicity

Harmful if swallowed. Harmful if inhaled.

Acute toxicity of components of the mixture

Name of substance	*Exposure route*	*Endpoint*	*Value*	*Species*
Oxygenated inorganic salt	oral	LD50	1,034 $^{mg}/_{kg}$	rat
Oxygenated inorganic salt	dermal	LD50	>2,000 $^{mg}/_{kg}$	rabbit
Carbonate salt	oral	LD50	2,800 $^{mg}/_{kg}$	rat
Carbonate salt	dermal	LD50	>2,000 $^{mg}/_{kg}$	rabbit

Skin corrosion/irritation

Causes severe skin burns and eye damage.

Serious eye damage/eye irritation

Causes serious eye damage. Causes serious eye irritation.

Respiratory or skin sensitization

Shall not be classified as a respiratory or skin sensitizer.

Germ cell mutagenicity

Shall not be classified as germ cell mutagenic.

Carcinogenicity

Shall not be classified as carcinogenic.

Reproductive toxicity

Shall not be classified as a reproductive toxicant.

Specific target organ toxicity - single exposure

Shall not be classified as a specific target organ toxicant (single exposure).

Specific target organ toxicity - repeated exposure

May cause damage to organs through prolonged or repeated exposure.

Aspiration hazard

Shall not be classified as presenting an aspiration hazard.

SECTION 12: Ecological information

12.1 Toxicity

Shall not be classified as hazardous to the aquatic environment.

Aquatic toxicity (acute)

Endpoint	*Value*	*Species*	*Exposure time*
LC50	341.5 $^{mg}/_{l}$	fathead minnow	96 h
LC50	41 $^{mg}/_{l}$	Ceriodaphnia dubia (water flea)	48 h
LC50	1,342 $^{mg}/_{l}$	marine fish	96 h
LC50	17.89 $^{mg}/_{l}$	Arcatia tonsa	48 h

Aquatic toxicity (acute) of components of the mixture

Name of substance	*Endpoint*	*Exposure time*	*Value*	*Species*	*Source*
Oxygenated inorganic salt	LC50	48 h	70.7 $^{mg}/_{l}$	fish	European Chemicals Agency, http://echa.europa.eu/
Oxygenated inorganic salt	EC50	48 h	4.9 $^{mg}/_{l}$	aquatic invertebrates	European Chemicals Agency, http://echa.europa.eu/

Aquatic toxicity (acute) of components of the mixture					
Name of substance	*Endpoint*	*Exposure time*	*Value*	*Species*	*Source*
Carbonate salt	LC50	96 h	300 $^{mg}/_{l}$	fish	European Chemicals Agency, http://echa.europa.eu/
Carbonate salt	EC50	48 h	227 $^{mg}/_{l}$	aquatic invertebrates	European Chemicals Agency, http://echa.europa.eu/

12.2 Persistence and degradability

Data are not available.

12.3 Bioaccumulative potential

Data are not available.

12.4 Mobility in soil

Data are not available.

12.5 Results of PBT and vPvB assessment

Not applicable.

12.6 Other adverse effects

Data are not available.

Remarks

Do not empty into drains or surface water.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Do not empty into drains; dispose of this material and its container at hazardous or special waste collection point. Dispose of waste according to applicable legislation.

Waste treatment of containers/packages

Only packagings which are approved (e.g. acc. to DOT) may be used. Completely emptied packages can be recycled. Handle contaminated packages in the same way as the substance itself.

Remarks

Please consider the relevant national or regional provisions. Waste shall be separated into the categories that can be handled separately by the local or national waste management facilities. Avoid release to the environment.

SECTION 14: Transport information

14.1 UN number	3262
14.2 UN proper shipping name	Corrosive solid, basic, inorganic, n.o.s.
Technical name (hazardous ingredients)	contains: (sodium carbonate peroxyhydrate) (disodium carbonate)
14.3 Transport hazard class(es)	
Class	8
14.4 Packing group	II
14.5 Environmental hazards	non-environmentally hazardous acc. to the dangerous goods regulations

14.6 Special precautions for user

There is no additional information.

14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code

The cargo is not intended to be carried in bulk.

Information for each of the UN Model Regulations

Transport of dangerous goods by road or rail (49 CFR US DOT)

Index number	3262
Proper shipping name	Corrosive solid, basic, inorganic, n.o.s.
Particulars in the shipper's declaration	UN3262, Corrosive solid, basic, inorganic, n.o.s., (sodium carbonate peroxyhydrate, disodium carbonate), 8, II
Class	8
Packing group	II
Danger label(s)	8



Special provisions (SP)	IB8, IP2, IP4, T3, TP33
ERG No	154

International Maritime Dangerous Goods Code (IMDG)

UN number	3262
Proper shipping name	CORROSIVE SOLID, BASIC, INORGANIC, N.O.S.
Particulars in the shipper's declaration	UN3262, CORROSIVE SOLID, BASIC, INORGANIC, N.O.S., (sodium carbonate peroxyhydrate, disodium carbonate), 8, II
Class	8
Marine pollutant	-
Packing group	II
Danger label(s)	8



EmS	F-A, S-B
Segregation group	18 - Alkalis
Segregation codes	SG35

International Civil Aviation Organization (ICAO-IATA/DGR)

UN number	3262
Proper shipping name	Corrosive solid, basic, inorganic, n.o.s.
Particulars in the shipper's declaration	UN3262, Corrosive solid, basic, inorganic, n.o.s., (sodium carbonate peroxyhydrate, disodium carbonate), 8, II
Class	8
Environmental hazards	no
Packing group	II
Danger label(s)	8



SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations specific for the product in question

National regulations (United States)

Toxic Substance Control Act (TSCA) all ingredients are listed or exempt from listing

Superfund Amendment and Reauthorization Act (SARA TITLE III)

The List of Extremely Hazardous Substances and Their Threshold Planning Quantities (EPCRA Section 302, 304)

none of the ingredients are listed

Specific Toxic Chemical Listings (EPCRA Section 313)

none of the ingredients are listed

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

List of Hazardous Substances and Reportable Quantities (CERCLA section 102a) (40 CFR 302.4)

none of the ingredients are listed

Clean Air Act

none of the ingredients are listed

New Jersey Worker and Community Right to Know Act

none of the ingredients are listed

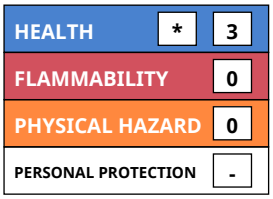
California Environmental Protection Agency (Cal/EPA): Proposition 65 - Safe Drinking Water and Toxic Enforcement Act of 1987

none of the ingredients are listed

Industry or sector specific available guidance(s)

NPCA-HMIS® III

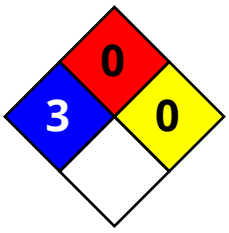
Hazardous Materials Identification System. American Coatings Association.



A "*" on the health line indicates a chronic health hazard is present.

NFPA® 704

National Fire Protection Association: Standard System for the Identification of the Hazards of Materials for Emergency Response (United States).



Additional information

Substance is listed in the following national inventories:
The contained substances are listed in the following national inventories:
AICS (Australia)
ASIA-PAC (Asia-Pacific Region)
DSL (Canada)
NDSL (Canada)
DSL/NDSL (Canada)
IECSC (China)
EINECS/ELINCS/NLP (Europe)
EINECS (European Union)
REACH (Europe)
ENCS, class 1 and 2 (MITI-inventory, Japan)
CSCL-ENCS (Japan)
ISHA-ENCS (Japan)
KECL (Republic of Korea)
INSQ (Mexico)
NZIoC (New Zealand)
PICCS (Philippines)
CICR (Turkey)
TCSI (Taiwan)
TSCA (United States)

15.2 Chemical Safety Assessment

Chemical Safety Assessment: No.

SECTION 16: Other information, including date of preparation or last revision

Abbreviations and acronyms

Abbr.	*Descriptions of used abbreviations*
49 CFR US DOT	49 CFR U.S. Department of Transportation
Acute Tox.	Acute toxicity
CAS	Chemical Abstracts Service (service that maintains the most comprehensive list of chemical substances)
DGR	Dangerous Goods Regulations (see IATA/DGR)
DOT	Department of Transportation (USA)
EC50	Effective Concentration 50 %. The EC50 corresponds to the concentration of a tested substance causing 50 % changes in response (e.g. on growth) during a specified time interval
EC No	The EC Inventory (EINECS, ELINCS and the NLP-list) is the source for the seven-digit EC number, an identifier of substances commercially available within the EU (European Union)
EINECS	European Inventory of Existing Commercial Chemical Substances
ELINCS	European List of Notified Chemical Substances
EmS	Emergency Schedule
ERG No	Emergency Response Guidebook - Number
Eye Dam.	Seriously damaging to the eye
Eye Irrit.	Irritant to the eye
GHS	"Globally Harmonized System of Classification and Labelling of Chemicals" developed by the United Nations
IATA	International Air Transport Association
IATA/DGR	Dangerous Goods Regulations (DGR) for the air transport (IATA)
ICAO	International Civil Aviation Organization
IMDG	International Maritime Dangerous Goods Code
LC50	Lethal Concentration 50%: the LC50 corresponds to the concentration of a tested substance causing 50 % lethality during a specified time interval
LD50	Lethal Dose 50 %: the LD50 corresponds to the dose of a tested substance causing 50 % lethality during a specified time interval
MARPOL	International Convention for the Prevention of Pollution from Ships (abbr. of "Marine Pollutant")
NLP	No-Longer Polymer
NPCA-HMIS® III	National Paint and Coatings Association: Hazardous Materials Identification System - HMIS® III, Third Edition
OSHA	Occupational Safety and Health Administration (United States)
Ox. Sol.	Oxidizing solid
PBT	Persistent, Bioaccumulative and Toxic
PEL	Permissible exposure limit
ppm	Parts per million
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals

Abbr.	*Descriptions of used abbreviations*
STEL	Short-term exposure limit
STOT RE	Specific target organ toxicity - repeated exposure
TWA	Time-weighted average
vPvB	Very Persistent and very Bioaccumulative

Key literature references and sources for data

ECHA: European Chemicals Agency, http://echa.europa.eu/.

OSHA Hazard Communication Standard (HCS), 29 CFR 1910.1200.

Transport of dangerous goods by road or rail (49 CFR US DOT). International Maritime Dangerous Goods Code (IMDG). Dangerous Goods Regulations (DGR) for the air transport (IATA).

Classification procedure

Physical and chemical properties: The classification is based on tested mixture.
Health hazards, Environmental hazards: The method for classification of the mixture is based on ingredients of the mixture (additivity formula).

List of relevant phrases (code and full text as stated in section 2 and 3)

Code	*Text*
H272	May intensify fire; oxidizer.
H302	Harmful if swallowed.
H314	Causes severe skin burns and eye damage.
H318	Causes serious eye damage.
H319	Causes serious eye irritation.
H330	Fatal if inhaled.
H332	Harmful if inhaled.
H373	May cause damage to organs through prolonged or repeated exposure.

Disclaimer

This information is based upon the present state of our knowledge. This SDS has been compiled and is solely intended for this product.

GE Power
Water & Process Technologies

SAFETY DATA SHEET

KLEEN MCT405

1. Identification

Product identifier **KLEEN MCT405**

Other means of identification None.

Recommended use Membrane cleaner

Recommended restrictions None known.

Company/undertaking identification

GE Betz, Inc.
4636 Somerton Road
Trevose, PA 19053
T 215 355 3300, F 215 953 5524

Emergency telephone

(800) 877 1940

2. Hazard(s) identification

Physical hazards	Corrosive to metals	Category 1
Health hazards	Skin corrosion/irritation	Category 2
	Serious eye damage/eye irritation	Category 1

OSHA defined hazards Not classified.

Label elements



Signal word Danger

Hazard statement May be corrosive to metals. Causes skin irritation. Causes serious eye damage.

Precautionary statement

Prevention Keep only in original container. Wash thoroughly after handling. Wear eye protection/face protection. Wear protective gloves.

Response IF ON SKIN: Wash with plenty of soap and water. If skin irritation occurs: Get medical advice/attention. Take off contaminated clothing and wash before reuse. Absorb spillage to prevent material damage. If on skin: Wash with plenty of water. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor.

Storage Store in corrosive resistant container with a resistant inner liner. Store in a corrosion resistant container with a resistant inner liner.

Disposal Dispose of waste and residues in accordance with local authority requirements.

Hazard(s) not otherwise classified (HNOC) None known.

Supplemental information None.

3. Composition/information on ingredients

Mixtures

Components	CAS #	Percent
N-hydroxyethylenediamine triacetic acid trisodium salt	139-89-9	2.5 - 10
Sodium alkyl benzene sulphonate	28348-53-0	2.5 - 10
Sodium carbonate	497-19-8	2.5 - 10
Sodium dodecylbenzenesulphonate	25155-30-0	1 - 2.5
Sodium hydroxide	1310-73-2	1 - 2.5

Composition comments Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this SDS for our assessment of the potential hazards of this formulation.

4. First-aid measures

Inhalation If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing. Call a physician if symptoms develop or persist.

Skin contact Wash with plenty of soap and water. If skin irritation occurs: Get medical advice/attention. Wash contaminated clothing before reuse.

Eye contact Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention immediately.

Ingestion Rinse mouth. If ingestion of a large amount does occur, call a poison control center immediately.

Most important symptoms/effects, acute and delayed Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. Skin irritation. May cause redness and pain.

Indication of immediate medical attention and special treatment needed Provide general supportive measures and treat symptomatically. Keep victim under observation. Symptoms may be delayed. Corrosive material It may not be advisable to induce vomiting. Possible mucosal damage may contraindicate the use of gastric lavage.

General information Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire-fighting measures

Suitable extinguishing media Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2).

Unsuitable extinguishing media Do not use water jet as an extinguisher, as this will spread the fire.

Specific hazards arising from the chemical During fire, gases hazardous to health may be formed.

Special protective equipment and precautions for firefighters Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

Fire fighting equipment/instructions In case of fire and/or explosion do not breathe fumes. Use standard firefighting procedures and consider the hazards of other involved materials. Move containers from fire area if you can do so without risk. Cool containers / tanks with water spray.

Specific methods Use standard firefighting procedures and consider the hazards of other involved materials.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures Keep unnecessary personnel away. Wear appropriate protective equipment and clothing during clean-up. Do not touch or walk through spilled material. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. See Section 8 of the SDS for Personal Protective Equipment. For personal protection, see section 8 of the SDS.

Methods and materials for containment and cleaning up Absorb spillage to prevent material damage. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Following product recovery, flush area with water.

Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.

Environmental precautions Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling Alkaline. Do not mix with acidic material. Do not get this material in contact with eyes. Avoid prolonged exposure. Provide adequate ventilation. Wear appropriate personal protective equipment. Observe good industrial hygiene practices. Avoid contact with eyes, skin, and clothing. Use care in handling/storage.

Conditions for safe storage, including any incompatibilities Do not freeze. If frozen, thaw completely and mix thoroughly prior to use. Store in corrosive resistant container with a resistant inner liner. Keep only in the original container. Store in a cool, dry place out of direct sunlight. Store away from incompatible materials (see Section 10 of the SDS). Store in original tightly closed container. Store away from acids. Use proper containers.

8. Exposure controls/personal protection

Occupational exposure limits

The following constituents are the only constituents of the product which have a PEL, TLV or other recommended exposure limit. At this time, the other constituents have no known exposure limits.

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value
Sodium hydroxide (CAS 1310-73-2)	PEL	2 mg/m3

US. ACGIH Threshold Limit Values

Components	Type	Value
Sodium hydroxide (CAS 1310-73-2)	Ceiling	2 mg/m3

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
Sodium hydroxide (CAS 1310-73-2)	Ceiling	2 mg/m3

Biological limit values No biological exposure limits noted for the ingredient(s).

Appropriate engineering controls Provide eyewash station. Eye wash fountain and emergency showers are recommended. Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Individual protection measures, such as personal protective equipment

Eye/face protection Splash proof chemical goggles. Face shield.

Skin protection

Hand protection Wear appropriate chemical resistant gloves. The choice of an appropriate glove does not only depend on its material but also on other quality features and is different from one producer to the other. Glove selection must take into account any solvents and other hazards present.

Other Wear appropriate chemical resistant clothing. Rubber or butyl gloves. Viton gloves. Wash off after each use. Replace as necessary.

Respiratory protection If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.

Thermal hazards Not applicable. Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance

Color Light yellow

Physical state Liquid

Odor Mild

Odor threshold Not available.

pH (concentrated product) 12.9

pH in aqueous solution 11.3 (2% SOL.)

Melting point/freezing point 28 °F (-2 °C)

Initial boiling point and boiling range 212 °F (100 °C)

Flash point > 213 °F (> 101 °C) P-M(CC)

Evaporation rate < 1 (Ether = 1)

Flammability (solid, gas) Not applicable.

Upper/lower flammability or explosive limits

Flammability limit - lower (%) Not available.

Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	18 mm Hg
Vapor pressure temp.	70 °F (21 °C)
Vapor density	< 1 (Air = 1)
Relative density	1.14
Relative density temperature	70 °F (21 °C)
Solubility(ies)	
Solubility (water)	100 %
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	12 cps
Viscosity temperature	70 °F (21 °C)
Other information	
Explosive properties	Not explosive.
Oxidizing properties	Not oxidizing.
Percent volatile	0 (Estimated)
Pour point	33 °F (1 °C)
Specific gravity	1.138

10. Stability and reactivity

Reactivity	May be corrosive to metals.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Protect from freezing. Avoid contact with strong acids and oxidizers.
Incompatible materials	Strong acids. Metals. Contact with strong acids may cause a violent reaction releasing heat.
Hazardous decomposition products	Oxides of carbon, nitrogen, and sulphur evolved in fire.

11. Toxicological information

Information on likely routes of exposure

Inhalation	Prolonged inhalation may be harmful.
Skin contact	Causes skin irritation.
Eye contact	Causes serious eye damage.
Ingestion	May cause severe irritation or burning of the gastrointestinal tract.
Symptoms related to the physical, chemical and toxicological characteristics	Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. Skin irritation. May cause redness and pain.

Information on toxicological effects

Acute toxicity

Product	Species	Test Results
KLEEN MCT405 (CAS Mixture)		
Acute		
Dermal		
LD50	Rabbit	> 5000 mg/kg, (Calculated according to GHS additivity formula)

Product	Species	Test Results
Inhalation		
LC50	Rat	> 5.5 mg/l, 4 Hours, (Calculated according to GHS additivity formula)
Oral		
LD50	Rat	> 5000 mg/kg, (Calculated according to GHS additivity formula)

Components	Species	Test Results
N-hydroxyethylenediamine triacetic acid trisodium salt (CAS 139-89-9)		
Acute		
Inhalation		
LC50	Rat	> 10.054 mg/l, 4 Hour
Oral		
LD50	Rat	1780 mg/kg
Sodium carbonate (CAS 497-19-8)		
Acute		
Dermal		
LD50	Rabbit	> 2000 mg/kg
Oral		
LD50	Rat	2800 mg/kg
Sodium dodecylbenzenesulphonate (CAS 25155-30-0)		
Acute		
Oral		
LD50	Rat	1260 mg/kg
Sodium hydroxide (CAS 1310-73-2)		
Acute		
Dermal		
LD50	Rabbit	1350 mg/kg
Oral		
LD50	Rabbit	> 500 mg/kg

* Estimates for product may be based on additional component data not shown.

Skin corrosion/irritation Causes skin irritation.

Serious eye damage/eye irritation Causes serious eye damage.

Respiratory or skin sensitization

Respiratory sensitization This product is not expected to cause respiratory sensitization.

Skin sensitization This product is not expected to cause skin sensitization.

Germ cell mutagenicity No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

Carcinogenicity Not classified.

IARC Monographs. Overall Evaluation of Carcinogenicity

Not listed.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

US. National Toxicology Program (NTP) Report on Carcinogens

Not listed.

Reproductive toxicity This product is not expected to cause reproductive or developmental effects.

Specific target organ toxicity - single exposure Not classified.

Specific target organ toxicity - repeated exposure Not classified.

Aspiration hazard Based on available data, the classification criteria are not met.
Aspiration of this product may cause the same corrosiveness/irritation impacts as if it were ingested.

Chronic effects Prolonged inhalation may be harmful. Prolonged exposure may cause chronic effects.

12. Ecological information

Ecotoxicity

Product		Species	Test Results
KLEEN MCT405 (CAS Mixture)			
	LC50	Fathead Minnow	164.9 mg/L, Static Renewal Bioassay, 96 hour
	NOEL	Fathead Minnow	125 mg/L, Static Renewal Bioassay, 96 hour
Aquatic			
Crustacea	LC50	Daphnia magna	696.5 mg/L, Static Renewal Bioassay, 48 hour, (pH adjusted)
	NOEL	Daphnia magna	313 mg/L, Static Renewal Bioassay, 48 hour, (pH adjusted)
Fish	LC50	Rainbow Trout	258.2 mg/L, Static Renewal Bioassay, 96 hour
	NOEL	Rainbow Trout	125 mg/L, Static Renewal Bioassay, 96 hour

Bioaccumulative potential

Partition coefficient n-octanol / water (log Kow)

Sodium dodecylbenzenesulphonate 0.45

Mobility in soil No data available.

Other adverse effects No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

Persistence and degradability

No data available

13. Disposal considerations

Disposal instructions Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Incinerate the material under controlled conditions in an approved incinerator. Dispose of contents/container in accordance with local/regional/national/international regulations.

Local disposal regulations Dispose in accordance with all applicable regulations.

Hazardous waste code D002: Waste Corrosive material [pH <=2 or =>12.5, or corrosive to steel]
The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions). Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner.

Contaminated packaging Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

UN number UN1760
UN proper shipping name Corrosive liquids, n.o.s. (Sodium Dodecylbenzenesulfonate, Sodium Hydroxide)
Transport hazard class(es)
Class 8
Subsidiary risk -
Packing group III
Special precautions for user Read safety instructions, SDS and emergency procedures before handling.
ERG number 154
Some containers may be exempt from Dangerous Goods/Hazmat Transport Regulations, please check BOL for exact container classification.

IATA

UN number UN1760
UN proper shipping name Corrosive liquid, n.o.s. (Sodium Dodecylbenzenesulfonate, Sodium Hydroxide)

Transport hazard class(es)

Class	8
Subsidiary risk	-
Packing group	III
Environmental hazards	No.
ERG Code	154
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

IMDG

UN number	UN1760
UN proper shipping name	CORROSIVE LIQUID, N.O.S. (Sodium Dodecylbenzenesulfonate, Sodium Hydroxide)
Transport hazard class(es)	
Class	8
Subsidiary risk	-
Packing group	III
Environmental hazards	
Marine pollutant	No.
EmS	F-A, S-B
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

DOT



IATA; IMDG



15. Regulatory information

US federal regulations

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
All components are on the U.S. EPA TSCA Inventory List.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Sodium dodecylbenzenesulphonate (CAS 25155-30-0)	Listed.
Sodium hydroxide (CAS 1310-73-2)	Listed.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories

Immediate Hazard - Yes
Delayed Hazard - No
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical Yes

SARA 313 (TRI reporting)

Not regulated.

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

Inventory status

Country(s) or region	Inventory name	On inventory (yes/no)*
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

US state regulations

US - California Proposition 65 - CRT: Listed date/Carcinogenic substance

No ingredient listed.

US - California Proposition 65 - CRT: Listed date/Developmental toxin

No ingredient listed.

US - California Proposition 65 - CRT: Listed date/Female reproductive toxin

No ingredient listed.

US - California Proposition 65 - CRT: Listed date/Male reproductive toxin

No ingredient listed.

US - Massachusetts RTK - Substance List

Sodium dodecylbenzenesulphonate (CAS 25155-30-0)
Sodium hydroxide (CAS 1310-73-2)

US - Pennsylvania RTK - Hazardous Substances

Sodium dodecylbenzenesulphonate (CAS 25155-30-0) Listed.
Sodium hydroxide (CAS 1310-73-2) Listed.

US - Rhode Island RTK

Sodium hydroxide (CAS 1310-73-2)

US. New Jersey Worker and Community Right-to-Know Act

Sodium dodecylbenzenesulphonate (CAS 25155-30-0) Listed.
Sodium hydroxide (CAS 1310-73-2) Listed.

US. California Proposition 65

Not Listed.

16. Other information, including date of preparation or last revision

Issue date Nov-16-2014

Revision date Jun-29-2017

Version # 0.0

List of abbreviations	CAS: Chemical Abstract Service Registration Number ACGIH: American Conference of Governmental Industrial Hygienists TWA: Time Weighted Average STEL: Short Term Exposure Limit LD50: Lethal Dose, 50% LC50: Lethal Concentration, 50% NOEL: No Observed Effect Level COD: Chemical Oxygen Demand BOD: Biochemical Oxygen Demand TOC: Total Organic Carbon IATA: International Air Transport Association IMDG: International Maritime Dangerous Goods Code TSRN indicates a Trade Secret Registry Number is used in place of the CAS number.
References:	No data available
Disclaimer	The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.
Revision information	Hazard(s) identification: Prevention Exposure controls/personal protection: Eye/face protection Physical & Chemical Properties: Multiple Properties HazReg Data: North America GHS: Classification
Prepared by	This SDS has been prepared by GE Water & Process Technologies Regulatory Department (1-215-355-3300).

SAFETY DATA SHEET
BIOMATE* MBC2881

1. Identification

Product identifier **BIOMATE MBC2881**

Other means of identification None.

Recommended use Biocide

Recommended restrictions None known.

Company/undertaking identification

SUEZ WTS USA, Inc.
4636 Somerton Road
Trevose, PA 19053
T 215 355 3300, F 215 953 5524

Emergency telephone

(800) 877 1940

2. Hazard(s) identification

Physical hazards	Corrosive to metals	Category 1
Health hazards	Acute toxicity, oral	Category 4
	Acute toxicity, inhalation	Category 4
	Skin corrosion/irritation	Category 1
	Serious eye damage/eye irritation	Category 1
	Sensitization, skin	Category 1

OSHA defined hazards Not classified.

Label elements



Signal word Danger

Hazard statement May be corrosive to metals. Harmful if swallowed. Causes severe skin burns and eye damage. May cause an allergic skin reaction. Causes serious eye damage. Harmful if inhaled.

Precautionary statement

Prevention Keep only in original container. Do not breathe mist or vapor. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area. Contaminated work clothing must not be allowed out of the workplace. Wear eye protection/face protection. Wear protective gloves.

Response If swallowed: Rinse mouth. Do NOT induce vomiting. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. If inhaled: Remove person to fresh air and keep comfortable for breathing. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/physician. If skin irritation or rash occurs: Get medical advice/attention. Wash contaminated clothing before reuse. Absorb spillage to prevent material damage.

Storage Store locked up. Store in corrosive resistant container with a resistant inner liner.

Disposal Dispose of waste and residues in accordance with local authority requirements.

Hazard(s) not otherwise classified (HNOC)	None known.
Supplemental information	None.

3. Composition/information on ingredients

Mixtures

Components	CAS #	Percent
2,2-dibromo-3-nitrilopropionamide	10222-01-2	20 - 40

Composition comments Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this SDS for our assessment of the potential hazards of this formulation.

4. First-aid measures

Inhalation If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing. Oxygen or artificial respiration if needed. Call a POISON CENTER or doctor/physician if you feel unwell.

Skin contact Remove contaminated clothing immediately and wash skin with soap and water. Call a physician or poison control center immediately. Chemical burns must be treated by a physician. Wash contaminated clothing before reuse.

Eye contact Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a physician or poison control center immediately.

Ingestion If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Get medical advice/attention if you feel unwell.

Most important symptoms/effects, acute and delayed Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result.

Indication of immediate medical attention and special treatment needed Provide general supportive measures and treat symptomatically. Chemical burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. Keep victim warm. Keep victim under observation. Symptoms may be delayed.

General information Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance. Wash contaminated clothing before reuse.

5. Fire-fighting measures

Suitable extinguishing media Carbon dioxide, dry chemicals, foam, water spray (fog).

Unsuitable extinguishing media Do not use water jet as an extinguisher, as this will spread the fire.

Specific hazards arising from the chemical During fire, gases hazardous to health may be formed.

Special protective equipment and precautions for firefighters Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask.

Fire fighting equipment/instructions In case of fire and/or explosion do not breathe fumes. Use standard firefighting procedures and consider the hazards of other involved materials. Move containers from fire area if you can do so without risk. Cool containers / tanks with water spray.

Specific methods Use standard firefighting procedures and consider the hazards of other involved materials.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Wear appropriate protective equipment and clothing during clean-up. For personal protection, see section 8 of the SDS. Do not breathe mist or vapor. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained.

Methods and materials for containment and cleaning up	Prevent entry into waterways, sewer, basements or confined areas. Large Spills: Stop the flow of material, if this is without risk. Absorb spillage to prevent material damage. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Following product recovery, flush area with water. Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination. Neutralize the spilled material before disposal. Neutralize with approximately 17.2 grams sodium bisulfite or 15.7 grams sodium metabisulfite for every 100 grams biocide product. Never return spills to original containers for re-use.
Environmental precautions	Avoid discharge into drains, water courses or onto the ground. Water contaminated with this product may be sent to a sanitary sewer treatment facility, or a permitted waste treatment facility, in accordance with any local agreements.

7. Handling and storage

Precautions for safe handling	Observe good industrial hygiene practices. Do not get in eyes, on skin, or on clothing. Avoid prolonged exposure. Use care in handling/storage. Do not taste or swallow. Do not mix with alkaline material. Use only outdoors or in a well-ventilated area. Wear appropriate personal protective equipment. See Section 8 of the SDS for Personal Protective Equipment. When using, do not eat, drink or smoke. Wash hands thoroughly after handling.
Conditions for safe storage, including any incompatibilities	Store locked up. Store in a cool, dry place out of direct sunlight. Store in corrosive resistant container with a resistant inner liner. Keep only in the original container. Store in a well-ventilated place. Store in accordance with local/regional/national/international regulation.

8. Exposure controls/personal protection

Biological limit values	No biological exposure limits noted for the ingredient(s).
Appropriate engineering controls	Provide adequate ventilation. Eye wash facilities and emergency shower must be available when handling this product.

Individual protection measures, such as personal protective equipment

Eye/face protection	Wear safety glasses with side shields (or goggles) and a face shield.
Skin protection	
Hand protection	USERS OF A PESTICIDE PRODUCT SHOULD REFER TO THE PRODUCT LABEL FOR PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS. Wear appropriate chemical resistant gloves. The choice of an appropriate glove does not only depend on its material but also on other quality features and is different from one producer to the other. Glove selection must take into account any solvents and other hazards present.
Other	Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended.
Respiratory protection	A respiratory protection program that meets OSHA's 29 CFR 1910.34 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant a respirator's use. Consult the product label for respirator use.
Thermal hazards	Wear appropriate thermal protective clothing, when necessary.
General hygiene considerations	Keep away from food and drink. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Contaminated work clothing should not be allowed out of the workplace.

9. Physical and chemical properties

Appearance	Liquid
Physical state	Liquid.
Form	Not available.
Color	Yellow to amber
Odor	Slight
Odor threshold	Not available.
pH (concentrated product)	1.9 Neat
Melting point/freezing point	-0.04 °F (-18 °C)
Initial boiling point and boiling range	Not available.
Flash point	Not available.
Evaporation rate	Slower than Ether

Flammability (solid, gas)	Not applicable.
Upper/lower flammability or explosive limits	
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	< 0.1 mmHg
Vapor pressure temp.	70 °F (21 °C)
Vapor density	> 1
Relative density	1.27
Relative density temperature	70 °F (21 °C)
Solubility(ies)	
Solubility (water)	100 %
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	64 mPa.s
Viscosity temperature	70 °F (21 °C)
Other information	
Explosive properties	Not explosive.
Oxidizing properties	Not oxidizing.
pH in aqueous solution	3.3 (5% Solution)
Pour point	5 °F (-15 °C)
VOC	0 % CALCULATED

10. Stability and reactivity

Reactivity	May be corrosive to metals.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Keep away from heat. Contact with incompatible materials.
Incompatible materials	Strong oxidizing agents. Metals.
Hazardous decomposition products	Carbon dioxide, bromine, cyanogen bromide, dibromoacetonitrile

11. Toxicological information

Information on likely routes of exposure

Inhalation	Harmful if inhaled.
Skin contact	Causes severe skin burns. May cause an allergic skin reaction.
Eye contact	Causes serious eye damage.
Ingestion	Causes digestive tract burns. Harmful if swallowed.
Symptoms related to the physical, chemical and toxicological characteristics	Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result.

Information on toxicological effects

Acute toxicity Harmful if swallowed. May cause an allergic skin reaction.

Product	Species	Test Results
BIOMATE MBC2881		
Acute		
Dermal		
LD50	Rabbit	> 5000 mg/kg (Calculated according to GHS additivity formula)

Product	Species	Test Results
Inhalation		
LC50	Rat	1.3 mg/l, 4 hours (Calculated according to GHS additivity formula)
Oral		
LD50	Rat	510 mg/kg (Calculated according to GHS additivity formula)

Components	Species	Test Results
2,2-dibromo-3-nitrilopropionamide (CAS 10222-01-2)		
Acute		
Dermal		
LD50	Rabbit	> 2000 mg/kg
Inhalation		
LC50	Rat	0.32 mg/l, 4 Hour
Oral		
LD50	Rat	206 mg/kg

Skin corrosion/irritation Causes severe skin burns and eye damage.

Serious eye damage/eye irritation Causes serious eye damage.

Respiratory or skin sensitization

Respiratory sensitization This product is not expected to cause respiratory sensitization.

Skin sensitization May cause an allergic skin reaction.

Germ cell mutagenicity Not classified.

Carcinogenicity Not classified.

IARC Monographs. Overall Evaluation of Carcinogenicity

Not listed.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not listed.

US. National Toxicology Program (NTP) Report on Carcinogens

Not listed.

Reproductive toxicity Not classified.

Specific target organ toxicity - single exposure Not classified.

Specific target organ toxicity - repeated exposure Not classified.

Aspiration hazard Not classified.

Chronic effects Prolonged inhalation may be harmful. Prolonged exposure may cause chronic effects.

12. Ecological information

Ecotoxicity

Product		Species	Test Results
Aquatic			
Algae	ErC50	Algae	1.5 mg/L, 72 hours
Crustacea	EC50	Daphnia magna	0.65 mg/L, 21 days (Reproduction EC50)
	LC50	Daphnia magna	3.3 mg/L, 48 hours
			1.3 mg/L, 21 days
		Mysid Shrimp	0.72 mg/L, 48 hours (Data given as toxicity of active component.)
	LOEC	Daphnia magna	0.6 mg/L, 21 days (Reproduction LOEC)
	NOEL	Daphnia magna	2.15 mg/L, 48 hours
			0.35 mg/L, 21 days (Reproduction NOEL)

Product		Species	Test Results
Fish	LC50	Bluegill Sunfish	6.5 mg/L, 96 hours
		Fathead Minnow	8.7 mg/L, 96 hours
		Rainbow Trout	2.3 mg/L, 96 hours
		Sheepshead Minnow	7 mg/L, 96 hours
	NOEL	Fathead Minnow	3.1 mg/L, 96 hours
		Rainbow Trout	1.8 mg/L, 96 hours
Other	LC50	Marine Copepod (Acartia tonsa or other)	1.78 mg/L, 48 hours

Persistence and degradability

Readily biodegradable.
78 % degradation in 28 days
CO2 Evolution (Modified Sturm Test) (OECD 301B)
(Refers to active component: 2,2-dibromo-3-nitrilopropionamide)

Readily biodegradable.
78 % degradation in 28 days
CO2 Evolution (Modified Sturm Test) (OECD 301B)
(Refers to active component: 2,2-dibromo-3-nitrilopropionamide)

- **COD (mgO2/g)** 959
- **TOC (mg C/g)** 732
- **CO2 evolution (modified Sturm test)** 78

Bioaccumulative potential

Partition coefficient n-octanol / water (log Kow)

2,2-dibromo-3-nitrilopropionamide	0.79

Bioconcentration factor (BCF)

2,2-dibromo-3-nitrilopropionamide	13 Species: Fish

Mobility in soil No data available.

Other adverse effects Not available.

13. Disposal considerations

Disposal instructions Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Dispose of in approved pesticide facility or according to label instructions. Incinerate the material under controlled conditions in an approved incinerator.

Hazardous waste code D002: Waste Corrosive material [pH <=2 or =>12.5, or corrosive to steel]
The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner.

Contaminated packaging Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. Transport information

DOT

- **UN number** UN3265
- **UN proper shipping name** Corrosive liquid, acidic, organic, n.o.s. (DBNPA (2,2-DIBROMO-3-NITRILOPROPIONAMIDE))
- **Transport hazard class(es)**
  - **Class** 8
  - **Subsidiary risk** -
- **Packing group** III
- **Special precautions for user** Not available.
- **ERG number** 153

Some containers may be exempt from Dangerous Goods/Hazmat Transport Regulations, please check BOL for exact container classification.

IATA

- **UN number** UN3265

UN proper shipping name	Corrosive liquid, acidic, organic, n.o.s. (DBNPA (2,2-DIBROMO-3-NITRILOPROPIONAMIDE))
Transport hazard class(es)	
Class	8
Subsidiary risk	-
Packing group	III
Environmental hazards	Yes
ERG Code	153
Special precautions for user	Not available.

IMDG

UN number	UN3265
UN proper shipping name	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. (DBNPA (2,2-DIBROMO-3-NITRILOPROPIONAMIDE)), MARINE POLLUTANT
Transport hazard class(es)	
Class	8
Subsidiary risk	-
Packing group	III
Environmental hazards	
Marine pollutant	Yes
EmS	F-A, S-B
Special precautions for user	Not available.

DOT



IATA; IMDG



Marine pollutant



15. Regulatory information

US federal regulations

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
This is an EPA registered biocide and is exempt from TSCA inventory requirements. See FIFRA registry number.

Toxic Substances Control Act (TSCA)

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Not listed.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not listed.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical	Yes
Classified hazard categories	Corrosive to metal Acute toxicity (any route of exposure) Skin corrosion or irritation Serious eye damage or eye irritation Respiratory or skin sensitization

SARA 313 (TRI reporting)

Not regulated.

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Clean Water Act (CWA) Section 112(r) (40 CFR 68.130)	Hazardous substance
Safe Drinking Water Act (SDWA)	Contains component(s) regulated under the Safe Drinking Water Act.

Inventory status

Country(s) or region	Inventory name	On inventory (yes/no)*
Canada	Domestic Substances List (DSL)	No
Canada	Non-Domestic Substances List (NDSL)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

FIFRA registration number	3876-95
TSCA	This is an EPA registered biocide and is exempt from TSCA inventory requirements.
Food and drug administration	The ingredients in this product are approved by FDA under 21 CFR 176.300.

Other federal regulations

Hazard statement

This chemical is a pesticide product registered by the Environmental Protection Agency and is subject to certain labeling requirements under federal pesticide law. These requirements differ from the classification criteria and hazard information required for safety data sheets, and for workplace labels of non-pesticide chemicals. Following is the hazard information as required on the pesticide label:

DANGER
Corrosive
Causes irreversible eye damage
Harmful if inhaled, swallowed, or absorbed through the skin
Prolonged or frequently repeated skin contact may cause allergic reaction in some individuals
This pesticide is toxic to fish and aquatic organisms

US state regulations

California Proposition 65

California Safe Drinking Water and Toxic Enforcement Act of 2016 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins. For more information go to www.P65Warnings.ca.gov.

US - California Proposition 65 - CRT: Listed date/Carcinogenic substance

No ingredient listed.

US - California Proposition 65 - CRT: Listed date/Developmental toxin

No ingredient listed.

US - California Proposition 65 - CRT: Listed date/Female reproductive toxin

No ingredient listed.

US - California Proposition 65 - CRT: Listed date/Male reproductive toxin

No ingredient listed.

16. Other information, including date of preparation or last revision

Issue date	Oct-17-2014
Revision date	Jun-15-2022
Version #	4.0
NFPA ratings	Health: 3 Flammability: 0 Instability: 0
NFPA ratings	
List of abbreviations	CAS: Chemical Abstract Service Registration Number TWA: Time Weighted Average STEL: Short Term Exposure Limit LD50: Lethal Dose, 50% LC50: Lethal Concentration, 50% EC50: Effect Concentration, 50% NOEL: No Observed Effect Level COD: Chemical Oxygen Demand BOD: Biochemical Oxygen Demand TOC: Total Organic Carbon IATA: International Air Transport Association IMDG: International Maritime Dangerous Goods Code ACGIH: American Conference of Governmental Industrial Hygienists TSRN indicates a Trade Secret Registry Number is used in place of the CAS number.
References:	No data available
Disclaimer	The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.
Revision information	This document has undergone significant changes and should be reviewed in its entirety.
Prepared by	This SDS has been prepared by SUEZ Regulatory Department (1-215-355-3300).

* Trademark of SUEZ. May be registered in one or more countries.

Safety Data Sheet

Vitec™ 3000

Date of compilation: 2023-12-29

SECTION 1: Identification

1.1 Product identifier

Trade name **Vitec™ 3000**

CAS number none

1.2 Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses Water treatment chemical
RO Reverse Osmosis

1.3 Details of the supplier of the safety data sheet

Avista Technologies, Inc.
140 Bosstick Blvd.
92069 San Marcos
United States

Telephone: +1 (760) 744 0536
e-mail: regulatory@avistatech.com
Website: AvistaMembraneSolutions.com

1.4	**Emergency telephone number**	Emergency Number (USA, Canada): 1 (800) 424-9300 (ChemTrec) Emergency Number (International): 1 (703) 527-3887 (International Collect)

1.5 Registration

CERTIFIED BY NSF INTERNATIONAL TO NSF/ANSI 60 AS A STANDARD DRINKING WATER TREATMENT CHEMICAL FOR USE IN REVERSE OSMOSIS SYSTEMS AT A MAXIMUM LEVEL OF 7 mg/L

SECTION 2: Hazard(s) identification

2.1 Classification of the substance or mixture

Classification acc. to OSHA "Hazard Communication Standard" (29 CFR 1910.1200)

Hazard class	*Category*	*Hazard statement*
skin corrosion/irritation	2	H315
serious eye damage/eye irritation	2A	H319

For full text of abbreviations: see SECTION 16.

2.2 Label elements

Signal word warning

Pictograms

GHS07



Hazard statements

H315	Causes skin irritation.
H319	Causes serious eye irritation.

Precautionary statements

P280	Wear protective gloves.
P302+P352	If on skin: Wash with plenty of water.
P305+P351+P338	If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P332+P313	If skin irritation occurs: Get medical advice/attention.
P337+P313	If eye irritation persists: Get medical advice/attention.
P362	Take off contaminated clothing and wash before reuse.

2.3 Other hazards

Results of PBT and vPvB assessment

This mixture does not contain any substances that are assessed to be a PBT or a vPvB.

SECTION 3: Composition/information on ingredients

3.1 Mixtures

Hazardous ingredients

Name of substance	*Identifier*	*Wt%*	*Classification acc. to GHS*
Chelate Agent E	CAS No Proprietary EC No Proprietary	10 – < 20	Skin Corr. 1 / H314 Eye Dam. 1 / H318 Met. Corr. 1 / H290
Deflocculant & Sequestrant	CAS No Proprietary EC No Proprietary	5 – < 10	Skin Corr. 1C / H314 Eye Dam. 1 / H318 Met. Corr. 1 / H290
Water	7732-18-5	80 – < 90	Not established

For full text of abbreviations: see SECTION 16.
Specific chemical identity and concentration of some ingredients are protected as Trade Secret information.

HMIRA Registry Number: 3329893 Date filed: 5/10/2019.

SECTION 4: First-aid measures

4.1 Description of first-aid measures

General notes

In case of unconsciousness place person in the recovery position. Never give anything by mouth.

Following inhalation

In case of respiratory tract irritation, consult a physician.

Following skin contact

Rinse skin with water/shower. Take off contaminated clothing. After contact with skin, wash immediately with plenty of water. In all cases of doubt, or when symptoms persist, seek medical advice.

Following eye contact

Irrigate copiously with clean, fresh water for at least 15 minutes, holding the eyelids apart. Remove contact lenses, if present and easy to do. Continue rinsing.

Following ingestion

Rinse mouth with water (only if the person is conscious). Do NOT induce vomiting. In all cases of doubt, or when symptoms persist, seek medical advice.

4.2 Most important symptoms and effects, both acute and delayed

Symptoms and effects are not known to date.

4.3 Indication of any immediate medical attention and special treatment needed

No specific antidote is known. Treatment of the symptoms.

SECTION 5: Fire-fighting measures

5.1 Extinguishing media

Suitable extinguishing media

Non-combustible. Coordinate firefighting measures to the fire surroundings. Water spray, Alcohol resistant foam, Fire extinguishing powder, Carbon dioxide (CO2)

Unsuitable extinguishing media

None

5.2 Special hazards arising from the substance or mixture

none

Hazardous combustion products

Carbon monoxide (CO), Carbon dioxide (CO2)

5.3 Advice for firefighters

Keep containers cool with water spray. In case of fire and/or explosion do not breathe fumes. Do not allow firefighting water to enter drains or water courses. Collect contaminated firefighting water separately. Fight fire with normal precautions from a reasonable distance.

Special protective equipment for firefighters

Use suitable breathing apparatus

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Aqueous solutions or powders that become wet produce extremely slippery conditions.

For non-emergency personnel

Follow emergency procedures such as the need to evacuate the danger area or to consult an expert. Remove persons to safety. Prevent skin contact. Avoid inhaling sprayed product. Aqueous solutions or powders that become wet produce extremely slippery conditions.

For emergency responders

Wear breathing apparatus if exposed to vapors/dust/aerosols/gases. Wear personal protective equipment/face protection. Aqueous solutions or powders that become wet produce extremely slippery conditions. Special danger of slipping by leaking/spilling product.

Suitable fabric for personal protective clothing

PE: polyethylene, NR: natural rubber, latex, CR: chloroprene (chlorobutadiene) rubber

6.2 Environmental precautions

Keep away from drains, surface and ground water. Retain contaminated washing water and dispose of it. If substance has entered a water course or sewer, inform the responsible authority. Disposal considerations: see section 13. Chemicals generally shouldn't reach surface water.

6.3 Methods and material for containment and cleaning up

Advice on how to contain a spill

Covering of drains

Advice on how to clean up a spill

Wipe up with absorbent material (e.g. cloth, fleece). Collect spillage: Absorbent material (e.g. sand, diatomaceous earth, acid binder, universal binder, sawdust, etc.), Material for neutralising like diluted acetic acid.

Appropriate containment techniques

Neutralization techniques. Decontamination techniques. Use of adsorbent materials. Vacuuming techniques.

Equipment required for containment/clean-up

Approved industrial vacuum cleaner, Absorbent material (e.g. sand, diatomaceous earth, acid binder, universal binder, sawdust, etc.), Sweeping compounds (oil absorbing), Shovel, Drain seal, Collecting container, Protective gloves, Eye protection (e.g. protective goggles), Personal protective equipment: see section 8

Other information relating to spills and releases

Place in appropriate containers for disposal. Ventilate affected area.

6.4 Reference to other sections

Section 7: Handling and storage. See also to sections 8 and 13 of the safety data sheet.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Recommendations

Measures to prevent fire as well as aerosol and dust generation

Use local and general ventilation.

Handling of incompatible substances or mixtures

Do not mix with acids. Do not mix with other chemicals.

Keep away from

Strong oxidizers, Other chemicals

Measures to protect the environment

Do not empty into drains; dispose of this material and its container at hazardous or special waste collection point.

Advice on general occupational hygiene

Wash hands after use. Do not eat, drink and smoke in work areas. Remove contaminated clothing and protective equipment before entering eating areas. Never keep food or drink in the vicinity of chemicals. Never place chemicals in containers that are normally used for food or drink. Keep away from food, drink and animal feedingstuffs.

7.2 Conditions for safe storage, including any incompatibilities

Consideration of other advice Store between 5°C and 40°C. Avoid freezing.

Specific designs for storage rooms or vessels

No special measures are necessary. Keep container tightly closed.

Packaging compatibilities

Keep only in original container.

7.3 Specific end use(s)

Water treatment chemical. RO Reverse Osmosis.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

National limit values

Occupational Exposure Limits: PELs, TLVs, etc

These information are not available.

8.2 Exposure controls

Appropriate engineering controls

General ventilation.

Individual protection measures (personal protective equipment)

Guarantee that the eye flushing systems and safety showers are closely located to the working place.

Eye/face protection

Wear eye/face protection.

Skin protection

Chemical resistant protective clothing.

Hand protection

Wear suitable gloves. Chemical protection gloves are suitable, which are tested according to EN 374. Check leak-tightness/impermeability prior to use. For special purposes, it is recommended to check the resistance to chemicals of the protective gloves mentioned above together with the supplier of these gloves. In case of spray contact at least protection index 2 recommended, according to more than 30 min. penetration time (EN 374).
Layer thickness of gloves at least: 0.4 mm
In case of prolonged and intensive contact protection index 6 recommended, according to more than 480 min. penetration time (EN 374).
Layer thickness of gloves at least: 0.7 mm.

Type of material

PVC: polyvinyl chloride, PE: polyethylene, NBR: acrylonitrile-butadiene rubber, IIR: isobutene-isoprene (butyl) rubber

Breakthrough times of the glove material

Breakthrough times and swelling properties of the material must be taken into consideration

Other protection measures

Wash hands thoroughly after handling.

Respiratory protection

Not necessary under normal conditions and provided good general ventilation. In case of inadequate ventilation wear respiratory protection. Type : E (against acidic gases like sulfur dioxide or hydrogen chloride, color code: Yellow).

Environmental exposure controls

Disposal considerations: see section 13.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance

Physical state	liquid
Color	clear , amber liquid
Odor	characteristic
Odor threshold	no data available

Other safety parameters

pH (value)	ca. 10 – 11.8 (25 °C)
Melting point/freezing point	ca. -7.5 °C at 1 atm
Initial boiling point and boiling range	ca. >100 °C at 1 atm
Flash point	not applicable
Evaporation rate	not determined
Flammability (solid, gas)	not applicable
Upper/lower flammability or explosive limits	not determined
Vapor pressure	ca. 18 – 21 mmHg at 25 °C
Vapor density	this information is not available
Density	not determined
Relative density	1.2 – 1.3 at 25 °C (water = 1)
Solubility(ies): Water solubility	miscible in any proportion
-Partition coefficient: octanol/water (log KOW)	this information is not available
Auto-ignition temperature	not determined not applicable
Decomposition temperature	not determined
Viscosity	not determined
Explosive properties	none
Oxidizing properties	none

9.2 Other information

There is no additional information.

SECTION 10: Stability and reactivity

10.1 Reactivity

This material is not reactive under normal ambient conditions.

10.2 Chemical stability

The material is stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

10.3 Possibility of hazardous reactions

Dangerous/dangerous reactions with Acids.

10.4 Conditions to avoid

Incompatible materials.

10.5 Incompatible materials

Oxidizers

10.6 Hazardous decomposition products

Reasonably anticipated hazardous decomposition products produced as a result of use, storage, spill and heating are not known. Hazardous combustion products: see section 5.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Test data are not available for the complete mixture.

Classification procedure

The method for classification of the mixture is based on ingredients of the mixture (additivity formula).

Acute toxicity

Shall not be classified as acutely toxic.

Skin corrosion/irritation

Causes skin irritation.

Serious eye damage/eye irritation

Causes serious eye irritation.

Respiratory or skin sensitization

Shall not be classified as a respiratory or skin sensitizer.

Germ cell mutagenicity

Shall not be classified as germ cell mutagenic.

Carcinogenicity

Shall not be classified as carcinogenic.

Reproductive toxicity

Shall not be classified as a reproductive toxicant.

Specific target organ toxicity - single exposure

Shall not be classified as a specific target organ toxicant (single exposure).

Specific target organ toxicity - repeated exposure

Shall not be classified as a specific target organ toxicant (repeated exposure).

Aspiration hazard

Shall not be classified as presenting an aspiration hazard.

SECTION 12: Ecological information

12.1 Toxicity

Shall not be classified as hazardous to the aquatic environment.

Aquatic toxicity (acute)

Endpoint	*Value*	*Species*	*Exposure time*
LC50	2,500 $^{mg}/_{l}$	marine fish	96 h
LC50	>10,000 $^{mg}/_{l}$	Arcatia tonsa	48 h
LC50	1,767 $^{mg}/_{l}$	water flea (Daphnia)	48 h
LC50	3,474 $^{mg}/_{l}$	fathead minnow (Pimephales promelas)	48 h
LC50	>1,000 $^{mg}/_{l}$	rainbow trout (Oncorhynchus mykiss)	48 h
LC50	>1,000 $^{mg}/_{l}$	Mysidopsis bahia	48 h
EC50	2,980 $^{mg}/_{l}$	Skeletonema costatum	72 h
EC50	1,000 $^{mg}/_{l}$	sheepshead minnow (Cyprinodon variegatus)	96 h

12.2 Persistence and degradability

Data are not available.

12.3 Bioaccumulative potential

Data are not available.

12.4 Mobility in soil

Data are not available.

12.5 Results of PBT and vPvB assessment

Not applicable.

12.6 Other adverse effects

Data are not available.

Remarks

Do not empty into drains or surface water.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

The user of this chemical is responsible for the disposal of any unused product and residue. Unused product should be disposed of in accordance with all applicable local, state and federal regulations regarding treatment, storage and disposal of hazardous and nonhazardous wastes.

Waste treatment of containers/packages

Empty containers should not be reused. Containers should be emptied and rinsed before disposal. Empty containers should be taken to an approved waste handling site to be recycled or disposed of in accordance with local, state and federal regulation. Handle contaminated packages in the same way as the substance itself.

Remarks

Avoid release into the environment.

SECTION 14: Transport information

14.1 UN number	**not subject to transport regulations**
14.2 UN proper shipping name	not relevant
Technical name (hazardous ingredients)	contains:
14.3 Transport hazard class(es)	
Class	-
14.4 Packing group	not relevant
14.5 Environmental hazards	non-environmentally hazardous acc. to the dangerous goods regulations

14.6 Special precautions for user

There is no additional information.

14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code

The cargo is not intended to be carried in bulk.

Information for each of the UN Model Regulations

Transport of dangerous goods by road or rail (49 CFR US DOT)

Not subject to transport regulations.

International Maritime Dangerous Goods Code (IMDG)

Not subject to IMDG.

International Civil Aviation Organization (ICAO-IATA/DGR)

Not subject to ICAO-IATA.

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations specific for the product in question

National regulations (United States)

Toxic Substance Control Act (TSCA) all ingredients are listed or exempt from listing

Superfund Amendment and Reauthorization Act (SARA TITLE III)

The List of Extremely Hazardous Substances and Their Threshold Planning Quantities (EPCRA Section 302, 304)

none of the ingredients are listed

Specific Toxic Chemical Listings (EPCRA Section 313)

none of the ingredients are listed

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

List of Hazardous Substances and Reportable Quantities (CERCLA section 102a) (40 CFR 302.4)

none of the ingredients are listed

Clean Air Act

none of the ingredients are listed

New Jersey Worker and Community Right to Know Act

none of the ingredients are listed

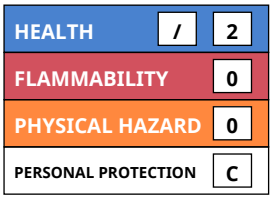
California Environmental Protection Agency (Cal/EPA): Proposition 65 - Safe Drinking Water and Toxic Enforcement Act of 1987

none of the ingredients are listed

Industry or sector specific available guidance(s)

NPCA-HMIS® III

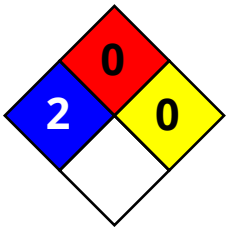
Hazardous Materials Identification System. American Coatings Association.



A "*" on the health line indicates a chronic health hazard is present.

NFPA® 704

National Fire Protection Association: Standard System for the Identification of the Hazards of Materials for Emergency Response (United States).



Additional information

Substance is listed in the following national inventories:
The contained substances are listed in the following national inventories:
AICS (Australia)
ASIA-PAC (Asia-Pacific Region)
DSL (Canada)
NDSL (Canada)
DSL/NDSL (Canada)
IECSC (China)
EINECS/ELINCS/NLP (Europe)
EINECS (European Union)
REACH (Europe)
ENCS, class 1 and 2 (MITI-inventory, Japan)
CSCL-ENCS (Japan)
ISHA-ENCS (Japan)
KECL (Republic of Korea)
INSQ (Mexico)
NZIoC (New Zealand)
PICCS (Philippines)
CICR (Turkey)
TCSI (Taiwan)
TSCA (United States)

15.2 Chemical Safety Assessment

Chemical Safety Assessment: No.

SECTION 16: Other information, including date of preparation or last revision

Abbreviations and acronyms

Abbr.	*Descriptions of used abbreviations*
49 CFR US DOT	49 CFR U.S. Department of Transportation
CAS	Chemical Abstracts Service (service that maintains the most comprehensive list of chemical substances)
DGR	Dangerous Goods Regulations (see IATA/DGR)
EC50	Effective Concentration 50 %. The EC50 corresponds to the concentration of a tested substance causing 50 % changes in response (e.g. on growth) during a specified time interval
EC No	The EC Inventory (EINECS, ELINCS and the NLP-list) is the source for the seven-digit EC number, an identifier of substances commercially available within the EU (European Union)
EINECS	European Inventory of Existing Commercial Chemical Substances
ELINCS	European List of Notified Chemical Substances
Eye Dam.	Seriously damaging to the eye
Eye Irrit.	Irritant to the eye
GHS	"Globally Harmonized System of Classification and Labelling of Chemicals" developed by the United Nations
IATA	International Air Transport Association
IATA/DGR	Dangerous Goods Regulations (DGR) for the air transport (IATA)
ICAO	International Civil Aviation Organization
IMDG	International Maritime Dangerous Goods Code

Abbr.	*Descriptions of used abbreviations*
LC50	Lethal Concentration 50%: the LC50 corresponds to the concentration of a tested substance causing 50 % lethality during a specified time interval
MARPOL	International Convention for the Prevention of Pollution from Ships (abbr. of "Marine Pollutant")
Met. Corr.	Substance or mixture corrosive to metals
NLP	No-Longer Polymer
NPCA-HMIS® III	National Paint and Coatings Association: Hazardous Materials Identification System - HMIS® III, Third Edition
OSHA	Occupational Safety and Health Administration (United States)
PBT	Persistent, Bioaccumulative and Toxic
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals
Skin Corr.	Corrosive to skin
Skin Irrit.	Irritant to skin
vPvB	Very Persistent and very Bioaccumulative

Key literature references and sources for data

ECHA: European Chemicals Agency, http://echa.europa.eu/.

OSHA Hazard Communication Standard (HCS), 29 CFR 1910.1200.

Transport of dangerous goods by road or rail (49 CFR US DOT). International Maritime Dangerous Goods Code (IMDG). Dangerous Goods Regulations (DGR) for the air transport (IATA).

Classification procedure

Physical and chemical properties: The classification is based on tested mixture.
Health hazards, Environmental hazards: The method for classification of the mixture is based on ingredients of the mixture (additivity formula).

List of relevant phrases (code and full text as stated in section 2 and 3)

Code	*Text*
H290	May be corrosive to metals.
H314	Causes severe skin burns and eye damage.
H315	Causes skin irritation.
H318	Causes serious eye damage.
H319	Causes serious eye irritation.

Disclaimer

This information is based upon the present state of our knowledge. This SDS has been compiled and is solely intended for this product.

VEOLIA

SAFETY DATA SHEET
HYPERSPERSE* MDC714

1. Identification

Product identifier **HYPERSPERSE MDC714**

Other means of identification None.

Recommended use Membrane Deposit Control Agent

Recommended restrictions None known.

Company/undertaking identification

Veolia WTS USA, Inc.
3600 Horizon Blvd.
Trevose, PA 19053
T 215 355 3300, F 215 953 5524

Emergency telephone

(800) 877 1940

2. Hazard(s) identification

Physical hazards Not classified.

Health hazards Not classified.

OSHA defined hazards Not classified.

Label elements

Hazard symbol None.

Signal word None.

Hazard statement The mixture does not meet the criteria for classification.

Precautionary statement

Prevention Observe good industrial hygiene practices.

Response Wash hands after handling.

Storage Store away from incompatible materials.

Disposal Dispose of waste and residues in accordance with local authority requirements.

Hazard(s) not otherwise classified (HNOC) None known.

Supplemental information None.

3. Composition/information on ingredients

Mixtures

The manufacturer lists no ingredients as hazardous to health according to OSHA 29 CFR 1910.1200.

Composition comments Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this SDS for our assessment of the potential hazards of this formulation.

4. First-aid measures

Inhalation If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing. If breathing stops, provide artificial respiration. For breathing difficulties, oxygen may be necessary. Call a physician if symptoms develop or persist.

Skin contact	Rinse skin with water/shower. Get medical attention if irritation develops and persists.
Eye contact	Rinse with water. Remove contact lenses, if present and easy to do. Get medical attention if irritation develops and persists.
Ingestion	Rinse mouth. Never give anything by mouth to a victim who is unconscious or is having convulsions. If ingestion of a large amount does occur, call a poison control center immediately.
Most important symptoms/effects, acute and delayed	Direct contact with eyes may cause temporary irritation.
Indication of immediate medical attention and special treatment needed	Treat symptomatically.
General information	Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire-fighting measures

Suitable extinguishing media	Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2).
Unsuitable extinguishing media	Do not use water jet as an extinguisher, as this will spread the fire.
Specific hazards arising from the chemical	During fire, gases hazardous to health may be formed.
Special protective equipment and precautions for firefighters	Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask.
Fire fighting equipment/instructions	In case of fire and/or explosion do not breathe fumes. Use standard firefighting procedures and consider the hazards of other involved materials. Move containers from fire area if you can do so without risk. Cool containers / tanks with water spray.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General fire hazards	No unusual fire or explosion hazards noted.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Keep out of low areas. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. See Section 8 of the SDS for Personal Protective Equipment.
Methods and materials for containment and cleaning up	Prevent entry into waterways, sewer, basements or confined areas. Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. Absorb in vermiculite, dry sand or earth and place into containers. Following product recovery, flush area with water. Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination. Never return spills to original containers for re-use.
Environmental precautions	Avoid discharge into drains, water courses or onto the ground. Water contaminated with this product may be sent to a sanitary sewer treatment facility, or a permitted waste treatment facility, in accordance with any local agreements.

7. Handling and storage

Precautions for safe handling	Avoid prolonged exposure. Use care in handling/storage.
Conditions for safe storage, including any incompatibilities	Store in original tightly closed container. Store in accordance with local/regional/national/international regulation.

8. Exposure controls/personal protection

Biological limit values	No biological exposure limits noted for the ingredient(s).
Appropriate engineering controls	Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Individual protection measures, such as personal protective equipment

Eye/face protection	Wear safety glasses with side shields (or goggles).

Skin protection	
Hand protection	Wear appropriate chemical resistant gloves. The choice of an appropriate glove does not only depend on its material but also on other quality features and is different from one producer to the other. Glove selection must take into account any solvents and other hazards present.
Other	Wear suitable protective clothing.
Respiratory protection	If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. A respiratory protection program that meets OSHA's 29 CFR 1910.34 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant a respirator's use.
Thermal hazards	Wear appropriate thermal protective clothing, when necessary.
General hygiene considerations	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance	Liquid
Physical state	Liquid.
Form	Not available.
Color	Colorless to yellow
Odor	Slight
Odor threshold	Not available.
pH (concentrated product)	7.6 Neat
Melting point/freezing point	-8 °F (-22 °C)
Initial boiling point and boiling range	216 °F (102 °C)
Flash point	Not Applicable
Evaporation rate	Slower than Ether
Flammability (solid, gas)	Not available.
Upper/lower flammability or explosive limits	
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	18 mmHg
Vapor pressure temp.	70 °F (21 °C)
Vapor density	< 1
Relative density	1.42
Relative density temperature	70 °F (21 °C)
Solubility(ies)	
Solubility (water)	100 %
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	59 mPa.s
Viscosity temperature	77 °F (25 °C)
Other information	
pH in aqueous solution	7.9 (5% Solution)
Pour point	-3 °F (-19 °C)
VOC	0 % ESTIMATED

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.

Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Contact with incompatible materials.
Incompatible materials	Strong oxidizing agents.
Hazardous decomposition products	Oxides of carbon, nitrogen and phosphorus evolved in fire.

11. Toxicological information

Information on likely routes of exposure

Inhalation	No adverse effects due to inhalation are expected.
Skin contact	No adverse effects due to skin contact are expected.
Eye contact	Direct contact with eyes may cause temporary irritation.
Ingestion	Expected to be a low ingestion hazard.
Symptoms related to the physical, chemical and toxicological characteristics	Direct contact with eyes may cause temporary irritation.

Information on toxicological effects

Acute toxicity

Product	Species	Test Results
HYPERSPERSE MDC714		
Acute		
Oral		
LD50	Rat	> 5000 mg/kg (Calculated according to GHS additivity formula)

Skin corrosion/irritation	Prolonged skin contact may cause temporary irritation.
Serious eye damage/eye irritation	Direct contact with eyes may cause temporary irritation.
Respiratory or skin sensitization	
Respiratory sensitization	This product is not expected to cause respiratory sensitization. Not a respiratory sensitizer.
Skin sensitization	This product is not expected to cause skin sensitization.
Germ cell mutagenicity	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
Carcinogenicity	This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

IARC Monographs. Overall Evaluation of Carcinogenicity

Not listed.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not listed.

US. National Toxicology Program (NTP) Report on Carcinogens

Not listed.

Reproductive toxicity	This product is not expected to cause reproductive or developmental effects.
Specific target organ toxicity - single exposure	Not classified.
Specific target organ toxicity - repeated exposure	Not classified.
Aspiration hazard	Based on available data, the classification criteria are not met. Not an aspiration hazard.
Chronic effects	Prolonged inhalation may be harmful.

12. Ecological information

Ecotoxicity

Product		Species	Test Results
Aquatic			
Crustacea	LC50	Daphnia magna	1366 mg/L, 48 hour
	NOEL	Daphnia magna	1000 mg/L, 48 hour

Product		Species	Test Results
Fish	LC50	Fathead Minnow	5098 mg/L, 96 hour
		Rainbow Trout	5464 mg/L, 96 hour
	NOEL	Fathead Minnow	2000 mg/L, 96 hour
		Rainbow Trout	4000 mg/L, 96 hour

Persistence and degradability Not biodegradable.

Not biodegradable.

- **COD (mgO2/g)** 180 (calculated data)
- **BOD 5 (mgO2/g)** 0 (calculated data)
- **BOD 28 (mgO2/g)** 0 (calculated data)
- **Closed Bottle Test (% Degradation in 28 days)** 22-23 OECD 301D
- **Zahn-Wellens Test (% Degradation in 28 days)** 23 OECD 302B
- **TOC (mg C/g)** 38,5
- **Modified SCAS** 15-35% 126d OECD 302A

Bioaccumulative potential Not bioaccumulating BCF: 22

Mobility in soil No data available.

Other adverse effects Not available.

13. Disposal considerations

Disposal instructions Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Dispose of contents/container in accordance with local/regional/national/international regulations.

Local disposal regulations Dispose in accordance with all applicable regulations.

Hazardous waste code The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions). Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner.

Contaminated packaging Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

Not regulated as dangerous goods.

Some containers may be exempt from Dangerous Goods/Hazmat Transport Regulations, please check BOL for exact container classification.

IATA

Not regulated as dangerous goods.

IMDG

Not regulated as dangerous goods.

15. Regulatory information

US federal regulations

Toxic Substances Control Act (TSCA)

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Not listed.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not listed.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical No

SARA 313 (TRI reporting)

Not regulated.

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Contains component(s) regulated under the Safe Drinking Water Act.

Inventory status

Country(s) or region	Inventory name	On inventory (yes/no)*
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

US state regulations

California Proposition 65

California Safe Drinking Water and Toxic Enforcement Act of 2016 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins. For more information go to www.P65Warnings.ca.gov.

US - California Proposition 65 - CRT: Listed date/Carcinogenic substance

No ingredient listed.

US - California Proposition 65 - CRT: Listed date/Developmental toxin

No ingredient listed.

US - California Proposition 65 - CRT: Listed date/Female reproductive toxin

No ingredient listed.

US - California Proposition 65 - CRT: Listed date/Male reproductive toxin

No ingredient listed.

16. Other information, including date of preparation or last revision

Issue date Oct-08-2014

Revision date Feb-19-2023

Version # 1.4

NFPA ratings Health: 0
Flammability: 0
Instability: 0

NFPA ratings



List of abbreviations	CAS: Chemical Abstract Service Registration Number ACGIH: American Conference of Governmental Industrial Hygienists NOEL: No Observed Effect Level STEL: Short Term Exposure Limit LD50: Lethal Dose, 50% LC50: Lethal Concentration, 50% TWA: Time Weighted Average BOD: Biochemical Oxygen Demand COD: Chemical Oxygen Demand TOC: Total Organic Carbon IATA: International Air Transport Association IMDG: International Maritime Dangerous Goods Code TSRN indicates a Trade Secret Registry Number is used in place of the CAS number.
References:	No data available
Disclaimer	The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.
Revision information	This document has undergone significant changes and should be reviewed in its entirety.
Prepared by	This SDS has been prepared by Veolia Water Technologies & Solutions' Regulatory Department (1-215-355-3300).

* Trademark of Veolia. May be registered in one or more countries.

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	CAT-FLOC® LS
Other means of identification	:	Not applicable.
Recommended use	:	CATIONIC POLYMER
Restrictions on use	:	Refer to available product literature or ask your local Sales Representative for restrictions on use and dose limits.
Company	:	Nalco Company 1601 W. Diehl Road Naperville, Illinois 60563-1198 USA TEL: (630)305-1000
Emergency telephone number	:	(800) 424-9300 (24 Hours) CHEMTREC
Issuing date	:	06/18/2014

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification

Not a hazardous substance or mixture.

GHS Label element

Precautionary Statements : **Prevention:**
Wash hands thoroughly after handling. Water in contact with the product will cause slippery floor conditions.
Response:
Specific measures: consult MSDS Section 4.
Storage:
Store in accordance with local regulations. Protect product from freezing.

Other hazards : None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

No hazardous ingredients

SECTION 4. FIRST AID MEASURES

In case of eye contact	:	Rinse with plenty of water. Get medical attention if symptoms occur.
In case of skin contact	:	Wash off with soap and plenty of water. Get medical attention if symptoms occur.
If swallowed	:	Rinse mouth. Get medical attention if symptoms occur.
If inhaled	:	Get medical attention if symptoms occur.
Protection of first-aiders	:	In event of emergency assess the danger before taking action. Do

not put yourself at risk of injury. If in doubt, contact emergency responders.Use personal protective equipment as required.

Notes to physician : Treat symptomatically.

See toxicological information (Section 11)

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media : None known.

Specific hazards during firefighting : Not flammable or combustible.

Hazardous combustion products : Carbon oxides

Special protective equipment for firefighters : Use personal protective equipment.

Specific extinguishing methods : Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures : Refer to protective measures listed in sections 7 and 8.

Environmental precautions : No special environmental precautions required.

Methods and materials for containment and cleaning up : Stop leak if safe to do so. Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13). Flush away traces with water. For large spills, dike spilled material or otherwise contain material to ensure runoff does not reach a waterway.

SECTION 7. HANDLING AND STORAGE

Advice on safe handling : For personal protection see section 8. Wash hands after handling.

Conditions for safe storage : Keep out of reach of children. Keep container tightly closed. Store in suitable labeled containers.

Suitable material : Keep in properly labelled containers.

Unsuitable material : The following compatibility data is suggested based on similar product data and/or industry experience: Carbon steel, Copper

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

This product does not contain any substance that has an established exposure limit.
Contains no substances with occupational exposure limit values.

Engineering measures	:	Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

Personal protective equipment

Eye protection	:	Safety glasses
Hand protection	:	Wear protective gloves. Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough.
Skin protection	:	Wear suitable protective clothing.
Respiratory protection	:	No personal respiratory protective equipment normally required.
Hygiene measures	:	Wash hands before breaks and immediately after handling the product.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	Viscous liquid
Colour	:	Clear Yellow
Odour	:	None
Flash point	:	> 93.3 °C Method: Pensky-Martens closed cup
pH	:	5.0 - 8.0, 100 % (25 °C)
Odour Threshold	:	no data available
Melting point/freezing point	:	no data available
Initial boiling point and boiling range	:	no data available
Evaporation rate	:	no data available
Flammability (solid, gas)	:	no data available
Upper explosion limit	:	no data available
Lower explosion limit	:	no data available
Vapour pressure	:	similar to water
Relative vapour density	:	no data available
Relative density	:	1.0 - 1.04 (25 °C)
Density	:	no data available
Water solubility	:	completely soluble
Solubility in other solvents	:	no data available
Partition coefficient: n-octanol/water	:	no data available

Auto-ignition temperature	:	no data available
Thermal decomposition	:	Carbon oxides
Viscosity, dynamic	:	< 350 mPa.s (25 °C)
Viscosity, kinematic	:	no data available
VOC	:	0 %

SECTION 10. STABILITY AND REACTIVITY

Chemical stability	:	Stable under normal conditions.
Possibility of hazardous reactions	:	No dangerous reaction known under conditions of normal use.
Conditions to avoid	:	Freezing temperatures.
Incompatible materials	:	Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors.
Hazardous decomposition products	:	Oxides of carbon Oxides of nitrogen

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure	:	Inhalation, Eye contact, Skin contact

Potential Health Effects

Eyes	:	Health injuries are not known or expected under normal use.
Skin	:	Health injuries are not known or expected under normal use.
Ingestion	:	Health injuries are not known or expected under normal use.
Inhalation	:	Health injuries are not known or expected under normal use.
Chronic Exposure	:	Health injuries are not known or expected under normal use.

Experience with human exposure

Eye contact	:	No symptoms known or expected.
Skin contact	:	No symptoms known or expected.
Ingestion	:	No symptoms known or expected.
Inhalation	:	No symptoms known or expected.

Toxicity

Product

Acute oral toxicity	:	LD50 rat: 14,600 mg/kg Test substance: 20% Active Ingredient

Acute inhalation toxicity	:	no data available
Acute dermal toxicity	:	LD50 rabbit: > 20,000 mg/kg Test substance: 40% Active Ingredient
Skin corrosion/irritation	:	no data available
Serious eye damage/eye irritation	:	no data available
Respiratory or skin sensitization	:	no data available
Carcinogenicity	:	no data available
Reproductive effects	:	no data available
Germ cell mutagenicity	:	no data available
Teratogenicity	:	no data available
STOT - single exposure	:	no data available
STOT - repeated exposure	:	no data available
Aspiration toxicity	:	no data available

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Environmental Effects	:	Very toxic to aquatic life.

Product

Toxicity to fish	:	LC50 Rainbow Trout: 1.48 mg/l Exposure time: 96 hrs Test substance: Product tested in clean water LC50 Zebra Danio: 10 - 100 mg/l Exposure time: 96 hrs Test substance: Representative polymer tested in water with DOC LC50 Rainbow Trout: 0.24 mg/l Exposure time: 96 hrs Test substance: Hazardous component LC50 Bluegill Sunfish: 0.21 mg/l Exposure time: 96 hrs Test substance: Hazardous component
Toxicity to daphnia and other aquatic invertebrates	:	LC50 Daphnia magna: 3.6 mg/l Exposure time: 48 hrs Test substance: Product tested in clean water LC50 Daphnia magna: 10 - 100 mg/l

Exposure time: 48 hrs
Test substance: Representative polymer tested in water with DOC

LC50 Daphnia magna: 0.07 mg/l
Exposure time: 48 hrs
Test substance: Hazardous component

Toxicity to algae : no data available

Toxicity to terrestrial organisms : LC50 Mallard Duck: 56 mg/kg
Exposure time: 4 Days

Persistence and degradability

no data available

Mobility

The product is eliminated from aqueous phase via abiotic process (adsorption on suspended material) to a large extent (>95 %).

Air :
Water :
Soil :

Bioaccumulative potential

No bioaccumulation will occur. The large size of the polymer is incompatible with transport across the cellular membranes.

Other information

The hazard characterization is based on the tests or potential hazard in the clean water.

SECTION 13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it is not a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.

Disposal methods : The product should not be allowed to enter drains, water courses or the soil. Where possible recycling is preferred to disposal or incineration. If recycling is not practicable, dispose of in compliance with local regulations. Dispose of wastes in an approved waste disposal facility.

Disposal considerations : Dispose of as unused product. Empty containers should be taken to an approved waste handling site for recycling or disposal. Do not re-use empty containers.

SECTION 14. TRANSPORT INFORMATION

The shipper/consignor/sender is responsible to ensure that the packaging, labeling, and markings are in compliance with the selected mode of transport.

Land transport (DOT)

Proper shipping name	: PRODUCT IS NOT REGULATED DURING TRANSPORTATION

Air transport (IATA)

Proper shipping name	: PRODUCT IS NOT REGULATED DURING TRANSPORTATION

Sea Transport (IMDG/IMO)

Proper shipping name	: PRODUCT IS NOT REGULATED DURING TRANSPORTATION

SECTION 15. REGULATORY INFORMATION

EPCRA - Emergency Planning and Community Right-to-Know Act

CERCLA Reportable Quantity

This material does not contain any components with a CERCLA RQ.

SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 311/312 Hazards	: No SARA Hazards
SARA 302	: SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.
SARA 313	: SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

California Prop 65

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

INTERNATIONAL CHEMICAL CONTROL LAWS :

TOXIC SUBSTANCES CONTROL ACT (TSCA)

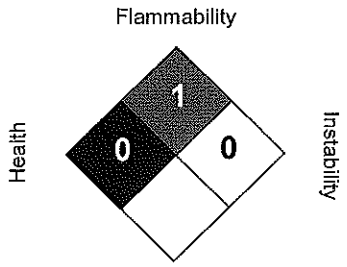
The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA)

The substance(s) in this preparation are included in or exempted from the Domestic Substance List (DSL).

SECTION 16: OTHER INFORMATION

NFPA:



Special hazard.

HMIS III:

HEALTH	0
FLAMMABILITY	1
PHYSICAL HAZARD	0

0 = not significant, 1 =Slight,
2 = Moderate, 3 = High
4 = Extreme, * = Chronic

Revision Date	:	06/18/2014
Version Number	:	1.0
Prepared By	:	Regulatory Affairs

REVISED INFORMATION: Significant changes to regulatory or health information for this revision is indicated by a bar in the left-hand margin of the SDS.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

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ATTACHMENT H

Information Required by 40 CFR §§ 125.86(b)(2)-(4)
Technical Report 1.0
Item 12.g

ATTACHMENT H.1
CITY OF AUSTIN
NACOGDOCHES GENERATING FACILITY
TPDES PERMIT RENEWAL APPLICATION
PHASE I COMPLIANCE INFORMATION

The Nacogdoches Generating Facility (Facility) Cooling Water Intake Structure (CWIS) complies with Phase I, Track I requirements for new facilities that withdraw equal to or greater than 2 million gallons per day (MGD) but less than 10 MGD [40 Code of Federal Regulations (CFR) §125.86(a)(1)(ii)]. The Facility has previously demonstrated compliance with all requirements for velocity, source waterbody flow, and design and construction technologies. The information herein is submitted to satisfy the application requirements specified in 40 CFR §125.86(b)(2)-(4).

The Facility conducted two years of monitoring in accordance with the Texas Pollutant Discharge Elimination System (TPDES) permit, Other Requirements Item 10. Data were submitted to the Texas Commission on Environmental Quality (TCEQ) Industrial Permits Team on July 27, 2014, and the Facility was granted a monitoring frequency reduction on February 27, 2015. The revised monitoring frequency authorized by the February 27, 2015, letter from the TCEQ should be incorporated in the reissued TPDES permit. A copy of the letter is attached as application Attachment H.2.

VELOCITY INFORMATION [40 CFR §125.86(b)(2)]:

The CWIS is located at approximately N 31.934767° W 94.975953°. Three vertical turbine pumps mounted on a concrete and galvanized steel platform draw water from a depth of approximately 10 – 12 feet. There are approximately 1.5 – 2.0 feet of water between the bottom of each intake screen and the lakebed. The intake screens are located approximately 45 feet horizontally from the shoreline. The intake screens have 78% open area and are made of stainless steel with approximately 0.25-inch openings.

The CWIS is positioned between 20 to 40 feet offshore in the southeast portion of the lake adjacent to the lake spillway. The structure is designed to support the use of five pumps, three of which provide water to the power plant and the remaining two pumps are available for future public water use through the Angelina Nacogdoches Water Control Improvement District Number One. Figures 3 through 6 in Attachment H.3 illustrate the current details for intake location and design. The three pumps capable of providing water to the plant are each 900 gpm with the total design capacity being 3.8 MGD. However, the typical plant operation requires the use of only two of the three pumps at any one time, providing a firm capacity of 2.6 MGD. The third pump serves as a secondary pump which is used during the back-flush process, during routine maintenance of the CWIS, and to potentially provide additional capacity. Each pump is fitted with an 8-inch diameter steel pipe fitted with a fine mesh screen housing which draws water from approximately 10 ft below the surface. The back-flush system allows for the removal of debris from the screens.

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TPDES PERMIT RENEWAL APPLICATION
PHASE I COMPLIANCE INFORMATION

The intake structure design meets the design and construction technologies requirements for best technology available by incorporating the following components:

- Through-screen velocity of no more than 0.5 ft/s
- Intake pipes fitted with fine mesh screen
- Not located in an area where fish and shellfish protection is necessary
- Location of intake structure offshore and in mid water depth

Operation of the CWIS is continuous over a 24-hr period each day while the plant is in operation and producing power.

Design calculations of through-screen velocity are presented in Attachment H.4. Through-screen velocity is measured quarterly in accordance with the existing TPDES permit and the Update to the Biological Monitoring Plan (Attachment H.3).

SOURCE WATERBODY FLOW INFORMATION [40 CFR §125.86(b)(3)]:

Lake Striker is a relatively shallow lake with an average depth of 15 feet and covers about 2,400 acres at a normal pool elevation of 293 feet above mean sea level. It is likely that wind driven mixing occurs frequently and any stratification that occurs is likely to be intermittent and relatively short lived. During any short periods of stratification, the minor amount of water withdrawn from the intake would not substantially impact the turnover pattern or stratification of Lake Striker. The total volume of the lake is estimated to be greater than 8,780 million gallons (26,960 acre-feet) In comparison, the design intake volume of 3.8 MGD is insignificant. Therefore, this intake does not have potential to impact any intermittent thermal stratification that occurs in Lake Striker.

DESIGN AND CONSTRUCTION TECHNOLOGY PLAN [40 CFR §125.86(b)(4)]:

The hydraulic zone of influence is defined as "that portion of the source waterbody hydraulically affected by the cooling water intake structure withdrawal of water" (40 CFR 125.83). The zone is used to assess the potential impacts of threatened, endangered or otherwise protected species, or migratory and/or sport or commercial species of impingement concern (40 CFR 125.84(a)(4)(i) and 40 CFR 125.84(a)(4)(ii)). The approach to determining the hydraulic zone of influence is not defined in the Phase I 316(b) rules. Therefore, for this study we have considered the hydraulic zone of influence to be the area in which induced velocities have some potential to impact species of concern. The evaluated velocities are based on an established velocity of 0.5 fps, which is the velocity organisms are typically considered able to swim away from and avoid impingement. A conservative estimate of 0.01 fps was considered in this report to demonstrate the maximum hydraulic zone of influence. Velocities below this value would be very unlikely to have a substantial impact on motile organisms. We believe this definition of the hydraulic zone of influence is conservative and the actual area where organisms will be impacted may be lower.

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CITY OF AUSTIN
NACOGDOCHES GENERATING FACILITY
TPDES PERMIT RENEWAL APPLICATION
PHASE I COMPLIANCE INFORMATION

The zone of hydraulic influence is the areal extension of a cylinder surrounding the cooling water intake through which all the CWIS flow passes and is of sufficient size so that the velocity through the area is equal to 0.01 fps. Based on this, the zone of hydraulic influence is calculated based on the water depth, the design intake flow (in cfs) and the target velocity of 0.01 fps. Based on the design intake of 3.8 MGD (5.9 cfs) and an average depth in vicinity of the intake of 10 ft, we estimated that the hydraulic zone of influence would consist of a cylinder with a diameter of approximately 19 ft. The operational design hydraulic zone of influence was calculated at approximately 13 ft. In other words, the zone of hydraulic influence would extend between 6 to 13 feet from the intakes. The following table provides a summary of the hydraulic zone calculations. The relatively small zones of hydraulic influence indicate that the area of the lake hydraulically affected by the intake is negligible.

Calculation Parameter	Unit	Firm Capacity	Total Design Capacity
Flow	gpm	1800	2650
	MGD	2.6	3.8
	cfs	4.0	5.9
Ambient Velocity	ft/sec	0.1	0.1
Zone of Hydraulic Influence	sq. ft	401	590
Depth	ft	10	10
Circumference	ft	40	59
Radius of Cylinder	ft	6.4	9.4
Diameter	ft	13	19

Design and construction technologies are discussed above.

Bryan W. Shaw, Ph.D., P.E., *Chairman*
Toby Baker, *Commissioner*
Zak Covar, *Commissioner*
Richard A. Hyde, P.E., *Executive Director*

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

February 27, 2015
Dennis Runyan
Alan Plummer Associates, Inc.
6300 La Calma, Suite 400
Austin, Texas 78752-3825

Re: Nacogdoches Power LLC
Texas Pollutant Discharge Elimination System (TPDES) Permit No. WQ0004414000
Biological Monitoring Frequency Reduction Request

The Technical Memorandum, *Biological Monitoring Frequency Reduction Request* received by the Texas Commission on Environmental Quality (TCEQ) on June 27, 2014, and the monitoring data therein, satisfies Other Requirements No. 10 of the current TPDES Permit, issued August 18, 2011 as the Phase I Yearly Status Report for the year 2014.

The following provisions supersede and replace the existing provisions of Other Requirements, No. 10 of TPDES Permit No. WQ0004414000. The Biological Monitoring Plan received by the TCEQ on June 27, 2014 as part of the Technical Memorandum, *Biological Monitoring Frequency Reduction Request*, is approved by the TCEQ and supersedes and replaces the Biological Monitoring Plan submitted in accordance with Other Requirements, No. 10 of TPDES Permit No. WQ0004414000.

1. 316(b) – Cooling Water Intake Structure Requirements

   a. Velocity Monitoring

      The permittee shall monitor through screen velocity once per quarter to ensure the design and construction technology continues to perform consistent with design specifications for intake velocity.

   b. Visual or Remote Inspections

      The permittee shall continue to conduct visual inspections or employ remote monitoring devices during the period the CWIS is in operation. Visual inspections must occur at least once per week when the intake structure is in operation for the purpose of withdrawing cooling water to ensure that the design and construction of

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the CWIS function as designed. Visual monitoring may be conducted concurrently with velocity monitoring. Alternatively, remote monitoring devices may be used.

c. Biological Monitoring.

The permittee must continue to monitor impingement and entrainment of the commercial, recreational, and forage fish and shellfish as described below, in order to corroborate the results of the velocity monitoring and visual or remote inspections. Samples must be collected once per permit term and submitted with the Biological Monitoring Report. The Biological Monitoring Report is due 180 days prior to the date of each subsequent permit expiration, and may be submitted at any point in time after the date of permit issuance and prior to 180 days from the date of permit expiration. Impingement and entrainment sampling may be conducted concurrently. Biological monitoring conducted to date and reported in the technical memorandum received by the TCEQ on July 27th, 2014 satisfies biological monitoring requirements for the existing permit term.

i. Impingement Sampling

The permittee shall collect samples to monitor impingement rates (simple enumeration) for each species over a 24-hour period.

ii. Entrainment Sampling

The permittee shall collect samples to monitor entrainment rates (simple enumeration) for each species over a 24-hour period. Samples shall be collected during the primary period of reproduction, larval recruitment, and peak abundance (i.e., between March and August).

iii. The permittee shall begin revised biological monitoring (i.e., impingement and entrainment) immediately.

2. Record Keeping Requirements

The permitee shall maintain records and report information and data to the TCEQ Industrial Permits Team (MC-148) as follows:

a. The permittee shall submit a 316(b) Phase I Yearly Status Report annually to the TCEQ, Industrial Permits Team (MC-148), beginning September 1st, 2015. The 316(b) Phase I Yearly Status Report must be submitted to the TCEQ, Industrial Permits Team (MC-148) by the 20th of September of each calendar year. The 316(b) Phase I Yearly Status Report must include the following information:

i. Velocity monitoring records for the CWIS.

ii. Records of visual or remote inspections for the CWIS.

iii. Biological monitoring records for the CWIS, when due in accordance with item (1)(c) of these provisions.

If you have any questions or comments please contact me at (512) 239-4420, by fax at (512) 239-4420, or via e-mail at *merrit.mckelvy@tceq.texas.gov*

Sincerely,

Merrit McKelvy
Industrial Wastewater Permitting Team
Water Quality Division

Type text here

ATTACHMENT H.3

City of Austin Nacogdoches Generating Facility

Update to the Biological Monitoring Plan

October 2021

Project #: 3516-001-01

PLUMMER

Update to the Biological Monitoring Plan
City of Austin
Nacogdoches Generating Facility

3516-001-01
October 14, 2021

Plummer:	6300 La Calma Drive, Suite 400 | Austin, TX 78752
Prepared By:	Tres Koenings Jenni English, EIT
Reviewed By:	Thomas Johnson

PLUMMER

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LIST OF ACRONYMS

ACRONYM	DESCRIPTION
BioMP	Biological Monitoring Plan
CFR	Code of Federal Regulations
CWIS	cooling water intake structure
°C	degrees Celsius
msl	mean sea level
NGF	Nacogdoches Generating Facility
TPDES	Texas Pollutant Discharge Elimination System

Update to the Biological Monitoring Plan

1.0 INTRODUCTION

The City of Austin is permitted under the Texas Pollutant Discharge Elimination System (TPDES) to discharge cooling tower blowdown water from the Nacogdoches Generating Facility (NGF) (TPDES Permit No. WQ0004414000). The NGF constructed a cooling water intake structure (CWIS) to pump water from Lake Striker to the NGF near Sacul, Texas. The TPDES permit requires biological monitoring for aquatic organisms that may be impacted by the CWIS. Specifically, the NGF must monitor for impingement of aquatic organisms against the intake screens and entrainment of aquatic organisms in the intake system. Velocity monitoring and visual or remote inspection of the CWIS is also required by the TPDES Permit.

AECOM, Inc., prepared a Biological Monitoring Plan (BioMP) that describes procedures for conducting biological monitoring associated with the CWIS. The original BioMP is included for reference in Appendix A and updated CWIS engineering drawings are included in Appendix B. The AECOM, Inc., BioMP was submitted to the TCEQ with the permit application for the current TPDES permit. However, additional details must be incorporated in the BioMP to execute biological monitoring. The purpose of this Update to the BioMP is to provide details for impingement, entrainment, and velocity monitoring frequencies not included in the original BioMP.

2.0 IMPINGEMENT MONITORING

The NGF will monitor for impingement of organisms against the CWIS intake screens. Impingement is defined as the entrapment of all life stages of fish and shellfish on the outer part of an intake structure or against a screening device during periods of intake water withdrawal [Title 40 Code of Federal Regulations (CFR) §125.83].

The CWIS uses three intake screens to withdraw water from Lake Striker. One or two intakes will be used at any given time under normal operation depending on water demand at the NGF. Impingement samples will be taken using only one intake during each monitoring event. Results will be used to estimate an impingement rate of the second intake if two pumps are operated during the monitoring event. An impingement rate will be determined for each species collected.

Samples will be collected once per permit term over a 24-hour period when the CWIS is in operation.

2.1 MONITORING

The NGF has the option to utilize a back-flushing process to sample impinged organisms. However, this is not likely necessary as impinged objects readily fall off of or can be easily removed from an intake screen once the pump is turned off. A diver will be required to perform impingement monitoring as the depth of water at the intake screens is approximately 15 feet. The monitoring protocol will be as follows:

- One intake screen will be randomly selected from the three available.
- A diver will inspect the intake screen to ensure that the screen is clear of organisms or debris. If the selected intake is in operation at the time, the intake will be back-flushed, if necessary, to remove any impinged organisms, debris or trash. .
- With the screen clear, the intake will resume normal operation for a period of 24 consecutive hours.
- At the end of the 24-hour period and prior to turning off the intake pump, a diver will inspect the screen for impinged organisms or debris. If the screen is 100% clear (i.e., no impingement), the

impingement event may be terminated. If impinged organisms, debris or trash are present, then the diver must collect the impinged matter.

- With the diver positioned near the intake, the pump will be turned off. The diver will pull a mesh bag over the intake screen at the moment the pump is turned off. The bag will envelop the screen, impinged matter will be collected in the bag, and the bag will be sealed and taken to the surface for examination.
- All live non-fish organisms and live fishes greater than 6 inches may be identified, photographed, measured for length, and returned to the water. The remainder of the sample must be preserved in its entirety except for non-biological trash that has been checked for fish and shellfish. Trash may be discarded.
- The sample will either be placed in a 10% formalin solution or in a storage container with water and stored on ice. A sample placed on ice must be delivered to the laboratory for preservation and identification of contents within 24 hours of collection to prevent deterioration. A sample preserved in 10% formalin should be delivered to the laboratory within 48 – 72 hours.
- A Chain-of-Custody record will accompany all samples and be signed every time the sample(s) is relinquished if an external laboratory is used (see Appendix C for example form).
- Samples will be sorted and categorized in the laboratory. Aquatic organisms will be identified to the lowest practical taxonomic level, enumerated, and measured using an appropriate length metric (i.e., total length for fishes).

2.2 LABELING

A label will be placed on or in each sample storage container. The label will identify, at a minimum, the following:

- Date
- Time
- Intake screen number (e.g., 1, 2 or 3)
- Number of containers included in sample (e.g., 1 of 2)
- Preservative and concentration
- Collector name(s)

2.3 REPORTING

Observations will be recorded on a Field Data Reporting Form (see Appendix D for example). This will include identification of any released fishes or other organisms, observations of intake screens or CWIS, number of sample containers prepared for the laboratory, general water quality and weather information, and any additional relevant information. Results including observations and impingement rates will be recorded and provided as part of an annual report to the TCEQ.

3.0 ENTRAINMENT MONITORING

The NGF will perform entrainment monitoring to determine the extent to which aquatic organisms are entrained in the intake system as a result of normal operation of the CWIS. Entrainment is defined as the incorporation of all life stages of fish and shellfish with intake water flow entering and passing through a cooling water intake structure and into a cooling water system (40 CFR §125.83).

Samples will be collected once per permit term for each species over a 24-hour period during the primary period of reproduction, larval recruitment, and peak abundance. The primary period of reproduction, larval recruitment, and peak abundance is identified as March – August in the Source Water Baseline Characterization Data Study Report. The report was submitted to the TCEQ as part of the permit application for the current TPDES permit.

Monitoring will be conducted using a tie-in line on the main water intake line at the NGF. The flow rate will be measured, and results of entrainment monitoring will be used to extrapolate an entrainment rate for the total volume of water sampled during the 24-hour monitoring period. A water-buffered filtering station will be used to filter samples and capture entrained organisms, which will be transferred to a laboratory for identification and enumeration. A conceptual drawing of this setup is included in Appendix E.

3.1 MONITORING

The NGF will utilize a tie-in line to sample entrained organisms. The monitoring protocol will be as follows:

- A 3 inch tie-in line on the main intake piping structure at the CWIS will be used to collect the samples. A manual ball valve will operate the system during sample collection.
- Water from the tie-in will flow through a pipe or hose into a buffering station where water will pass through fine mesh (750 micrometer) nets to collect entrained. The buffering station consists of two 150 gallon drums. Water will flow into each net, out into the respective drum, and return to the lake via an overflow valve. The surrounding water in the drum will reduce physical degradation of organisms. Two nets will be used, one for each drum, simultaneously or individually as necessary.
- Flow rate will be measured using a flow meter to be located between the 3 inch tie-in and sampling apparatus.
- Samples will be collected for periods of time evenly spaced over the 24-hour period. It is not possible to know at this time if longer duration monitoring is practical or if a large amount of organisms and debris will be entrained, which would necessitate shorter duration monitoring. This will be determined by the investigator on scene. Example scenarios include collecting samples at 4 or 6 hour intervals. If possible, samples will be collected to observe possible diurnal changes (i.e., dawn, day, dusk, and night hours).
- Samples collected in the separate drums may be composited within the same time interval over the 24-hour period.

- Each sample will either be placed in a 10% formalin solution or in a storage container with water and stored on ice. A sample placed on ice must be delivered to the laboratory for preservation and identification of contents within 24 hours of collection to prevent deterioration. A sample immediately preserved in 10% formalin should be delivered to the laboratory within 48 – 72 hours.
- A Chain-of-Custody record will accompany all samples and be signed every time the sample(s) is relinquished if an external laboratory is used.
- Samples will be sorted and categorized in the laboratory. Aquatic organisms will be identified to the lowest practical taxonomic level and enumerated.

3.2 LABELING

A label will be placed on or in each storage container. The label will identify, at a minimum, the following:

- Date
- Time
- Volume of water sampled
- Number of containers included in sample (e.g., 1 of 2)
- Preservative and concentration
- Collector name(s)

3.3 REPORTING

Observations will be recorded on a Field Data Reporting Form. This will include the volume of water sampled, observations recorded during the event, number of sample containers prepared for the laboratory, general water quality and weather information, and any additional relevant information. Results including observations and entrainment rates will be recorded and provided as part of an annual report to the TCEQ.

4.0 VELOCITY MONITORING

Velocity monitoring is required by the TPDES permit during periods when the CWIS is in operation. Velocity monitoring must be conducted quarterly to ensure that the design and construction technologies continue to perform consistent with design specifications for intake velocity. A diver is required to measure velocity at the intake screens. The diver must be assisted by a velocity meter operator to be located on the CWIS platform. One or two pumps may be in operation during this monitoring; however, one pump is preferred because this should maximize through-screen velocity.

A diver will ensure that the screen(s) is clear of impinged items and use an electromagnetic flow meter at five locations on the screen(s) to measure velocity. A minimum of one discrete, 1-minute average velocity measurement will be determined for each location on the screen. The results will be used in an area-proportional velocity calculation. A conceptual drawing of an intake screen with measurement locations and the area-proportional velocity formula are located in Appendix F. Velocity will be recorded on the field data form.

5.0 VISUAL OR REMOTE INSPECTIONS

The TPDES permit requires the NGF to perform visual or remote inspections of the CWIS during the period when the CWIS is in operation. Visual inspections must occur at least weekly to ensure that the design and construction technologies are maintained and operated to ensure that they will continue to function as designed. Alternatively remote monitoring devices may be used to ensure that the impingement and entrainment technologies function as designed.

Inspections will be performed using an underwater camera on a telescopic rod during periods when a diver is not present to conduct impingement monitoring or other work that requires a diver. If a diver is present, he will visually inspect each intake screen for integrity. Inspection records are maintained by NGF staff.

6.0 MONITORING PROTOCOL REVISION

Monitoring protocols may need to be modified as a result of changed conditions at the NGF or CWIS. Any significant deviation from the above-described monitoring protocols will be recorded in a revision the BioMP.

7.0 MONITORING TIMING AND EXEMPTION

Impingement monitoring will be timed such that it does not interfere with entrainment monitoring and vice-versa. However, the events may be conducted concurrently. An example monitoring scenario is as follows:

- Inspect intake screen(s), backflush screen, and begin impingement monitoring
- Commence entrainment monitoring for a 24-hour period
- Complete entrainment monitoring
- Inspect intake screen and collect sample, if necessary

The CWIS is located in close proximity to the Lake Striker spillway. Impingement monitoring, velocity monitoring, or other work that requires a diver in the water will not be performed if unsafe conditions (e.g., flooding) exist in Lake Striker. If conditions that pose a hazardous risk persist for longer than one month, during which time dive-related monitoring was scheduled, monitoring will be postponed until conditions are deemed safe. Entrainment monitoring should not be affected by higher lake elevations because of the elevated CWIS platform. However, inclement weather (e.g., thunderstorms or high winds) could cause short-term delays in monitoring. Monitoring will resume when safe conditions prevail.

APPENDIX A

EXISTING BIOLOGICAL MONITORING PLAN

AECOM Environment

Submitted to:
Southern Power Company
Atlanta, Georgia

Submitted by:
AECOM
Houston, TX
November 2010

Biological Monitoring Plan

Nacogdoches Power Plant Project

AECOM Environment

Submitted to:
Southern Power Company
Atlanta, Georgia

Submitted by:
AECOM
Houston, TX
November 2010

Biological Monitoring Plan

Nacogdoches Power Plant Project

Draft

_____
Prepared By Kurtis K. Schlicht

_____
Reviewed By Jessica Wilson

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List of Acronyms

AEI	Adverse Environmental Impacts
BioMP	Biological Monitoring Plan
BTA	Best Technology Available
CFP	Cubic Foot Per Second
CWA	Clean Water Act
CWIS	Cooling Water Intake Structure
E	Entrainment
EPA	Environmental Protection Agency
EPRI	Electric Power Research Institute
GPM	Gallons Per Minute
IM	Impingement Mortality
MGD	Million Gallons Day
MSL	Mean Sea Level
MW	Mega-watt
NPDES	National Pollutant Discharge Elimination System
SPC	Southern Power Company
TCEQ	Texas Commission on Environmental Quality
TPWD	Texas Parks and Wildlife Department
TPDES	Texas Pollutant Discharge Elimination System
T&E	Threatened & Endangered
U.S.	United States
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
YOY	Young of the Year

1.0 Introduction

Southern Power Company (SPC) is currently permitted under the Texas Pollutant Discharge Elimination System Permit No. WQ0004414000 for the treatment and discharge of waste from the Nacogdoches Power Project located four miles northwest of the City of Cushing, Nacogdoches County, Texas – (Figure 1). The power project is a 100 mega-watt (MW) wood fired electric power generating facility (SIC 4911). Currently, SPC is proposing to relocate the existing permitted Cooling Water Intake Structure (CWIS) for the Nacogdoches Power Plant from the Angelina River to Lake Striker, located in Rusk and Cherokee Counties, Texas, approximately 18 miles southwest of Henderson, TX – (Figure 2). As a result of this modification, SPC is required to provide source water baseline characterization data and biological monitoring plan for the new proposed CWIS location on Lake Striker. SPC is providing two separate documents related to each of these compliance topics.

This biological monitoring plan (BioMP) describes procedures for monitoring the impacts on aquatic organisms associated with the proposed water intake structure to be located on Lake Striker. As of the date of the preparation of this BioMP, the intake structure has not been constructed. Once in operation, the structure will divert over 2.1 MGD water for the Nacogdoches Power Plant for evaporative cooling purposes. The power generating system will be designed for highly efficient water use by re-circulating water through the cooling towers, blowing down (discharging) only what is necessary to maintain proper water chemistry in the cooling system. Consumptive water use for the Project will be limited primarily to replacing losses due to evaporation and blowdown. Nacogdoches Power, LLC (Nacogdoches Power) will operate the power generating facility

The new proposed Lake Striker CWIS will be positioned between 20 to 40 feet offshore in the southeast portion of the lake adjacent to the lake spillway. The structure will be designed to support the use of 5 pump stations, three of which will provide water to the power plant and the remaining two pumps stations will be available for future public water use through the ANWCID. Figures 3 through 6 illustrate the current conceptual details for intake location and preliminary design. The three pumps providing water to the plant will consist of 900 gpm pumps with a total design capacity of 3.9 MGD of water. Operation requirements for the plant will only require two pumps which will provide a water volume of 2.1 MGD. The third pump will be utilized as a back up during back-flushing and routine maintenance of the CWIS. Each pump will be fitted with an 8 inch diameter steel pipe fitted with a fine mesh screen housing which will draw water from approximately 10 ft below the surface. The pump system is designed with a back flush system which will allow for the removal of debris from the screens. The proposed intake structure design meets the design and construction technologies requirements for best technology available by incorporating the following components:

- Through-screen velocity of no more than 0.5 ft/s
- Intake pipes fitted with fine mesh screen
- Not located in an area where fish and shellfish protection is necessary
- Location of intake structure offshore and in mid water depth

Operation of the CWIS will be continuous over a 24-hr period each day while the plant is in operation and producing power. As mentioned plant operation will require the use of only two of the three pumps at any one time with the third pump serving as a backup.

2.0 Regulatory Background

Part 40 Code of Federal Regulations (40 CFR) §§125.80-125.89 (hereinafter referred to as Subpart I) regulates the design, construction, and operation of cooling water intakes for power generating facilities. The cooling water intake for the Project is subject to the requirements of Subpart I because the Project is a new facility proposing to utilize a CWIS with a design pumping rate exceeding 2 MGD. The purpose of Subpart I is to ensure that cooling water intakes are designed, constructed, and operated to minimize adverse environmental impacts associated with impingement and entrainment of fish and shellfish. The regulations call for minimizing impacts through the application of best technologies available in the design and construction of such intakes.

The current TPDES permit requires the development of the BioMP, citing requirements of Subpart I at §125.84(c) and 125.87 and reporting in 125.88. The following elements of monitoring are required:

- Source Water Baseline Biological Characterization
- Biological monitoring
    - o Impingement Sampling
    - o Entrainment Sampling
- Velocity Monitoring
- Visual Inspections
- Records and Reporting

Monitoring and inspections are required to occur on a routine basis. In addition, the TPDES permit requires Nacogdoches Power to maintain records of biological monitoring and to periodically report on the status of monitoring.

2.1 Baseline Biological Characterization

A new Source Water Baseline Biological Characterization (Baseline Characterization) has been prepared for the Project and submitted with the application renewal. Data in this study characterizes the biological community as well as the intended operation of the cooling water intake facility. Requirements for the Baseline Characterization are found in 40 CFR §122.21(r)(3) and are referenced in Subpart I.

The Baseline Characterization identifies species and relevant taxa for all life stages in the vicinity of the intake structure. The following information was documented for each of the identified species:

- Relative abundance
- Life stages that would be most susceptible to impingement and entrainment
- Primary period of reproduction, larval recruitment, and period of peak abundance
- Seasonal and daily activities (e.g., feeding and water column migration)

SPC has prepared Source Water Baseline Biological Characterization document to address specific permit requirements set forth by the Subpart I and provides additional information to demonstrate that the Nacogdoches CWIS and its operation meets the best technology available and effectively minimizes adverse environmental impacts (AEI) on the biota of the source water body. The source water baseline characterization study provides a complete review of the current and historic data and literature used to evaluate the biological communities in proximity of the proposed CWIS.

2.2 Intake Monitoring

As the owner operator of a new facility a verification monitoring plan is required. The requirements for this plan are found in 40 CFR 125.87 and include the following

(a) biological monitoring – monitor both impingement and entrainment of commercial, recreational, and forage base fish and shellfish species identified in the source water baseline biological characterization data required by 40 CFR 122.21(r)(3). Monitoring frequency must cover at least a 2 year period after the initial permit issuance.
   (1) Impingement – must collect samples to monitor of impingement rates (simple enumeration) for each species over a 24-hour period and no less than once per month when the CWIS is in operation.
   (2) Entrainment – must collect samples to monitor entrainment rates (simple enumeration) for each species over a 24-hour period and no less than biweekly during the primary period of reproduction, larval recruitment, and peak abundance identified in the source water baseline biological characterization. Samples must be collected only when CWIS is in operation.

(b) Velocity monitoring – facilities with surface water intake screens must monitor head loss across the screens an correlate the measured value with the design intake velocity. The head loss across the intake screen must be measured a the minimum ambient source water surface elevation (best professional judgment based on available hydrological data). The maximum head loss across the screen for each CWIS must be used to determine compliance with the velocity requirement in §125.84(b)(2) or (c)(1 If the facility uses devices other than surface water intake screens, the facility must monitor velocity at the point of entry through the device. Head loss or velocity during initial facility startup must be monitored at the frequency specified in the facility's NPDES permit, but no less than once per quarter.

(c) Visual or remote inspections – must either conduct visual inspections or employ remote monitoring devices during the period the CWIS is in operation. Must conduct visual inspections at least weekly to ensure that any design and construction technologies required in § 125.84(b)(4) and (5) or (c)(3) and (4) are maintained and operated to ensure that they will continue to function as designed. Alternatively, the facility must inspect via remote monitoring devices to ensure that the impingement and entrainment technologies are functioning as designed.

The general procedures associated with each element are described in the following subsections. The proposed schedules for initiation and frequency of monitoring are addressed in the section 4.0, Monitoring Schedule.

2.2.1 Impingement Monitoring

The objective of this element of the monitoring program is to determine whether normal operation of the intake structure will cause impingement of relevant species (all life stages). Impingement is defined in Subpart I as "the entrapment of all life stages of fish and shellfish on the outer part of an intake structure or against a screening device during periods of intake water withdrawal.

The CWIS on Lake Striker is configured such that there are potentially three screen structures that may be sampled to verify impingement. However, due to the design of each intake pipe, the screen mesh housing, and the pump capacity we propose to sample only one of the intake pipes for verification. Furthermore, only two intake pipes will be in operation at one time. Therefore, SPC believes that by selecting only one intake pipe we will be able to extrapolate the data and provide an estimate of overall cumulative numbers for impingement across the two intake pipes that are in operation at the time of monitoring.

SPC has evaluated multiple options for conducting verification monitoring for impingement. Through this review we have identified three possible options for impingement, which include:

- Sampling from the screens during back-flushing
- Ambient samples adjacent to the CWIS, and
- Use of video technologies

Evaluation of these three options has determined that although these methodologies will provide data that can be associated with enumerating the impingement at the CWIS none of them specifically address the requirements of the rule. For example, the use of ambient samples and video technologies will not actually demonstrate what species are being impinged. These methods will only provide information on the species in the area of the intake. By collecting this data and estimating impingement it will over estimate the actual number of organisms impinged. Sampling from the screens during back-flushing poses separate issues such as safety issues and collecting viable samples due to potential impact to the organisms during the impingement and the back-flushing process. Despite this concern, SPC has determined that this option will provide the most relevant data required in meeting the verification monitoring requirements.

2.2.1.1 Impingement Monitoring Procedures

Impingement monitoring requires that samples must be collected over a 24-hour period and no less than once per month when the CWIS is in operation. Samples collected will be used to monitor impingement rates (simple enumeration) for each species on a daily and seasonal basis.

SPC has elected to implement a sample program that will rely on collecting impinged organisms from the intake screens during the intake back-flushing process. The steps for sampling will include the following:

1. During each sampling event one intake pipe will be randomly selected and sampled to represent impingement for all three intake pipes. The selected intake pipe will be sampled for a continuous 24-hour period and then all organisms will be collected in net/basket during the back-flushing process.
2. Prior to sample collection, the selected intake pipe will be back-flushed just prior to commencing the 24-hour collection period to assure there are no organisms on the intake screen.
3. The intake pump will be operated for the 24-hour period and then stopped to allow placement of the net/basket onto the intake pipe. The pump will then be turned on and back-flushed into the net until all organisms are removed from the screen. It is anticipated that this back-flushing process will be completed over a ten minute period.
4. All collected organisms will them be indentified and enumerated to obtain the sample results.

Impingement estimates from the intake sample will first be summarized to determine the overall impingement for the single intake. This number will then be extrapolated to demonstrate the overall impingement value each intake that was operated at the time of sample collection. Observations of

other materials (e.g., leaves, sediment, litter, etc. that may have been impinged on the screens will also be recorded. The results of the sampling event, including observations, water quality data, and impingement counts will be recorded and provided as part of the annual report to the TCEQ.

2.2.2 Entrainment Monitoring

The objective of entrainment monitoring is to determine the extent to which aquatic organisms are being entrained into the intake system as a result of normal operation of the intake pumps. Subpart I defines entrainment as "the incorporation of all life stages of fish and shellfish with intake water flow entering and passing through a cooling water intake structure and into a cooling water system."[1] The approach for sampling entrainment will be to have a tie-in line on the main water intake line at the plant which will be sampled based on volume of water pumped and then extrapolated to represent the entrainment number by total water used during the 24-hour period.

Sampling will be performed using a water buffering station that will filter samples and capture entrained organisms which will be later identified and enumerated in a laboratory setting.

2.2.2.1 Entrainment Monitoring Procedures

Entrainment requires that samples must be collected over a 24-hour period and no less than biweekly during the primary period of reproduction, larval recruitment, and peak abundance identified in the source water baseline biological characterization. Samples collected will be used to monitor entrainment rates (simple enumeration) for each species on a daily and seasonal basis. Samples will be collected only when CWIS is in operation. The steps for sampling will include the following:

1. A tie-line into the main intake piping structure at the plant will be used to collect the samples. This will consist of having a valve system that will be manually opened and closed during sample collection.
2. Water from the tie-lie will then flow through a 3"hose into a buffering station where water will be sifted through fine mesh (363µm) nets to collect entrained organisms. The buffering station consists of two 375 gallon drums fitted with 3" pvc pipe flow structure which holds the nets and allows water to be sampled. The surrounding water in the chamber helps reduce impacts to organisms. Two nets will be used, one for each drum.
3. Water volumes will be measured using an inline flow meter. Sample collections will result in a total of 100 cubic meters (four, 6-hour sample sets of 25 cm^3) of water sampled over a 24-hour period.
4. Samples will be collected every six hours (two daylight samples and two night samples) during operation of the CWIS. Each of the daylight samples will be composited to represent one daytime sample and the two night samples will be composited to represent the night time samples.
5. All samples will be preserved first in 10% formalin solutions for a 24-hour period and then rinsed and preserved in 90% alcohol for shipping to laboratory for identification and enumeration. Each sample will be placed in a discrete container with the appropriate label including time and date.

[1] 40 CFR §125.83 (Definitions)

Samples will be submitted to a qualified laboratory for identification and enumeration. The laboratory will provide a summary of larval and eggs identified down to the lowest possible taxonomic identification as possible. As required by Subpart I, simple enumeration of aquatic life will be used to determine the amount of entrainment within the intake system. These data will be used to estimate the number of aquatic organisms potentially entrained into the intake system during the sampling event. The estimated total number will be recorded for later use. Observation of other materials (e.g., leaves, sediment, litter, etc.) that may have been entrained will also be recorded. The results of the sampling event, including observations, water quality data, and entrainment counts will be recorded.

2.2.3 Velocity Monitoring

The objective of velocity monitoring is to verify that the water velocity across the intake screen is less than 0.5 feet per second (fps), as required in Subpart I. For the proposed intake structure, the intake screens are located at the end of the intake pipe at a depth of approximately 8 to 10 ft. Therefore, velocity monitoring will be performed at the intake screens. In order to verify compliance all three intake pipes will be monitored. The requirements for velocity monitoring include:

> 40 CFR 125.87 (b) Velocity monitoring. If the facility uses surface intake screen systems, you must monitor head loss across the screens and correlate the measured value with the design intake velocity. The head loss across the intake screen must be measured at the minimum ambient source water surface elevation (best professional judgment based on available hydrological data). The maximum head loss across the screen for each cooling water intake structure must be used to determine compliance with the velocity requirement in § 125.84(b)(2) or (c)(1). If the facility uses devices other than surface intake screens, you must monitor velocity at the point of entry through the device. Head loss or velocity during initial facility startup must be monitored at the frequency specified in the facility's NPDES permit, but no less than once per quarter.

The objective of this portion of the monitoring program is to characterize the velocity through the intake screens as accurately as possible. Actual measurement of the velocity through the intake screen is not feasible due to the small size of the mesh openings.

In this case, the intake screens will be located at the end of the intake pipe at a depth of approximately 8 to 10 ft. Therefore, the head loss monitoring requirement of the rule does not apply to this intake. In order to monitor the through screen velocity at the point of entry, the rate of water withdrawal through the individual intake structures will be monitored on a quarterly basis. This rate of withdrawal will be used with the known screen dimensions and open area to calculate the corresponding through-screen velocity. When the through screen velocity is calculated, an allowance will be included for the occlusion of open area that debris on the screens may cause.

Other approaches to monitoring the velocity were considered and rejected for various reasons. Direct measurements of the velocity of water flowing through the screen slots would be infeasible due to the small size of the openings. This constraint is recognized in the Phase I rule which require monitoring of head loss across the screens and correlating that with the actual intake velocity for surface intakes. Measurement of the velocity in front of the screen (approach velocity) using diver mounted velocity meters would be feasible. However, deriving the through screen velocity would require assumptions that are similar to those required with the selected monitoring approach. Furthermore, these measurements would be impacted by artifacts and represent only a selected period of time. Therefore, the approach outlined above was selected.

Velocities measurements are instantaneous and therefore do not require a minimum measuring period as with impingement or entrainment sampling. However, normal pumping operations are needed during the velocity measurement to ensure the recording of representative data. The results of the measurements, including observations, and water quality data, will be recorded and reported on the annual monitoring report.

3.0 Intake Facility Inspections

Nacogdoches Power will conduct visual inspections at least weekly to ensure that facility equipment and operations at the CWIS function according to design specifications. The results of visual inspections will be recorded in a weekly log book for future reference and reporting to the TCEQ.

4.0 Reporting and Timekeeping

As required by the TPDES permit, Nacogdoches Power will maintain records of all data used to complete the initial permit application and data used to show compliance with Subpart I for a period of at least three years from the date of issuance of the TPDES permit. In addition, Nacogdoches Power will submit an annual status report to the TCEQ. Each annual report will include the following information:

- The results of impingement monitoring
- The results of entrainment monitoring
- The results of velocity monitoring
- The results of visual inspections of the intake structure and pump station

In the event that the intake structure is not functional by the time the initial annual report is due, Nacogdoches Power will report only on the status of activities related to the development of the intake structure. Once the permit is issued, SPC will provide a schedule for submittal of these reports for the first three years.

5.0 Monitoring Schedule

This section details the frequency of monitoring necessary for compliance with the TPDES permit and provisions of Subpart I. Monitoring will be conducted at prescribed frequencies as indicated in Table 1 unless instructed otherwise by the TCEQ, the cooling water system at the power plant is not in operation, or if other circumstances warrant a variance in the schedule. The table describes the various required studies, events, and reports; the required date for the initial study, event, or report; the required frequency; the end date; and any allowable exceptions to completion.

Table 1. Monitoring and Reporting Schedule				
Monitoring or Report Type	**Initial Monitoring Event or Report Due**	**Frequency**	**End Date**	**Authorized Exceptions**
Biological Monitoring Plan	Completed as part of application amendment and renewal (November 2010)	One time	N/A	N/A
Baseline Biological Characterization	Completed as part of application amendment and renewal (November 2010)	One time	N/A	N/A
316(b) Phase I Status Report	To be determined based on issuance of permit and operation of plant	Annually	Permit Term	When conditions in river pose unacceptable risks
				When facility is inactive
Impingement Monitoring	Upon facility start-up	Monthly. After 2 years, a variance can be requested.	Two Years	When conditions in river pose unacceptable risks
				When facility is inactive
Entrainment Monitoring	Upon facility start-up	Once per two weeks during primary period of reproduction, larval recruitment, and peak abundance	Permit Term	When conditions in river pose unacceptable risks
				When facility is inactive
Velocity Monitoring	Upon facility start-up	Quarterly	Permit Term	When conditions in river pose unacceptable risks
				When facility is inactive
Visual Inspections	Upon facility start-up	Weekly	Permit Term	When facility is inactive

6.0 Updates to the Biological Monitoring Plan

It may become necessary from time to time, to modify the BioMP. Such changes may be a result of design changes to the intake structure, prior to or during construction; new information obtained during the Baseline Characterization; or improvements in monitoring technology that would enhance data collection. Nacogdoches Power will provide a copy of any updates to the BioMP to the TCEQ as necessary.

Figures

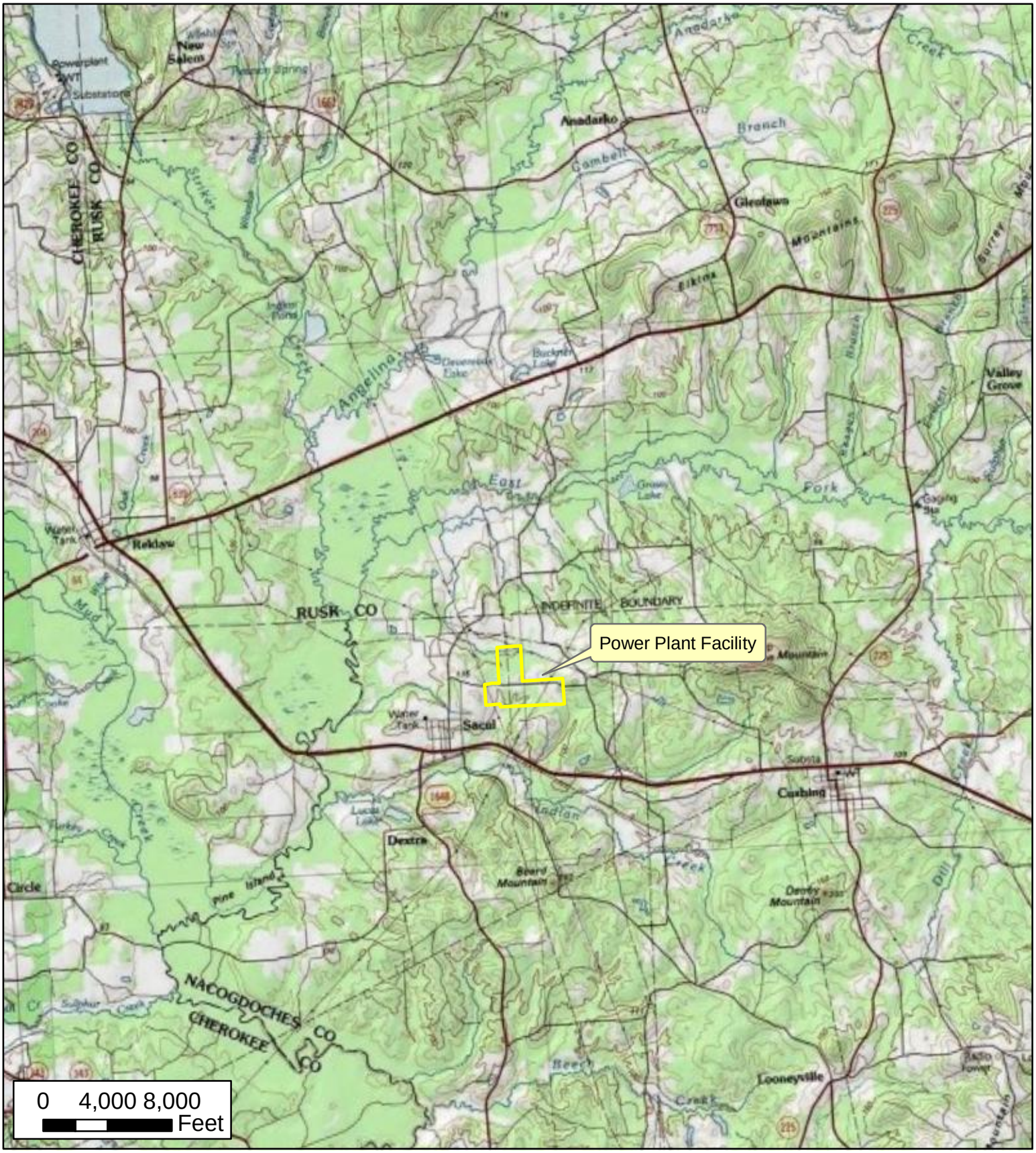


Figure 1 - Site Location Map
Nacogdoches Power Plant
USGS Topographic

Projection: Texas State Plane Central, NAD 1983, US Feet
Background: USGS Topographic Quadrangle
Source: ESRI
Creator: Ryan Hilliard (Ryan.Hilliard@aecom.com)

Southern Company

AECOM

September 8, 2010

Project: 60143213

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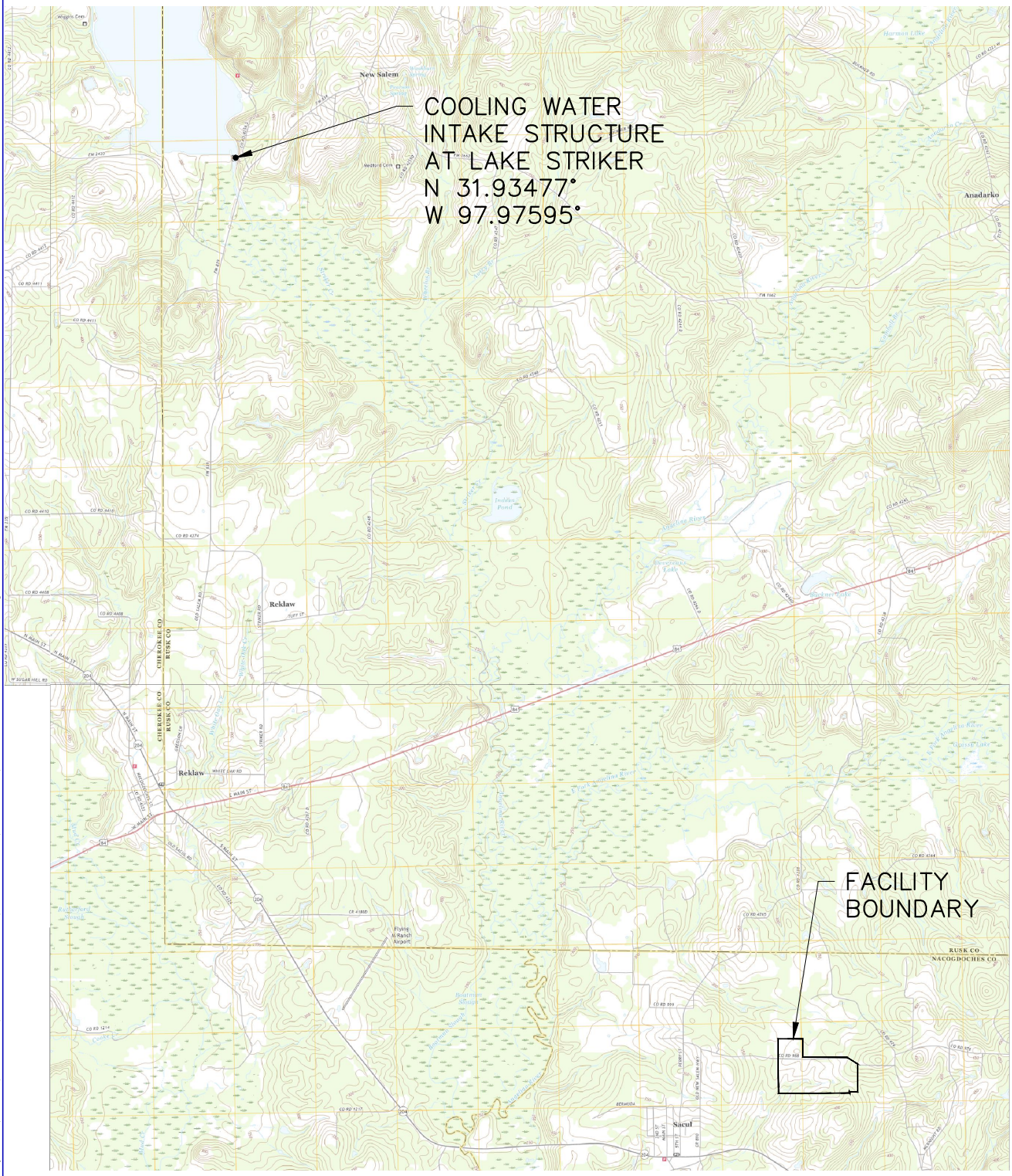
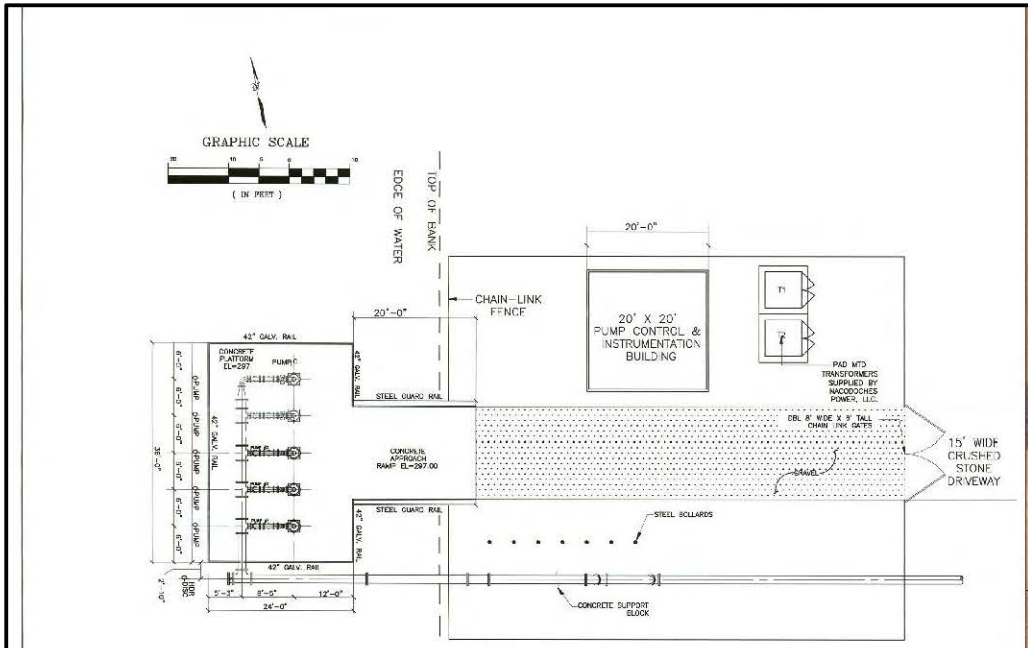


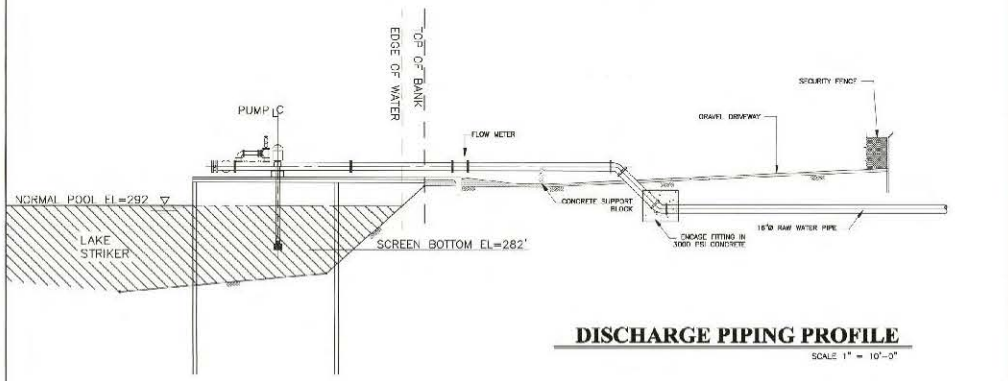
FIGURE 2
AUSTIN ENERGY
NACOGDOCHES POWER ELECTRIC GENERATING PLANT
TPDES PERMIT RENEWAL APPLICATION
INTAKE STRUCTURE LOCATION MAP

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PLAN OF PROPOSED PUMP STATION

SCALE 1" = 10'-0"



DISCHARGE PIPING PROFILE

SCALE 1" = 10'-0"

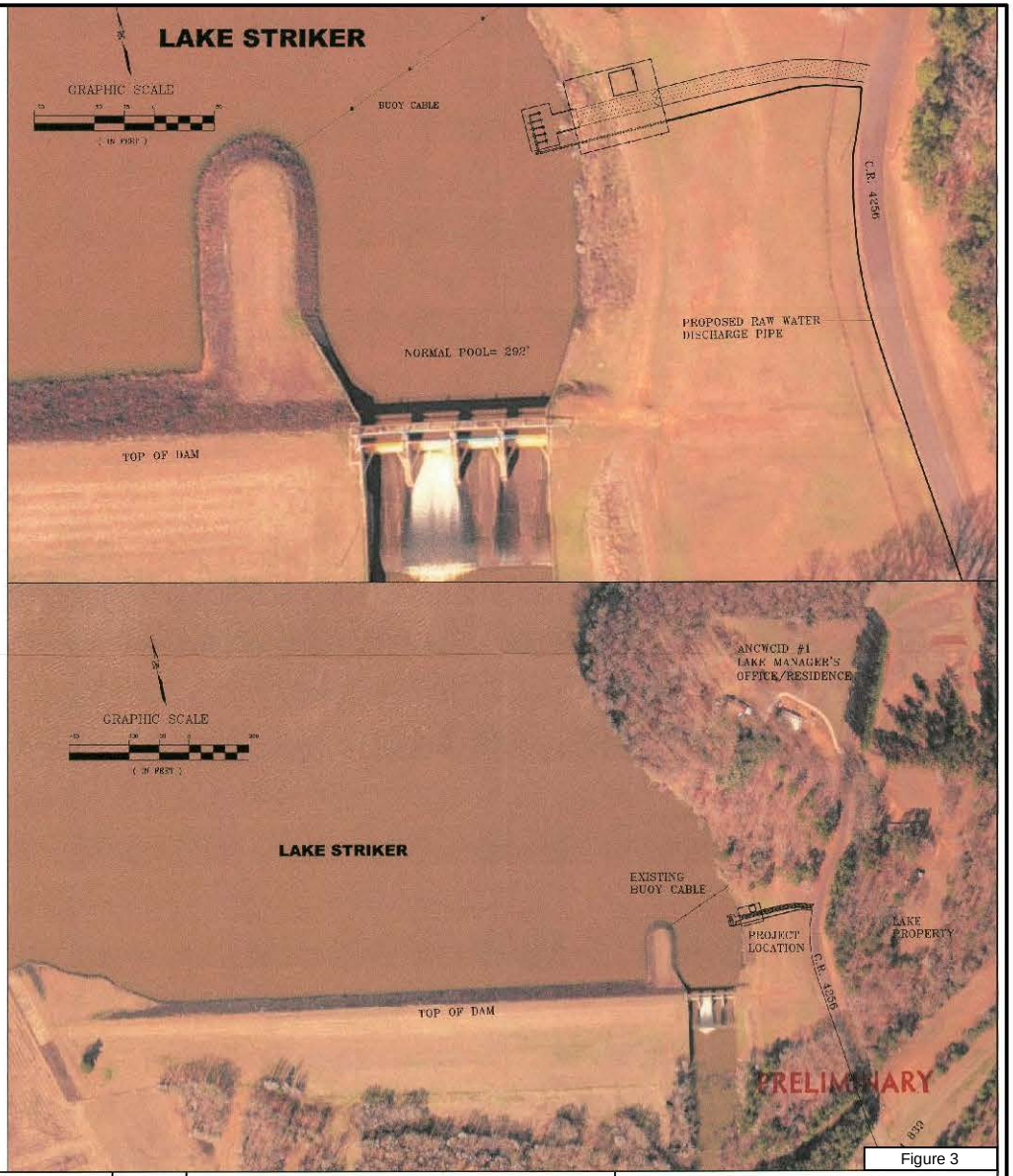
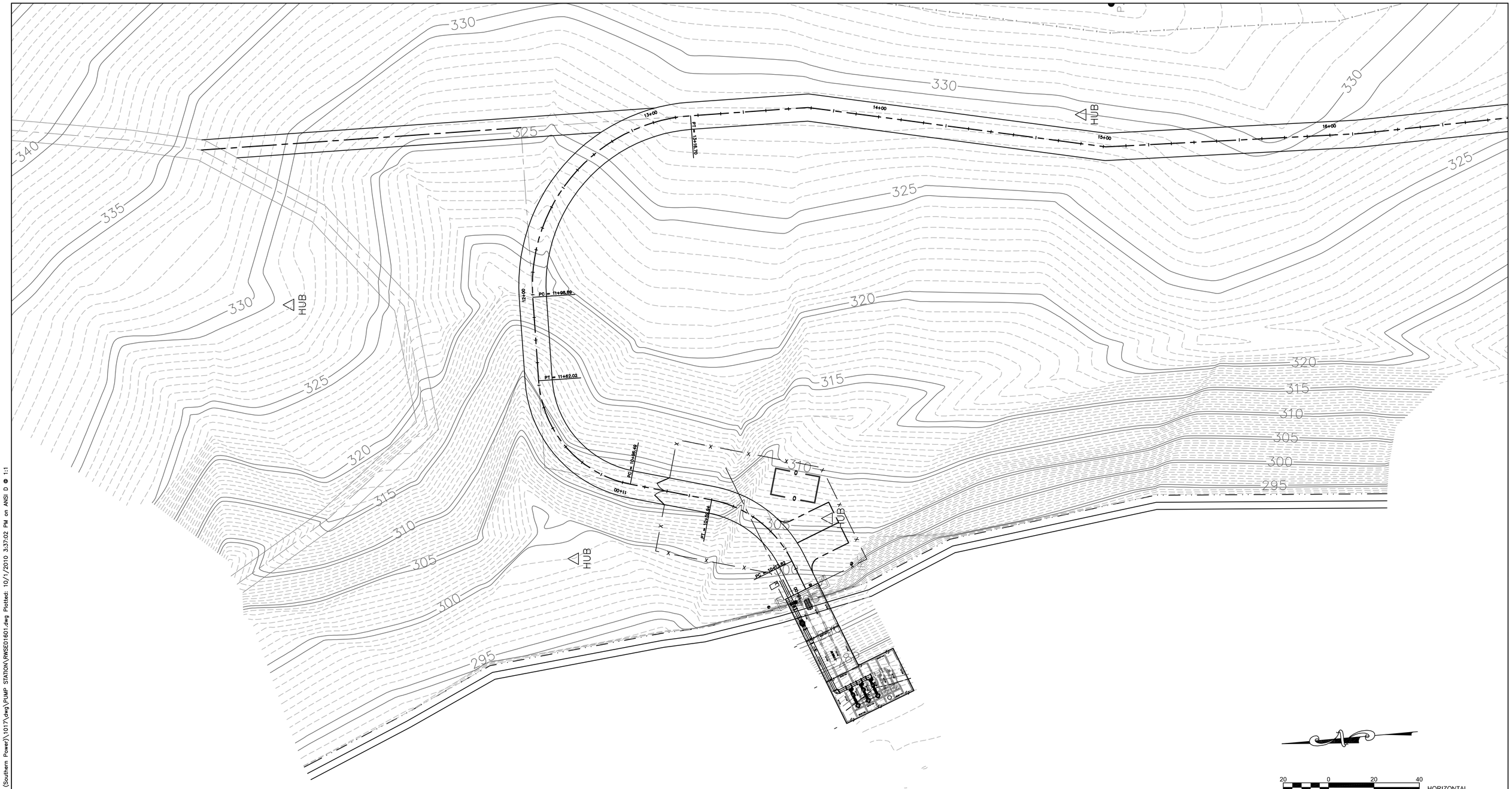


Figure 3

Drawn By: RLB 04-27-2010 Approved By: XXX XX-XX-XXXX FILE NAME & LAYOUT NAME: SitePlan.dwg\Layout1	DWG. NO. REFERENCE DRAWINGS	STOKES & ASSOCIATES, INC. RETAINS ALL RIGHT, TITLE AND INTEREST IN AND TO THIS DOCUMENT AND ALL INFORMATION INCLUDING BUT NOT LIMITED TO ALL INTELLECTUAL PROPERTY DEVELOPED BY OR ON BEHALF OF STOKES & ASSOCIATES, INC. NEITHER THIS DRAWING/SPECIFICATION NOR ANY INFORMATION CONTAINED HEREIN SHALL BE REPRODUCED, USED OR RELIED UPON FOR THE PREPARATION OF SPECIFICATION OR APPARATUS, OR FOR ANY OTHER PURPOSE EXCEPT AS EXPRESSLY AUTHORIZED IN WRITING BY STOKES & ASSOCIATES, INC.	EPAC-JV JOINT VENTURE DESIGN/BUILD GROUP Stokes & Associates, Inc./Apeck Construction, Inc. REGISTRATION NO. F-967 P.O. BOX 1114 HENDERSON, TEXAS 75653 Tel (903) 657-7558 Fax (903) 657-7864	PROJECT NUMBER	NACOGDOCHES POWER, LLC LAKE STRIKER OPTION INTAKE & PUMP STATION	PLOT SCALE: 1:1 SHEET: XX OF XX



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SAI PROJECT: 190–1017

PLOT SCALE: 1:1

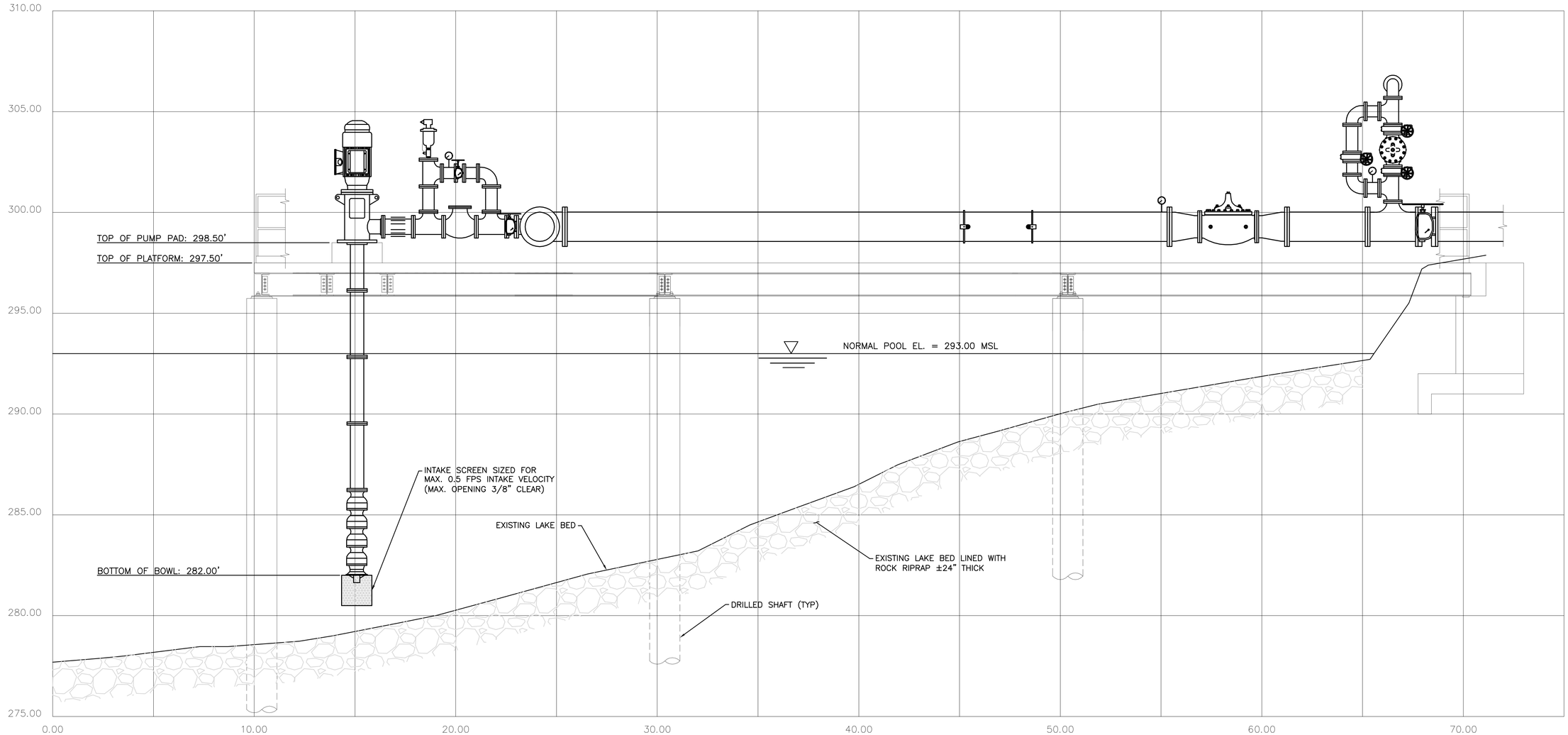
ANGELINA & NACOGDOCHES COUNTIES
WATER CONTROL & IMPROVEMENT DISTRICT NO. 1
RAW WATER PUMP STATION
SITE ELECTRICAL PLAN

DWN BY: XXX DATE: XX–XX–2010
CHK BY: CDH DATE: 09–23–2010

DRAWING NUMBER: D1901017-RWSE01601

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REV: 0



A SECTION VIEW
Scale: 3/8" = 1'

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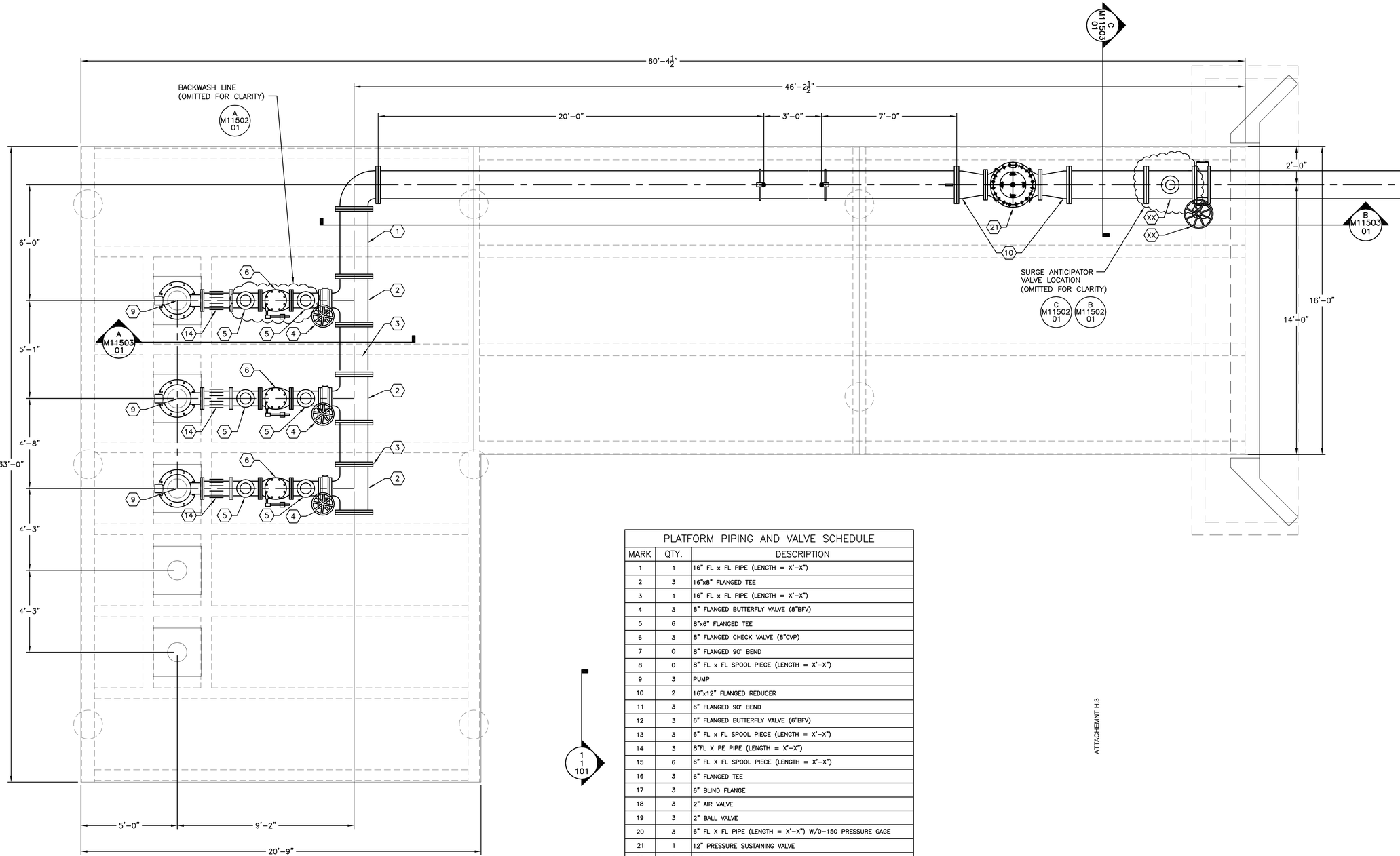
SAI PROJECT: 190–1017
PLOT SCALE: 1:1

ANGELINA & NACOGDOCHES COUNTIES
WATER CONTROL & IMPROVMENT DISTRICT NO. 1
RAW WATER PUMP STATION
PLATFORM PIPING SECTIONS 2

DWN BY: CDH DATE: 09–27–2010
CHK BY: CDH DATE: 09–27–2010

DRAWING NUMBER: D1901017-RWSM11503
SHEET: 02
REV: 0

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PLATFORM PIPING AND VALVE SCHEDULE		
MARK	QTY.	DESCRIPTION
1	1	16" FL x FL PIPE (LENGTH = X'-X")
2	3	16"x8" FLANGED TEE
3	1	16" FL x FL PIPE (LENGTH = X'-X")
4	3	8" FLANGED BUTTERFLY VALVE (8"BFV)
5	6	8"x6" FLANGED TEE
6	3	8" FLANGED CHECK VALVE (8"CVP)
7	0	8" FLANGED 90° BEND
8	0	8" FL x FL SPOOL PIECE (LENGTH = X'-X")
9	3	PUMP
10	2	16"x12" FLANGED REDUCER
11	3	6" FLANGED 90° BEND
12	3	6" FLANGED BUTTERFLY VALVE (6"BFV)
13	3	6" FL x FL SPOOL PIECE (LENGTH = X'-X")
14	3	8"FL X PE PIPE (LENGTH = X'-X")
15	6	6" FL X FL SPOOL PIECE (LENGTH = X'-X")
16	3	6" FLANGED TEE
17	3	6" BLIND FLANGE
18	3	2" AIR VALVE
19	3	2" BALL VALVE
20	3	6" FL X FL PIPE (LENGTH = X'-X") W/0-150 PRESSURE GAGE
21	1	12" PRESSURE SUSTAINING VALVE
22	1	16" X 6" FLANGED TEE
23	1	16" FLANGED BUTTERFLY VALVE (16"BFV)

1 PLATFORM PIPING PLAN
Scale: 3/8" = 1'

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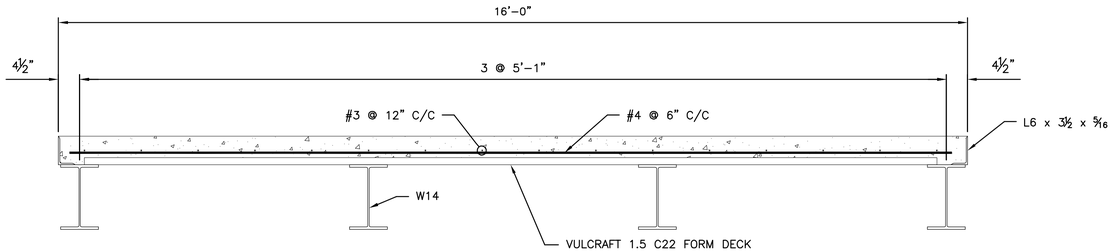
SAI PROJECT: 190-1017
PLOT SCALE: 1:1

ANGELINA & NACOGDOCHES COUNTIES
WATER CONTROL & IMPROVMENT DISTRICT NO. 1
RAW WATER PUMP STATION
PLATFORM PIPING PLAN

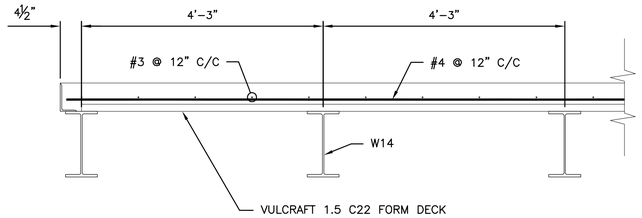
DWN BY: CDH DATE: 09-10-2010
CHK BY: CDH DATE: 09-23-2010

DRAWING NUMBER: D1901017-RWSM11502
SHEET: 01
REV: 0

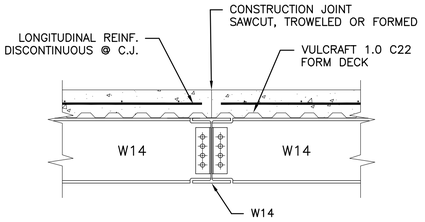
Drawing Path & Filename: Y:\Nacogdoches Power (Southern Power)\1017\dwg\PUMP STATION\RWSM11502.dwg Plotted: 10/1/2010 3:34:23 PM on ANSI D @ 1:1



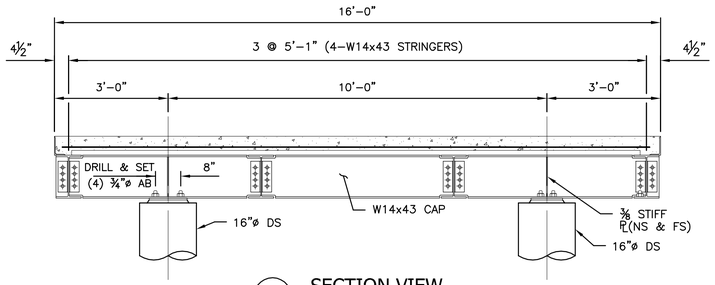
A SECTION VIEW
Scale: 3/4" = 1'-0"



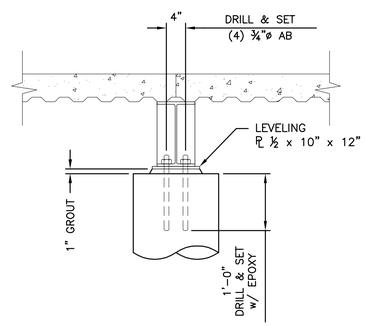
B SECTION VIEW
Scale: 3/4" = 1'-0"



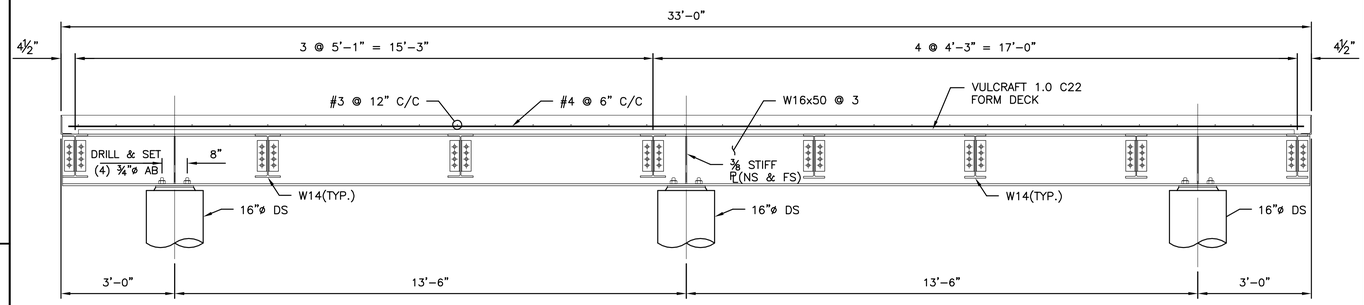
C SECTION VIEW
Scale: 3/4" = 1'-0"



D SECTION VIEW
Scale: 1/2" = 1'-0"

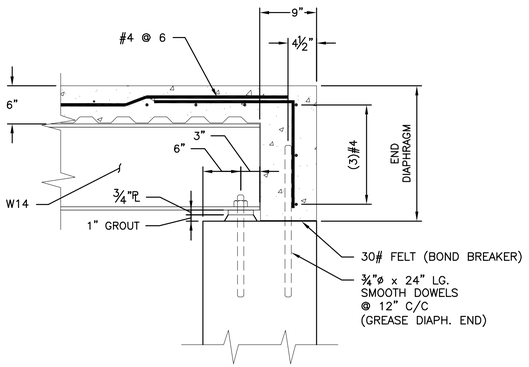


E SECTION VIEW
Scale: 3/4" = 1'-0"

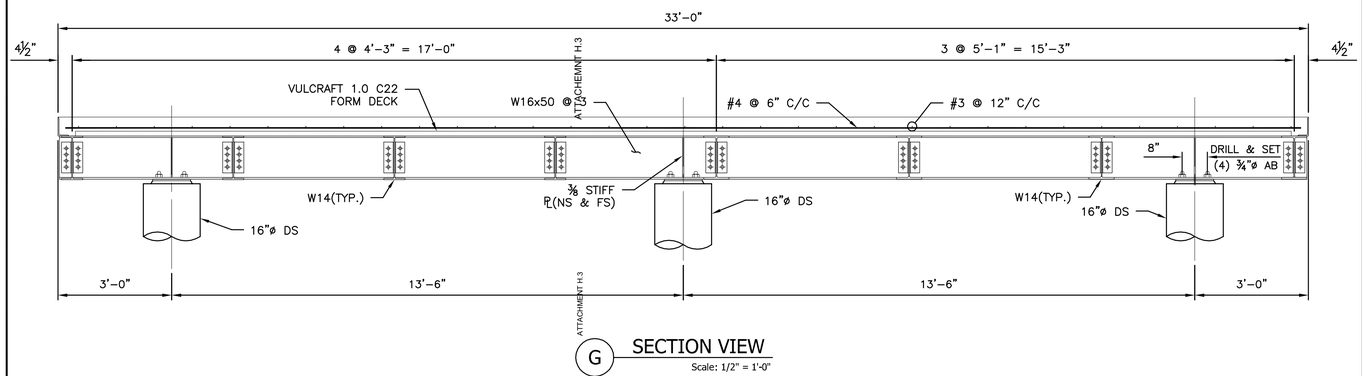


F SECTION VIEW
Scale: 1/2" = 1'-0"

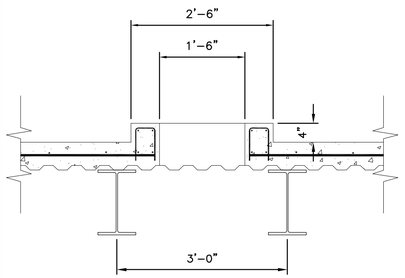
H SECTION VIEW
Scale: 3/4" = 1'-0"



K SECTION VIEW
Scale: 1" = 1'-0"



G SECTION VIEW
Scale: 1/2" = 1'-0"



J SECTION VIEW
Scale: 3/4" = 1'-0"

DWG. NO.	REFERENCE DRAWINGS	MK.	REVISION	BY	CHK.	APP.	DATE
		0	50% CONSTRUCTION DOCUMENTS	CDH	CDH	CDH	09/23/10

SEAL:

PRELIMINARY
FOR REVIEW

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ANCWCID NO. 1 RUSK, CHEROKEE & NACOGDOCHES COUNTIES

SAI PROJECT: 190–1017

PLOT SCALE: 1:1

ANGELINA & NACOGDOCHES COUNTIES WATER CONTROL & IMPROVEMENT DISTRICT NO. 1 RAW WATER PUMP STATION PUMP STATION - STRUCTURAL SECTIONS

DWN BY: MLM DATE: 09–20–2010
CHK BY: CDH DATE: 09–23–2010

DRAWING NUMBER: D1901017-RWSS21402

SHEET 01

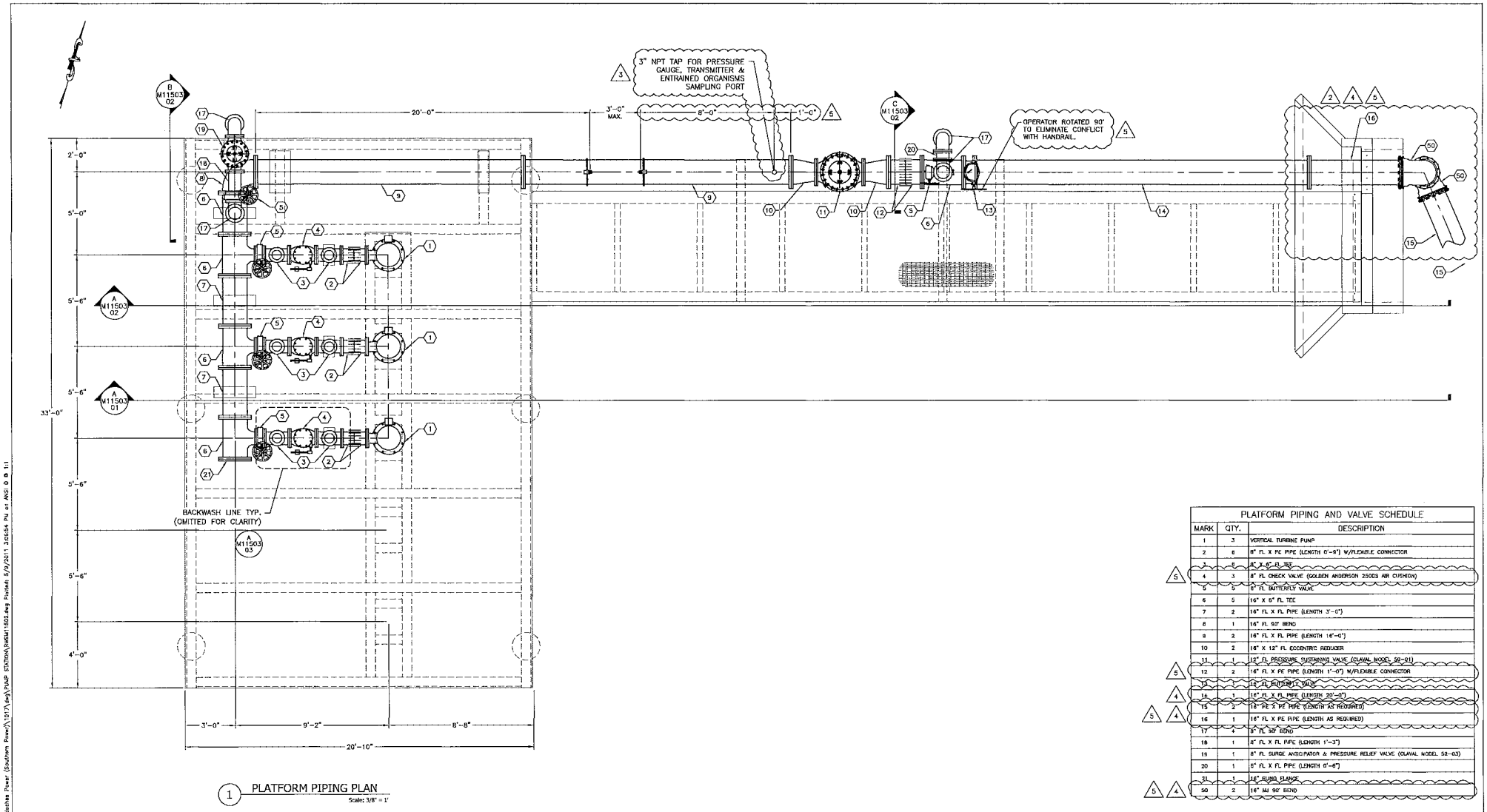
REV 0

Drawing Path & Filename: Y:\Nacogdoches Power (Southern Power)\1017\dwg\PUMP STATION\RWSS21402.dwg Plotted: 10/1/2010 3:40:09 PM on ANSI D @ 1:1

ATTACHMENT H.3

APPENDIX B

ENGINEERING DRAWINGS



1 PLATFORM PIPING PLAN
Scale: 3/8" = 1'

PLATFORM PIPING AND VALVE SCHEDULE

MARK	QTY.	DESCRIPTION
1	3	VERTICAL TURBINE PUMP
2	8	8" FL X PE PIPE (LENGTH 0'-9") W/FLEXIBLE CONNECTOR
3	6	8" X 8" FL TEE
4	3	8" FL CHECK VALVE (GOLDEN ANDERSON 250DS AIR CUSHION)
5	5	8" FL BUTTERFLY VALVE
6	5	16" X 8" FL TEE
7	2	16" FL X FL PIPE (LENGTH 3'-0")
8	1	16" FL 90° BEND
9	2	16" FL X FL PIPE (LENGTH 16'-0")
10	2	16" X 12" FL ECCENTRIC REDUCER
11	1	12" FL PRESSURE SUSTAINING VALVE (CLAVAL MODEL 50-01)
12	2	16" FL X PE PIPE (LENGTH 1'-0") W/FLEXIBLE CONNECTOR
13	1	16" FL BUTTERFLY VALVE
14	1	16" FL X FL PIPE (LENGTH 20'-0")
15	2	16" PE X PE PIPE (LENGTH AS REQUIRED)
16	1	16" FL X PE PIPE (LENGTH AS REQUIRED)
17	4	8" FL 90° BEND
18	1	8" FL X FL PIPE (LENGTH 1'-3")
19	1	8" FL SURGE ANTICIPATOR & PRESSURE RELIEF VALVE (CLAVAL MODEL 52-03)
20	1	8" FL X FL PIPE (LENGTH 0'-6")
21	1	16" BLIND FLANGE
50	2	16" MJ 90° BEND

DWG. NO.	REFERENCE DRAWINGS	MK.	REVISION	BY	CHK.	APP.	DATE
		5	RECORD DRAWINGS	CDH	CDH	CDH	04/28/11
		4	REVISED PIPING CROSSING ABUTMENT & TRANSITIONING UNDERGROUND	CDH	CDH	CDH	01/10/11
		3	MODIFIED 2" NPT TAP TO 3" FOR "ENTRAINED ORGANISMS" SAMPLING PORT	CDH	CDH	CDH	12/08/10
		2	REVISED CONNECTION POINT TO 16" PVC PIPELINE	CDH	CDH	CDH	12/06/10
2	Y:\Nacogdoches Power (Southern Power)\1017\dwg\PUMP STATION\RWSE01602.dwg	1	100% CONSTRUCTION DOCUMENTS	CDH	CDH	CDH	11/24/10
1	Y:\Nacogdoches Power (Southern Power)\1017\dwg\PUMP STATION\RWSS21401.dwg	0	50% CONSTRUCTION DOCUMENTS	CDH	CDH	CDH	09/23/10

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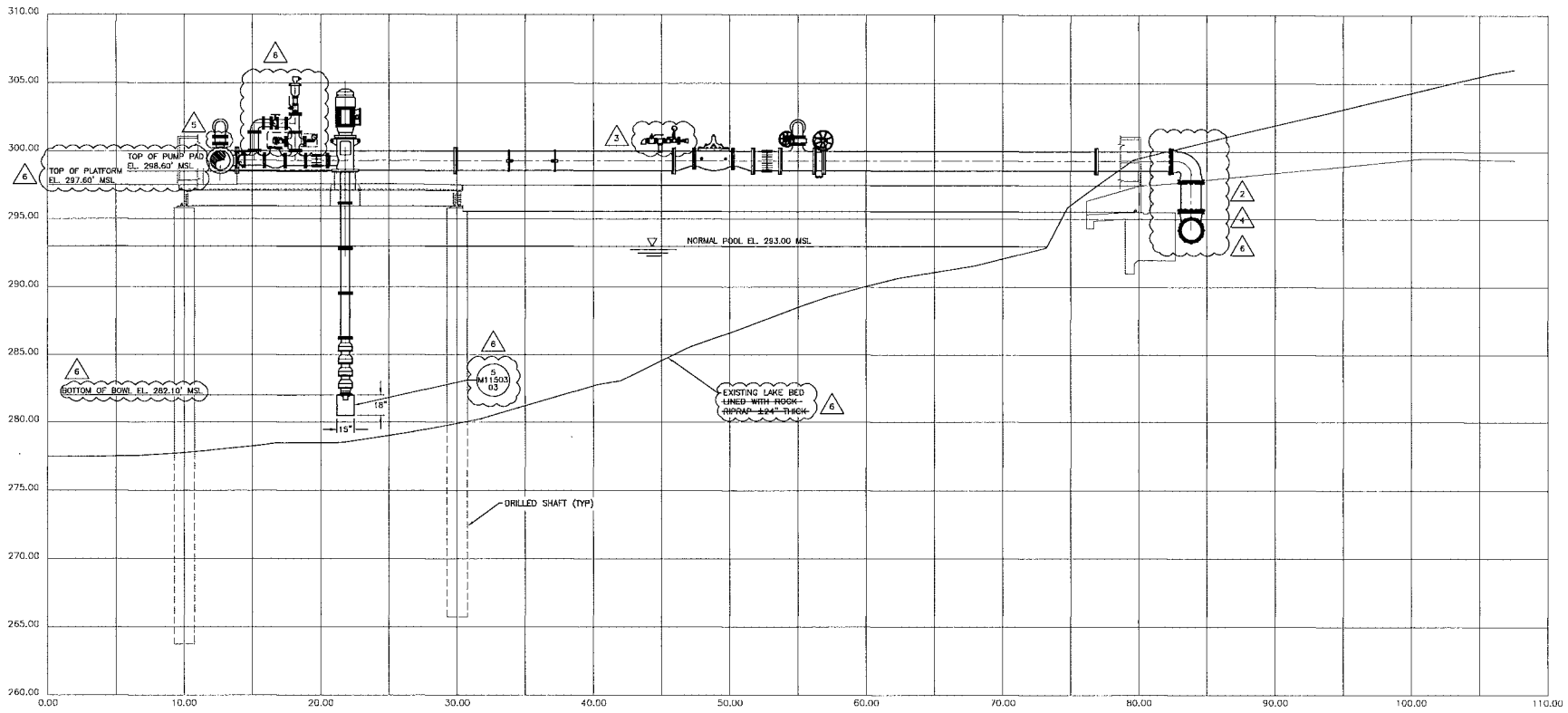
ANCWOID NO. 1 — RUSK, CHEROKEE & NACOGDOCHES COUNTIES, TEXAS

SA PROJECT: 190--1017
PLOT SCALE: 1:1

ANGELINA & NACOGDOCHES COUNTIES
WATER CONTROL & IMPROVMENT DISTRICT NO. 1
RAW WATER PUMP STATION
PLATFORM PIPING PLAN

DWN BY: CDH DATE: 09-10-2010
CHK BY: CDH DATE: 04-26-2011
DRAWING NUMBER: D1901017-RWSM11502
SHEET 01 REV 5

Drawing Path & Filename: Y:\Nacogdoches Power (Southern Power)\1017\dwg\PUMP STATION\RWSM11502.dwg Plotted: 5/9/2011 3:06:54 PM on ANSI D



A SECTION VIEW
Scale: 1/4" = 1'

DWG. NO.	REFERENCE DRAWINGS	MK.	REVISION	BY	CHK.	APP.	DATE
		6	RECORD DRAWINGS	CDH	CDH	CDH	04/26/11
		5	ADDED 6"L SPOOL TO SURGE VALVE PIPING TO CLEAR TOP HANDRAIL	CDH	CDH	CDH	02/22/11
		4	REVISED PIPING CROSSING ABUTMENT & TRANSITIONING UNDERGROUND	CDH	CDH	CDH	01/10/11
		3	ADDED 3" "ENTRAINED ORGANISMS" SAMPLING PORT	CDH	CDH	CDH	12/08/10
		2	REVISED CONNECTION POINT TO 16" PVC PIPELINE	CDH	CDH	CDH	12/06/10
		1	100% CONSTRUCTION DOCUMENTS	CDH	CDH	CDH	11/24/10
		0	50% CONSTRUCTION DOCUMENTS	CDH	CDH	CDH	09/27/10

SCALE:

C. DANIEL HAYS 86630 REGISTERED PROFESSIONAL ENGINEER

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ANCWCID NO. 1 — RUSK, CHEROKEE & NACOGDOCHES COUNTIES, TEXAS

SA PROJECT: 190-1017

PLOT SCALE: 1:1

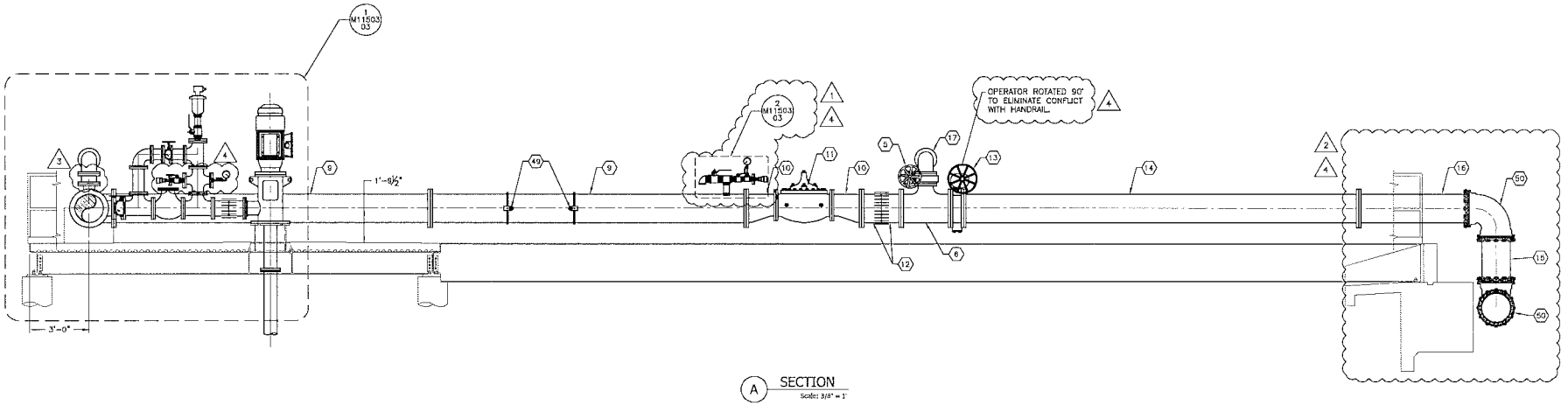
ANGELINA & NACOGDOCHES COUNTIES
WATER CONTROL & IMPROVMENT DISTRICT NO. 1
RAW WATER PUMP STATION
PLATFORM PIPING SECTIONS 1

DWN BY: CDH DATE: 09-27-2010
CHK BY: CDH DATE: 04-26-2011

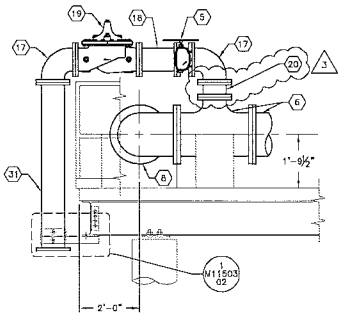
DRAWING NUMBER: D1901017-RWSM11503

SHEET: 01 REV: 6

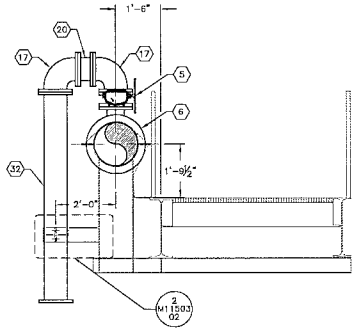
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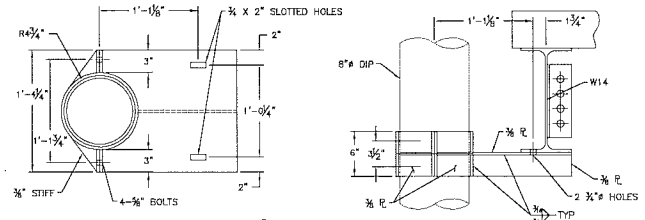
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Scale: 3/8" = 1'



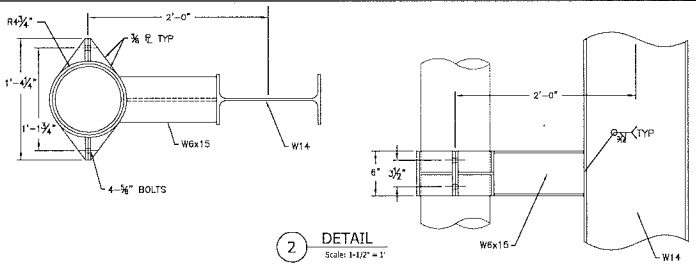
B SECTION
Scale: 1/2" = 1'



C SECTION
Scale: 1/2" = 1'



1 DETAIL
Scale: 1-1/2" = 1'



2 DETAIL
Scale: 1-1/2" = 1'

PLATFORM PIPING AND VALVE SCHEDULE

	MARK	QTY.	DESCRIPTION
	5	5	8" FL BUTTERFLY VALVE
	6	5	16" X 8" FL TEE
	9	2	16" FL X FL PIPE (LENGTH 18'-0")
	10	2	16" X 12" FL ECCENTRIC REDUCER
	11	1	12" FL PRESSURE SUSTAINING VALVE (CLAVAL MODEL 50-01)
	12	2	16" FL X FL PIPE (LENGTH 1'-0")
	13	1	16" FL BUTTERFLY VALVE
2	14	1	16" FL X FL PIPE (LENGTH 20'-0")
4	15	2	16" PE X PE PIPE (LENGTH AS REQUIRED)
	16	1	16" FL X PE PIPE (LENGTH AS REQUIRED)
	17	4	8" FL 90° BEND
	18	1	8" FL X FL PIPE (LENGTH 1'-3")
	19	1	8" FL SURGE ANTICIPATOR & PRESSURE RELIEF VALVE (CLAVAL MODEL 52-03)
3	20	2	8" FL X FL PIPE (LENGTH 0'-6")
	31	1	8" FL X FL PIPE (LENGTH 0'-8")
	32	1	8" FL X FL PIPE (LENGTH 7'-0")
2 4	49	1	ULTRASONIC TRANSIT-TIME FLOW METER (ERMOMETER MEASURED RANGE 0.02 TO 40 FPS)
	50	2	16" MJ 90° BEND

VESTFALS & ASSOCIATES
206 Michelle Lane
Lonview, Texas 75605
903-758-8869
Firm No. F-1851

DWG. NO.	REFERENCE DRAWINGS	MK.	REVISION	BY	CHK.	APP.	DATE
		4	RECORD DRAWINGS	CDH	CDH	CDH	04/26/11
		3	ADDED 6"℄ SPOOL TO SURGE VALVE PIPING TO CLEAR TOP HANDRAIL	CDH	CDH	CDH	02/22/11
		2	REVISED PIPING CROSSING ABUTMENT & TRANSITIONING UNDERGROUND	CDH	CDH	CDH	01/10/11
		1	ADDED 3" "ENTRAINED ORGANISMS" SAMPLING PORT	CDH	CDH	CDH	12/08/10
		0	100% CONSTRUCTION DOCUMENTS	CDH	CDH	CDH	11/24/10

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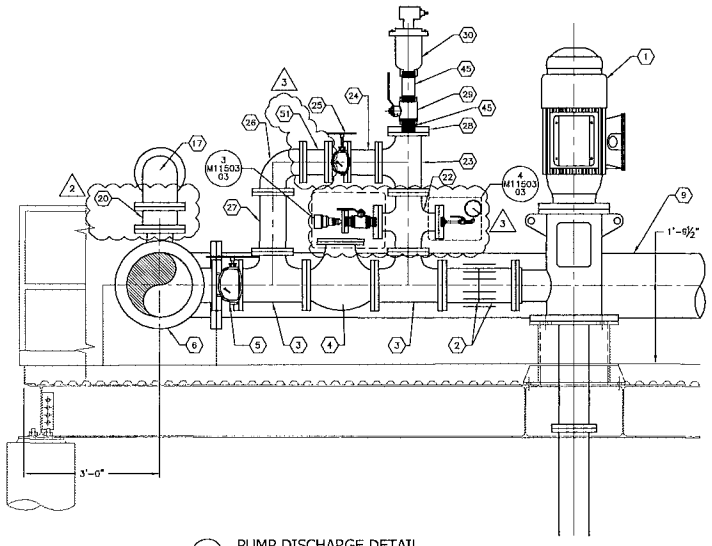
ANCWCID NO. 1 — RUSK, CHEROKEE & NACOGDOCHES COUNTIES

SA PROJECT: 190-1017
PLOT SCALE: 1:1

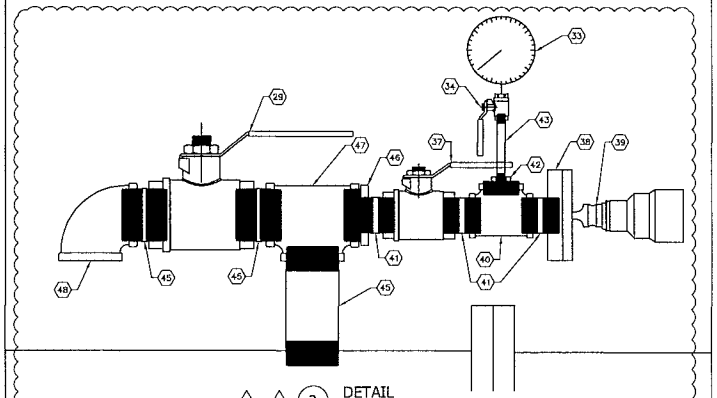
ANGELINA & NACOGDOCHES COUNTIES
WATER CONTROL & IMPROVMENT DISTRICT NO. 1
RAW WATER PUMP STATION
PLATFORM PIPING SECTIONS 2

DWN BY: RLB DATE: 09-20-2010
CHK BY: CDH DATE: 04-26-2011
DRAWING NUMBER: D1901017-RWSM11503
SHEET 02 REV 4

Drawing Path & Filename: I:\Nacogdoches Power (Southern Power)\1017\dwg\PUMP STATION\RWSM11503.dwg Plotted: 5/9/2011 2:16:36 PM on ANSI D (E 1:1



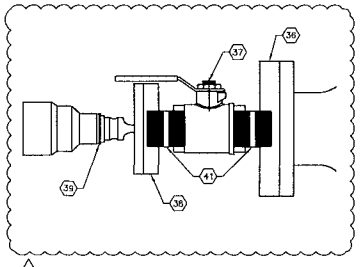
1 PUMP DISCHARGE DETAIL
Scale: 3/4" = 1'



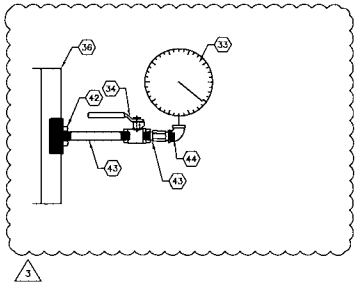
3 1 2 DETAIL
Scale: 3"=1'

PLATFORM PIPING AND VALVE SCHEDULE		
MARK	QTY.	DESCRIPTION
1	3	VERTICAL TURBINE PUMP
2	6	8" FL X PE PIPE (LENGTH 0'-0")
3	6	8" X 6" FL TEE
4	3	8" FL CHECK VALVE (GOLDEN ANDERSON 2500S AIR CUSHION)
5	5	8" FL BUTTERFLY VALVE
8	5	16" X 8" FL TEE
9	2	16" FL X FL PIPE (LENGTH 16'-0")
17	4	8" FL 90° BEND
20	2	6" FL X FL PIPE (LENGTH 0'-8")
22	3	6" X 3" FL REDUCING CROSS
23	3	6" FL TEE
24	3	6" FL X FL PIPE (LENGTH 0'-8 1/4")
25	3	6" FL BUTTERFLY VALVE
26	3	6" FL 90° BEND
27	3	6" FL X FL PIPE (LENGTH 1'-4")
28	3	6" COMPANION FLANGE (TAPPED 3" NPT)
29	4	3" NPT STAINLESS STEEL BALL VALVE
30	3	3" AIR VALVE (ARI D-060NF-C-NS) W/3" COMPANION FLANGE TAPPED 3" NPT
33	5	4.5" STAINLESS STEEL PRESSURE GAUGE (GLYCERIN FILLED, 0-150 PSI)
34	4	1/4" NPT STAINLESS STEEL BALL VALVE
35	0	3" COMPANION FLANGE (TAPPED 1/4" NPT)
36	8	3" COMPANION FLANGE (TAPPED 2" NPT)
37	4	2" NPT STAINLESS STEEL BALL VALVE
38	4	2" COMPANION FLANGE (TAPPED 2" NPT)
39	4	PRESSURE TRANSMITTER (ENDRESS+HAUSER PMP55-MA21J01PGFAFJA1A+AA)
40	1	2" NPT STAINLESS STEEL TEE
41	8	2" NPT STAINLESS STEEL NIPPLE (LENGTH AS REQ'D)
42	4	4" x 2" NPT STAINLESS STEEL BUSHING
43	7	¼" NPT STAINLESS STEEL NIPPLE (LENGTH AS REQ'D)
44	3	¼" NPT STAINLESS STEEL ELBOW
45	9	3" NPT STAINLESS STEEL NIPPLE (LENGTH AS REQ'D)
46	1	2" x 3" NPT STAINLESS STEEL BUSHING
47	1	3" NPT STAINLESS STEEL TEE
48	1	3" NPT STAINLESS STEEL ELBOW
51	3	6" FL X FL PIPE (LENGTH 0'-6 3/4")

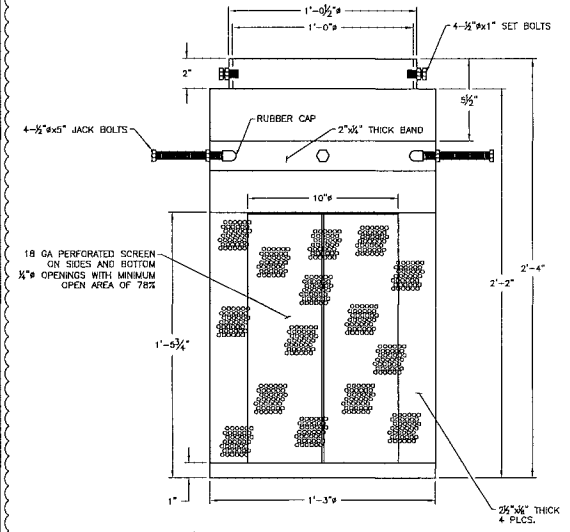
NOTES:
1. PROVIDE ALUMINUM JACKETED INSULATION FOR PIPING ON ALL PRESSURE GAUGES, TRANSMITTERS & AIR VALVE PIPING.



3 DETAIL
Scale: 3"=1'



4 DETAIL
Scale: 3"=1'



NOTES:
1. SCREEN SHALL BE OF ALL STAINLESS STEEL FABRICATION.

3 5 INTAKE SCREEN DETAIL
Scale: 3"=1'

DWG. NO.	REFERENCE DRAWINGS	MK.	REVISION	BY	CHK.	APP.	DATE
		3	RECORD DRAWINGS	CDH	CDH	CDH	04/26/11
		2	ADDED 6"L SPOOL TO SURGE VALVE PIPING TO CLEAN TOP MANORAL	CDH	CDH	CDH	03/22/11
		1	ADDED 3" "ENTRAINED ORGANISMS" SAMPLING PORT TO DETAL 2	CDH	CDH	CDH	12/08/10
		0	100% CONSTRUCTION DOCUMENTS	CDH	CDH	CDH	11/24/10

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TEXAS FIRM REGISTRATION NO. F-967 Fax (903) 657-7864

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ANCWCID NO. 1 — RUSK, CHEROKEE & NACOGDOCHES COUNTIES

SAI PROJECT: 190-1017

PLOT SCALE: 1:1

ANGELINA & NACOGDOCHES COUNTIES
WATER CONTROL & IMPROVMENT DISTRICT NO. 1
RAW WATER PUMP STATION
PLATFORM PIPING SECTIONS 3

DWN BY: RLB DATE: 09-20-2010
CHK BY: CDH DATE: 04-26-2011

DRAWING NUMBER: D1901017-RWSM11503

SHEET: 03 REV: 3

Drawing Path & Filename: X:\Nacogdoches Power (Southern Pearl)\1017\dwg\PUMP STATION\RWSM11503.dwg Plotted: 5/9/2011 3:32:53 PM on ANSI D ● 1:1

APPENDIX C

CHAIN-OF-CUSTODY RECORD

Appendix C

Chain-of-Custody Record

Client Contact	**Project Manager:**					**Site Contact:**																	**Date:**												**COC No:**
	Tel/Fax:					**Lab Contact:**																	**Carrier:**												_____ of _____ COCs
	Analysis Turnaround Time																																	Job No.
	Calendar (C) or Work Days (W) _____																																	
Phone	TAT if different from Below _____																																	
FAX	☐ 2 weeks																																	SDG No.
Project Name: **Nacogdoches Power, L.L.C.**	☐ 1 week																																	
Site:	☐ 2 days																																	
P O #	☐ 1 day																																	
Sample Identification	**Sample Date**	**Sample Time**	**Sample Type**	**Matrix**	**# of Cont.**																													Sample Specific Notes:
Preservation Used: 1= Ice, 2= 10% Formalin; 3= Other _____																																		
Possible Hazard Identification						***Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)***																												
☐ *Non-Hazard* ☐ *Flammable* ☐ *Skin Irritant* ☐ *Poison B* ☐ *Unknown*						☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For _____ Months*																												

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

APPENDIX D

FIELD DATA REPORTING FORM

Nacogdoches Power, LLC
Field Data Reporting Form

Date:

Value	Sample Information
	Type of sample: I-Impingement, E-Entrainment, V-Velocity
	Volume of water sampled (entrainment; gallons)
	Sample duration (entrainment; minutes)
	Sample duration (impingement; minutes)
	Number of intake screens operated (For two screens identify duration for each if not on for entire sample event)
	Number of sample containers used for sample
	Preservative used including concentration
	Velocity (feet/second)

Value	Water Conditions
	Water Temperature (°C)
	Visual Observation of Turbidity: 1-Low 2-Medium 3-High
	Lake elevation (ft above msl)

Value	Air/Weather Conditions
	Air Temperature (°C)
	Precipitation Severity: 1-None 3-Medium 2-Low 4-High
	Days Since Last Significant Precipitation
	Wind Severity: 1-None 3-Medium 2-Low 4-High

Measurement Comments and Field Observations:

APPENDIX E

ENTRAINMENT FILTERING STATION CONCEPT DRAWING

ALAN PLUMMER ASSOCIATES, INC.
ENVIRONMENTAL ENGINEERS AND SCIENTISTS

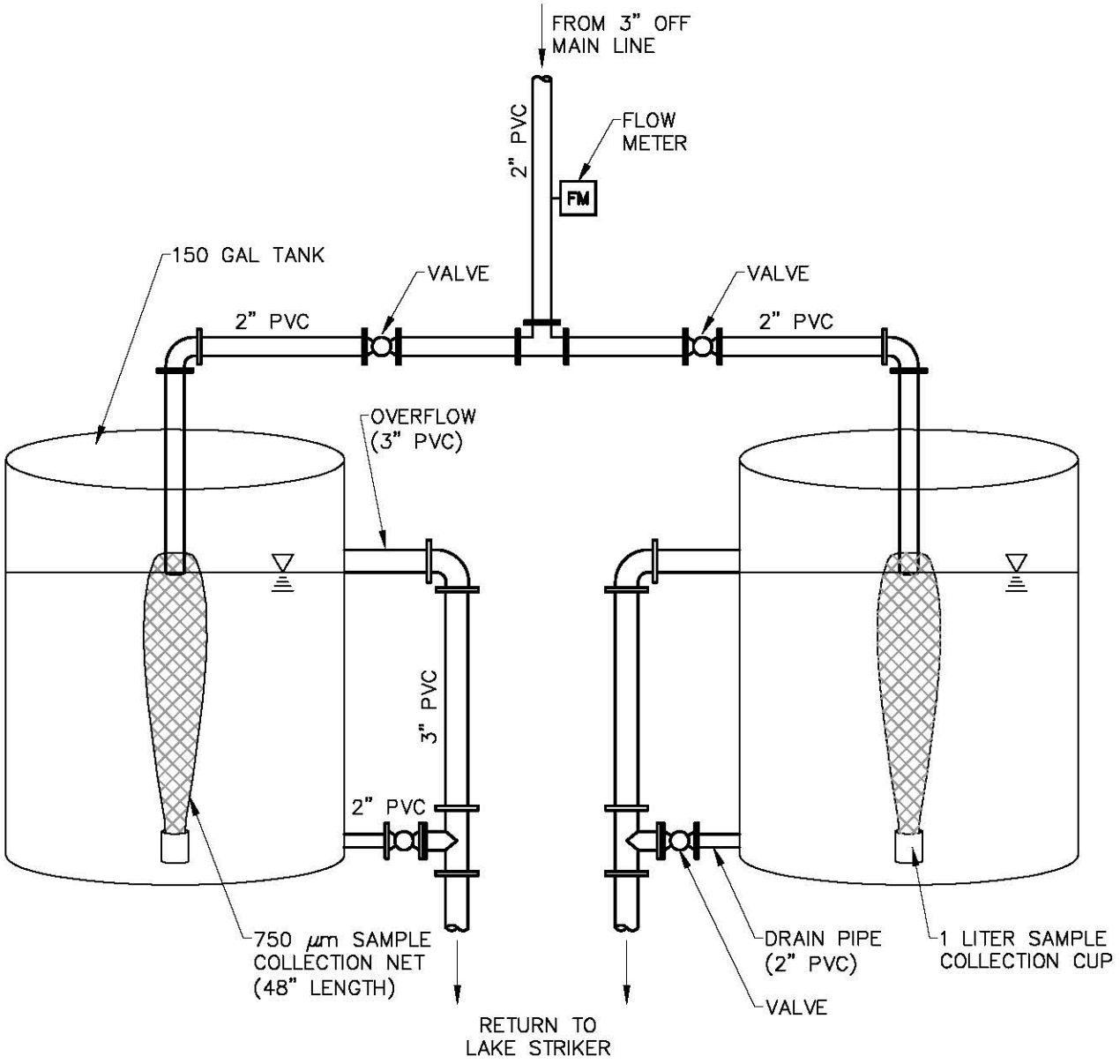


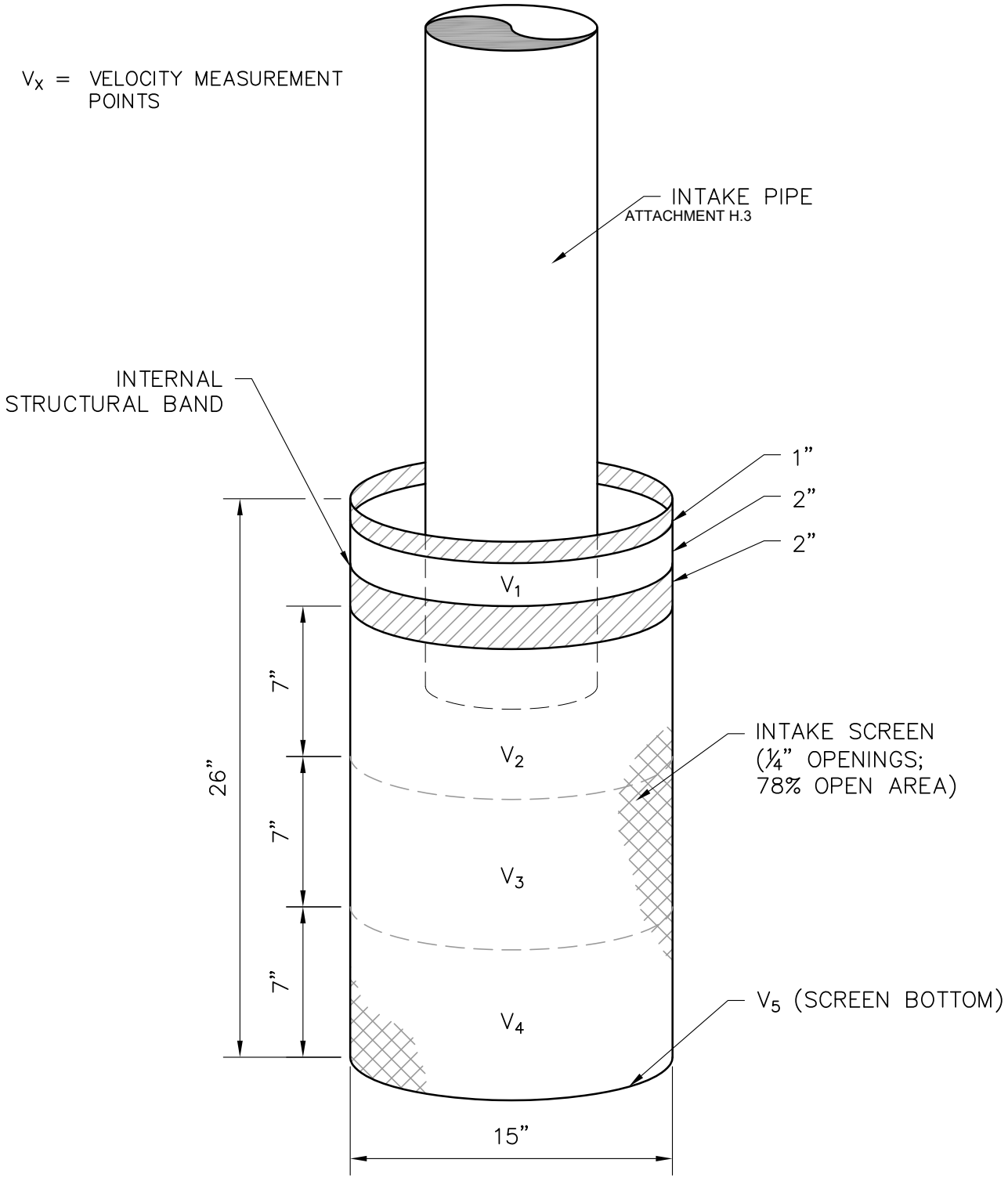
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NACOGDOCHES POWER, LLC
ENTRAINMENT FILTERING STATION
CONCEPT DRAWING

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APPENDIX F

INTAKE SCREEN VELOCITY MONITORING DRAWING AND AREA-PROPORTIONAL VELOCITY FORMULA

ALAN PLUMMER ASSOCIATES, INC.
ENVIRONMENTAL
ENGINEERS AND SCIENTISTS



NACOGDOCHES POWER, LLC
COOLING WATER INTAKE STRUCTURE
VELOCITY MONITORING DRAWING

TEXAS REGISTERED ENGINEERING FIRM F-13
11/21/2012 9:33 AM M:\Projects\0898\012-01\Acad\Figures\Intake.dwg Briand

NACOGDOCHES POWER, LLC
AREA PROPORTIONAL VELOCITY FORMULA

Through-screen velocity will be calculated using the following equation:

$V_A = 0.07474 * V_1 + 0.261587 * V_2 + 0.261587 * V_3 + 0.261587 * V_4 + 0.1405 * V_5$

and

$V_F = V_A / 0.78$

Where,

V_x = Velocity measurement location (e.g., V_1)

V_A = Area proportional approach velocity

0.07474 = Area-proportional constant for location V_1 (side of screen)

0.261587 = Area-proportional constant for locations V_2, V_3, and V_4 (side of screen)

0.1405 = Area-proportional constant for location V_5 (bottom of screen)

V_F = Final velocity (reported through-screen velocity measurement)

0.78 = Constant for the screen effective open area of 78%

Example:

V_1 = 0.10 ft/s
V_2 = 0.31 ft/s
V_3 = 0.35 ft/s
V_4 = 0.19 ft/s
V_5 = 0.09 ft/s

$V_A = 0.07474 * 0.10 + 0.261587 * 0.31 + 0.261587 * 0.35 + 0.261587 * 0.19 + 0.1405 * 0.09$

V_A = 0.2425 ft/s

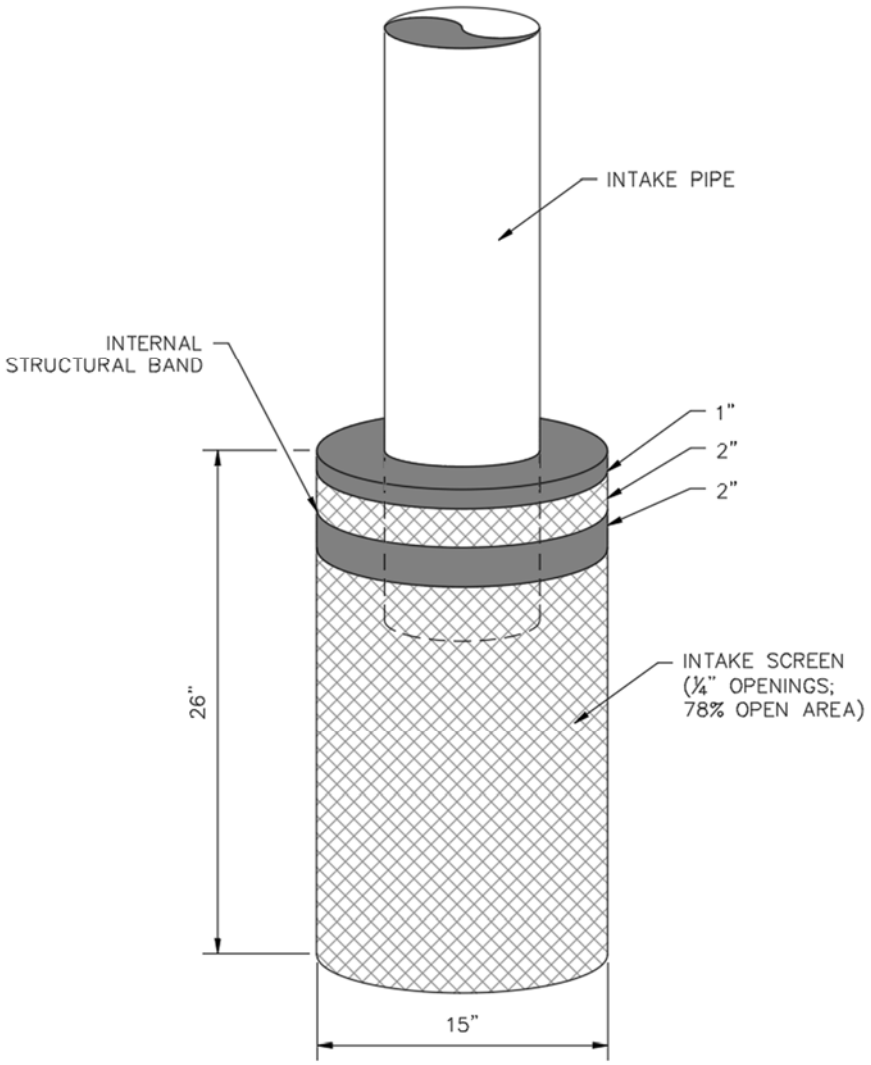
V_F = 0.2425 / 0.78

V_F = 0.311 ft/s

ATTACHMENT H.4
CITY OF AUSTIN
NACOGDOCHES GENERATING FACILITY
TPDES PERMIT RENEWAL APPLICATION
SCREEN DESIGN CALCULATIONS

The Nacogdoches Generating Facility (Facility) Cooling Water Intake Structure (CWIS) is positioned between 20 to 40 feet offshore in the southeast portion of Lake Striker, adjacent to the lake spillway. The structure is designed to support the use of five pumps, three of which will provide water to the Facility. The three pumps are rated for 900 gallons per minute (gpm) each and can provide a total pumping capacity of approximately 3.8 million gallons per day (MGD). The firm capacity of the pump station (with only two pumps in operation) is 2.6 MGD. The third pump will serve as a backup pump which will be used during the back-flush process and during routine maintenance of the CWIS. Each pump will be fitted with an 8-inch diameter steel pipe fitted with a fine mesh screen housing which will draw water from approximately 10 ft below the surface. The back-flush system will allow for the removal of debris from the screens.

The design of the intake screen is provided in the diagram below:



ATTACHMENT H.4
CITY OF AUSTIN
NACOGDOCHES GENERATING FACILITY
TPDES PERMIT RENEWAL APPLICATION
SCREEN DESIGN CALCULATIONS

Each screen houses an 8" diameter pipe that leads to a 900 gpm pump. For the purposes of this calculation, this flow rate (*Q*) is converted to cubic feet per second (ft^3/s).

Conversion from gpm to ft^3/s: $Q = 900\ gpm * \frac{1\ ft^3}{7.48\ gal} * \frac{1\ min}{60\ sec} = 2.00\ \frac{ft^3}{s}$

In this calculation, the following equation is used, where *V* is the velocity in feet per second (ft/s) and *A* is the area of the screen through which water flows in square feet (ft^2).

Equation 1. $V = Q/A$

A of the intake screen is determined by multiplying the through-screen open area percentage ($A_{P\%}$) by the surface area of the whole screen (A_S)

Equation 2. $A = A_S * A_{P\%}$

$A_{P\%}$ is shown to be 78% open area in the screen diagram based on a fine mash with ¼" openings. To determine A_S, the lateral surface area of the cylindrical screen and surface area of the open bottom are calculated..

The lateral surface area is calculated by multiplying the circumference of the screen by the length of the cylinder (*L*). In this case, 3" of the 26"-screen are closed by structural bands, so L is only 23". The diameter (*D*) of the screen in 15".

Equation 3. $A_s = (L * \pi * D) + \left(\pi * \frac{D^2}{4}\right) = \left(\frac{23"}{12"/1\ ft} * \pi * \frac{15"}{12"/1\ ft}\right) + \left[\pi * \frac{\left(\frac{15"}{12"/1\ ft}\right)^2}{4}\right] = 8.75\ ft^2$

This value of A_S, can then be used in Equation 2 along with $A_{P\%}$

Equation 2. $A = 8.75\ ft^2 * 78\% = 6.83\ ft^2$

Now that the *A* is determined, the through-screen velocity can be calculated with Equation 1.

Equation 1. $V = \frac{2.00\frac{ft^3}{s}}{8.75\ ft^2} = 0.294\ ft/s$

These equations show that when operating at the full pump capacity of 900 gpm, the through-screen velocity will remain under 0.5 ft/s as required in 40 CFR §125.86(b)(2).

ATTACHMENT I

Contract Laboratory Information and Pollutants Analyzed
Worksheet 2.0
Item 1.c

ATTACHMENT I
CITY OF AUSTIN
NACOGDOCHES GENERATING FACILITY
TPDES PERMIT RENEWAL APPLICATION

CONTRACT LABORATORY INFORMATION AND POLLUTANTS ANALYZED

Laboratory Name: **SPL Labs**
Address: 2600 Dudley Rd.
Kilgore, Texas 75662
Phone: 903-984-0551
Fax: 903-984-5914

Pollutant	Pollutant	Pollutant
BOD (5-day)	Chromium, trivalent	p-Cresol [4-Methylphenol]
CBOD (5-day)	Copper, total	1,2-Dibromoethane
Chemical oxygen demand	Cyanide, available	m-Dichlorobenzene [1,3-Dichlorobenzene]
Total organic carbon	Lead, total	o-Dichlorobenzene [1,2-Dichlorobenzene]
Dissolved oxygen	Mercury, total	p-Dichlorobenzene [1,4-Dichlorobenzene]
Ammonia nitrogen	Nickel, total	3,3'-Dichlorobenzidine
Total suspended solids	Selenium, total	1,2-Dichloroethane
Nitrate nitrogen	Silver, total	1,1-Dichloroethene [1,1-Dichloroethylene]
Total organic nitrogen	Thallium, total	Dichloromethane [Methylene chloride]
Total phosphorus	Zinc, total	1,2-Dichloropropane
Oil and grease	Acrylonitrile	1,3-Dichloropropene [1,3-Dichloropropylene]
Total residual chlorine	Anthracene	2,4-Dimethylphenol
Total dissolved solids	Benzene	Di-n-Butyl phthalate
Sulfate	Benzidine	Epichlorohydrin (1-Chloro-2,3-epoxypropane)
Chloride	Benzo(a)anthracene	Ethylbenzene
Fluoride	Benzo(a)pyrene	Ethylene Glycol
Total alkalinity (mg/L as CaCO3)	Bis(2-chloroethyl)ether	Fluoride
Temperature (°F) (Analyzed onsite)	Bis(2-ethylhexyl)phthalate	Hexachlorobenzene
pH (standard units) (Analyzed onsite)	Bromodichloromethane [Dichlorobromomethane]	Hexachlorobutadiene
Aluminum, total	Bromoform	Hexachlorocyclopentadiene
Antimony, total	Carbon tetrachloride	Hexachloroethane
Arsenic, total	Chlorobenzene	4,4'-Isopropylidenediphenol (bisphenol A)
Barium, total	Chlorodibromomethane [Dibromochloromethane]	Methyl ethyl ketone
Beryllium, total	Chloroform	Methyl tert-butyl ether (MTBE)
Cadmium, total	Chrysene	Nitrobenzene
Chromium, total	m-Cresol [3-Methylphenol]	N-Nitrosodiethylamine
Chromium, hexavalent	o-Cresol [2-Methylphenol]	N-Nitroso-di-n-butylamine

ATTACHMENT I
CITY OF AUSTIN
NACOGDOCHES GENERATING FACILITY
TPDES PERMIT RENEWAL APPLICATION

CONTRACT LABORATORY INFORMATION AND POLLUTANTS ANALYZED

Pollutant	Pollutant	Pollutant
Nonylphenol	Molybdenum, total	
Pentachlorobenzene	Tin, total	
Pentachlorophenol	Titanium, total	
Phenanthrene		
Polychlorinated biphenyls (PCBs)		
PCB-1016		
PCB-1221		
PCB-1232		
PCB-1242		
PCB-1248		
PCB-1254		
PCB-1260		
PCB-1262		
PCB-1268		
Pyridine		
1,2,4,5-Tetrachlorobenzene		
1,1,2,2-Tetrachloroethane		
Tetrachloroethene [Tetrachloroethylene]		
Toluene		
1,1,1-Trichloroethane		
1,1,2-Trichloroethane		
Trichloroethene [Trichloroethylene]		
2,4,5-Trichlorophenol		
TTHM (Total trihalomethanes)		
Vinyl chloride		
Bromide		
Color (PCU)		
Nitrate-Nitrite (as N)		
Sulfide (as S)		
Sulfite (as SO3)		
Surfactants		
Boron, total		
Cobalt, total		
Iron, total		
Magnesium, total		
Manganese, total		

ATTACHMENT J

Cooling Water System Information
Worksheet 11.0
Items 1-4

ATTACHMENT J.1
CITY OF AUSTIN
NACOGDOCHES GENERATING FACILITY
TPDES PERMIT RENEWAL APPLICATION
COOLING WATER SYSTEM INFORMATION

The Nacogdoches Generation Facility (Facility) uses water from Lake Striker for cooling tower makeup. Lake Striker is located approximately 7.5 miles southwest of the intersection of U.S. Highway 79 and State Highway 110 and approximately 5 miles north of the intersection of U.S. Highway 84 and State Highway 204 in Cherokee and Rusk Counties. The cooling water intake structure (CWIS) is located near the dam on the southeastern shore. The information herein is submitted to satisfy the requirements of the permit renewal application.

WORKSHEET 11.0 ITEM 1.b: COOLING WATER SYSTEM DATA

i. Design capacity for the CWIS is 3.8 million gallons per day (MGD) with a firm capacity of 2.6 MGD. The CWIS is operated as needed when the Facility is operating seasonally as a power peaking plant during high-temperature months. Lake Striker is a reservoir on Striker Creek and has a capacity of 26,960 acre-feet of water. The surface area is 1,900 acres at the normal operating elevation of 292 feet above mean sea level. The lake has an average depth of 15 feet. See Attachment D for a description of the cooling water system as it relates to the CWIS.

ii. Maps and aerial views of Lake Striker are presented in Attachment H.3 of this application.

iii. Cooling tower water is condensed and recirculated to reduce the need to withdraw water via the CWIS. The proportion of the source water body, Lake Striker, that is withdrawn on a monthly basis varies from 0.004% when not producing power to 0.394% during peak production months.

iv. Intake flow uses are presented in Attachment F. Engineering schematics of the CWIS presented Attachment H.3 and engineering calculations are presented in Attachment H.4.

v. Twelve (12) Months of Actual Intake Flows:

Month No.	Year	Month	Intake per Month (Gallons)
1	2024	February	4,293,147.0
2	2024	March	359,103.0
3	2024	April	168,330.0
4	2024	May	22,385,520.0
5	2024	June	37,586,900.0
6	2024	July	20,345,000.0
7	2024	August	29,124,000.0
8	2024	September	437,000.0
9	2024	October	11,230,000.0
10	2024	November	2,849,000.0
11	2024	December	14,561,000.0
12	2025	January	723,000.0

vi. The CWIS was designed and constructed to minimize the possibility of impingement and entrainment. The location of the CWIS in Lake Striker (i.e., offshore) was chosen to minimize impact to fishes that use shoreline habitat for shelter or spawning. The location combined with screen design, velocity measurements consistently less than 0.5 feet per second, and visual inspections that identify proper function support a significant reduction in biological monitoring. Through-screen velocity monitoring, visual inspections, impingement sampling, and entrainment sampling are performed as required by the existing permit. Impingement and entrainment monitoring data indicate that the CWIS has little impact on fishes and shellfishes in Lake Striker.

WORKSHEET 11.0 ITEM 2.b: COOLING WATER INTAKE STRUCTURE DATA

The CWIS is located at approximately N 31.934742° W 94.975974°. Three vertical turbine pumps mounted on a concrete and galvanized steel platform draw water from a depth of approximately 10 – 12 feet. There are approximately 1.5 – 2.0 feet of water between the bottom of each intake screen and the lakebed. The intake screens are located approximately 45 feet horizontally from the shoreline. The intake screens have 78% open area and are made of stainless steel with approximately 0.25-inch openings.

Design capacity for the CWIS is 3.8 million gallons per day (MGD) with a firm capacity of 2.6 MGD. The CWIS is operated as needed when the Facility is in operation during peak power demand season in the late summer.

A flow distribution with water balance diagram is located in Attachment F of this permit application. Engineering schematics of the CWIS are presented in Attachment H.3 and engineering calculations are presented Attachment H.4.

WORKSHEET 11.0 ITEM 3.b: SOURCE WATER PHYSICAL DATA

i. A narrative description of the CWIS is provided above.

ii. Lake Striker is an impoundment of Striker Creek and has a drainage area of approximately 182 square miles. Striker Creek is a tributary to the Angelina River which is in the Neches River Basin. The reservoir was completed in 1957 and is owned by the Angelina and Nacogdoches Counties Water Control and Improvement District No. 1. The lake was constructed by the placement of a dam upstream of Striker Creek. The earthfill dam has a top of dam elevation of 309 feet above MSL, with a service spillway elevation of 282 feet above MSL. Water released from the lake flows from spillway into Striker Creek which then flows into the Angelina River. Lake Striker has a capacity of 26,960 acre-feet of water, with a surface area of 2,400 acres at normal operating elevation of 293 feet above MSL. The lake has a shoreline length of 13.7

miles, and an average depth of 15 feet. Water level fluctuations average 1-3 feet annually. The lake has an average depth of 15 feet.

iii. Maps and aerial views of Lake Striker are presented in Attachment H.3 and Attachment J.2 of this application.

iv. Determination of the zone of hydraulic influence is provided in Attachment H.1 of this application.

WORKSHEET 11.0 ITEM 4.a: OPERATIONAL STATUS

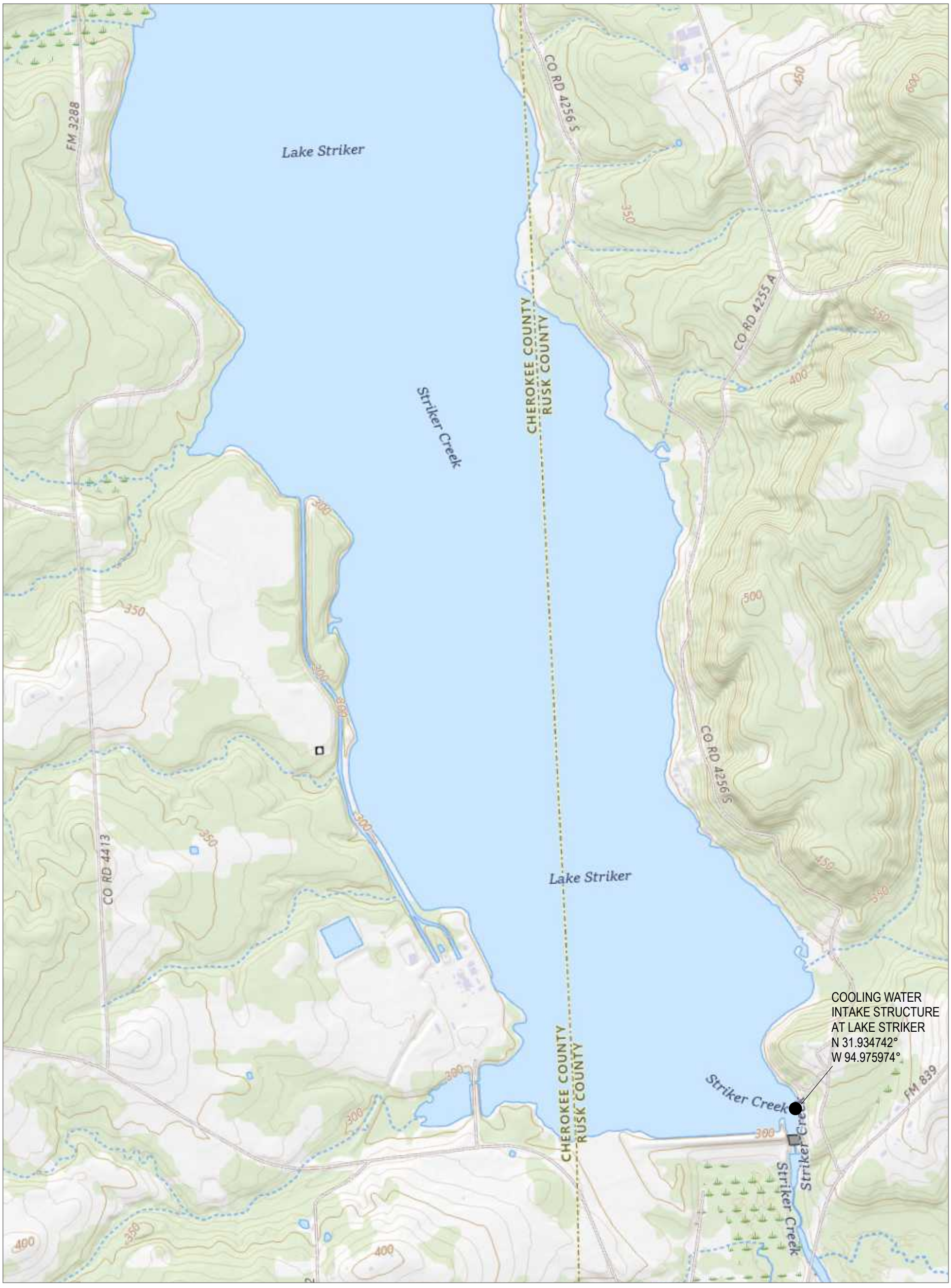
i. The Facility was commissioned in June 2012. The Facility is now 13 years old, and has a nominal capacity of 105 MW (115 MW Gross). The Facility is operated seasonally as a power peaking plant during the warmer months.

ii. Extended outages include those seasonal operations and also depend on ERCOT market conditions and decisions made by the City of Austin.

iii. Not Applicable – New Facility.

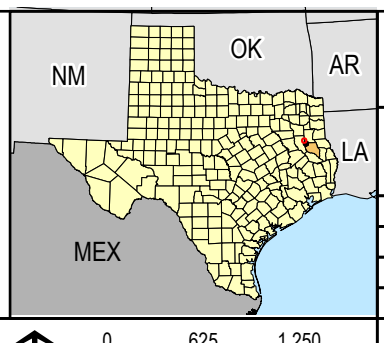
iv. No major upgrades or replacements of units has taken place.

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LEGEND

- COOLING WATER INTAKE STRUCTURE AT LAKE STRIKER



BASE MAP: USGS TOPOGRAPHIC MAP SERVICE LAYER
DATA SOURCES: TRC

0 625 1,250 FEET
1:15,000 1" = 1,250'

PROJECT: CITY OF AUSTIN
NACOGDOCHES GENERATING FACILITY
TPDES PERMIT RENEWAL APPLICATION

TITLE: SOURCE WATER DRAWING

DRAWN BY:	A. CLINE	PROJ. NO.:	606438
CHECKED BY:	B. TRACY		
APPROVED BY:	M. MILLER		ATTACHMENT J.2
DATE:	APRIL 2025		

TRC
505 EAST HUNTLAND DRIVE
SUITE #250
AUSTIN, TX 78752
PHONE: 512.329.6080

FILE: 606438_NAES_TPDES_PERMIT_RENEWAL

ATTACHMENT K

Source Water Biological Data
Worksheet 11.2
Item 2.a - e

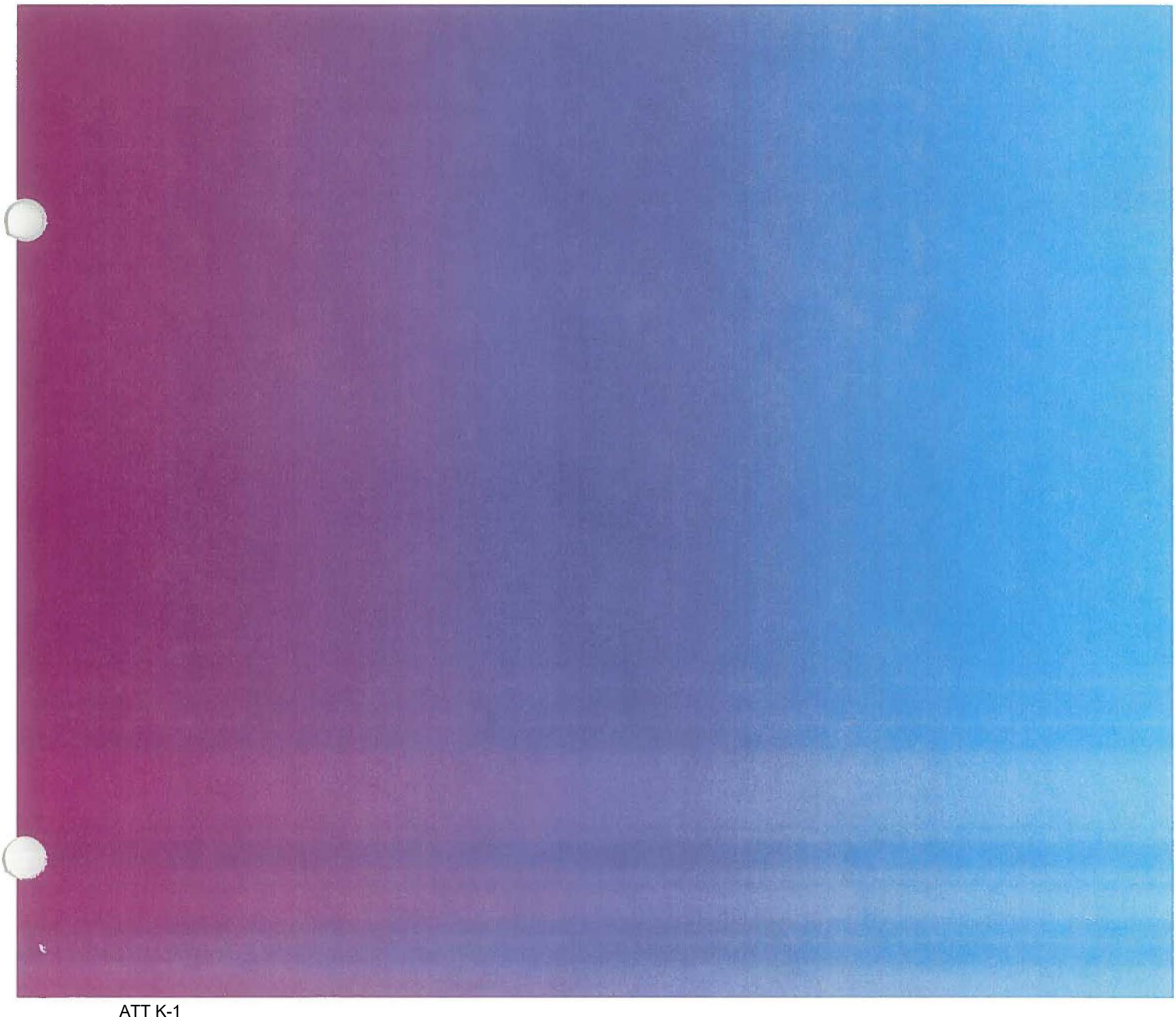
AECOM Environment

Submitted to:
Southern Power Company
Atlanta, GA

Submitted by:
AECOM
Houston, Texas
November 2010

Source Water Baseline Characterization Data Study

Nacogdoches Power Plant



AECOM Environment

Submitted to:
Southern Power Company
Atlanta, GA

Submitted by:
AECOM
Houston, Texas
November 2010

Source Water Baseline Characterization Data Study

Nacogdoches Power Plant

Prepared By John Isaacs and Travis Wycoff

Reviewed By Kurtis K. Schlicht

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Table 7 Summary of Threatened and Endangered Aquatic Species in Rusk and Cherokee Counties, Texas.

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Figure 8 Relative Abundance of Fish Taken by Three Sampling Gears at Three Respective Stations Near the Proposed Intake Structure on Lake Striker

Figure 9 Relative Abundance of Fish Taken by Three Sampling Gears at Three Respective Stations >1 Mile North of the Proposed Intake Structure on Lake Striker

List of Acronyms

AEI	Adverse Environmental Impacts
BTA	Best Technology Available
CWA	Clean Water Act
CWIS	Cooling Water Intake Structure
E	Entrainment
EPA	Environmental Protection Agency
EPRI	Electric Power Research Institute
GPM	Gallons Per Minute
IM	Impingement Mortality
MGD	Million Gallons Day
MSL	Mean Sea Level
MW	Mega-watt
NN	Night Net
NPDES	National Pollutant Discharge Elimination System
SPC	Southern Power Company
TCEQ	Texas Commission on Environmental Quality
TPWD	Texas Parks and Wildlife Department
TPDES	Texas Pollutant Discharge Elimination System
T&E	Threatened & Endangered
U.S.	United States
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
YOY	Young of the Year

1.0 Introduction

Southern Power Company (SPC) is currently permitted under the Texas Pollutant Discharge Elimination System (TPDES) Permit No. WQ0004414000 for the treatment and discharge of waste water from the Nacogdoches Power Project located four miles northwest of the City of Cushing, Nacogdoches County, Texas (Figure 1). The Power Project is a 100 mega-watt (MW) wood fired electric power generating facility (SIC 4911). Currently, SPC is proposing to relocate the permitted Cooling Water Intake Structure (CWIS) for the Nacogdoches Power Plant from the Angelina River to Lake Striker, located in Rusk and Cherokee Counties, Texas, approximately 5 miles north of Reklaw, TX (Figure 2).

The proposed CWIS and associated pump station will be located on Lake Striker which is currently managed by the Angelina Nacogdoches Water Control Improvement District #1 (ANWCID). The ANWCID will own the CWIS while SPC will operate the pumps associated with providing water to the power plant in accordance with an operations and maintenance agreement. At this time the current design and operation plan for the CWIS are considered conceptual for the development of the source water baseline characterization study. Final design of the intake will be provided during the permit process. Water use for the CWIS has a design intake volume of 3.8 MGD and an operational volume of approximately 2.6 MGD. A description of the CWIS system and its operation is provided in Section 6.1 of this report.

As a result of this modification, SPC is required to provide source water baseline characterization data for the new proposed CWIS location on Lake Striker.

The source water baseline characterization data is required to characterize the biological community in the vicinity of the CWIS and to characterize the operation of the CWIS. Under 40 CFR 122.21 (r)(4), the source water baseline characterization study must address the following components:

(i) List of data sources not available and efforts made to identify sources of data;

(ii) List of species (or relevant taxa) for all life stages and their relative abundance in the vicinity of the CWIS;

(iii) Identification of the species and life stages that would be most susceptible to IM/E. Include forage base species as well as commercial and recreational;

(iv) Identification and evaluation of the primary period of reproduction, larval recruitment and period of peak abundance;

(v) Data representative of the seasonal and daily activities (e.g. feeding and water column migration):

(vi) Identification of threatened, endangered and other protected species;

(vii) Documentation of any public participation or consultation with federal and state agencies undertaken in the development of the plan, and;

(viii) If supplementing the information with data collected in the field include description of all methods and quality assurance procedures for sampling and data analysis.

SPC has prepared this document to address specific permit requirements set forth by the Rule and provides additional information to demonstrate that the CWIS located on Lake Striker and its operation meet the best technology available and effectively minimize adverse environmental impacts (AEI) on the biota of the source water body. This source water baseline characterization study provides a complete review of the current and historic data and literature used to evaluate the biological communities in proximity of the proposed CWIS.

2.0 Regulatory Components

The proposed CWIS for the Nacogdoches Power Plant is subject to the Environmental Protection Agency (EPA) Phase I rule promulgated in December 2001 implementing Section 316(b) of the Clean Water Act (CWA) for new facilities that that use water withdrawn from rivers, streams, lakes, reservoirs, estuaries, oceans or other waters of the United States (U.S.) for cooling purposes. The Rule (40 CFR 125 et al.) establishes location, design, construction and capacity standards for cooling water intake structures at new facilities to ensure that the above factors reflect the best technology available for minimizing adverse environmental impact.

To comply with the Rule, EPA considers a fast-track based on a commitment by the facility to employ a suite of technologies that would represent best technology available for minimizing adverse environmental impact. The technologies include a reduction in intake capacity commensurate with that achievable by use of a closed-cycle recirculating cooling water system; a velocity limitation of less than or equal to 0.5 ft/s; and location where intake capacity would be no more than five (5) percent of the mean annual flow of a freshwater stream or river, no more than one (1) percent of the tidal excursion volume of a tidal river or estuary or where the intake capacity would not disrupt the natural stratification and turnover patterns of a lake or reservoir.

Phase I of the Rule applies to new greenfield and stand alone facilities that use cooling water intake structures to withdraw water from waters of the U.S. and that have or require a National Pollution Discharge Elimination System (NPDES) permit issued under section 402 of the CWA. New facilities subject to this regulation include those that have a design intake flow greater than two (2) million gallons per day (MGD) and that use at least twenty-five (25) percent of water withdrawn for cooling purposes. If a new facility meets these conditions, it is subject to final regulations. If a new facility has or requires an NPDES permit but does not meet the two MGD intake flow threshold or uses less than 25 percent of its water for cooling water purposes, the permit authority will implement sections 316(b) on a case-by-case basis, using best professional judgment.

The Rule also establishes national technology-based performance requirements applicable to the location, design, construction, and capacity of CWIS at new facilities. The national requirement establishes the best technology available, based on a two-track approach, for minimizing adverse environmental impact associated with the use of these structures.

Based on size, Track I of the Rule establishes national intake capacity and velocity requirements as well as location and capacity-based requirements to reduce intake flow below certain proportions of certain waterbodies (referred to as "proportional-flow requirements"). It also requires the permit applicant to select and implement design and construction technologies under certain conditions to minimize impingement mortality and entrainment.

Track II of the Rule allows permit applicants to conduct site-specific studies to demonstrate to the Director that alternatives to the Track I requirements will reduce impingement mortality and entrainment for all life stages of fish and shellfish to a level of reduction comparable to the level the facility would achieve at the CWIS if it met the Track I requirements.

The Nacogdoches Power Plant has elected to pursue Track I, thus technology based performance requirements would be used for the intake structure. The current design intake flow for this facility is 3.8 MGD, which requires the facility follow conditions for facilities that use between 2 to 10 MGD.

Under Track I, new facilities with a design intake flow equal to or greater than 2 MGD, but less than 10 MGD, must meet the following requirements:

(1) Design and construct the cooling water intake structure to a maximum through-screen design intake velocity of 0.5 feet per second (fps); (40CFR 125.84(c)(1))

(2) Design and construct the cooling water intake structure such that the total design intake flow from the cooling water intake structure meets the following requirements:

   i. for fresh water rivers or streams, intake flow must be less than or equal to 5 percent of the mean annual flow;

   ii. for lakes or reservoirs, intake flow may not disrupt natural thermal stratification or turnover pattern (where present) of the source water except in cases where the disruption is determined to be beneficial to the management of fisheries for fish and shellfish by any fishery management agency(ies);

   iii. for estuaries or tidal rivers, intake flow must be less than or equal to 1 percent of the tidal excursion volume; for oceans, there are no proportional flow requirements); (40 CFR 125.84(c)(2)

(3) Must select and implement design and construction technologies or operational measures for minimizing impingement mortality must be selected if certain conditions exist where the CWIS is located §125.84(c)(3); and design and construction technologies for minimizing entrainment must be selected and implemented. (40 CFR 125.84(c)(4)

(4) Must select and implement design and construction technologies or operational measure for minimizing entrainment of entrainable life stages of fish and shellfish

(5) Must submit the application information required in 40 CFR 122.21(r) and §125.86(b)(2), (3), and (4)

(6) Must implement the monitoring requirements specified in §125.87

(7) Must implement the record keeping requirements specified §125.88.

3.0 Methodology

In accordance with the Rule, AECOM completed an extensive desktop evaluation of current and historical data for Lake Striker as well as similar reservoirs in the Neches River Basin. Data from these studies were then compiled to evaluate the biological communities, to determine the potential impingement and entrainment (IM and E) impacts that may occur at the CWIS, and to address the components of 40 CFR 122.21 (r)(4). Data were organized according to those specific to Lake Striker and those within the Neches River Basin. Fisheries data collected at Lake Striker from the Texas Parks and Wildlife Department (TPWD) was analyzed to demonstrate the current fish community within the lake and to assess which species would be most susceptible to IM and E. Additional data of similar reservoirs located in the Neches River Basin collected by TPWD were evaluated to verify the community structure of reservoirs in comparison with Lake Striker. This approach provides a regional assessment of the reservoirs and allows for the use of more data in this evaluation. In addition, this approach was accepted by TCEQ during the Phase II Rule process under best professional judgment (BPJ).

Specific components of the data were evaluated to document and characterize:

- The presence of commercially and recreationally important species, threatened and endangered species, and life stages of those species with potential to be present near the CWIS at Lake Striker.
- Life histories of all relatively important fish species in Lake Striker were evaluated to identify habitat preferences, peak periods of reproduction and recruitment, and to identify those species that could potentially increase IM/E during certain months or seasons.
- Historic impingement and entrainment data collected at electric generating plants from Texas, Louisiana, and Arkansas were evaluated to identify common species susceptible to IM/E.

The following sections in this report provide a summary of the relevant information evaluated in this source waterbody characterization study in accordance with 40 CFR 122.21(r)(4).

4.0 Data Summary

4.1 Lake Striker Overview

Lake Striker is an impoundment of Striker Creek and has a drainage area of approximately 182 square miles. Striker Creek is a tributary to the Angelina River which is in the Neches River Basin. The reservoir was completed in 1957 and is owned by the Angelina and Nacogdoches Counties Water Control and Improvement District No. 1. The lake was constructed by the placement of a dam upstream of Striker Creek. The earthfill dam has a top of dam elevation of 309 feet above MSL, with a service spillway elevation of 282 feet above MSL. Water released from the lake flows from spillway into Striker Creek which then flows into the Angelina River. Lake Striker has a capacity of 26,960 acre-feet of water, with a surface area of 1,900 acres at normal operating elevation of 292 feet above MSL. The lake has a shoreline length of 13.7 miles, and an average depth of 15 feet. Water level fluctuations average 1-3 feet annually. Water withdrawal from Lake Striker is permitted for municipal and industrial use.

4.2 Lake Striker Biological Data

Fish populations in Lake Striker Reservoir are surveyed by TPWD using electrofishing, gill netting, and trap netting. Vegetation and access surveys are also conducted. Data collected in these reports are used by TPWD fisheries managers for assessing overall fish community health and for implementing new management goals for the lake.

Lake Striker survey report data from 1999, 2003, and 2008 was provided by TPWD and used in this study to determine fish community structure, spatial and temporal changes, and the presence of threatened or endangered species. Based on the data evaluated, the Lake Striker fish community has experienced little variation since 1999 and the lake is currently considered average for overall fish quality.

Important sport fish include channel catfish, spotted bass, largemouth bass, and white crappie and the lake is managed under general statewide fishing regulations. Historically, primary production and subsequent prey abundance in the lake has been limited. Lack of vegetative habitat (1.3% of surface area) and turbidity contribute to poor fish recruitment and survival. In 1998 and 1999, palmetto bass were stocked (153,238 fish total) in an attempt to provide an additional fishery with no success.

A total of 18 species were noted in the three survey seasons (See Table 4 for a comprehensive list). Of these, ten species has occurred in all three surveys, including gizzard shad, channel catfish, flathead catfish, yellow bass, bluegill, redear sunfish, spotted bass, largemouth bass, white crappie and black crappie.

Prey species including the gizzard shad and threadfin shad are present in the reservoir and have increased their overall abundance from 1999 to 2008. Sunfishes have experienced a downward trend in catch rate since 1999. Electrofishing catch of bluegill in 2008 was low; no fish over 6 inches in length were collected. Other prey species included longear, redear, and spotted sunfish.

Channel catfish catch rates in 1999 were relatively low and reflected a decline in channel catfish recruitment. In 2003, however, catch rates and size structure indicated several years of increased

survival of juvenile channel catfish. The 2008 survey indicated a healthy channel catfish population. Flathead catfish continued to occur in good numbers in the 2008 survey.

White bass are present in limited abundance and have continued to experience decreasing catch rates since the 1999 survey. Lack of sufficient prey may be hindering survival as evidenced with the poor palmetto bass stocking survival, which was last stocked in 1998.

Spotted bass is the prevalent black bass present; however, abundance overall has declined since 1999. The population is characterized by mostly smaller individuals and the conditions of the fish are good. Historically, largemouth bass abundance has been low in the lake. Size structure has remained consistent and skewed toward smaller sizes. Largemouth bass are in moderate condition. The current largemouth bass water body record is 11.10 lbs set in March 2004. Limited forage and insufficient aquatic vegetative cover are the likely factors affecting black bass recruitment and survival.

White and black crappies are present in the reservoir, but only one black crappie was collected in 2009. Catch rates based on a net night (nn) for white crappie have been low in past surveys with 0.0/nn and 1.8/nn observed in 1999 and 2003, respectively. However, in 2008 the catch rate increased considerably (15.4/nn) and included an abundance of smaller fish in the 5-to 9-inch range, indicating an abundant 2008 year class. As a result, an abundance of white crappie is expected to remain for the next couple of years.

Current management concerns derived from the three surveys include the need to enhance the limited trophy fish potential at Lake Striker. The 2008 surveys indicated an increase in clupeid abundance which may sustain stocking of additional sport species. Stocking of blue catfish has been mentioned as a possible management strategy.

Data from the TPWD fish management reports does not include information pertaining to species such as clams or mussels. SPC conducted a data search to determine if other existing data was available and found that these species are typically associated with streams and rivers with limited populations being found in lakes. In addition, SPC spoke with TPWD lake managers and they indicated they did not have any detailed information to address populations in the lake.

4.3 Biological Data from Other Lakes

Additional TPWD survey reports for reservoirs located in the Neches River Basin, in proximity to Lake Striker were examined to verify fish communities within Lake Striker and to establish an overall baseline for similar lakes (Table 1). In addition, Table 2 provides a summary of the lake characteristics for all the lakes reviewed. The data from these studies indicates that overall fish composition, including species richness and abundances, are very similar across reservoirs for this region, which suggests that this information is supportive in establishing a baseline characterization for Lake Striker. Common species in the reservoirs include gizzard shad, threadfin shad, largemouth bass, channel catfish, white and black crappie, and bluegill. Although overall proportions may vary within each of these lakes, these species represent TPWD's fisheries management baseline structure for these lakes. Summaries of these reports are located in Appendix A of this document.

5.0 Baseline Characterization

5.1 Data Sources Used

The following data sources were used to address the requirements of the source water baseline characterization study. Specifically, the data was evaluated to derive a comprehensive list of fish species and to determine the life histories of the species occurring in Lake Striker in an effort to address the following:

- Identification and evaluation of primary periods of reproduction,
- larval recruitment and period of peak abundance of meroplankton,
- seasonal and biological activity, and
- identification of fish species with preference to habitat near the proposed CWIS

The TPWD Statewide Freshwater Fisheries Monitoring and Management Program survey reports are developed to determine management procedures for fisheries resources across the state of Texas. Nine survey reports for reservoirs located in the Neches River Basin were evaluated to determine the fish communities and establish a baseline characterization for Lake Striker. Of these nine reports, three were specific to Lake Striker for the years 1999, 2003, and 2008.

Data from 316(b) Phase II studies conducted in Texas, Arkansas, and Louisiana were evaluated to provide an overview of the species that are typically impacted by IM and E. Although the parameters such as intake design and water volumes associated with the intakes at these facilities are significantly different, these data do provide valid information as to which species are commonly exposed to intake structures in a freshwater setting.

In addition to reviewing these documents, internet searches for existing literature on Lake Striker and other lakes in Texas relevant to fish community characterizations were performed. Search results indicate that there is little to no data available for Lake Striker or other reservoirs for this region of the state. TPWD's monitoring and management program provides the only source of information relevant to fish communities. The TWPD-Regional Manager, Todd Driscoll, was contacted about obtaining other sources of information, and he indicated that he was not aware of any such studies.

References for these publications are provided in Section 8 of this document.

5.2 Species in the Vicinity of the CWIS

A list of species potentially occurring in Lake Striker was developed by examining species lists of known occurrence in Lake Striker as well as similar reservoirs in the Neches River Basin. A list of all known fish species occurrences in the Neches River Basin is provided in Table 3. A summarized list of species as derived from the TPWD Management Reports is provided in Table 4. This table indicates those species which would be considered as primary species for the baseline characterization for Lake Striker. Furthermore, these species were evaluated based on habitat preferences and known occurrences in the reservoir and the potential for occurring in the vicinity of the CWIS.

Figure 7 illustrates the TPWD sample locations for data collected in 2008. Sample locations were then evaluated to compare species composition from sample locations in the lake to those in the vicinity of the proposed CWIS. Table 5 provides comparison of relative abundances for fish taken by three sampling gears at locations near and >1 mile from the proposed intake structure and Figures 8 and 9 illustrate the relative abundance of species for the selected stations. Based on this comparison species assemblages do not appear to be any different between locations which suggest there would not be a greater impact on fish assemblages due to location near the spillway as compared to other locations on the lake.

5.3 Primary Periods of Reproduction and Recruitment

The primary periods of reproduction for species occurring in Lake Striker and in similar reservoirs in proximity to Lake Striker is generally early spring to early summer with recruitment being highest in late spring to late summer. Spawning season is one of the most important biological factors affecting IM and E. The primary period of reproduction and peak abundance of most Lake Striker taxa is during the months of spring, typically March thru May (See Table 6). The peak time of egg recruitment is during early spring, while larval recruitment is primarily late spring and early summer. Spring and summer are therefore the most important seasons at Lake Striker as this is the time eggs and larval organisms are most abundant.

Additional species specific information is provided in Appendix B.

5.4 Seasonal and Daily Biological Activity

Seasonal and daily biological activities in fish communities are associated with natural species-specific behaviors such as feeding and spawning. For the species identified in Lake Striker these patterns can be sorted based on where in the lake the fish occur and the types of habitats they are associated with. Species such as shads are commonly found in the open regions of the lake and are known to school and cover great distances. Species such as the black basses and sunfishes are generally associated with shoreline habitats or areas where there is extensive structure, and their activities are typically associated with small areas of movement. Catfish species such as the channel catfish and the flathead catfish pursue a variety of activities. The channel catfish is known to cover a wide range of area and is found in many different habitats. The flathead catfish is usually associated with open water and deep areas of the lake.

Daily activities of fishes reported to occur in Lake Striker generally include feeding and resting, but timing and pattern of these behaviors are largely species-specific or trophic guild-specific. For example, gizzard shad, threadfin shad, and other planktivores may follow plankton, which ascend and descend vertically in predictable diel patterns, during the afternoon and evening when plankton concentrate near the water surface. These fish species then typically return to the mid-portion of the water column. Another example is the behavior of predaceous fishes (e.g., black basses and catfishes), which follow their prey into littoral (i.e., near the shore) habitat in the evening and night and return to deeper water and/or cover during the day to rest. Organisms are much more active and mobile when feeding and would have a higher chance of becoming impinged during these periods. In general most aquatic organisms are more active in the morning hours at daybreak and the evening hours at sunset. Other variables which can stimulate activity in the fish community includechanges in the weather, lunar phases, influx or loss of water, and abrupt habitat changes.

Seasonal variations in Lake Striker typically result in a movement of fish into deeper warmer waters. As the lake temperatures drop in the winter, most species will seek the deeper holes and creek bed

channels where warmer pockets of water can be found. During warming periods in early spring, the fish become more active and will move to the shallower waters for feeding in spawning. Most of the species occurring in Lake Striker are tolerant of the colder temperatures that may occur. Only the gizzard shad and threadfin shad tend to demonstrate physical conditions related to cold water that may make them susceptible to impingement. These species tend to become very lethargic and less mobile when water temperatures drop below 45° F.

Additional species specific information is provided in Appendix B.

5.5 Threatened, Endangered, and Protected Species

The TPWD state and federal threatened and endangered county species lists for Rusk and Cherokee Counties were examined to determine the potential for listed species in Lake Striker and potentially in vicinity of the CWIS. Five species are listed by TPWD as either threatened or as a species of concern in these counties (Table 7). None of the species are federally listed. The two state listed species are the creek chubsucker and the paddlefish. The creek chubsucker is known to occur in East Texas streams south of the Red River down to the San Jacinto Basin and prefers streams that are densely vegetated and seldom occurs in impoundments. The paddlefish typically occurs in slow moving waters of rivers and reservoirs. Historically in Texas, paddlefish inhabited the Red River's tributaries, Sulphur River, Big Cypress Bayou, Sabine River, Neches River, Angelina River, Trinity River, and San Jacinto River.

No rare, threatened or endangered species were encountered in any of the TPWD sampling efforts on Lake Striker. TPWD was contacted to discuss the presence of threatened and endangered species in Lake Striker and all indications by their biologist indicate there have not been any occurrences to date.

In addition to threatened and endangered species, some commercial and recreational fish species are managed by TPWD (e.g., species with a catch limit or season) in Texas. TPWD regulates eight of the fish species reported to occur in Lake Striker. These are identified in Table 4.

5.6 Public Participation

As part of this review and development of the source water baseline characterization, the TPWD was contacted on several occasions to discuss developing the baseline, the biology of the lake, and threatened and endangered species. Table 8 provides summary of those contacts. No other public involvement specific to the baseline study has occurred.

5.7 Methods and Quality Assurance Procedures

The above data has not been supplemented with data collected in actual field studies directly related to the construction and operation of the Lake Striker CWIS. Therefore, SPC is not required to provide a description of methods and quality assurance procedures.

6.0 Assessment of Impingement and Entrainment Potential

6.1 Potential for Adverse Environmental Impacts associated with the CWIS

The potential for adverse environmental impacts associated with IM and E at the CWIS is based on a series of variables including capacity, design and operation, location, and types of organisms within the system. The following sections provide an overview of the variables.

CWIS Capacity, Design and Operation

SPC is proposing to operate a new CWIS on Lake Striker. The CWIS will be positioned between 20 to 40 feet offshore in the southeast portion of the lake adjacent to the lake spillway. The structure will be designed to support the use of five pump stations, three of which will provide water to the power plant and the remaining two pumps stations will be available for future public water use through the ANWCID. Figures 3 through 6 illustrate the current conceptual details for intake location and preliminary design. The three pumps capable of providing water to the plant will each be 900 gpm with the total design capacity being 3.8 MGD. However, the typical plant operation will require the use of only two of the three pumps at any one time, which will be an approximate volume of 2.6 MGD. The third pump will serve as a secondary pump which will be used during the back flush process, during routine maintenance of the CWIS, and to potentially provide additional capcity. Each pump will be fitted with an 8 inch diameter steel pipe fitted with a fine mesh screen housing which will draw water from approximately 10 ft below the surface. The back flush system will allow for the removal of debris from the screens.

The proposed intake structure design meets the design and construction technologies requirements for best technology available by incorporating the following components:

- Through-screen velocity of no more than 0.5 ft/s
- Intake pipes fitted with fine mesh screen
- Not located in an area where fish and shellfish protection is necessary
- Location of intake structure offshore and in mid water depth

Operation of the CWIS will be continuous over a 24-hr period each day while the plant is in operation and producing power.

Hydraulic Zone of Influence

The hydraulic zone of influence is defined as "that portion of the source waterbody hydraulically affected by the cooling water intake structure withdrawal of water" (40 CFR 125.83). The zone is used to assess the potential impacts of threatened, endangered or otherwise protected species, or migratory and/or sport or commercial species of impingement concern (40 CFR 125.84(a)(4)(i) and 40 CFR 125.84(a)(4)(ii)). The approach to determining the hydraulic zone of influence is not defined in the Phase I 316(b) rules. Therefore, for this study we have considered the hydraulic zone of influence to be the area in which induced velocities have some potential to impact species of concern. The evaluated

velocities are based on an established velocity of 0.5 fps, which is the velocity organisms are typically considered able to swim away from and avoid impingement. A conservative estimate of 0.01 fps was considered in this report to demonstrate the maximum hydraulic zone of influence. Velocities below this value would be very unlikely to have a substantial impact on motile organisms. We believe this definition of the hydraulic zone of influence is conservative and the actual area where organisms will be impacted may be lower.

The zone of hydraulic influence is the areal extension of a cylinder surrounding the cooling water intake through which all of the CWIS flow passes, and is of sufficient size so that the velocity through the area is equal to 0.01 fps. Based on this, the zone of hydraulic influence is calculated based on the water depth, the design intake flow (in cfs) and the target velocity of 0.01 fps. Based on the design intake of 3.8 MGD (6 cfs) and an average depth in vicinity of the intake of 10 ft, we estimated that the hydraulic zone of influence would consist of a cylinder with a diameter of approximately 19 ft. The operational design hydraulic zone of influence was calculated at approximately 13 ft. In other words, the zone of hydraulic influence would extend between 6 to 13 feet from the intakes. Table 9 provides a summary of the hydraulic zone calculations. The relatively small zones of hydraulic influence indicate that the area of the lake hydraulically affected by the intake is negligible.

Thermal Stratification or Turnover

The Phase I 316(b) rule requires that the total design intake on lake or reservoirs "must not disrupt the natural thermal stratification or turnover pattern (where present) of the source water except in cases where the disruption is determined to be beneficial to the management of fisheries for fish and shellfish by any fishery management agency(ies);" (40 CFR 125.84 (b) (3)(iii)). Lake Striker is a relatively shallow lake with an average depth of 15 feet and covers more than 1,900 acres at normal pool elevations. It is likely that wind driven mixing occurs frequently and any stratification that occurs is likely to be intermittent and relatively short lived.

During any short periods of stratification, the minor amount of water withdrawn from the intake would not substantially impact the turnover pattern or stratification of Lake Striker. The total volume of the lake is estimated to be greater than 7,400 million gallons (22,900 acre feet[1]). In comparison, the design intake volume of 3.8MGD is insignificant. Therefore, this intake does not have potential to impact any intermittent thermal stratification that occurs in Lake Striker.

Life Stages Subject to Impingement and Entrainment

The TPDES permit requirements call for the characterization of life stages that might be subject to impingement and, if appropriate, entrainment. This characterization is necessary to ensure the full scope of any potential impact is understood and that any implications for selection of mitigation measures are known. SPC believes that the literature as provided in this document supports the understanding of those species and the potential impacts to the life stages at the Nacogdoches Power Project. Data from 316(b) Phase II IM and E studies indicate that life stages of species reported to occur in Lake Striker that are subject to IM and E are larval and post larval (i.e., juvenile) stages. However, the CWIS complies with the more stringent 316(b) Phase I design requirements. Species habitat

[1] See http://lakestriker.com/default.aspx

requirements and their likely spawning locations combined with the design and proposed location of the CWIS minimize potential IM/E impacts at the proposed CWIS in Lake Striker.

Impingement

Life stages subject to impingement include life stages greater than the intake screen mesh size that cannot out-swim intake approach velocities. Impingement varies with species, but young of the year (YOY) individuals typically dominate historical impingement studies (based on length and weight data and observations). Exceptions are smaller species that typically do not exceed several inches in length even as adults. Impingement data from other water bodies also show a dominance of YOY on traveling water screens over adult organisms. Large adult organisms are not typically subject to impingement due to the placement of trash racks and debris screens on intake pipes and their ability to out-swim intake approach velocities.

The EPA rule calls for design and construction technologies for minimizing IM and E to be implemented. Historically, impingement studies data have shown gizzard shad and threadfin shad to be two of the most abundantly impinged fish in existing power plant cooling reservoirs. Larger fish such as freshwater drum, carp, sunfishes, and catfishes are able to swim relatively fast and are typically impinged in low numbers, likely due to their ability to swim faster than the approach velocity at permitted intakes. The design of the proposed CWIS includes an intake velocity of less than 0.5 ft/s, which is currently described by the EPA as "best technology available" to preclude impingement of these fishes.

It should be noted that impacts to organisms due to impingement do not always result in mortality. A study on impingement mortality performed by EPRI in 2003 grouped families of fish into three categories: high survival rate potential (71-100%), intermediate survival rate potential (31-70%), and low survival rate potential (0-30 %). With the exception of gizzard shad and threadfin shad from the family Clupeidae, all of the fish known to occur in Lake Striker are from families categorized as having a high survival rate potential.

Entrainment

Organisms subject to entrainment include life stages smaller than the intake screen mesh size that cannot out-swim intake approach velocities. Entrainment is typically dominated by eggs, larvae, and small juveniles referred to as ichthyoplankton. These organisms are typically associated with spawning areas that can vary due to species-specific preferences.

Historical studies have shown the majority of the fishes occurring in Lake Striker spawn and/or nest in benthic, littoral zones, over substrates including silt, gravel, and vegetation, and have demersal, adhesive eggs (Table 10). The proposed construction of the CWIS in the middle of the water column, over rip-rap substrate in deep water near the dam of Lake Striker minimizes entrainment potential by avoiding these areas.

7.0 Discussion

This report provides a compilation and summary of all the data reviewed and evaluated for completing the source water baseline characterization for the proposed CWIS on Lake Striker. The information presented in this report supports each of the 8 components required under 40 CFR 122.21(r)(4), and therefore, demonstrates SPC's compliance with the 316(b) Phase I Rule.

As part of the Rule, SPC has taken the initiative to reduce adverse environmental impacts (AEI) associated with the Nacogdoches Power Plant in several ways. First, the CWIS is being relocated from the Angelina River to Lake Striker where the overall fisheries communities are typically less dynamic and habitats are less sensitive to impacts. Second, the design and construction of the CWIS meets the requirements of the rule for best technology available. Third, the location of the CWIS in Lake Striker is in deeper water away from littoral habitat and is away from prime spawning and foraging habitat for the species identified in this study.

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Texas Parks and Wildlife Department. District 3-D. Jasper, Texas. *Statewide Freshwater Fisheries Monitoring and Management Program; 2008 Survey Report, Striker Reservoir.* By Dan Ashe and Todd Driscoll.

Tables

Table 1. Summary of Reservoirs and Fisheries Data Available in Proximity to Lake Striker.

Approximate distance from Striker	Name of Lake	Power Plant on lake	Survey data available?	Species Documented
0 miles	Lake Striker	Stryker Creek (Luminant) 685MW Nat. Gas; Proposed Nacogdoches Power (Austin Energy) 100MW Biomass	1999, 2003, and 2008	Gizzard shad, threadfin shad, spotted sucker, channel catfish, flathead catfish, white bass, warmouth, bluegill, longear sunfish, redear sunfish, spotted bass, largemouth bass, white crappie, black crappie
17 miles W	Lake Jacksonville	None		
20 miles NNW	Lake Tyler	None		
20 miles NNW	Lake Tyler East	None		
25 miles SSE	Lake Nacogdoches	None	2004	Gizzard shad, threadfin shad, spotted sucker, channel catfish, warmouth, bluegill, longear sunfish, redear sunfish, spotted sunfish, largemouth bass, white crappie, black crappie
26 miles WNW	Lake Palestine	None		
30 miles NE	Martin Lake	Martin Lake (Luminant) 2,250MW Lignite	2005	Spotted gar, gizzard shad, threadfin shad, common carp, triploid grass carp, spotted sucker, blue catfish, channel catfish, redbreast sunfish, warmouth, bluegill, longear sunfish, redear sunfish, spotted sunfish, spotted bass, largemouth bass
31 miles ENE	Lake Murvaul	None	2004	Spotted gar, gizzard shad, threadfin shad, common carp, golden shiner, bullhead minnow, lake chubsucker, spotted sucker, channel catfish, flathead catfish, yellow bass, redbreast sunfish, warmouth, bluegill, longear sunfish, redear sunfish, spotted sunfish, largemouth bass, white crappie, black crappie, logperch

Table 1. Summary of Reservoirs and Fisheries Data Available in Proximity to Lake Striker (continued).

Approximate distance from Striker	Name of Lake	Power Plant On Lake	Survey data available?	Species Documented
33 miles ESE	Lake Timpson	None	2007	Threadfin shad, golden shiner, lake chubsucker, spotted sucker, blue catfish, yellow bullhead, channel catfish, redbreast sunfish, warmouth, bluegill, longear sunfish, redear sunfish, spotted sunfish, largemouth bass, white crappie, black crappie
35 miles NE	Lake Cherokee	Knox Lee (SWEPCO) 470MW Nat. Gas		
37 miles NNE	Ferguson Creek Reservoir	AEP/Eastman Chemical 440MW Nat. Gas		
37 miles NNE	Tanyard Creek Reservoir	AEP/Eastman Chemical 440MW Nat. Gas		
40 miles ESE	Pinkston Reservoir			
42 miles N	Lake Gladewater		2005	Gizzard shad, threadfin shad, channel catfish, flathead catfish, warmouth, orange spotted sunfish, bluegill, longear sunfish, redear sunfish, spotted sunfish, largemouth bass, spotted bass, white crappie, black crappie
44 miles NE	Rogers Lake	None		
46 miles WNW	Lake Athens	None	2005	Gizzard shad, threadfin shad, channel catfish, white bass, redbreast sunfish, warmouth, bluegill, longear sunfish, redear sunfish, largemouth bass, black crappie
49 miles SE	Lake Sam Rayburn	None	2006	Gizzard shad, threadfin shad, blue catfish, channel catfish, white bass, yellow bass, palmetto bass, redbreast sunfish, warmouth, bluegill, longear sunfish, redear sunfish, spotted sunfish, spotted bass, largemouth bass, white crappie, black crappie

Table 2. Lake Characterization Summary for Lakes with Fisheries Data Proximate to Lake Striker .

Reservoir Name	Location (County)	Managing Entity	Year Constructed	Associated Waterbody	Size (acres)	Mean Depth (feet)	Fisheries Data	Water Uses
Lake Striker	Rusk	ANCWCID	1957	Striker Creek/Angelina River	1,920	15	TPWD	Flood control and cooling
Lake Timpson	Shelby	SCFWSD	1956	Blackwater Creek	223	8	TPWD	Water supply and recreation
Gladewater City Lake	Upshur	City of Gladewater	1953	Glade Creek	481	12	TPWD	Municipal and industrial use
Lake Murvaul	Panola	PCFWSD	1957	Murvaul Creek	3,280	12	TPWD	Municipal and industrial use
Martin Creek	Rusk	TXU Energy	1974	Martin Creek	4,981	16	TPWD	Cooling
Lake Nacogdoches	Nacogdoches	City of Nacogdoches	1976	Loco Bayou/Angelina	2,212	15	TPWD	Municipal Water and recreation
Lake Athens	Henderson	Athens MWA	1962	Flat Creek/Neches River	1,799	15	TPWD	Muncipal and industrial

Table 3. Phylogenetic List of Fish Species Occuring in the Neches River Basin

Family	Species Name	Common Name	Family	Species Name	Common Name
Petromyzontidae	*Ichthyomyzon castaneus*	Chestnut Lamprey	**Aphredoderidae**	*Aphredoderus sayanus*	Pirate Perch
	Ichthyomyzon gagei	Southern Brook Lamprey	**Atherinopsidae**	*Labidesthes sicculus*	Brook Silverside
Lepisosteidae	*Atractosteus spatula*	Alligator Gar		*Menidia beryllina*	Inland Silverside
	Lepisosteus oculatus	Spotted Gar	**Fundulidae**	*Fundulus notatus*	Blackstripe Topminnow
	Lepisosteus osseus	Longnose Gar	**Poeciliidae**	*Gambusia affinis*	Western Mosquitofish
Amiidae	*Amia calva*	Bowfin	**Moronidae**	*Morone mississippiensis*	Yellow Bass*
Clupeidae	*Dorosoma cepedianum*	Gizzard Shad*		*Morone chrysops*	White Bass*
	Dorosoma petenense	Threadfin Shad*		*Morone chrysops* x *Morone saxatalis*	Hybrid Striped Bass (Palmetto Bass)
Cyprinidae	*Carassius auratus*	Goldfish	**Centrarchidae**	*Centrarchus macropterus*	Flier
	Cyprinella lutrensis	Red Shiner		*Lepomis auritus*	Redbreast Sunfish*
	Cyprinella venusta	Blacktail Shiner		*Lepomis cyanellus*	Green Sunfish
	Cyprinus carpio	Common Carp*		*Lepomis gulosus*	Warmouth*
	Notemigonus crysoleucas	Golden Shiner		*Lepomis humilis*	Orangespotted Sunfish
	Notropis atherinoides	Emerald Shiner		*Lepomis machrochirus*	Bluegill*
	Notropis buchanani	Ghost Shiner		*Lepomis marginatus*	Dollar Sunfish
	Notropis chalybaeus	Ironcolor Shiner (R)		*Lepomis megalotis*	Longear sunfish*
	Notropis texanus	Weed Shiner		Lepomis microlophus	Redear sunfish*
	Opsopoeodus emiliae	Pugnose Minnow		*Lepomis miniatus*	Redspotted sunfish
	Pimephales vigilax	Bullhead Minnow		*Lepomis punctatus*	Spotted sunfish*
Catostomidae	*Carpiodes carpio*	River Carpsucker		*Lepomis symmetricus*	Bantam Sunfish
	Cycleptus elongatus	Blue Sucker		*Micropterus punctulatus*	Spotted Bass*
	Erimyzon sucetta	Lake Chubsucker		*Micropterus salmoides*	Largemouth Bass*
	Ictiobus bubalus	Smallmouth Buffalo		*Poxomis annularis*	White Crappie*
Ictaluridae	*Ameiurus melas*	Black Bullhead		*Pomoxis nigromaculatus*	Black Crappie*
	Ameiurus natalis	Yellow Bullhead	**Percidae**	*Etheostoma gracile*	Slough Darter
	Ictalurus furcatus	Blue Catfish		*Percina macrolepida*	Bigscale Logperch
	Ictalurus punctatus	Channel Catfish*		*Percina sciera*	Dusky Darter
	Noturus gyrinus	Tadpole Madtom	**Sciaenidae**	*Aplodinotus grunniens*	Freshwater Drum
	Noturus nocturnus	Freckled Madtom			
	Pylodictus olivaris	Flathead Catfish*			

* Present in TPWD Samples of Lake Striker according to Lake Survey Reports

(R) Listed as a rare species by TPWD

(T) Listed as a threatened species by TPWD

Table 4. Species Occurring in Lake Striker TPWD Surveys

Family	Species Name	Common Name	Potential For Presence in Proximity to CWIS
Clupeidae	*Dorosoma cepedianum*	Gizzard Shad	Likely
	Dorosoma petenense	Threadfin Shad	Likely
Cyprinidae	*Cyprinus carpio*	Common Carp	Potential
Ictaluridae	*Ictalurus punctatus*	Channel Catfish	Likely
	Pylodictus olivaris	Flathead Catfish	Potential
Moronidae	*Morone mississippiensis*	Yellow Bass	Likely
	Morone chrysops	White Bass	Likely
Centrarchidae	*Lepomis auritus*	Redbreast Sunfish	Potential
	Lepomis gulosus	Warmouth	Potential
	Lepomis punctatus	Spotted sunfish	Potential
	Lepomis machrochirus	Bluegill	Potential
	Lepomis megalotis	Longear sunfish	Potential
	Lepomis microlophus	Redear sunfish	Likely
	Micropterus punctulatus	Spotted Bass	Likely
	Micropterus salmoides	Largemouth Bass	Likely
	Poxomis annularis	White Crappie	Likely
	Pomoxis nigromaculatus	Black Crappie	Potential
Catostomidae	*Minytrema melanops*	Spotted sucker	Potential

Surveys conducted by TPWD in 1999, 2003, and 2008

Table 5. Comparison of Relative Abundances for Fish Taken by Three Sampling Gears at Locations near and >1 Mile from the Proposed Intake Structure

	Stations Near Intake Structure				Stations >1 Mile from Intake Structure			
	Electrofishing	Gill Net	Trap Net	Station Totals	Electrofishing	Gill Net	Trap Net	Station Totals
Gizzard Shad	4			**4**	3	2		**5**
Threadfin Shad	3			**3**				
Bluegill	0				1			**1**
Redear sunfish	1			**1**	1			**1**
Longear sunfish	8			**8**	1			**1**
Redbreast sunfish	0							
Spotted sunfish	0							
Spotted bass	3	1		**4**		4		**4**
Largemouth bass	3			**3**		1		**1**
Flathead Catfish								
Channel Catfish		3		**3**		5		**5**
White crappie		1	6	**7**		8	21	**29**
Spotted sucker								
Spotted gar						1		**1**
White bass						1		**1**
Black crappie			1	**1**				
			Total	**34**			**Total**	**49**

Table 6. Spawning and Recruitment Periods for Species Occuring in Lake Striker

Common Name	Family	Species Name	Spawning Period	Larval/ Juvenile Recruitment
Gizzard Shad	**Clupeidae**	*Dorosoma cepedianum*	March - May	Larval: 5 days. Sexual maturity at 3 year
Threadfin Shad		*Dorosoma petenense*	March - June	Larval: 5 days. Sexual maturity in 1 year
Common Carp	**Cyprinidae**	*Cyprinus carpio*	March - May	Sexual maturity between 3 and 5 years
Channel Catfish	**Ictaluridae**	*Ictalurus punctatus*	March - June	Sexual Maturity at 3 - 5 years
Flathead Catfish		*Pylodictus olivaris*	Late June - July	Sexual maturity between 2 and 5 years
Yellow Bass	**Moronidae**	*Morone mississippiensis*	April - Early June	Larva reaches 25 mm TL in 3 weeks. Sexual maturity between 2 and 4 years
White Bass		*Morone chrysops*	Mid March - Late May	Females reach sexual maturity in 2 years
Redbreast Sunfish	**Centrarchidae**	*Lepomis auritus*	Spring	Young may remain schooled for several weeks before scattering
Warmouth		*Lepomis gulosus*	Spring	Sexual maturity at approximately 1 year
Spotted sunfish		*Lepomis punctatus*	Spring	Sexual maturity at approximately 1 year
Bluegill		*Lepomis machrochirus*	May - August	Sexual maturity at approximately 2 years
Longear sunfish		*Lepomis megalotis*	Late Spring - Early Summer	Sexual maturity at approximately 2 years
Redear sunfish		Lepomis microlophus	May - Early July	2nd year, but may spawn in 1st
Spotted Bass		*Micropterus punctulatus*	Early April - Mid June	Sexually mature at 2 years
Largemouth Bass		*Micropterus salmoides*	Late March - June	Sexually mature at 2 years
White Crappie		*Poxomis annularis*	May - June	Sexually mature at 2 years
Black Crappie		*Pomoxis nigromaculatus*	Late March - Early May	Sexually mature at 2 years
Spotted sucker	**Catostomidae**	*Minytrema melanops*	Late March-Early April	Larval 7-12 days. Sexually mature at 3 years

Sources: Chilton, Earl. W., Inland Fisheries Division. 1997. Freshwater Fishes of Texas. Texas Parks and Wildlife Press. Austin Texas.

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Table 7. Summary of Threatened and Endangered Aquatic Species in Rusk and Cherokee Counties, Texas

Common Name	Species Name	Federal Status	State Status	Potential to Occur in Lake Striker
Creek chubsucker	*Erimyzon oblongus*	R	T	Unlikely as Lake Striker lacks appropriate habitat.
Ironcolor shiner	*Notropis chalybaeus*	R	R	Unlikely as Lake Striker lacks appropriate habitat.
Orangebelly darter	*Etheostoma radiosum*	R	R	Unlikely, as Lake Striker lacks appropriate habitat.
Paddlefish	*Polyodon spathula*	R	T	Not known by TPWD to occur in Lake Striker, though habitat is appropriate.
American eel	*Anguilla rostrata*	R	R	Unlikely, as Lake Striker is seperated from marine environments by several dams.

R- Listed as Rare, but with no regulatory listed status

T- State Listed as Threatened

Source: Texas Parks and Wildlife Department: http://www.tpwd.state.tx.us/landwater/land/maps/gis/ris/endangered_species/

Table 8. Summary of Public Participation and Agency Contacts

Name of Contact	Affiliation of Contact	Date Contacted	Purpose of Contact
Todd Driscoll	Texas Parks and Wildlife Department	August 2, 2010	Request for TPWD reports on Lake Striker
Todd Driscoll	Texas Parks and Wildlife Department	August 9, 2010	Request for additional studies and clarification on sampling protocols
Todd Driscoll	Texas Parks and Wildlife Department	August 11, 2010	Inquiry of any known occurances of T&E or invasive species
Todd Driscoll	Texas Parks and Wildlife Department	September 16, 2010	Provide progress update and inquire about any additional studies on lakes in proximity to Lake Striker
Todd Driscoll	Texas Parks and Wildlife Department	September 24, 2010	Request for station-specific data summarized in TPWD reports
Todd Driscoll	Texas Parks and Wildlife Department	September 27, 2010	Inquiry of any known fish congregation near the dam as compared to the remainder of the lake

Table 9. Calculation of Zone of Hydraulic Influence for the Nacogdoches Power Plant Cooling Water Intake Structure on Lake Striker.

	Flow			Ambient velocity	Zone of hydraulic influence	Depth	Circumference	Radius of cylinder	Diameter
	gpm	MGD	cfs	ft/sec	sq ft	ft	ft	ft	ft
Operational Volume	1800	2.6	4.0	0.01	401	10	40	6.4	13
Design Intake Volume	2650	3.8	5.9	0.01	590	10	59	9.4	19

Table 10. Habitat Preference for Species Documented in Lake Striker TPWD Fish Surveys

Family	Scientific Name	Common Name	Habitat
Clupeidae	*Dorosoma cepedianum*	Gizzard Shad	Spawning occurs in shallow waters of protected bays and inlets. Juveniles and adults school in open water. Shad are filter feeders.
	Dorosoma petenense	Threadfin Shad	Spawning occurs along the shoreline. Juveniles and adults school in open water. Threadfin shad are susceptible to low water temperatures and are relatively short lived (2-3 years).
	Cyprinus carpio	Common Carp	Spawning occurs along the shoreline. Juveniles grow rapidly, reaching approximately 6.5 inches in their first year of growth. Adults can reach almost 30 inches and weigh over 5 pounds.
Ictaluridae	*Ictalurus punctatus*	Channel Catfish	Spawning occurs about piles of drift, logs, or undercut banks, in semi-darkness and seclusion.
	Pylodictus olivaris	Flathead Catfish	Characteristic of deep holes of medium and large rivers. Spawns under logs or other concealing cover.
Moronidae	*Morone mississippiensis*	Yellow Bass	Prefer relatively clear waters of large rivers, oxbow lakes, or impoundments. Spawn in gravel 2-3 feet deep.
	Morone chrysops	White Bass	Pelagic schooling fish, associated with firm sand or rock substrate. Intolerant of high turbidity. Migrates to small tributaries to spawn or in shallow water over wind swept shoals.
Centrarchidae	*Lepomis auritus*	Redbreast Sunfish	Spawns in beds or colonies on sand or gravel where the water is one to three feet deep.
	Lepomis gulosus	Warmouth	Prefers heavily vegetated areas with limited flow including streams, swamps, rivers, borrow areas, and oxbow lakes. Spawns over rock and gravel near stumps or clumps of vegetation.
	Lepomis punctatus	Spotted sunfish	Inhabit heavily vegetated ponds, lakes, pools of creeks and small to medium rivers and swamps. Usually over mud or sand.
	Lepomis machrochirus	Bluegill	Males will build nests in shallow water (approx. 2 feet deep). Highly valued in recreational fisheries.
	Lepomis megalotis	Longear sunfish	Occur in a variety of habitats and are most abundant in small, clear, upland streams with rocky bottoms. They are typically found in pools and do well in reservoirs. Spawning occurs in shallow water with gravel bottom and little current.
	Lepomis microlophus	Redear sunfish	Generally found near the bottom in warm water with little current and abundant aquatic vegetation. Spawning occurs in deeper water than most other sunfish, congregating in spawning "beds." Nests are saucer-shaped depressions in gravel or silt, and are sometimes so close they almost touch.
	Micropterus punctulatus	Spotted Bass	Generally found in clear water with permanent flow and gravel bottoms in deep pools.
	Micropterus salmoides	Largemouth Bass	Spawning nests constructed in 1 to 15 ft of water. Most commonly found in clear, quiet lakes, ponds, and backwaters and pools of streams, near logs and other vegetative cover.
	Poxomis annularis	White Crappie	Males nest in shallow to mid-depth water near structure. Fry stay near the nest; young crappies are often found in deeper waters. Adults congregate in shallow shoreline habitats
	Pomoxis nigromaculatus	Black Crappie	Commonly found in slower sections of large streams, oxbow lakes, and reservoirs. Spawn in shallow areas near vegetative cover.
Catostomidae	*Minytrema melanops*	Spotted sucker	Inhabits clear, warm waters having no noticeable current. Spawning occurs in riffles, above large pools.

Surveys conducted by TPWD in 1999, 2003, and 2008

Figures

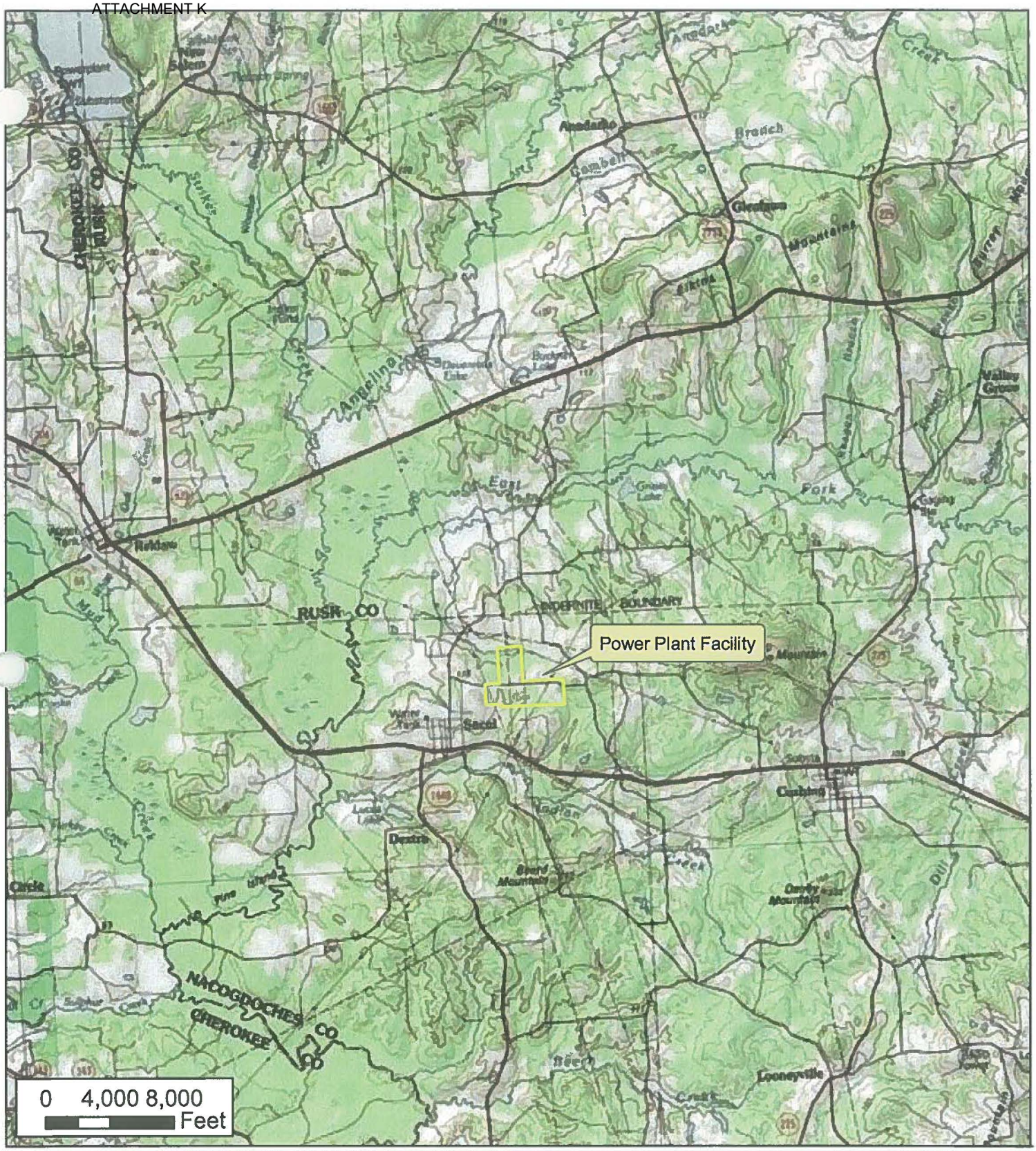


Figure 1 - Site Location Map
Nacogdoches Power Plant
USGS Topographic

Projection: Texas State Plane Central, NAD 1983, US Feet
Background: USGS Topographic Quadrangle
Source: ESRI
Creator: Ryan Hilliard (Ryan.Hilliard@aecom.com)

Southern Company

AECOM

September 8, 2010

Project: 60143213

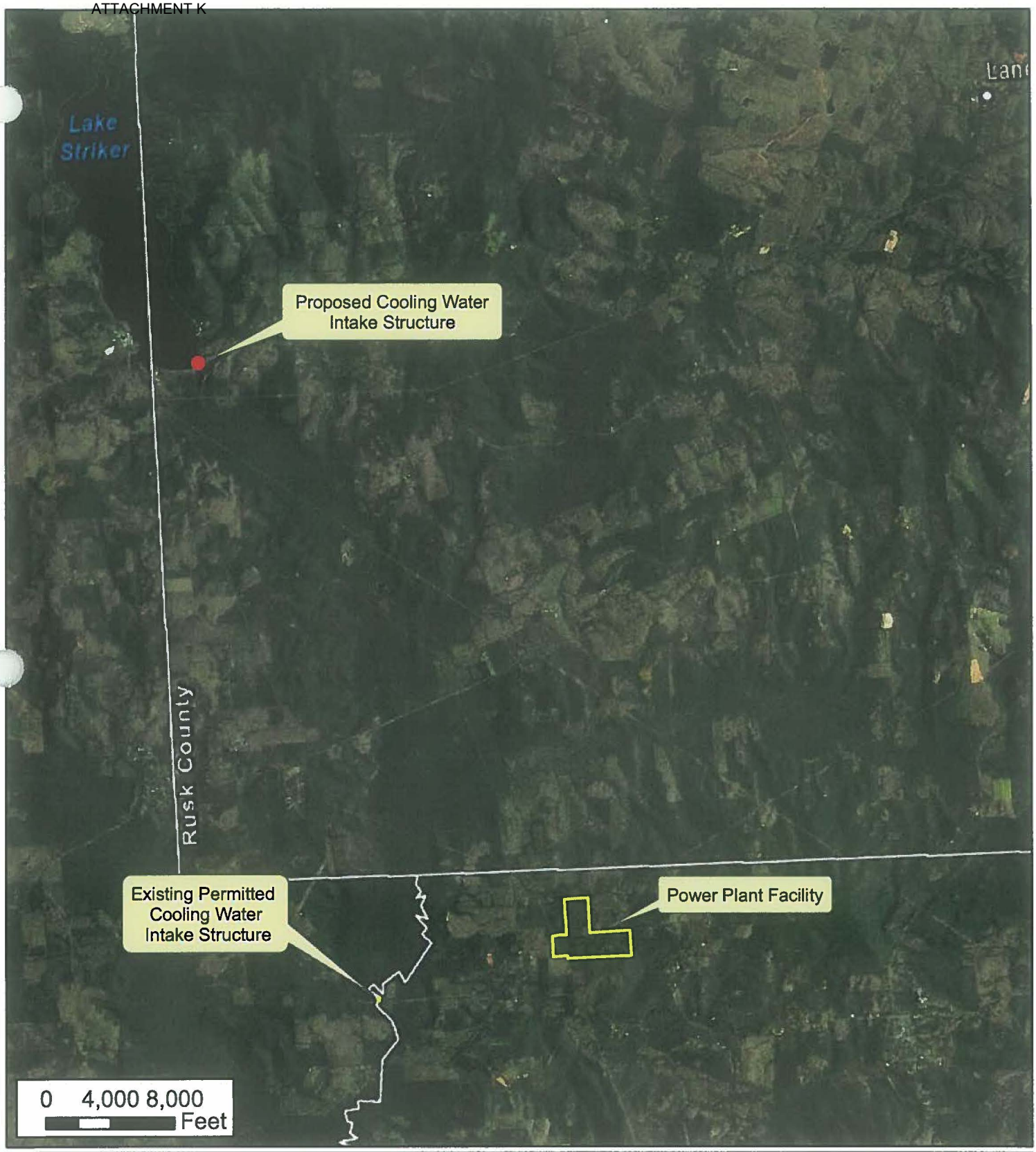
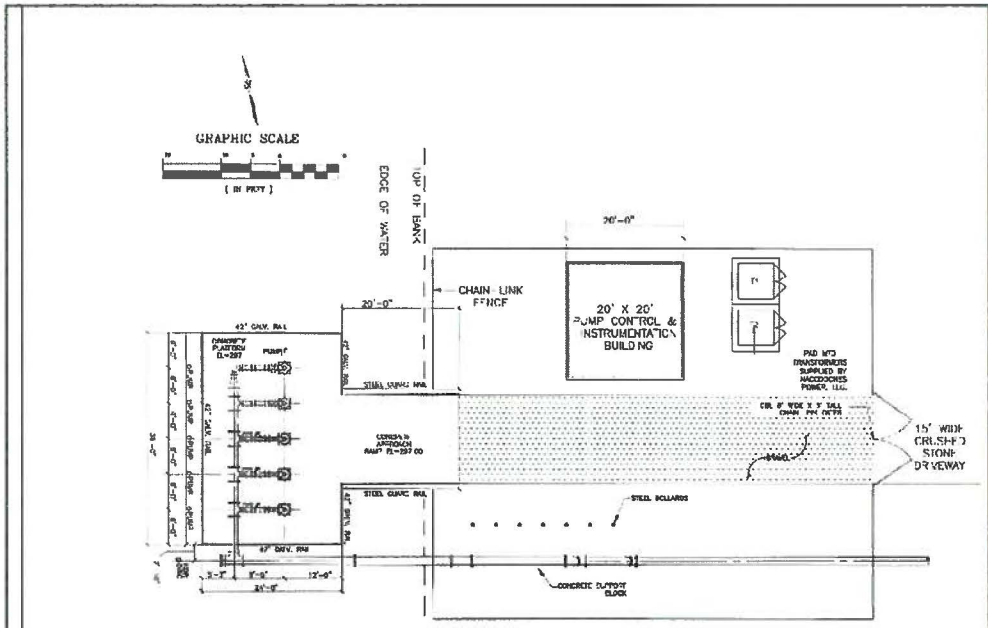


Figure 2 - Facilities Location Map
Nacogdoches Power Plant
USGS Topographic

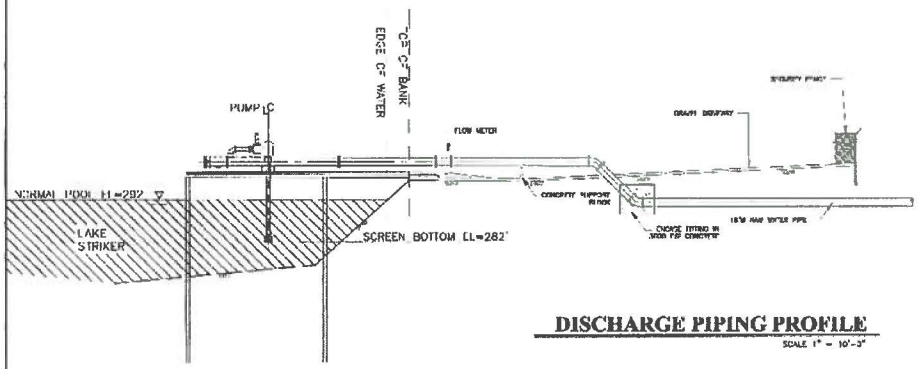
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Background: USGS Topographic Quadrangle
Source: ESRI
Creator: Ryan Hilliard (Ryan.Hilliard@aecom.com)

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September 8, 2010
Project: 60143213



PLAN OF PROPOSED PUMP STATION

SCALE 1" = 10'-0"



DISCHARGE PIPING PROFILE

SCALE 1" = 10'-0"

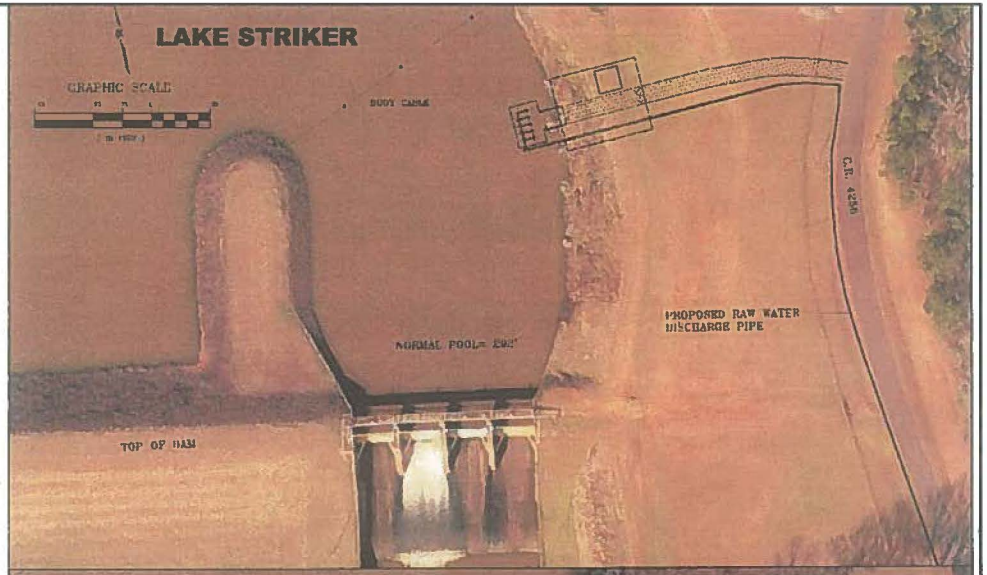




Figure 3

Drawn By: RLB 04-27-2010 Approved By: XXX XX-XX-XXXX FILE NAME & LAYOUT NAME: SiteMan.dwg\Layout1		STOKES & ASSOCIATES, INC. RETAINS ALL RIGHT, TITLE AND INTEREST IN AND TO THIS DOCUMENT AND ALL INFORMATION INCLUDING BUT NOT LIMITED TO ALL INTELLECTUAL PROPERTY DEVELOPED BY OR ON BEHALF OF STOKES & ASSOCIATES, INC. NEITHER THIS DRAWING/SPECIFICATION NOR ANY INFORMATION CONTAINED HEREIN SHALL BE REPRODUCED, USED OR RELIED UPON FOR THE PREPARATION OF WORK FOR OR ON A PARALLEL OR NON ANY OTHER PURPOSE EXCEPT AS EXPRESSLY AUTHORIZED IN WRITING BY STOKES & ASSOCIATES, INC.	EPAC-JV JOINT VENTURE DESIGN/BUILD GROUP Stokes & Associates, Inc./Apeck Construction, Inc. REGISTRATION NO. F-967 P.O. BOX 1114 HENDERSON, TEXAS 75653 TEL (903) 657-7558 FAX (903) 657-7884	PROJECT NUMBER	NACOGDOCHES POWER, LLC LAKE STRIKER OPTION INTAKE & PUMP STATION	PLOT SCALE: 1:1 SHEET XX OF XX

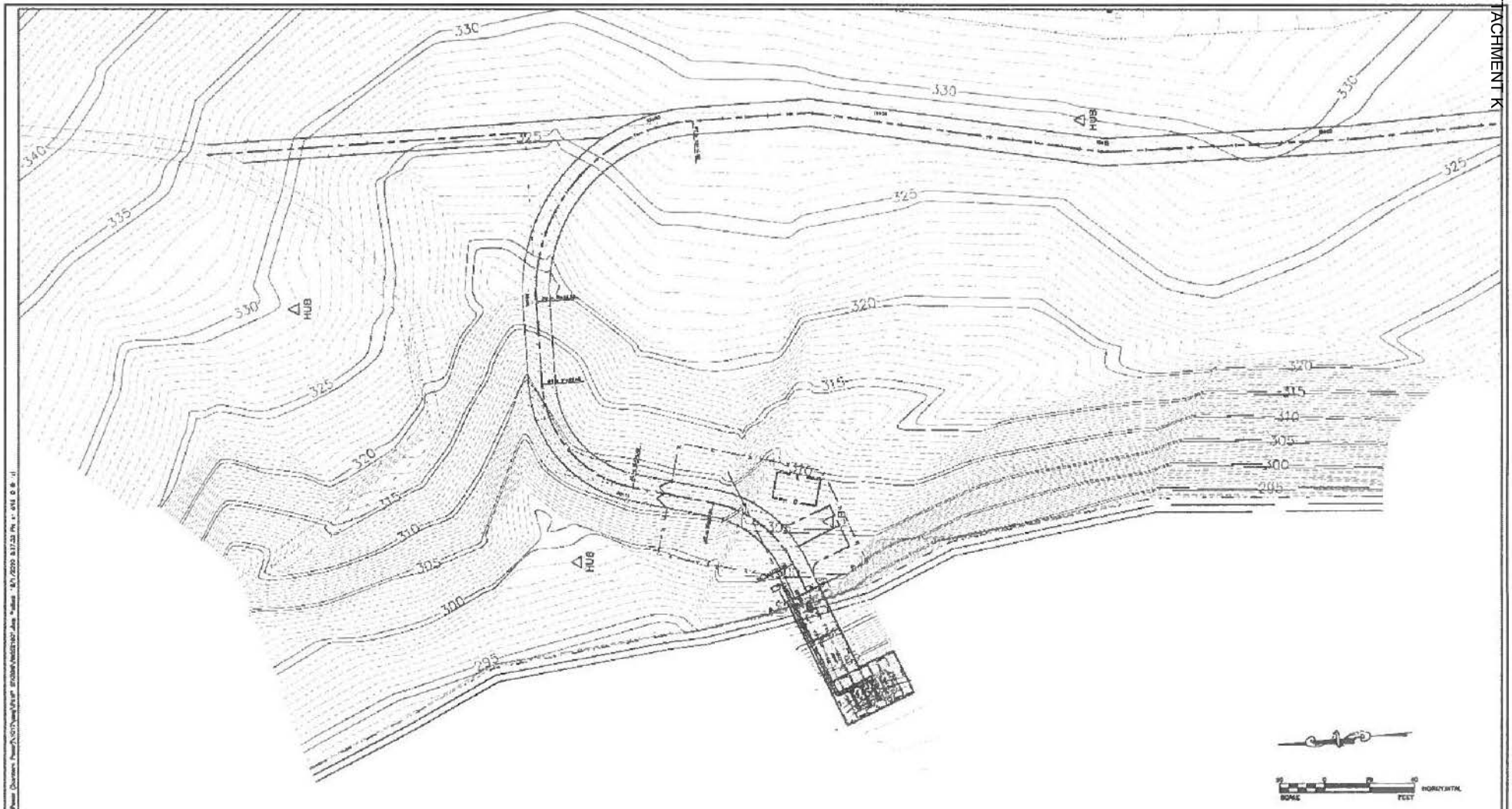


Figure 4

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PRELIMINARY
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ANDERSON NO. 1 — RUSK, CHEROKEE & NACOGDOCHES COUNTIES

SA PROJECT: 1901-1017

PLOT SCALE: 1:1

ANGELINA & NACOGDOCHES COUNTIES
WATER CONTROL & IMPROVEMENT DISTRICT NO. 1
RAW WATER PUMP STATION
SITE ELECTRICAL PLAN

DRAWN BY: JCS — DATE: XX-XX-2010
CHK BY: CSH — DATE: 08-23-2010

DRAWING NUMBER: D1901017-RWSES1601

SHEET: 01 — REV: 0

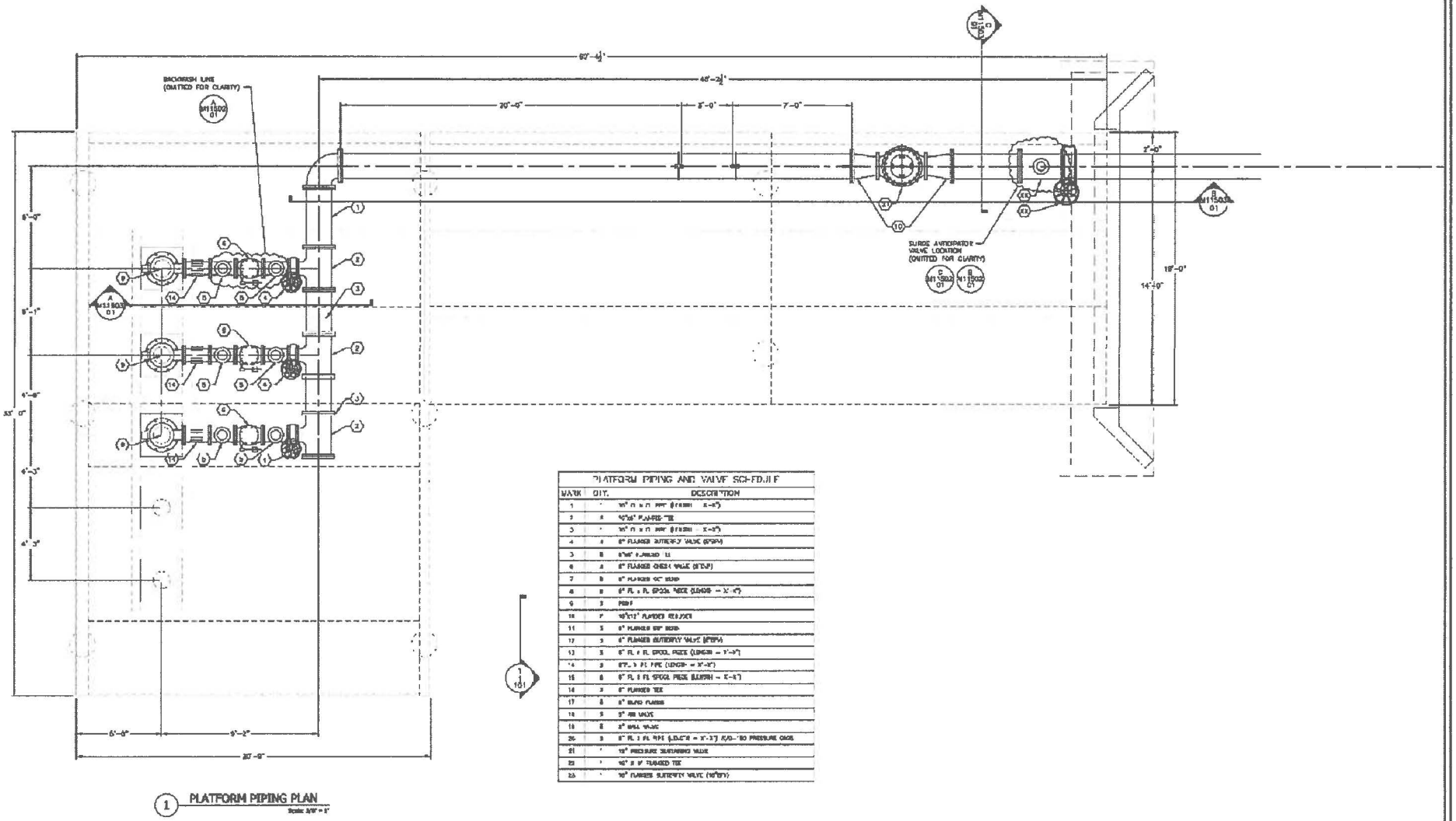

BACKWASH LINE
(OMITTED FOR CLARITY)
SURGE ANTICIPATOR VALVE LOCATION
(OMITTED FOR CLARITY)
PLATFORM PIPING AND VALVE SCHEDULE
MARK QTY. DESCRIPTION
1 1 10" D x D FPT (FROM E-E)
2 2 10"x6" FLANGE TEE
3 1 10" D x D FPT (FROM E-E)
4 2 6" FLANGE BUTTERFLY VALVE (OPEN)
5 8 6"x6" FLANGED EL
6 2 6" FLANGED CHECK VALVE (STEM)
7 8 6" FLANGED 90° ELBOW
8 8 6" FL x FL SPOOL PIECE (LENGTH = 1'-4")
9 3 PIPE
10 1 10"x12" FLANGED REDUCER
11 5 6" FLANGED END BLIND
12 3 6" FLANGED BUTTERFLY VALVE (OPEN)
13 3 6" FL x FL SPOOL PIECE (LENGTH = 1'-3")
14 3 6"FL x FL PIPE (LENGTH = 1'-4")
15 8 6" FL x FL SPOOL PIECE (LENGTH = 2'-8")
16 3 6" FLANGED TEE
17 8 6" BLIND FLANGE
18 3 3" AIR VALVE
19 8 2" BALL VALVE
20 3 6" FL x FL PIPE (LENGTH = 1'-3") FOR 150 PRESSURE GAGE
21 1 10" PRESSURE SUSTAINING VALVE
22 1 10" x 6" FLANGED TEE
23 1 10" FLANGED BUTTERFLY VALVE (10"DIA)
1 PLATFORM PIPING PLAN
Scale: 3/8" = 1'
PRELIMINARY
FOR REVIEW
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CONSULTANT ENGINEERS
P.O. BOX 1114 HENDERSON, TEXAS 75653
TEXAS FIRM REGISTRATION NO. F-957
ANGELINA & NACOGDOCHES COUNTIES
WATER CONTROL & IMPROVEMENT DISTRICT NO. 1
RAW WATER PUMP STATION
PLATFORM PIPING PLAN
D1901017-RWSM11602

Figure 5

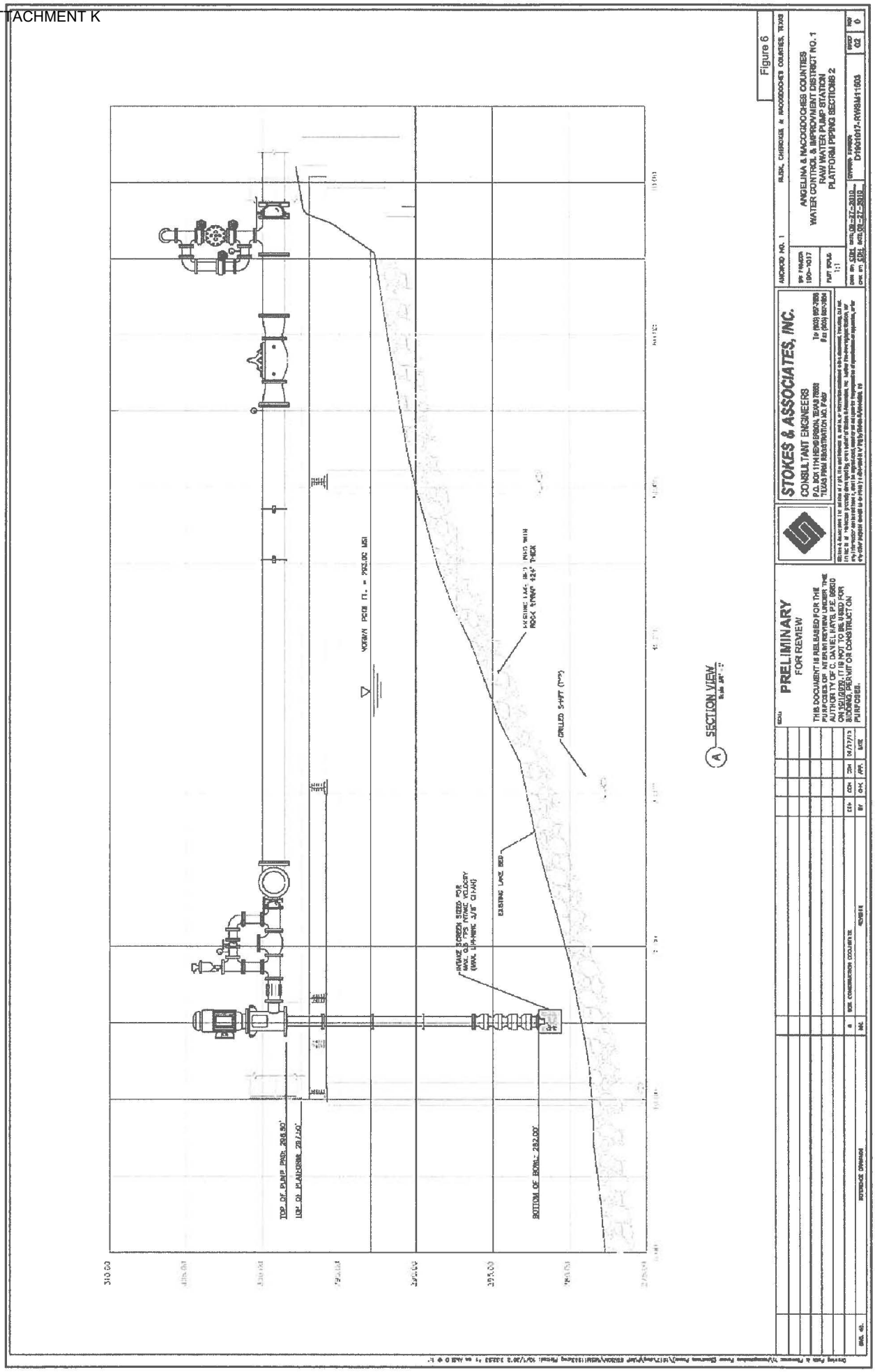

SECTION VIEW
TOP OF PUMP PROD. 298.50'
TOP OF FLANGE 297.00'
BOTTOM OF BORE 282.00'
EXISTING LAKE BED
DRILLED SHAFT (1'-3")
PRELIMINARY
FOR REVIEW
STOKES & ASSOCIATES, INC.
CONSULTANT ENGINEERS
ANGELINA & NACOGDOCHES COUNTIES
WATER CONTROL & IMPROVEMENT DISTRICT NO. 1
RAW WATER PUMP STATION
PLATFORM PIPING SECTIONS 2

Figure 6

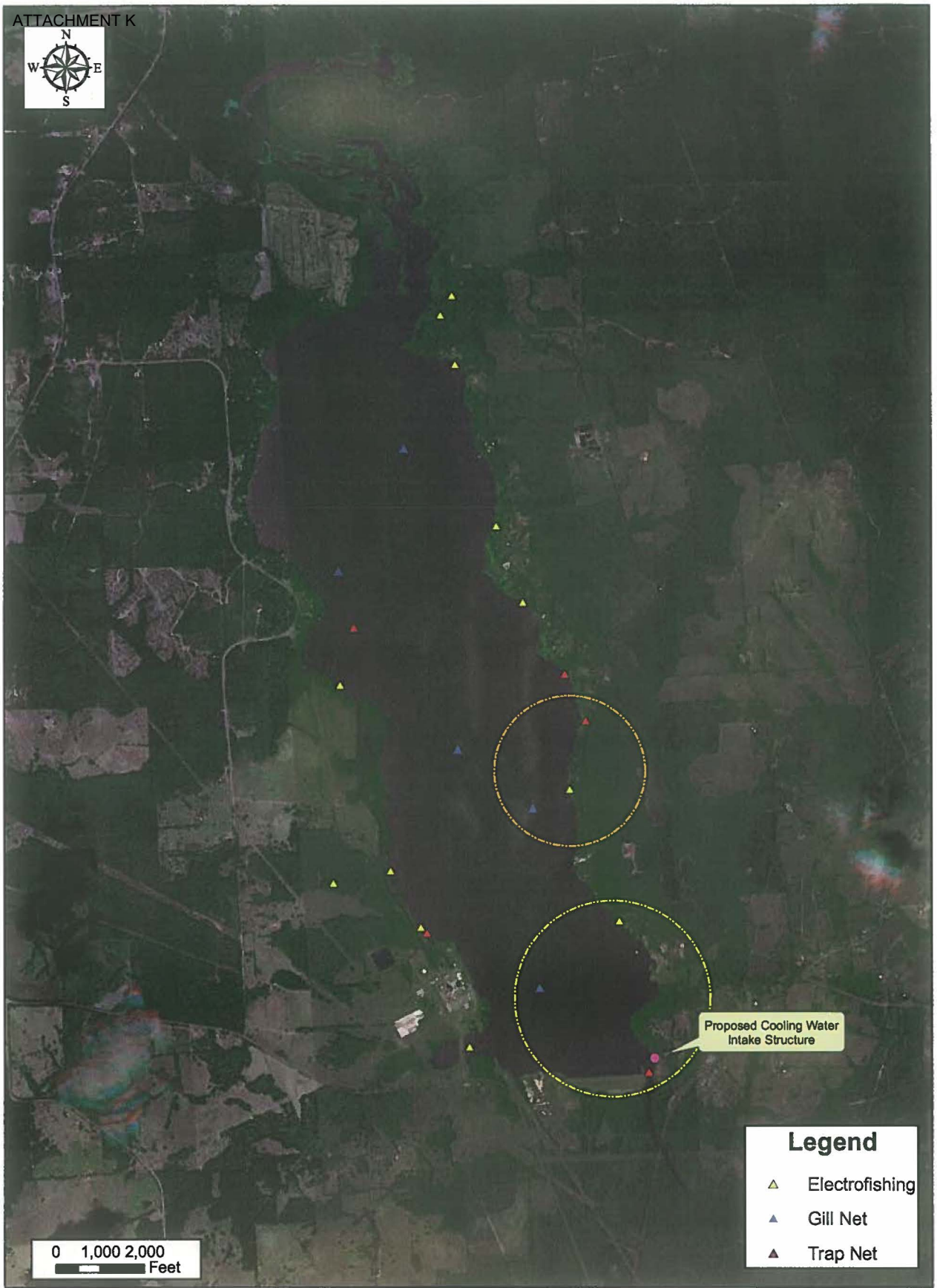


Figure 7
TPWD Sampling Locations

TPWD, Lake Striker Survey Report, 2008

Projection: Texas State Plane Central, NAD 1983, US Feet
Background: 2006 Aerial Imagery
Source: ESRI
Creator: Ryan Hilliard (Ryan.Hilliard@aecom.com)

Near Proposed Intake Locations

Mid - Reservoir Locations

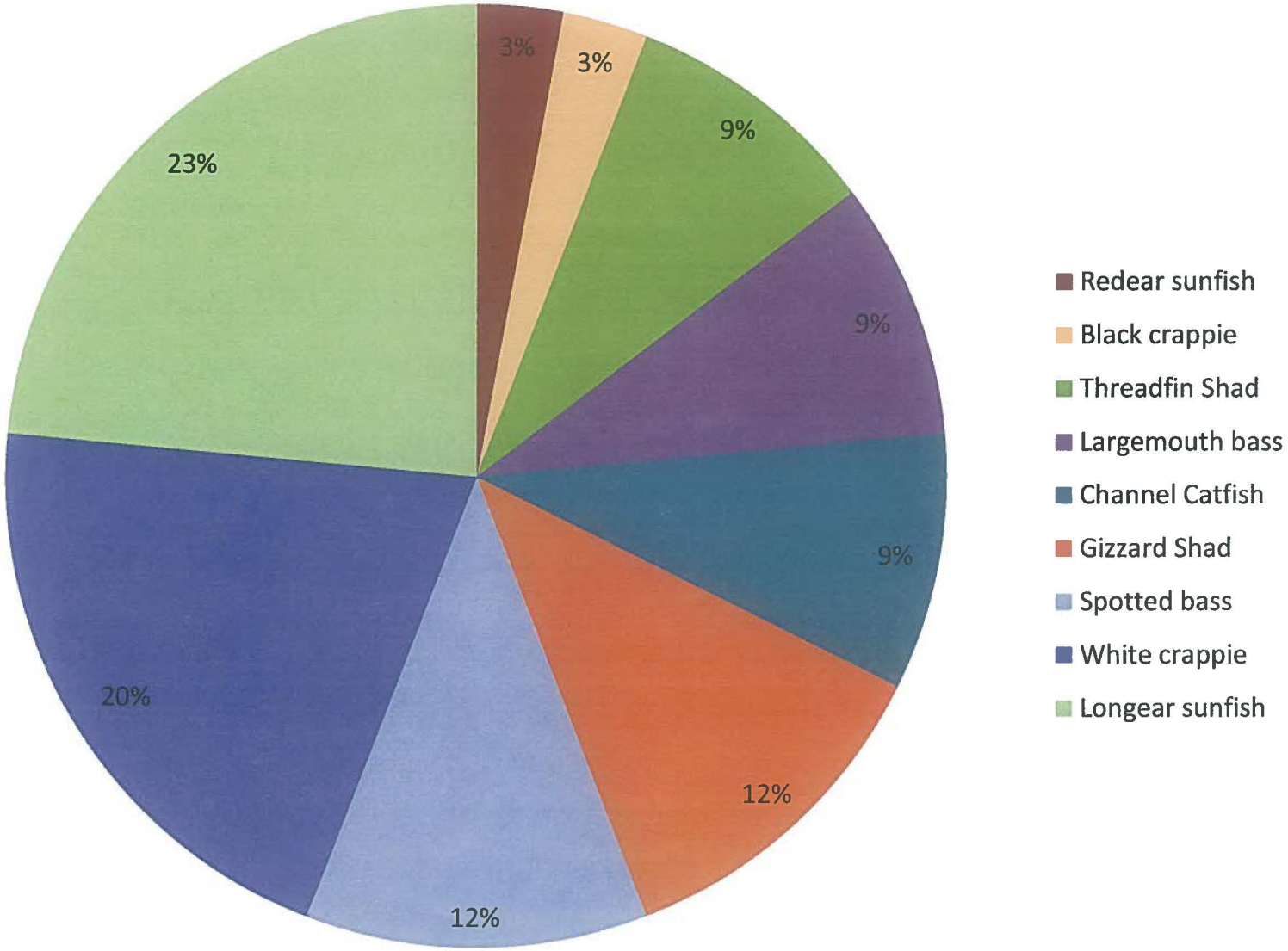
Southern Company

AECOM

September 2010

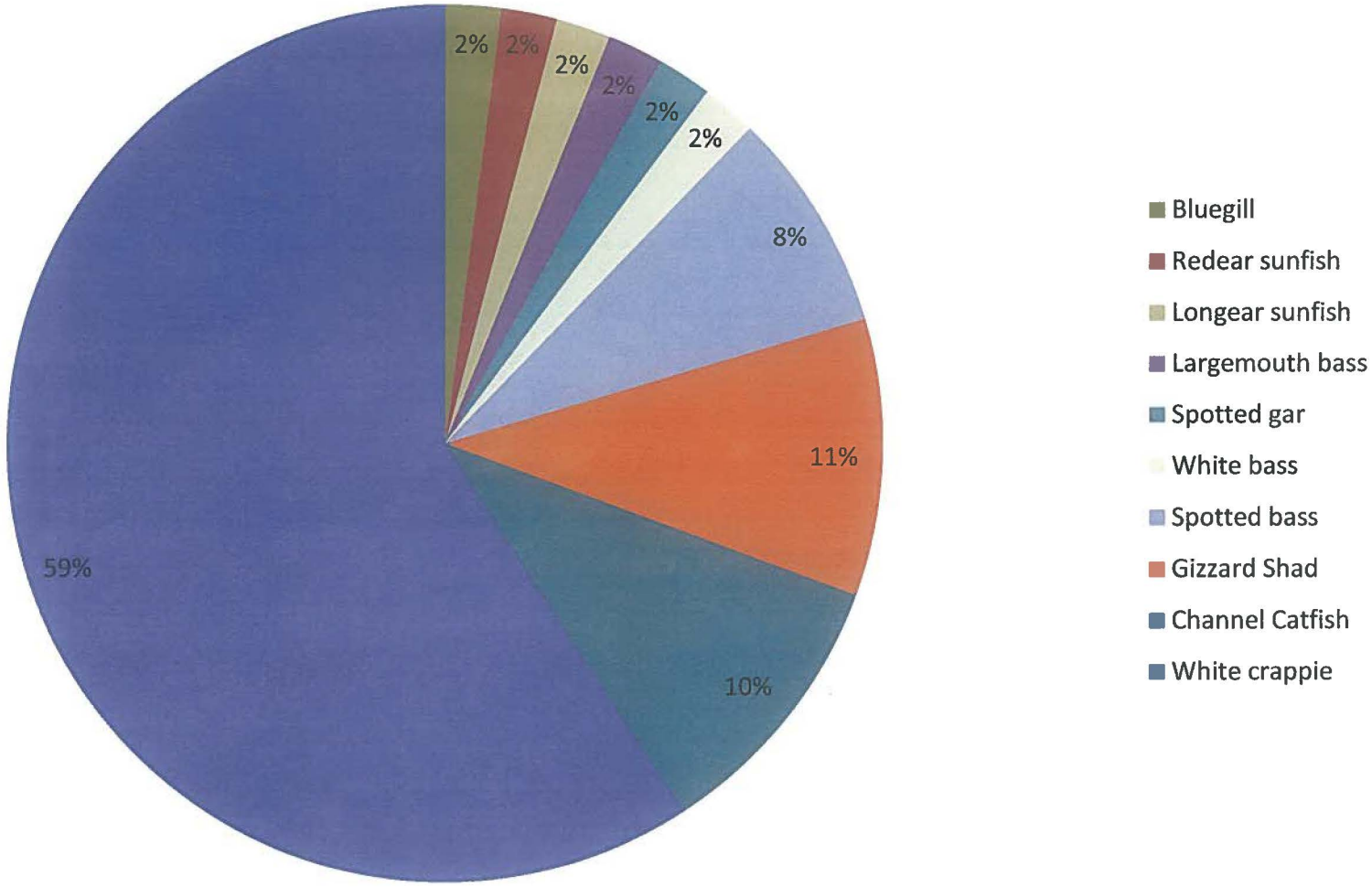
Project: 60143213

Figure 8. Relative Abundances for Fish Taken by Three Sampling Gears at Three Respective Stations near the Proposed Intake Structure on Lake Striker



Source: TPWD 2008

Figure 9. Relative Abundances for Fish Taken by Three Sampling Gears at Three Respective Stations >1 Mile North of the Proposed Intake Structure in Lake Striker



Source: TPWD 2008

Appendix A

Lake Data Summaries

November 2010

Lake Data Summaries

Under the Statewide Freshwater Fisheries Monitoring and Management Program, TPWD biologists conduct periodic surveys of freshwater fisheries and prepare detailed reports on their findings. The following are sampling summaries for relevant reservoirs located within the Neches River drainage. These summaries were utilized to verify species presence for Lake Striker and to develop a comprehensive species list within the Neches River watershed.

Lake Tyler East

The Lake Tyler East fish community was surveyed from June 2007-May 2008 using electrofisher, gill nets, and trap nets. This report summarizes results of the surveys and contains a management plan based on those findings. Lake Tyler East is a 2,276-acre reservoir on Mud Creek, Texas, a tributary of the Angelina River. Littoral habitat was sparse in the lower half of the reservoir, consisting mainly of featureless shoreline or featureless shoreline with boat docks. A narrow fringe of native emergent vegetation was present in the upper end (above the State Highway 64 bridge). Exotic emergent vegetation was locally abundant above the highway 64 bridge and in the backs of coves along the east side of the reservoir.

Fishes were collected by electrofishing (1 hour at 12, 5-min stations), gill netting (5 net nights at 5 stations), and trap netting (5 net nights at 5 stations). Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing and, for gill and trap nets, as the number of fish per net night (fish/nn).

Important sport fish include sunfishes, largemouth bass, channel catfish, white crappie and black crappie. Species present in surveys include gizzard shad, threadfin shad, channel catfish, white bass, redbreast sunfish, bluegill, longear sunfish, redear sunfish, spotted sunfish, spotted bass, largemouth bass, white crappie, and black crappie.

Threadfin shad were present in the reservoir and electrofishing catch rate was higher than in previous surveys. Electrofishing catch rates of gizzard shad and threadfin shad were good. Catch rates of sunfishes ≤4 inches were very high providing excellent prey availability for sport fishes.

Channel catfish receive little directed angling effort and were present at low numbers. Catfish collected during gill netting were of harvestable size as were fish observed in creel surveys.

White bass were abundant in the reservoir as gill net catch rates increased to a historical high. All fish collected were in excellent condition and were of harvestable length.

Largemouth bass were the most sought after species by anglers at Lake Tyler East during the 2004-2005 winter-quarter creel survey and the 2008 spring-quarter creel survey. Electrofishing catch rate of fish ≥8 inches was similar to previous years, but recruitment rate in 2007 was higher than previous surveys. Body condition of largemouth bass remained good for all size classes.

Crappie were the second most sought after sportfish during creel surveys in 2004-2005 and 2008. Both white crappie and black crappie were present, but trap net catches of both species continue to be low. However, overall angler catch rate of crappie was good.

Lake Tyler West

Lake Tyler West fish community was surveyed from June 2007 to May 2008 using electrofisher, gill nets, and trap nets. This report summarizes results of the surveys and contains a management plan based on those findings.

Lake Tyler West is a 2,224-acre reservoir on Prairie Creek, Texas, a tributary of the Angelina River. The reservoir was built to provide water for municipal and industrial purposes. Littoral habitat in the lower two thirds of the reservoir consisted mainly of featureless shoreline, boat docks, and bulkhead. Littoral emergent vegetation (primarily maidencane) occupied 53.2 acres. Native submersed vegetation (primarily stonewort and pondweed) occupied only 11.8 surface acres.

Fishes were collected by electrofishing (1 hour at 12, 5-min stations), gill netting (5 net nights at 5 stations), and trap netting (5 net nights at 5 stations). Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing and, for gill and trap nets, as the number of fish per net night (fish/nn). A vegetation survey was conducted in August 2004 and was repeated at the beginning and end of the growing season 2005 through 2007. All survey dates were randomly selected.

Fish present in surveys included gizzard shad, threadfin shad, channel catfish, white bass, redbreast sunfish, warmouth, bluegill, longear sunfish, redear sunfish, spotted sunfish, spotted bass, largemouth bass, white crappie and black crappie.

Threadfin shad were present in the reservoir. Electrofishing catch rate of gizzard shad increased. Catch rates of sunfishes ≤6 inches was average and overall prey availability was adequate for sportfishes.

Channel catfish population was improving as TPWD and the City of Tyler continued to stock advanced fingerlings in late spring.

White bass, once a rare catch at Tyler West, are now abundant and available for harvest. Excellent spawning conditions in spring of 2007 yielded a strong year-class.

Largemouth bass were the most sought after species by anglers at Lake Tyler West. Size structure and abundance continued to improve. A strong year-class in 2007 was a result of low water in 2006 followed by high rainfall creating nursery habitat.

Crappie were the second most sought after sportfish during creel surveys. Both white crappie and black crappie were present, but were in low abundance.

Lake Palestine

The Lake Palestine fish community was surveyed from June 2009 through May 2010 using electrofishing, gill netting, and trap netting. This report summarizes results of these surveys and contains a management plan based on those findings. Lake Palestine is a 23,434-acre reservoir on the Neches River, Texas, built to provide water for municipal and industrial purposes. Overall coverage of submersed aquatic vegetation remains below 5%.

Fishes were collected by electrofishing (2 hours at 24, 5-min stations), gill netting (15 net nights at 15 stations), and trap netting (15 net nights at 15 stations). Catch per unit effort (CPUE) for

electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing and, for gill-and trap-netting, as the number of fish per net night (fish/nn). A vegetation survey was conducted in September 2009. Roving creel surveys were conducted from June 2009 through May 2010. Surveys consisted of 9 creel days per quarter (4 weekdays and 5 weekend days). All survey dates were randomly selected and all surveys were conducted during daylight hours.

Species present in sampling include gizzard shad, threadfin shad, blue catfish, channel catfish, white bass, palmetto bass, redbreast sunfish, green sunfish, warmouth, bluegill, longear sunfish, redear sunfish, spotted sunfish, largemouth bass, white crappie, black crappie

Threadfin shad and gizzard shad are still present in the reservoir but electrofishing catch rates were lower than in previous surveys. Redear and bluegill sunfishes ≤4 inches also exhibited lower electrofishing catch rates than previous surveys but continue to provide adequate prey for sport fishes.

Channel catfish size distribution and growth were poor. Blue catfish size distribution was better than channel catfish and these two species account for the majority of directed angler effort.

Abundance of white bass continued to be low. Gill net catch rate of palmetto bass was low and reflect low stocking rate. Angler effort has declined and may be related to low target-fish abundance.

Largemouth bass size distribution was better than previous surveys and reflects a strong 2007 year class. Body condition and growth rate were good. Directed angler effort for largemouth bass has declined but angler success has improved.

White and black crappie trap net catch rates continue to be low but body condition is good. Crappie is the second most sought after species group and angler catch rate has increased.

Sam Rayburn Reservoir

Fish populations in Sam Rayburn Reservoir were surveyed in 2008 using electrofishing and in 2009 using gill netting. This report summarizes the results of the surveys and contains a management plan for the reservoir.

Sam Rayburn Reservoir is an impoundment of Angelina River in Jasper, Tyler, Angelina, Nacogdoches, San Augustine, and Sabine counties in southeast Texas. The U.S. Army Corps of Engineers (USACE) constructed the reservoir in 1965 for flood control, generation of hydroelectric power, and for municipal, industrial, agricultural, and recreational uses. At conservation pool, Sam Rayburn Reservoir is 111,422 surface acres, has a shoreline length of 750 miles, and a mean depth of 20 feet. Water level fluctuations average 6.7 feet annually. The reservoir was mesotrophic . Angler and boat access was excellent with 24 boat ramps present. Habitat at time of sampling consisted of aquatic vegetation (primarily hydrilla and American lotus) and standing timber. Most of the land around the reservoir is used for timber production and agriculture.

Fishes were collected by electrofishing (2 hours at 24, 5-min stations during October) and gill netting (15 net nights at 15 stations during February). Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing, and for gill nets as the number of fish per net night (fish/nn). All survey sites were randomly selected.

Species occurring in sampling include spotted gar, longnose gar, alligator gar, gizzards shad, threadfin shad, common carp, smallmouth buffalo, yellow bullhead, blue catfish, channel catfish, white bass, yellow bass, palmetto bass, redbreast sunfish, warmouth, bluegill, longear sunfish, redear sunfish, spotted sunfish, spotted bass, largemouth bass, white crappie, black crappie, and freshwater drum.

Gizzard shad, threadfin shad, and bluegill were the most abundant prey species and provided ample forage for sport fish.

The relative abundance of blue and channel catfish was stable compared to previous years. Angler catch rates averaged 2.9/hour. Blue and flathead catfish provided trophy opportunities for anglers.

White bass were present in the reservoir but numbers were low. Palmetto bass stockings were discontinued after 2000 and few fish remain. During the last two survey years, no anglers targeted temperate bass.

Spotted bass were present in low numbers. Largemouth bass abundance was high compared to previous years, and size structure and fish condition were favorable. The black bass fishery was most popular (68.9% of anglers targeted bass). The angler catch rate was high (1.1/hour).

White and black crappie were present in the reservoir. Angler catch (1.5/hour) and total annual harvest (99,087 fish) reflected an abundant crappie population.

Pinkston Reservoir

Fish populations in Pinkston Reservoir were surveyed in 2007-2008 using fall electrofishing, gill nets, and spring electrofishing. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

Pinkston Reservoir is a 447-acre impoundment constructed in 1976 on Sandy Creek. It is located in Shelby County approximately 10 miles west of Center and is operated and controlled by the City of Center. Primary water uses included municipal water supply and recreation. Secchi disc readings average 5 feet. Habitat at time of sampling consisted of concrete, standing timber, and aquatic vegetation (primarily hydrilla). The majority of the land surrounding the reservoir is used for agriculture, timber production, and residential development

Fishes were collected by electrofishing (1 hour at 12, 5-min stations during October and March (largemouth bass only) and gill netting (5 net nights at 5 stations). Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing and for gill nets as the number of fish caught per net night (fish/nn). All survey sites were randomly selected.

Species present in sampling include gizzard shad, threadfin shad, spotted sucker, yellow bullhead, warmouth, bluegill, longear sunfish, redear sunfish, spotted sunfish, largemouth bass, white crappie, and black crappie.

Gizzard shad and threadfin shad were present in the reservoir. Electrofishing catch of bluegill was high; few fish were over 6 inches in length. Other prey species included longear, redear, and spotted sunfish.

Although channel catfish were stocked in 1987, no channel catfish have been collected from monitoring surveys since 1989. Reproduction and growth of channel catfish has likely been limited by the excessive hydrilla growth that has created conditions favorable for increased catfish predation by largemouth bass.

Largemouth bass were abundant. Size structure has remained consistent from past surveys with a high abundance of fish within the protective slot-length limit. Largemouth bass exhibited good growth rates and were in average condition. The current largemouth bass water body record is 16.90 lbs set in February 1986.

White crappie and black crappie were present in the reservoir. No directed angling effort was observed for crappie during the 2008 creel survey.

Lake Nacogdoches

Fish populations in Nacogdoches Reservoir were surveyed from June 2008 through May 2009 with fall electrofishing, gill netting, and spring electrofishing. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

Nacogdoches Reservoir is a 2,212-acre impoundment constructed in 1976 on Loco Bayou. It is located in Nacogdoches County approximately 10 miles west of Nacogdoches and is operated and controlled by the City of Nacogdoches. Primary water uses included municipal water supply and recreation. Secchi disc readings average 2-4 feet. Water fluctuations average 2 feet annually. Habitat at time of sampling consisted of overhanging brush, rocky shoreline, and aquatic vegetation (primarily hydrilla and American lotus). The majority of the land surrounding the reservoir is used for agriculture, timber production, and residential development.

Fishes were collected by electrofishing (1 hour at 12, 5-min stations) during October and March (largemouth bass only) and gill netting (5 net nights at 5 stations). Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing and for gill nets as the number of fish caught per net night (fish/nn). All survey sites were randomly selected.

Species present in sampling include gizzard shad, threadfin shad, spotted sucker, yellow bullhead, channel catfish, warmouth, bluegill, longear sunfish, redear sunfish, spotted sunfish, spotted bass, largemouth bass, white crappie, and black crappie.

Gizzard shad and threadfin shad were present in the reservoir. However, most gizzard shad were too large to serve as suitable prey. Electrofishing catch of bluegill was high; few fish were over 6 inches in length. Other prey species included longear, redear, and spotted sunfish.

Numbers of channel catfish are relatively low in the reservoir. High densities of largemouth bass and aquatic vegetation probably limit reproduction and recruitment of channel catfish. Few anglers target catfish at Lake Nacogdoches (<2% of total fishing effort).

Spotted bass were present in low numbers. Largemouth bass were abundant. Size structure remained consistent with past surveys with a high abundance of fish measuring less than the maximum length limit (16 inches). Largemouth bass exhibited fast growth and were in moderate condition. Angler effort and catch was high. The current largemouth bass water body record is 14.02 lbs set in March 1986.

White crappie and black crappie were present in the reservoir. Directed angling effort in spring 2009 was less than in previous years. Angler catch rates were 1.1/h and total harvest was 1,069 fish.

Lake Jacksonville

The Lake Jacksonville fish community was surveyed from June 2008 through May 2009 using an electrofisher, gill nets, and trap nets. This report summarizes results of the surveys and contains a management plan based on those findings.

Lake Jacksonville is a 1,208-acre reservoir on Gum Creek, Texas, a tributary of the Neches River. The reservoir was built to provide water for municipal and industrial purposes. Lake Jacksonville is slightly eutrophic with a mean mg/m^3 chlorophyll *a* = 4.58. The littoral zone consists of a variety of physical habitat types. The majority of the shoreline is a combination of bulkhead and boat docks (38%), eroded shoreline with boat docks (28%) or featureless (26%).

Fishes were collected by electrofishing (1 hour at 12, 5-min stations), gill netting (5 net nights at 5 stations), and trap netting (5 net nights at 5 stations). Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing and, for gill and trap nets, as the number of fish per net night (fish/nn). A vegetation survey was conducted in August 2004 and was repeated at the beginning and end of the growing season 2005 through 2007. Roving creel surveys were conducted from December 2008 through May 2009. Surveys consisted of 9 creel days per quarter (4 weekdays and 5 weekend days); angler counts were instantaneous and were conducted at a random start time during the survey day. All survey dates were randomly.

Species present during sampling include gizzard shad, threadfin shad, channel catfish, flathead catfish, white bass, redbreast sunfish, warmouth, bluegill, redear sunfish, spotted sunfish, spotted bass, and largemouth bass.

Threadfin shad were present in the reservoir but the prey base continued to be dominated by sunfish species. Electrofishing catch rate of both threadfin and gizzard shad increased over previous surveys; however, most gizzard shad were too large to serve as prey. Catch rates of sunfishes ≤6 inches was high. Overall prey availability was adequate.

Channel catfish, although still present, were rare. Only one channel catfish was collected by standardized gill netting in spring 2009.

White bass were still present in Lake Jacksonville but abundance is low.

Largemouth bass were the most sought-after species by anglers at Lake Jacksonville during the winter/spring creel survey and angler success was high. Relative abundance was similar to previous surveys but size structure has continued to improve since 2002. Spotted bass were present but contribute little to the fishery.

Crappie was the second most sought after sport fish during the winter/spring creel surveys; however, no crappie were collected in trap nets in 2008.

Lake Athens

The Lake Athens fish community was surveyed from June 2009 through May 2010 using electrofishing and gill netting. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

Lake Athens is a 1,799-acre reservoir constructed in 1962 on Flat Creek, a tributary of the Neches River, Texas, built to supply water for municipal and industrial purposes. The lake is located in Henderson County and is operated and controlled by the Athens Municipal Water Authority. Lake Athens is eutrophic, exhibiting a mean TSI *chl-a* of 49.5. The shoreline at Lake Athens is primarily featureless or a combination of featureless/bulkhead and boat docks. A diverse native emergent and submersed aquatic plant community forms a beneficial fringe around the reservoir. Invasive aquatic plants, hydrilla (*Hydrilla verticillata*) and water hyacinth (*Eichhornia crassipes)* were discovered in 1995 and 2005, respectively. Alligatorweed (*Alternanthera philoxeroides*) is also present.

Fishes were collected by electrofishing (1 hour at 12, 5-min stations) and gill netting (5 net nights at 5 stations). Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (# of fish/h) of actual electrofishing and, for gillnets, as the number of fish per net night (# of fish/nn). All survey sites were randomly selected.

Species present in collections include gizzard shad, threadfin shad, channel catfish, white bass, redbreast sunfish, green sunfish, warmouth, bluegill, redear sunfish, spotted bass, and largemouth bass.

Threadfin shad continue to be present in the reservoir. Electrofishing catch rate of gizzard shad remained low, and few gizzard shad were available as prey to most sport fish. Despite low shad catch rates, sunfish (≤4 inches) catch rates were adequate to provide forage for sport fishes.

Channel catfish gill net catch rates were lower than in previous surveys. A declining trend in catch rates may indicate limited production in recent years.

White bass were present in the reservoir, although gill net catch rates have declined.

Size distribution of largemouth bass indicates a balanced population, and size structure has improved over previous surveys. Growth rates of fish within the protected slot-limit are still slow. The percentage of Florida largemouth bass alleles has increased since 2003, yet no pure Florida Bass were collected.

White crappie and black crappie have been collected in the reservoir in the past. Sampling for these species was not conducted in 2009 due to historically low sampling efficiency.

Appendix B

Species Profiles

November 2010

Life History of Fish Species in Lake Striker

Gizzard Shad

Gizzard shad (*Dorosoma cepedianum*) occur primarily in freshwater and are most abundant in large rivers and reservoirs, avoiding high gradient streams. The species is most often found in large schools. Spawning generally takes place in late spring, usually in shallow protected water. Gizzard shad are planktivorous. The young feed on microscopic animals and plants, as well as small insect larvae, while adults feed by filtering small food items from the water using their long gill rakers. Gizzard shad generally grow to 14 inches and provide forage for most game species (Chilton 1997). Ross (2001) noted that young gizzard shad tend to occur along shorelines in very shallow water, gradually moving offshore into deep water as they grow. Individuals older than age class 3 rarely occur in shallow water (Bodola 1966).

In Texas, gizzard shad may be found statewide, and can be highly abundant in reservoirs, often constituting over half of the fish biomass (Hubbs et al. 1991). Riggs and Bonn (1959) reported that gizzard shad were the most abundant species in Lake Texoma, Oklahoma and Texas, and its tail waters; juveniles and adults were commonly taken throughout the lake down to a depth of 40 feet, and large schools of young-of-year occurred frequently in shallow water or ranging through most parts of lake near the surface. Gizzard shad have little commercial or recreational value, although they do serve as forage for game fish.

Threadfin Shad

Like gizzard shad, threadfin shad (*Dorosoma petenense*) are most commonly found in large rivers and reservoirs. However, threadfin shad are most likely to be found in waters with a noticeable current and are usually found in the upper five feet of water. Spawning occurs in open water over plants or other objects, beginning in the spring and continuing through summer (Miller 1963; Carlander 1969). Adults are considerably smaller than gizzard shad and rarely exceed 6 inches in length (Chilton 1997). The threadfin shad is a pelagic schooling species that primarily occupies the areas between the surface and the thermocline with the greatest densities near the surface (Netsch et al. 1971).

Threadfin shad are found in the gulf slope drainages within the eastern half of the state of Texas (Hubbs et al. 1991). Carlander (1969) stated that the species shows a preference for brackish water with salinities of 10-20 ppt in Texas. Threadfin shad serve as forage fish but have little other commercial or recreational value.

Common Carp

Common carp (*Cyprinus carpio*) were first introduced into North America in 1877 and is now one of the most widely distributed fish in North America. They are primarily a warm-water species, and do very well in warm, muddy, highly productive (eutrophic) waters. Adults are primarily benthic and omnivorous, feeding on both plant and animal material. Common carp may grow as big as 75 pounds and are generally considered a nuisance by North American anglers (Chilton 1997).

The common carp has been introduced statewide in Texas, and occurs in small backwater areas, large rivers and reservoirs. It is most abundant in large bodies of water (Hubbs et al. 1991).

Channel Catfish

Channel catfish (*Ictalurus punctatus*) are extremely adaptable and occur in a variety of habitats but are especially characteristic of major rivers and large streams having low or moderate gradients. They prefer to live in cool to warm clear water habitats but will tolerate turbid waters. They are highly active at night from dusk to midnight when they do most of their feeding. Channel catfish spawn during the months of May thru July when water temperatures are above 75 degrees. They prefer overhanging rock ledges, cut banks, and submerged trees and roots systems for their nesting. Females mature at 14 inches and males somewhat smaller. At one year old, channel catfish are about four inches long. By their fourth year they have usually reached 12 inches. The channel catfish is an opportunistic omnivore, feeding on just about any living or dead material. Being primarily a nocturnal animal, channel catfish must rely on its sensory organs, including the well-developed barbels, to find food. Their diet consists of aquatic insects, worms, clams, crayfish, snails, and fish, all of which could be dead or alive. Their stomachs might be packed with vegetable materials dropped into the water or minnows depending on what's available. However, large channel catfish feed almost exclusively on fish.

The channel catfish is an important recreational and commercial fish that occurs throughout the state of Texas.

Flathead Catfish

Flathead catfish (*Pylodictis olivaris*) are well adapted to flowing water as well as impoundments and tolerate a wide range of turbidity (Miller and Robison 2004). This catfish inhabits a variety of stream types, but avoids those with high gradients or intermittent flow (Pflieger 1997). Adults prefer solidarity, staking out a single spot, typically in deep water or in cover during the day, moving into shallow areas to feed at night. Young remain in shallow riffles during the day, but feed actively at night (Chilton, 1997). Unlike the channel catfish, flatheads rarely scavenge. Young feed almost entirely on immature aquatic insects and larger flatheads subsist largely on fish and crayfish. Spawning begin spawning from May through August in Texas. Males construct nests by excavating a shallow depression in a natural cavity, or near a large object. Males guard the eggs before hatch-out, approximately 4-6 days after being laid.

The flathead is an important recreational fish throughout the state of Texas and is considered the second largest freshwater sportfish, where 50 pound catfish are not unusual.

Yellow Bass

Yellow bass (*Morone mississippiensis*) is typically found in natural lakes, particularly those along the flood plains of major rivers. However, it also occurs in deeper pools and backwaters of large streams (Pflieger 1997). Yellow bass are pelagic, living in schools in mid-water or near the surface of the water. They prefer gravel or rock substrate for spawning, but do not require flowing water like most temperate basses (Chilton 1997). Eggs are deposited in two to three feet of water. Yellow bass are slow growing, reaching 6-7 inches at sexual maturity in about two years. Young fish feed primarily on fish, crustaceans and insects. Adults eat large quantities of fish including their own young.

White Bass

White bass (*Morone chrysops*) occur in deeper pools of streams and the open water of lakes and reservoirs. White bass tend to avoid waters that are continuously turbid; they are found most

often over a firm sandy or rocky bottom. White bass is an active, schooling fish, feeding actively in early morning and late evening, often near the surface where forage fish, small crustaceans and young aquatic insects concentrate (Pflieger 1997). Gizzard and threadfin shad are the preferred food items. Spawning occurs from March to May near the surface or mid-water. Running water with a gravel or rock substrate is preferred. Females release up to 1,000,000 eggs to be fertilized, which sink to the bottom and attach to rocks, hatching 2-3 days later (Chilton 1997).

Palmetto Bass

The Palmetto bass (*Morone saxatilis* x *Morone chrysops)* is a hybrid between a striped bass (*Morone saxatilis*) and a white bass (*Morone chrysops*). They do well in slow moving streams, large reservoirs,
lakes and ponds. Palmetto bass are pelagic and are seldom found in extremely shallow areas or areas that contain dense growth of aquatic weeds. Palmetto bass is a predacious species throughout its life. Fish less than approximately 50 mm feed primarily on crustacean zooplankton such as cladocerans and copepods. Insects of various types and zooplankton continue to be a major part of the diet until the fish are 100 to 125 mm long. Adults switch to fish diet at a very small size if appropriate sized fish are available. However, this transition usually occurs when they are larger than 100 mm. Threadfin shad and gizzard shad are the most common fish prey species. Unlike other hybrids, palmetto bass are fertile. Spawning beging when temperatures reach 17-20 degrees Celsius. Palmetto bass have been observed spawning in 1-3 feet of water that contain clear rocky shoals. Eggs are semi-buoyant and hatch approximately 2 days later (Hodson 1987).

Redbreast Sunfish

The redbreast sunfish (*Lepomis auritus*) is mainly a stream-adapted fish, though it does well in some impoundments. It feeds mainly on insects, small molluscs,and small fish. Spawning occurs in the spring and it tends to be less of a colonial spawner like many other centrarchids, though nest construction and spawning are basically similar (Miller and Robison 2004).

Warmouth

The warmouth (*Lepomis gulosus*) is primarily a lowland species, inhabitating oxbow lakes, quiet waters of bayous and river, and swamps having mud and detritus bottoms. It prefers clear water and thick growth of aquatic vegetation and is often found near submerged stumps, logs and cypress knees. It will, however, tolerate moderate levels of turbidity. In upland areas it is found in sluggish streams and quiet pools and does well in impoundments. It feeds on more fish than most sunfish, but its diet also consists of crayfish, larval aquatic insects, and isopods. Spawning occurs from April thru August. Nests are constructed in substrate near cover. Fry hatch and are free swimming five or six days after spawning (Robison and Buchanan, 1992).

Spotted Sunfish

Spotted sunfish (*Lepomis punctatus*) inhabits heavily vegetated ponds, lakes, pools of creeks and small to medium rivers, and swamps (Breder and Rosen 1966). Spotted sunfish usually occurs over mud or sand. The diet of the spotted sunfish consists of midge larvae, other immature insects, and microcrustaceans such as amphipods and cladocerans. Nest building occurs in the spring. Males remain with eggs until they hatch, typically five days after spawning.

Bluegill

Bluegill (*Lepomis macrochirus*) begin spawning when water temperatures reach 70 F peaking in May or June. Nests are created in shallow water, one or two feet in depth usually on a gravel substrate (Chilton, 1997). The bluegill is a generalized sight feeder. It is a gregarious species, often moving in loose schools, and it feeds at various depths depending on food availability (Robison and Buchanan, 1992). Young fish feed on plankton, but as they grow the diet shifts to aquatic insects and their larvae. Up to 50% of their diet may consist of midge larvae (Chilton, 1997). Bluegill may be found at various depths in the water column.

Longear Sunfish

Longear sunfish (*Lepomis megalotis*) occur in a variety of habitats and is most abundant in small, clear, upland streams with rocky bottoms and permanent or semi-permanent flow. They are typically found in pools and do well in reservoirs. This species feeds primarily on aquatic and terrestrial insects as well as small fish. The species is a colonial nester and in Arkansas spawning occurs from May through August (Robison and Buchanan,1992). Boyer and Vogele (1971) reported that in reservoirs the species typically spawn in brush-free areas having a gradually sloping gravel substance. The authors note that most nests were between 0.7 and 11.2-feet with an average depth of 4.9-feet. Due to the species' preference for more shallow waters, the potential for impingement is minimal.

Redear Sunfish

Redear sunfish (*Lepomis microlophus*) is adapted near the bottom of warm, clear waters with no noticeable current and an abundance of aquatic plants. In streams, it is more often found in protected bays and overflow pools than in the main stream channel (Pflieger 1997). Redear sunfish often utilize snails as a major food item, but will feed on insect larvae and cladocerans. Redear generally spawn during May and June and in deeper water than most other sunfish. Nests are saucer shaped depressions in gravel or silt (Chilton 1997).

Spotted Bass

Spotted bass (*Micropterus punctulatus*) are considered intermediates between smallmouth and largemouth bass (Miller and Robison 2004). Spotted bass tend to be found in areas with more current than largemouth bass however, they usually inhabit areas that are too warm, turbid, and sluggish for smallmouth bass. They are common in reservoirs. Preferred spawning areas include rock and gravel beds from April to June. As young fish grow, their diet shifts from zooplankton to insects, and finally to fish and crayfish (Chilton, 1997).

Largemouth Bass

Largemouth bass (*Micropterus salmoides*) are most commonly found in clear, quite waters in natural and man-made lakes and ponds, and in back waters and pools of streams and rivers. The species is intolerant of high turbidity and siltation and is often found during most parts of the day near logs or other cover in deep water (Robison and Buchanan, 1992). Largemouth bass prefer to nest in quiet more vegetated water compared to other black bass, but will use any substrate besides soft mud, including submerged logs. Nests are usually built in two to eight feet of water. Fry feed primarily on zooplankton and insect larvae while adults feed extensively on other fish and large invertebrates such as crayfish (Chilton, 1997).

White Crappie

The white crappie (*Pomoxis annularis*) has wide ecological tolerances but prefers quiet waters and is almost always found near brush piles, the tops of fallen trees, or standing timber. It is not a strongly schooling species but tends to congregate in loose aggregations near suitable cover (Robison and Buchanan, 1992). In reservoirs, white crappie occurs in open areas and may show a pattern of vertical migration at night (Funk, 1955). Crappie spawn from early April to the middle of June. The nests may be located from less than 1-foot to 20-feet deep in silt-free substrates near a log, stump, or aquatic vegetation (Robison and Buchanan, 1992). Since this species tends to migrate vertically in the water column, it has some potential to be found in deeper waters.

Black Crappie

Like other members of the sunfish family, black crappie (*Pomoxis nigromaculatus*) are nest builders and tend to build relatively large "beds" in the spring. Although fry do not appear to school, fingerlings do. They grow three to five inches the first year and mature in three years. Black crappie feed on less fish than white crappie, but more insects and crustaceans (Chilton, 1997).

Black crappie occur in a variety of habitats but are more common in oxbow lakes, pools of larger rivers, and reservoirs. Black crappie are most active at night or in the early morning, and at least in reservoirs, tend to move from open waters during the day to closer to shore at night (Guy et al. 1992).

Black crappie are almost always found near fallen treetops, standing timber, logs, or other cover. At most locations they are less abundant than white crappie as they are less tolerant of turbidity and siltation. Black crappie prefers cooler, deeper waters and they do best in clear lakes with abundant aquatic vegetation (Robison and Buchanan, 1992). Except for the breeding season, black crappie form loose schools near submerged treetops or other cover 3-10-feet deep. At night the schools often move out over deep water (Moyle, 1969).

Spotted Sucker

The spotted sucker (*Minytrema melanops*) inhabits clear, warm waters having no noticeable vegetation, and soft bottoms contaiing large quanitites of organic debris. The spotted sucker is a schooling fish for the first years of its life, in mixed species schools. As it matures, it leaves the schools to inhabit deeper pools. First food for spotted sucker include small crustaceans and other zooplankton in mid-water. By the time its 2 inches long, it begins to bottom feed over sand mixed with organic debris. Adults feed primarily on zooplankton and larval insects, combined with considerable quantities of organic debris. Juveniles feed during the day, but adults prefer dawn and dusk (Pflieger 1997).

Spawning occurs in April and May on riffles above large pools. Eggs hatch in 7 to 12 days. Maturity is reached at 3 years and the maximum life span is about 5 years.

Appendix C

Texas Parks and Wildlife Department Threatened & Endangered Species Lists for Rusk and Cherokee Counties

November 2010

RUSK COUNTY

BIRDS

		Federal Status	State Status
American Peregrine Falcon	*Falco peregrinus anatum*	DL	T

year-round resident and local breeder in west Texas, nests in tall cliff eyries; also, migrant across state from more northern breeding areas in US and Canada, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.

Arctic Peregrine Falcon	*Falco peregrinus tundrius*	DL	

migrant throughout state from subspecies' far northern breeding range, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.

Bachman's Sparrow	*Aimophila aestivalis*		T

open pine woods with scattered bushes and grassy understory in Pineywoods region, brushy or overgrown grassy hillsides, overgrown fields with thickets and brambles, grassy orchards; remnant grasslands in Post Oak Savannah region; nests on ground against grass tuft or under low shrub

Bald Eagle	*Haliaeetus leucocephalus*	DL	T

found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds

Henslow's Sparrow	*Ammodramus henslowii*		

wintering individuals (not flocks) found in weedy fields or cut-over areas where lots of bunch grasses occur along with vines and brambles; a key component is bare ground for running/walking

Interior Least Tern	*Sterna antillarum athalassos*	LE	E

subspecies is listed only when inland (more than 50 miles from a coastline); nests along sand and gravel bars within braided streams, rivers; also know to nest on man-made structures (inland beaches, wastewater treatment plants, gravel mines, etc); eats small fish and crustaceans, when breeding forages within a few hundred feet of colony

Peregrine Falcon	*Falco peregrinus*	DL	T

both subspecies migrate across the state from more northern breeding areas in US and Canada to winter along coast and farther south; subspecies (F. p. anatum) is also a resident breeder in west Texas; the two subspecies' listing statuses differ, F.p. tundrius is no longer listed in Texas; but because the subspecies are not easily distinguishable at a distance, reference is generally made only to the species level; see subspecies for habitat.

Piping Plover	*Charadrius melodus*	LT	T

wintering migrant along the Texas Gulf Coast; beaches and bayside mud or salt flats

Wood Stork	*Mycteria americana*		T

RUSK COUNTY

BIRDS		Federal Status	State Status

forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960

FISHES		Federal Status	State Status
Creek chubsucker	*Erimyzon oblongus*		T

tributaries of the Red, Sabine, Neches, Trinity, and San Jacinto rivers; small rivers and creeks of various types; seldom in impoundments; prefers headwaters, but seldom occurs in springs; young typically in headwater rivulets or marshes; spawns in river mouths or pools, riffles, lake outlets, upstream creeks

Ironcolor shiner *Notropis chalybaeus*

Big Cypress Bayou and Sabine River basins; spawns April-September, eggs sink to bottom of pool; pools and slow runs of low gradient small acidic streams with sandy substrate and clear well vegetated water; feeds mainly on small insects, ingested plant material not digested

Orangebelly darter *Etheostoma radiosum*

Red through Angelina River basins; just headwaters ranging from high gradient streams to more sluggish lowland streams, gravel and rubble riffles preferred; eggs buried in gravel and riffle raceways, post-larvae live in quiet water, move into progressively faster water as they mature, young feed mostly on copepods and cladocerans, adults on mayfly and fly larvae, spawn late February through mid-April in eastern Texas

Paddlefish *Polyodon spathula* T

prefers large, free-flowing rivers, but will frequent impoundments with access to spawning sites; spawns in fast, shallow water over gravel bars; larvae may drift from reservoir to reservoir

Western sand darter *Ammocrypta clara*

Red and Sabine River basins; clear to slightly turbid water of medium to large rivers that have moderate to swift currents, primarily over extensive areas of sandy substrate

MAMMALS		Federal Status	State Status
Black bear	*Ursus americanus*	T/SA;NL	T

bottomland hardwoods and large tracts of inaccessible forested areas; due to field characteristics similar to Louisiana Black Bear (LT, T), treat all east Texas black bears as federal and state listed Threatened

Louisiana black bear *Ursus americanus luteolus* LT T

possible as transient; bottomland hardwoods and large tracts of inaccessible forested areas

Plains spotted skunk *Spilogale putorius interrupta*

catholic; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie

Rafinesque's big-eared bat *Corynorhinus rafinesquii* T

roosts in cavity trees of bottomland hardwoods, concrete culverts, and abandoned man-made structures

RUSK COUNTY

MAMMALS

		Federal Status	State Status
Red wolf	*Canis rufus*	LE	E

extirpated; formerly known throughout eastern half of Texas in brushy and forested areas, as well as coastal prairies

Southeastern myotis bat *Myotis austroriparius*

roosts in cavity trees of bottomland hardwoods, concrete culverts, and abandoned man-made structures

MOLLUSKS

		Federal Status	State Status
Creeper (squawfoot)	*Strophitus undulatus*		

small to large streams, prefers gravel or gravel and mud in flowing water; Colorado, Guadalupe, San Antonio, Neches (historic), and Trinity (historic) River basins

Fawnsfoot *Truncilla donaciformis*

small and large rivers especially on sand, mud, rocky mud, and sand and gravel, also silt and cobble bottoms in still to swiftly flowing waters; Red (historic), Cypress (historic), Sabine (historic), Neches, Trinity, and San Jacinto River basins.

Little spectaclecase *Villosa lienosa*

creeks, rivers, and reservoirs, sandy substrates in slight to moderate current, usually along the banks in slower currents; east Texas, Cypress through San Jacinto River basins

Louisiana pigtoe *Pleurobema riddellii* T

streams and moderate-size rivers, usually flowing water on substrates of mud, sand, and gravel; not generally known from impoundments; Sabine, Neches, and Trinity (historic) River basins

Rock pocketbook *Arcidens confragosus*

mud, sand, and gravel substrates of medium to large rivers in standing or slow flowing water, may tolerate moderate currents and some reservoirs, east Texas, Red through Guadalupe River basins

Sandbank pocketbook *Lampsilis satura* T

small to large rivers with moderate flows and swift current on gravel, gravel-sand, and sand bottoms; east Texas, Sulfur south through San Jacinto River basins; Neches River

Southern hickorynut *Obovaria jacksoniana* T

medium sized gravel substrates with low to moderate current; Neches, Sabine, and Cypress river basins

Texas heelsplitter *Potamilus amphichaenus* T

quiet waters in mud or sand and also in reservoirs. Sabine, Neches, and Trinity River basins

Wabash pigtoe *Fusconaia flava*

creeks to large rivers on mud, sand, and gravel from all habitats except deep shifting sands; found in moderate to swift current velocities; east Texas River basins, Red through San Jacinto River basins; elsewhere occurs in reservoirs and lakes with no flow

Wartyback *Quadrula nodulata*

RUSK COUNTY

MOLLUSKS		Federal Status	State Status

gravel and sand-gravel bottoms in medium to large rivers and on mud; Red, Sabine, Neches River basins

REPTILES		Federal Status	State Status
Alligator snapping turtle	*Macrochelys temminckii*		T

perennial water bodies; deep water of rivers, canals, lakes, and oxbows; also swamps, bayous, and ponds near deep running water; sometimes enters brackish coastal waters; usually in water with mud bottom and abundant aquatic vegetation; may migrate several miles along rivers; active March-October; breeds April-October

Louisiana pine snake	*Pituophis ruthveni*	C	T

mixed deciduous-longleaf pine woodlands; breeds April-September

Northern scarlet snake	*Cemophora coccinea copei*		T

mixed hardwood scrub on sandy soils; feeds on reptile eggs; semi-fossorial; active April-September

Sabine map turtle	*Graptemys ouachitensis sabinensis*		

Sabine River system; rivers and related tributaries, ponds and reservoirs with abundant aquatic vegetation; basks on fallen logs and exposed roots; eats insects, crustaceans, mollusks, and aquatic plants; breeding and egg-laying March-May, with hatchlings appearing in early fall

Texas horned lizard	*Phrynosoma cornutum*		T

open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive; breeds March-September

Timber/Canebrake rattlesnake	*Crotalus horridus*		T

swamps, floodplains, upland pine and deciduous woodlands, riparian zones, abandoned farmland; limestone bluffs, sandy soil or black clay; prefers dense ground cover, i.e. grapevines or palmetto

PLANTS		Federal Status	State Status
Texas trillium	*Trillium texanum*		

in or along the margins of hardwood forests on wet acid soils of bottoms and lower slopes, strongly associated with forested seeps and baygalls; flowering March-May

CHEROKEE COUNTY

BIRDS

		Federal Status	State Status
American Peregrine Falcon	*Falco peregrinus anatum*	DL	T

year-round resident and local breeder in west Texas, nests in tall cliff eyries; also, migrant across state from more northern breeding areas in US and Canada, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.

Arctic Peregrine Falcon	*Falco peregrinus tundrius*	DL	

migrant throughout state from subspecies' far northern breeding range, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.

Bachman's Sparrow	*Aimophila aestivalis*		T

open pine woods with scattered bushes and grassy understory in Pineywoods region, brushy or overgrown grassy hillsides, overgrown fields with thickets and brambles, grassy orchards; remnant grasslands in Post Oak Savannah region; nests on ground against grass tuft or under low shrub

Bald Eagle	*Haliaeetus leucocephalus*	DL	T

found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds

Henslow's Sparrow	*Ammodramus henslowii*		

wintering individuals (not flocks) found in weedy fields or cut-over areas where lots of bunch grasses occur along with vines and brambles; a key component is bare ground for running/walking

Interior Least Tern	*Sterna antillarum athalassos*	LE	E

subspecies is listed only when inland (more than 50 miles from a coastline); nests along sand and gravel bars within braided streams, rivers; also know to nest on man-made structures (inland beaches, wastewater treatment plants, gravel mines, etc); eats small fish and crustaceans, when breeding forages within a few hundred feet of colony

Peregrine Falcon	*Falco peregrinus*	DL	T

both subspecies migrate across the state from more northern breeding areas in US and Canada to winter along coast and farther south; subspecies (F. p. anatum) is also a resident breeder in west Texas; the two subspecies' listing statuses differ, F.p. tundrius is no longer listed in Texas; but because the subspecies are not easily distinguishable at a distance, reference is generally made only to the species level; see subspecies for habitat.

Piping Plover	*Charadrius melodus*	LT	T

wintering migrant along the Texas Gulf Coast; beaches and bayside mud or salt flats

Red-cockaded Woodpecker	*Picoides borealis*	LE	E

cavity nests in older pine (60+ years); forages in younger pine (30+ years); prefers longleaf, shortleaf, and loblolly

CHEROKEE COUNTY

BIRDS

		Federal Status	State Status
Wood Stork	*Mycteria americana*		T

forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960

FISHES

		Federal Status	State Status
American eel	*Anguilla rostrata*		

coastal waterways below reservoirs to gulf; spawns January to February in ocean, larva move to coastal waters, metamorphose, then females move into freshwater; most aquatic habitats with access to ocean, muddy bottoms, still waters, large streams, lakes; can travel overland in wet areas; males in brackish estuaries; diet varies widely, geographically, and seasonally

Creek chubsucker	*Erimyzon oblongus*		T

tributaries of the Red, Sabine, Neches, Trinity, and San Jacinto rivers; small rivers and creeks of various types; seldom in impoundments; prefers headwaters, but seldom occurs in springs; young typically in headwater rivulets or marshes; spawns in river mouths or pools, riffles, lake outlets, upstream creeks

Orangebelly darter	*Etheostoma radiosum*		

Red through Angelina River basins; just headwaters ranging from high gradient streams to more sluggish lowland streams, gravel and rubble riffles preferred; eggs buried in gravel and riffle raceways, post-larvae live in quiet water, move into progressively faster water as they mature, young feed mostly on copepods and cladocerans, adults on mayfly and fly larvae, spawn late February through mid-April in eastern Texas

Paddlefish	*Polyodon spathula*		T

prefers large, free-flowing rivers, but will frequent impoundments with access to spawning sites; spawns in fast, shallow water over gravel bars; larvae may drift from reservoir to reservoir

MAMMALS

		Federal Status	State Status
Black bear	*Ursus americanus*	T/SA;NL	T

bottomland hardwoods and large tracts of inaccessible forested areas; due to field characteristics similar to Louisiana Black Bear (LT, T), treat all east Texas black bears as federal and state listed Threatened

Louisiana black bear	*Ursus americanus luteolus*	LT	T

possible as transient; bottomland hardwoods and large tracts of inaccessible forested areas

Plains spotted skunk	*Spilogale putorius interrupta*		

catholic; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie

Rafinesque's big-eared bat	*Corynorhinus rafinesquii*		T

roosts in cavity trees of bottomland hardwoods, concrete culverts, and abandoned man-made structures

Red wolf	*Canis rufus*	LE	E

CHEROKEE COUNTY

MAMMALS

Federal Status State Status

extirpated; formerly known throughout eastern half of Texas in brushy and forested areas, as well as coastal prairies

Southeastern myotis bat *Myotis austroriparius*

roosts in cavity trees of bottomland hardwoods, concrete culverts, and abandoned man-made structures

MOLLUSKS

Federal Status State Status

Creeper (squawfoot) *Strophitus undulatus*

small to large streams, prefers gravel or gravel and mud in flowing water; Colorado, Guadalupe, San Antonio, Neches (historic), and Trinity (historic) River basins

Fawnsfoot *Truncilla donaciformis*

small and large rivers especially on sand, mud, rocky mud, and sand and gravel, also silt and cobble bottoms in still to swiftly flowing waters; Red (historic), Cypress (historic), Sabine (historic), Neches, Trinity, and San Jacinto River basins.

Little spectaclecase *Villosa lienosa*

creeks, rivers, and reservoirs, sandy substrates in slight to moderate current, usually along the banks in slower currents; east Texas, Cypress through San Jacinto River basins

Louisiana pigtoe *Pleurobema riddellii* T

streams and moderate-size rivers, usually flowing water on substrates of mud, sand, and gravel; not generally known from impoundments; Sabine, Neches, and Trinity (historic) River basins

Pistolgrip *Tritogonia verrucosa*

stable substrate, rock, hard mud, silt, and soft bottoms, often buried deeply; east and central Texas, Red through San Antonio River basins

Rock pocketbook *Arcidens confragosus*

mud, sand, and gravel substrates of medium to large rivers in standing or slow flowing water, may tolerate moderate currents and some reservoirs, east Texas, Red through Guadalupe River basins

Sandbank pocketbook *Lampsilis satura* T

small to large rivers with moderate flows and swift current on gravel, gravel-sand, and sand bottoms; east Texas, Sulfur south through San Jacinto River basins; Neches River

Southern hickorynut *Obovaria jacksoniana* T

medium sized gravel substrates with low to moderate current; Neches, Sabine, and Cypress river basins

Texas heelsplitter *Potamilus amphichaenus* T

quiet waters in mud or sand and also in reservoirs. Sabine, Neches, and Trinity River basins

Texas pigtoe *Fusconaia askewi* T

rivers with mixed mud, sand, and fine gravel in protected areas associated with fallen trees or other structures; east Texas River basins, Sabine through Trinity rivers as well as San Jacinto River

Wabash pigtoe *Fusconaia flava*

CHEROKEE COUNTY

MOLLUSKS

		Federal Status	State Status

creeks to large rivers on mud, sand, and gravel from all habitats except deep shifting sands; found in moderate to swift current velocities; east Texas River basins, Red through San Jacinto River basins; elsewhere occurs in reservoirs and lakes with no flow

Wartyback *Quadrula nodulata*

gravel and sand-gravel bottoms in medium to large rivers and on mud; Red, Sabine, Neches River basins

REPTILES

		Federal Status	State Status
Alligator snapping turtle	*Macrochelys temminckii*		T

perennial water bodies; deep water of rivers, canals, lakes, and oxbows; also swamps, bayous, and ponds near deep running water; sometimes enters brackish coastal waters; usually in water with mud bottom and abundant aquatic vegetation; may migrate several miles along rivers; active March-October; breeds April-October

Louisiana pine snake	*Pituophis ruthveni*	C	T

mixed deciduous-longleaf pine woodlands; breeds April-September

Northern scarlet snake	*Cemophora coccinea copei*	T

mixed hardwood scrub on sandy soils; feeds on reptile eggs; semi-fossorial; active April-September

Sabine map turtle *Graptemys ouachitensis sabinensis*

Sabine River system; rivers and related tributaries, ponds and reservoirs with abundant aquatic vegetation; basks on fallen logs and exposed roots; eats insects, crustaceans, mollusks, and aquatic plants; breeding and egg-laying March-May, with hatchlings appearing in early fall

Texas horned lizard	*Phrynosoma cornutum*	T

open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive; breeds March-September

Timber/Canebrake rattlesnake	*Crotalus horridus*	T

swamps, floodplains, upland pine and deciduous woodlands, riparian zones, abandoned farmland; limestone bluffs, sandy soil or black clay; prefers dense ground cover, i.e. grapevines or palmetto

PLANTS

		Federal Status	State Status
Carrizo leather flower	*Clematis carrizoensis*		

deep sandy soils; prairie areas of oak-hickory woodlands

Neches River rose-mallow	*Hibiscus dasycalyx*	C	

Texas endemic; open marshy habitats in seasonally wet alluvial soils, most often near standing rather than flowing water; flowering June-August

Texas trillium *Trillium texanum*

CHEROKEE COUNTY

PLANTS	Federal Status	State Status

in or along the margins of hardwood forests on wet acid soils of bottoms and lower slopes, strongly associated with forested seeps and baygalls; flowering March-May

ATTACHMENT L

Existing Entrainment Performance Studies
Biological Monitoring Frequency Reduction
Request Memorandum
Worksheet 11.3
Item 2

ALAN PLUMMER ASSOCIATES, INC.
ENVIRONMENTAL ENGINEERS AND SCIENTISTS

TECHNICAL MEMORANDUM

Nacogdoches Power, LLC
Biological Monitoring Frequency Reduction Request

Project No.: 0898-016-01

Date: June 20, 2014

Prepared For: Merrit McKelvy – Industrial Permits Team, Texas Commission on Environmental Quality

Prepared By: Dennis Runyan and Rex Hunt, P.E. – Alan Plummer Associates, Inc.

cc: Circe Starks and Clay Cochran – Nacogdoches Power, LLC

INTRODUCTION

Nacogdoches Power, L.L.C., operates a cooling water intake structure (CWIS) to pump water from Lake Striker to the Nacogdoches Power Project (NPP) facility located near Sacul, Texas. The CWIS uses three intake pumps, each with its own screen, to withdraw water from Lake Striker. In accordance with provisions contained in the Texas Pollutant Discharge Elimination System (TPDES) permit for the NPP (Permit No. WQ0004414000), the CWIS must be monitored for potential impacts to aquatic life. The monitoring provisions contained in the TPDES permit mirror requirements contained in 40 Code of Federal Regulations (CFR) §125.87.[1] The purpose of this memorandum is to present data collected for the CWIS monitoring program and request reduction of monitoring in accordance with provisions in the TPDES permit.

The TPDES permit requires biological monitoring for aquatic organisms that may be impacted by the CWIS ("Other Requirements" section of the permit, Item 10). Specifically, the NPP must monitor for impingement of fish and shellfish against the intake screens and entrainment of fish and shellfish into the intake system. Velocity monitoring and visual or remote inspections of the CWIS are also required by the permit.

The permit states that monitoring requirements may be reduced following two years of monitoring after facility startup. The CWIS began operation in June 2012, and the NPP has now completed two years of monitoring.[2] Methodologies and results of the previous two years' monitoring are discussed herein.

[1] Clean Water Act §316(b).
[2] Monitoring at the CWIS will continue to follow the current schedule until a frequency reduction is granted.

MONITORING METHODOLOGY

Monitoring methodologies for impingement, entrainment, velocity, and visual inspections are discussed in detail in the Update to the Biological Monitoring Plan (BioMP) (Alan Plummer Associates, Inc., 2012) that was submitted to the Texas Commission on Environmental Quality. A general discussion of methods for each monitoring requirement is presented below.

Impingement

The NPP monitors for impingement of fish and shellfish against the CWIS intake screens. Monitoring is conducted once per month over a 24-hour period when the CWIS operates. A diver is required to perform impingement monitoring as the water depth at the intake screens is approximately 13 feet. The diver inspects the intake screens prior to the monitoring event, then the respective pump(s) are operated for 24 hours. The diver then inspects the screens for impinged fish and shellfish and can capture any impinged organisms by enveloping the screen with a net to collect a sample once the respective pump is shut down.

Entrainment

Entrainment monitoring is performed to determine if, and if so the extent to which, all life stages of fish and shellfish are entrained in the intake system as a result of normal operation. Monitoring is conducted once every two weeks over a 24-hour period. Multiple samples are collected during each monitoring event to detect diel and seasonal variation during the primary period of reproduction, larval recruitment, and peak abundance. This time period is identified as March – August in the Source Water Baseline Characterization Data Study Report (AECOM, Inc., 2011). Entrainment monitoring is not conducted during September – February.

Monitoring is conducted by extracting water from the main water line to the NPP facility using a tie-in at the CWIS and passing the water through a water-buffered filtering station. Approximately 10-15% of water pumped to the plant is filtered during monitoring events. If any organisms are entrained and captured in the samples, they are preserved and transferred to a laboratory for identification and enumeration. The total flow of water pumped to the plant and total volume of water filtered for each sample is recorded in the field. If an entrainment event was scheduled during a period when the NPP did not operate, a pump was operated in a manner that would simulate normal operating conditions. In this case, water was filtered using the method described above, and all water was recycled back to the lake. A drawing of the entrainment sampling apparatus is included in Attachment A.

Velocity

Velocity monitoring is conducted once per quarter to ensure that the CWIS operates within design specifications for intake velocity (0.5 feet per second). A diver is required to measure velocity at the intake screens. The diver is assisted by a velocity meter operator located on the CWIS platform. An electromagnetic flow meter is used to measure velocity at five locations on the screen(s). A minimum of one discrete, one-minute average velocity measurement is recorded for each of the five locations on the screen. The results are used in an area-proportional velocity calculation. A drawing of an intake screen with measurement locations and the area-proportional velocity formula are located in Attachment B.

Visual or Remote Inspections

Visual inspection of the intake screens is conducted weekly to ensure that the CWIS design and construction technologies to reduce impingement and entrainment are maintained and operated as required. Alternatively, remote monitoring devices may be used.

Inspections are performed using an underwater camera on a telescopic rod when a diver is not present. When present, the diver visually inspects each intake screen for integrity and removes biofouling (e.g., algae and sediment) as needed.

RESULTS AND DISCUSSION

Monitoring is required to assess the potential impact the CWIS may have on fish and shellfish in Lake Striker. The BioMP identified that there are no threatened, endangered, or commercially regulated fishes or shellfishes in this water body. Protected organisms in Lake Striker are those regulated as recreational fishes (e.g., basses and catfishes) by the Texas Parks and Wildlife Department.

The NPP conducted required monitoring at the CWIS for 24 months following facility startup. This resulted in 25 impingement sampling events, 26 entrainment sampling events, 8 velocity measurements, and 102 visual or remote inspections. Results for each monitoring requirement are presented in Attachment C. Throughout the monitoring period, there was no impingement of fish, shellfish, or other aquatic organisms, and each velocity measurement was less than 0.5 feet per second. These results are attributed to the location and design of the intake, which were selected as best technology available for minimizing adverse environmental impacts of the CWIS. All visual and remote inspections indicated that the CWIS operated as designed throughout the monitoring period. Given these results, visual inspections and velocity measurements serve as surrogates for impingement assessment.

Entrainment sampling indicated that a small number of larval and/or juvenile fishes may be entrained during some months of the year. Collection of fishes was sporadic throughout the monitoring period; however, the data indicate that fishes may be more active around the CWIS during evening or night during May – August. The diver often observed small and large fish in close proximity to active intake

screens during summer months. These fish appeared to pick off prey from the outside of the screens, yet small fish were not readily impinged or entrained. The NPP hypothesizes that small fishes swim into the intake screens intentionally in search of prey[3] or shelter from predators and are consequently sometimes entrained.

Entrained fishes were often not identifiable because of their condition after passing through impellers and the varying pressures associated with pumping water. Catfish (*Ictalurus* sp.) were the only identifiable protected species entrained. Sunfish (*Lepomis* sp.) and/or bass (*Micropterus* sp.) were collected and some were identifiable only to family (i.e., Centrarchidae). These were most likely sunfish based on body shape and observation of numerous adult bluegill sunfish (*L. macrochirus*) throughout the year in the vicinity of the intake screens, although adult largemouth bass (*M. salmoides*) were frequently observed near the intake screens during summer months.[4]

MONITORING REDUCTION

Monitoring requirements for the NPP should be modified for several reasons. The CWIS was designed and constructed to minimize the possibility of impingement and entrainment. The location of the CWIS in Lake Striker (i.e., offshore) was chosen to minimize impact to fishes that use shoreline habitat for shelter or spawning. The location combined with screen design, velocity measurements consistently less than 0.5 feet per second, and visual inspections that identify proper function support a significant reduction in biological monitoring.

The TPDES permit and 40 CFR §125.87 both require biological monitoring, velocity monitoring, and visual monitoring of the CWIS in order to demonstrate compliance with requirements specified in 40 CFR §125.84. After two years, biological monitoring frequencies may be reduced, if data from the first two years of monitoring justify a reduction. As indicated above, the extensive biological monitoring performed in accordance with the permit clearly demonstrates that the CWIS has consistently operated as designed.

Impingement and entrainment monitoring data indicate that the CWIS has little impact on fishes and shellfishes in Lake Striker. Some fishes may be entrained, yet there are no adopted criteria, standards, or procedures upon which a limit may be set for the number or types of organisms that may be impinged or entrained; thus, continued biological monitoring at the level of the past two years will not serve a significant scientific purpose.

Likewise, the results of routine visual inspections and the consistently low through-screen velocities provide additional evidence that the CWIS is operated as designed. Visual inspection and velocity

[3] Diptera larvae and nymphs were typically collected in the entrainment samples.
[4] Adult fishes observed in the vicinity of the intake screens may have been there simply as a result of the diver's presence. Also, more fish may be present near the CWIS throughout the year that cannot be observed because of higher turbidity and very low visibility during fall and winter.

monitoring should, therefore, be accepted as surrogates for impingement and entrainment to demonstrate compliance with design and operational requirements on a routine basis.

Therefore, the following revised monitoring program for the NPP CWIS is proposed:

a. Monitoring

The following revised monitoring program replaces the program provided in Texas Pollutant Discharge Elimination System (TPDES) Permit No. WQ0004414000 (Issued August 18, 2011) immediately upon approval by the Texas Commission on Environmental Quality (TCEQ). In the revised program, the primary monitoring requirements are for through-screen velocity and visual or remote inspections of the CWIS. Biological monitoring is periodically conducted only to corroborate results obtained from velocity and visual monitoring.

i. Velocity Monitoring

The permittee must monitor through-screen velocity once per quarter to ensure that the design and construction technology continues to perform consistent with its design specifications for intake velocity.

ii. Visual or Remote Inspections

The permittee must continue to conduct visual inspections or employ remote monitoring devices during the period the CWIS is in operation. Visual inspections must occur at least once per week when the intake structure is in operation for the purpose of withdrawing cooling water to ensure that the design and construction of the CWIS function as designed. Visual monitoring may be conducted concurrently with velocity monitoring. Alternatively, remote monitoring devices may be used.

iii. Biological Monitoring

The permittee must continue to monitor impingement and entrainment of the commercial, recreational, and forage fish and shellfish as described below, in order to corroborate the results of the velocity monitoring and visual or remote inspections. Samples shall be collected once per permit term and may be conducted concurrently. Biological monitoring conducted to date and reported upon herein satisfies this requirement for the current permit term.

A. Impingement Sampling

The permittee shall collect samples to monitor impingement rates (simple enumeration) for each species over a 24-hour period.

B. Entrainment Sampling
The permittee shall collect samples to monitor entrainment rates (simple enumeration) for each species over a 24-hour period. Samples shall be collected during the primary period of reproduction, larval recruitment, and peak abundance (i.e., between May and August each year).

C. The permittee shall begin revised biological monitoring (i.e., impingement and entrainment) immediately.

b. Recordkeeping Requirements
The permittee must maintain records and report information and data to the TCEQ Industrial Permits Team (MC-148) as follows.

i. The permittee shall submit a 316(b) Phase I Yearly Status Report annually to the TCEQ, Industrial Permits Team (MC-148), beginning August 18, 2014. The 316(b) Phase I Yearly Status Report must include the following information.

A. Velocity monitoring records for the CWIS as required by item a.i.

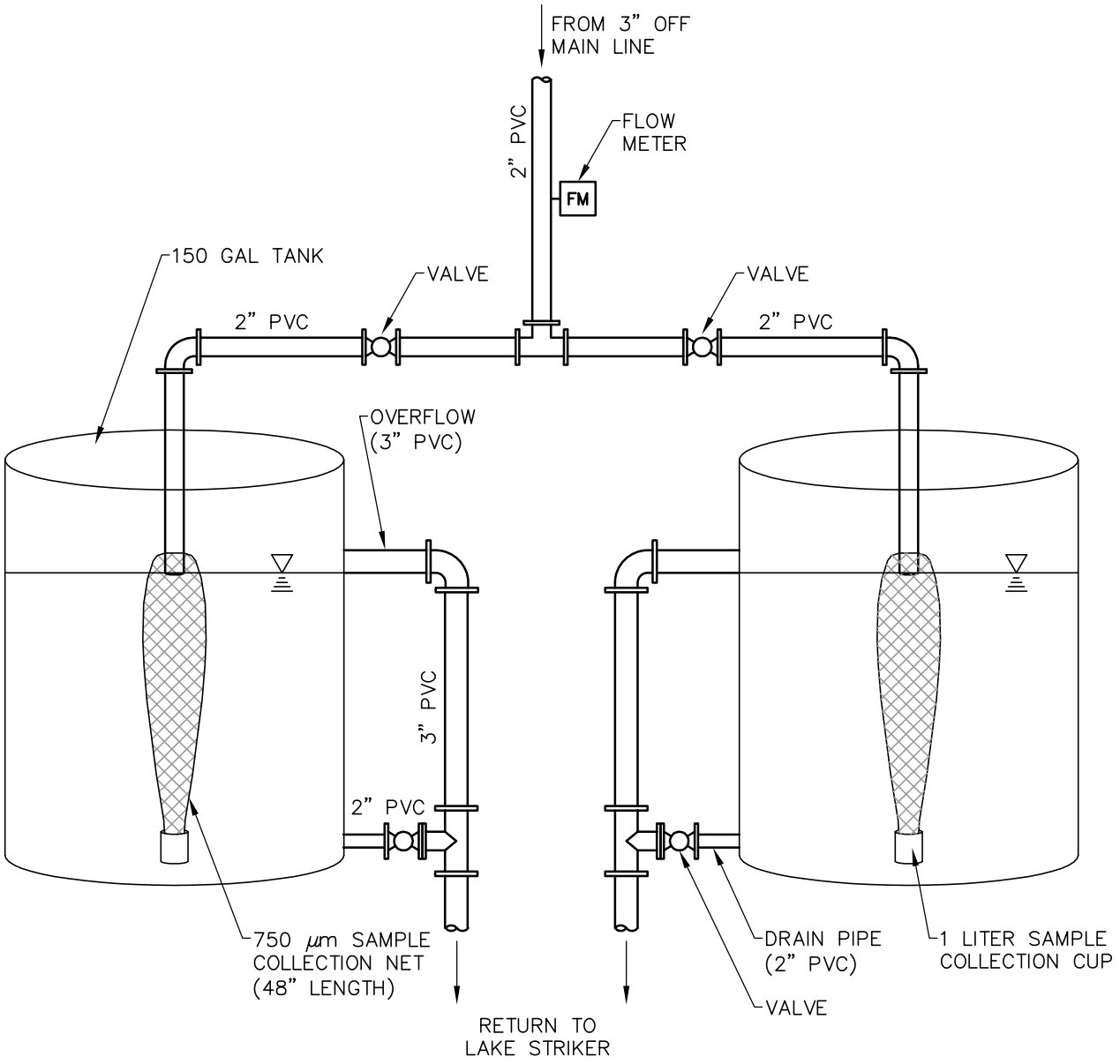
B. Records of visual or remote inspections for the CWIS as required by item a.ii.

C. Biological monitoring records for the CWIS as required by item a.iii.

This revised monitoring program would supersede the current provisions in “Other Requirements” of the TPDES permit.

ATTACHMENT A
ENTRAINMENT SAMPLING APPARATUS DRAWING

ALAN PLUMMER ASSOCIATES, INC.
ENVIRONMENTAL
ENGINEERS AND SCIENTISTS

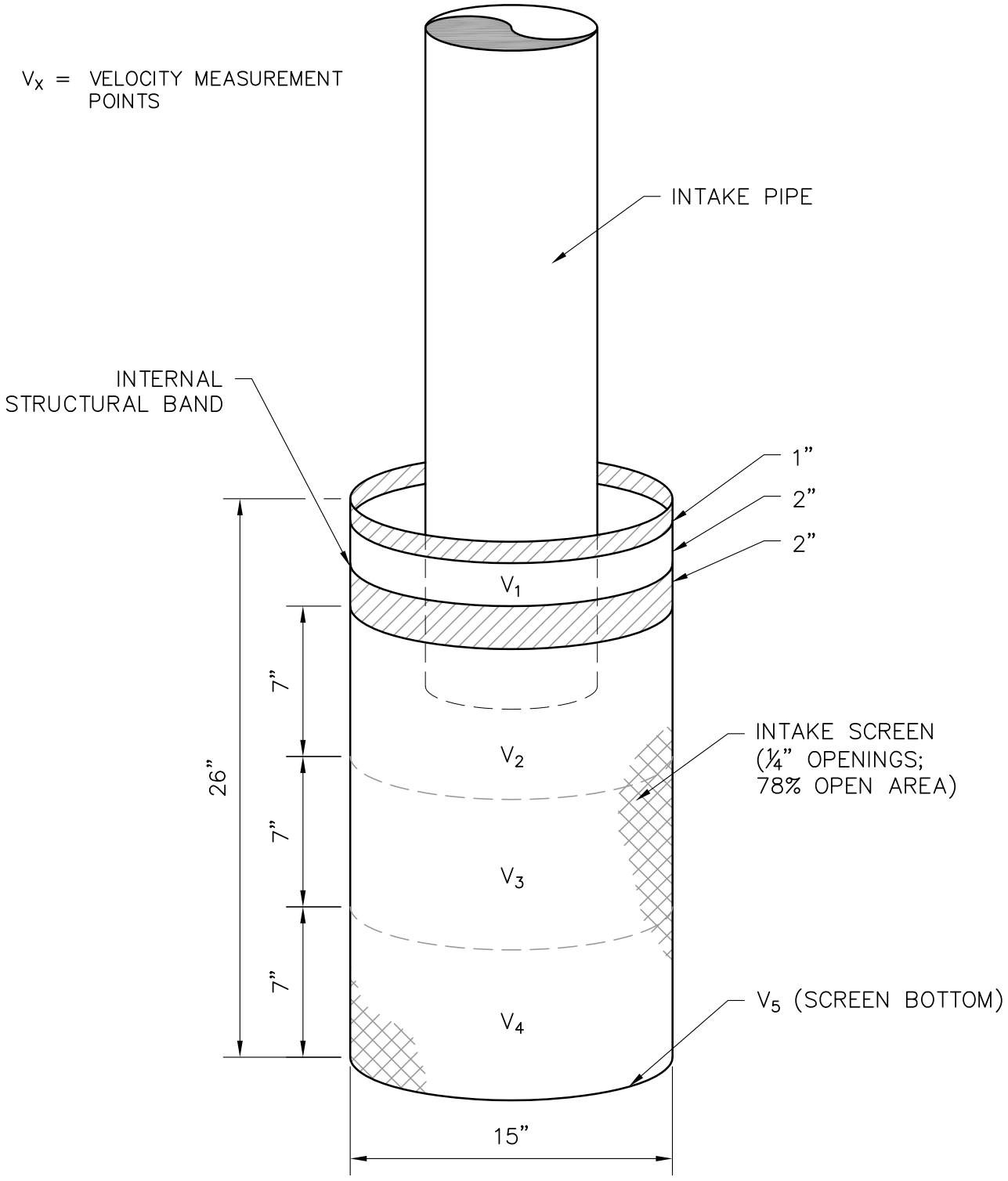


NACOGDOCHES POWER, LLC
ENTRAINMENT FILTERING STATION
CONCEPT DRAWING

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ATTACHMENT B
INTAKE SCREEN DRAWING AND VELOCITY CALCULATION

ALAN PLUMMER ASSOCIATES, INC.
ENVIRONMENTAL ENGINEERS AND SCIENTISTS



NACOGDOCHES POWER, LLC
COOLING WATER INTAKE STRUCTURE
VELOCITY MONITORING DRAWING

TEXAS REGISTERED ENGINEERING FIRM F-13
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NACOGDOCHES POWER, LLC
AREA-PROPORTIONAL VELOCITY FORMULA

Through-screen velocity will be calculated using the following equation:

$V_A = 0.07474 * V_1 + 0.261587 * V_2 + 0.261587 * V_3 + 0.261587 * V_4 + 0.1405 * V_5$

and

$V_F = V_A / 0.78$

Where,

V_x = Velocity measurement location (e.g., V_1)

V_A = Area proportional approach velocity

0.07474 = Area-proportional constant for location V_1 (side of screen)

0.261587 = Area-proportional constant for locations V_2, V_3, and V_4 (side of screen)

0.1405 = Area-proportional constant for location V_5 (bottom of screen)

V_F = Final velocity (reported through-screen velocity measurement)

0.78 = Constant for the screen effective open area of 78%

Example:

V_1 = 0.10 ft/s
V_2 = 0.31 ft/s
V_3 = 0.35 ft/s
V_4 = 0.19 ft/s
V_5 = 0.09 ft/s

V_A = 0.07474 * 0.10 + 0.261587 * 0.31 + 0.261587 * 0.35 + 0.261587 * 0.19 + 0.1405 * 0.09

V_A = 0.2425 ft/s

V_F = 0.2425 / 0.78

V_F = 0.311 ft/s

ATTACHMENT C
MONITORING RESULTS

IMPINGEMENT RESULTS

Start Date	Start Time	End Date	End Time	Result
06/25/2012	10:10	06/26/12	11:05	No Impingement
07/24/2012	11:10	07/25/12	11:57	No Impingement
08/08/2012	11:06	08/09/12	11:20	No Impingement
09/05/2012	12:10	09/06/12	12:09	No Impingement
10/02/2012	11:30	10/03/12	11:29	No Impingement
11/13/2012	11:00	11/14/12	11:03	No Impingement
12/11/2012	12:05	12/12/12	12:14	No Impingement
01/15/2013	11:55	01/16/13	12:00	No Impingement
02/05/2013	11:17	02/06/13	11:18	No Impingement
03/06/2013	11:40	03/07/13	11:40	No Impingement
04/03/2013	11:24	04/04/13	11:45	No Impingement
05/13/2013	11:16	05/14/13	11:31	No Impingement
06/12/2013	10:53	06/13/13	11:11	No Impingement
07/11/2013	10:36	07/12/13	11:29	No Impingement
08/08/2013	12:14	08/09/13	12:24	No Impingement
09/04/2013	11:57	09/05/13	12:02	No Impingement
10/02/2013	11:20	10/03/13	11:50	No Impingement
11/06/2013	12:06	11/07/13	12:17	No Impingement
12/05/2013	11:39	12/06/13	11:48	No Impingement
01/08/2014	11:43	01/09/14	11:45	No Impingement
02/05/2014	11:23	02/06/14	11:28	No Impingement
03/04/2014	12:00	03/05/14	11:59	No Impingement
04/03/2014	10:24	04/04/14	10:46	No Impingement
05/13/2014	10:20	05/14/14	10:35	No Impingement
06/09/2014	10:13	06/10/14	10:29	No Impingement

ENTRAINMENT RESULTS

Start Date	Start Time	End Date	End Time	Flow To Plant (gal)	Volume Sampled (gal)*	% of Plant Flow Sampled	Species	Quantity
06/25/2012	10:17	06/25/2012	16:17	394,920	38,121	10	Fish - Not Identifiable	2
06/25/2012	16:32	06/25/2012	22:17	407,100	36,234	9	Fish - Not Identifiable	1
06/25/2012	22:27	06/26/2012	04:15	358,440	36,792	10	Fish - Not Identifiable	9
06/25/2012	22:27	06/26/2012	04:15	358,440	36,792	10	Palaemonidae (Crustacean)	1
06/26/2012	04:28	06/26/2012	10:18	360,500	37,972	11	Fish - Not Identifiable	2
07/19/2012	17:32	07/19/2012	23:32	285,000	39,246	14	*Ictalurus sp.*	2
07/19/2012	17:32	07/19/2012	23:32	285,000	39,246	14	Fish - Not Identifiable	1
07/19/2012	23:46	07/20/2012	05:24	285,000	37,286	13	*Ictalurus sp.*	1
07/20/2012	05:36	07/20/2012	11:33	283,400	39,810	14	*Lepomis sp.*	1
07/20/2012	11:46	07/20/2012	17:32	139,600	38,385	27	No fish or shellfish collected	-
07/24/2012	11:14	07/24/2012	17:16	248,600	40,774	16	No fish or shellfish collected	-
07/24/2012	17:27	07/24/2012	23:17	287,900	39,371	14	No fish or shellfish collected	-
07/24/2012	23:29	07/25/2012	05:17	286,600	39,272	14	Fish - Not Identifiable	1
07/25/2012	05:28	07/25/2012	11:42	268,500	41,894	16	No fish or shellfish collected	-
08/08/2012	11:12	08/08/2012	23:03	730,000	77,273	11	No fish or shellfish collected	-
08/08/2012	23:13	08/09/2012	05:16	308,000	40,160	13	Fish - Not Identifiable	3
08/09/2012	05:26	08/09/2012	11:27	270,000	40,468	15	No fish or shellfish collected	-
08/21/2012	11:20	08/21/2012	17:15	356,000	37,732	11	No fish or shellfish collected	-
08/21/2012	17:23	08/21/2012	23:15	359,000	37,752	11	Cyprinidae	1
08/21/2012	23:25	08/22/2012	05:16	360,000	37,836	11	No fish or shellfish collected	-
08/22/2012	05:26	08/22/2012	11:21	362,000	38,075	11	No fish or shellfish collected	-
03/06/2013	11:40	03/06/2013	17:40	79,000	40,546	51	No fish or shellfish collected	-
03/06/2013	17:45	03/06/2013	23:30	0	41,545	-	No fish or shellfish collected	-
03/06/2013	23:40	03/07/2013	05:36	0	42,882	-	No fish or shellfish collected	-
03/07/2013	05:45	03/07/2013	11:40	0	40,846	-	No fish or shellfish collected	-
03/20/2013	10:44	03/20/2013	16:35	0	40,720	-	No fish or shellfish collected	-
03/20/2013	16:45	03/20/2013	22:22	0	38,755	-	No fish or shellfish collected	-
03/20/2013	22:30	03/21/2013	05:00	0	44,664	-	No fish or shellfish collected	-
03/21/2013	05:07	03/21/2013	10:43	0	38,522	-	No fish or shellfish collected	-
04/03/2013	11:36	04/03/2013	17:26	176,000	36,024	20	No fish or shellfish collected	-
04/03/2013	17:33	04/03/2013	23:33	355,000	38,483	11	No fish or shellfish collected	-
04/03/2013	23:42	04/04/2013	05:34	305,000	46,663	15	No fish or shellfish collected	-
04/04/2013	05:43	04/04/2013	11:36	317,000	34,241	11	No fish or shellfish collected	-

Start Date	Start Time	End Date	End Time	Flow To Plant (gal)	Volume Sampled (gal)*	% of Plant Flow Sampled	Species	Quantity
04/17/2013	10:56	04/17/2013	16:52	0	39,113	-	No fish or shellfish collected	-
04/17/2013	17:08	04/17/2013	23:08	0	39,115	-	No fish or shellfish collected	-
04/17/2013	23:15	04/18/2013	05:09	0	36,518	-	No fish or shellfish collected	-
04/18/2013	05:17	04/18/2013	10:55	41,480	34,623	83	No fish or shellfish collected	-
05/01/2013	10:35	05/01/2013	16:37	0	39,082	-	No fish or shellfish collected	-
05/01/2013	16:45	05/01/2013	22:35	0	38,609	-	No fish or shellfish collected	-
05/01/2013	22:45	05/02/2013	04:59	0	41,453	-	No fish or shellfish collected	-
05/02/2013	05:09	05/02/2013	10:34	40,172	32,681	81	No fish or shellfish collected	-
05/13/2013	11:40	05/13/2013	17:29	0	37,606	-	No fish or shellfish collected	-
05/13/2013	17:36	05/13/2013	22:30	0	31,893	-	No fish or shellfish collected	-
05/13/2013	22:42	05/14/2013	05:41	0	20,614	-	No fish or shellfish collected	-
05/14/2013	05:45	05/14/2013	11:48	0	16,955	-	No fish or shellfish collected	-
05/29/2013	11:31	05/29/2013	17:39	0	39,188	-	No fish or shellfish collected	-
05/29/2013	17:48	05/29/2013	22:26	0	35,159	-	Fish - Not Identifiable	1
05/29/2013	22:36	05/30/2013	06:32	0	58,461	-	Ictaluridae	1
05/30/2013	06:41	05/30/2013	11:34	0	35,208	-	No fish or shellfish collected	-
06/12/2013	11:03	06/12/2013	17:00	420,680	40,743	10	No fish or shellfish collected	-
06/12/2013	17:06	06/12/2013	22:43	302,970	37,679	12	No fish or shellfish collected	-
06/12/2013	22:53	06/13/2013	06:43	319,500	54,163	17	Ictaluridae	1
06/12/2013	22:53	06/13/2013	06:43	319,500	54,163	17	Centrarchidae	1
06/13/2013	06:52	06/13/2013	11:13	238,260	30,372	13	No fish or shellfish collected	-
06/24/2013	10:40	06/24/2013	16:23	100,820	36,437	36	Fish - Not Identifiable	1
06/24/2013	16:32	06/24/2013	22:50	0	40,978	-	No fish or shellfish collected	-
06/24/2013	23:00	06/25/2013	06:34	0	52,597	-	No fish or shellfish collected	-
06/25/2013	06:45	06/25/2013	10:41	69,530	24,898	36	No fish or shellfish collected	-
07/11/2013	10:41	07/11/2013	16:36	0	43,990	-	No fish or shellfish collected	-
07/11/2013	16:41	07/11/2013	23:04	0	46,409	-	Ictaluridae	1
07/11/2013	23:14	07/12/2013	06:12	0	48,793	-	No fish or shellfish collected	-
07/12/2013	06:24	07/12/2013	10:41	0	29,601	-	No fish or shellfish collected	-
07/22/2013	10:39	07/22/2013	16:45	0	37,708	-	No fish or shellfish collected	-
07/22/2013	16:55	07/22/2013	22:35	0	34,499	-	No fish or shellfish collected	-
07/22/2013	22:47	07/23/2013	06:10	0	45,898	-	No fish or shellfish collected	-
07/23/2013	06:11	07/23/2013	10:38	0	27,047	-	No fish or shellfish collected	-
08/08/2013	12:19	08/08/2013	18:07	450,600	36,871	8	No fish or shellfish collected	-
08/08/2013	18:14	08/08/2013	23:45	407,200	35,595	9	No fish or shellfish collected	-

Start Date	Start Time	End Date	End Time	Flow To Plant (gal)	Volume Sampled (gal)*	% of Plant Flow Sampled	Species	Quantity
08/08/2013	23:54	08/09/2013	07:28	430,200	45,472	11	No fish or shellfish collected	-
08/09/2013	07:38	08/09/2013	12:19	267,000	28,405	11	No fish or shellfish collected	-
08/22/2013	12:08	08/22/2013	17:58	466,200	36,757	8	No fish or shellfish collected	-
08/22/2013	18:05	08/22/2013	23:50	411,500	33,183	8	No fish or shellfish collected	-
08/22/2013	23:58	08/23/2013	07:30	491,600	46,061	9	No fish or shellfish collected	-
08/23/2013	07:37	08/23/2013	12:09	244,500	27,505	11	No fish or shellfish collected	-
03/04/2014	12:06	03/04/2014	18:13	389,500	40,508	10	No fish or shellfish collected	-
03/04/2014	18:23	03/05/2014	07:10	756,300	89,514	12	No fish or shellfish collected	-
03/05/2014	07:19	03/05/2014	12:07	0	34,136	-	No fish or shellfish collected	-
03/20/2014	08:01	03/20/2014	13:30	0	37,702	-	No fish or shellfish collected	-
03/20/2014	13:38	03/20/2014	20:11	53,900	45,442	84	No fish or shellfish collected	-
03/20/2014	20:22	03/21/2014	01:58	0	39,425	-	No fish or shellfish collected	-
03/21/2014	02:07	03/21/2014	08:00	0	39,652	-	No fish or shellfish collected	-
04/03/2014	10:54	04/03/2014	17:59	112,800	48,610	43	No fish or shellfish collected	-
04/03/2014	18:07	04/03/2014	23:06	0	38,175	-	No fish or shellfish collected	-
04/03/2014	23:15	04/04/2014	05:57	0	44,798	-	No fish or shellfish collected	-
04/04/2014	06:04	04/04/2014	10:56	0	28,955	-	No fish or shellfish collected	-
04/14/2014	09:58	04/14/2014	16:15	0	42,283	-	No fish or shellfish collected	-
04/14/2014	16:24	04/14/2014	21:50	0	34,201	-	No fish or shellfish collected	-
04/14/2014	22:00	04/15/2014	05:07	71,500	43,010	60	No fish or shellfish collected	-
04/15/2014	05:15	04/15/2014	10:02	97,000	28,066	29	No fish or shellfish collected	-
04/28/2014	10:17	04/28/2014	16:15	121,000	36,942	31	No fish or shellfish collected	-
04/28/2014	16:24	04/28/2014	22:10	0	38,094	-	No fish or shellfish collected	-
04/28/2014	22:19	04/29/2014	05:05	0	40,847	-	No fish or shellfish collected	-
04/29/2014	05:12	04/29/2014	10:16	98,100	26,921	27	No fish or shellfish collected	-
05/13/2014	10:23	05/13/2014	16:41	0	38,219	-	No fish or shellfish collected	-
05/13/2014	16:50	05/13/2014	22:28	0	40,896	-	No fish or shellfish collected	-
05/13/2014	22:35	05/14/2014	04:49	0	39,919	-	No fish or shellfish collected	-
05/14/2014	04:55	05/14/2014	10:24	0	33,801	-	No fish or shellfish collected	-
05/27/2014	10:00	05/27/2014	16:23	0	41,317	-	No fish or shellfish collected	-
05/27/2014	16:30	05/27/2014	21:47	0	37,093	-	No fish or shellfish collected	-
05/27/2014	21:56	05/28/2014	04:17	0	41,934	-	Fish - Not Identifiable	1
05/27/2014	21:56	05/28/2014	04:17	0	41,934		Ictaluridae	3
05/27/2014	21:56	05/28/2014	04:17	0	41,934		*Amieurus* sp.	1
05/28/2014	04:25	05/28/2014	10:01	91,885	31,982	35	Fish - Not Identifiable	1

Start Date	Start Time	End Date	End Time	Flow To Plant (gal)	Volume Sampled (gal)*	% of Plant Flow Sampled	Species	Quantity
06/09/2014	10:16	06/09/2014	17:06	379,700	39,157	10	No fish or shellfish collected	-
06/09/2014	17:13	06/10/2014	04:44	571,300	55,546	10	Ictaluridae	5
06/09/2014	17:13	06/10/2014	04:44	571,300	55,546	10	Fish - Not Identifiable	5
06/10/2014	04:52	06/10/2014	10:35	285,500	30,371	11	No fish or shellfish collected	-

*Volume of water drawn from the main line and passed through the entrainment filtering apparatus. Water returns to Lake Striker.

VELOCITY MEASUREMENTS

Date	Result (feet/second)
09/05/2012	0.32
10/02/2012	0.31
01/15/2013	0.22
04/03/2013	0.13
07/12/2013	0.13
10/03/2013	0.10
01/09/2014	0.08
04/03/2014	0.23

VISUAL INSPECTIONS

Date	Condition
06/25/2012	Maintained and operated as designed
07/06/2012	Maintained and operated as designed
07/11/2012	Maintained and operated as designed
07/24/2012	Maintained and operated as designed
08/03/2012	Maintained and operated as designed
08/08/2012	Maintained and operated as designed
08/17/2012	Maintained and operated as designed
08/24/2012	Maintained and operated as designed
08/28/2012	Maintained and operated as designed
09/05/2012	Maintained and operated as designed
09/10/2012	Maintained and operated as designed
09/18/2012	Maintained and operated as designed
09/26/2012	Maintained and operated as designed
10/02/2012	Maintained and operated as designed
10/10/2012	Maintained and operated as designed
10/17/2012	Maintained and operated as designed
10/22/2012	Maintained and operated as designed
10/30/2012	Maintained and operated as designed
11/06/2012	Maintained and operated as designed
11/13/2012	Maintained and operated as designed
11/21/2012	Maintained and operated as designed
11/27/2012	Maintained and operated as designed
12/05/2012	Maintained and operated as designed
12/11/2012	Maintained and operated as designed
12/17/2012	Maintained and operated as designed
12/27/2012	Maintained and operated as designed
01/01/2013	Maintained and operated as designed
01/10/2013	Maintained and operated as designed
01/15/2013	Maintained and operated as designed
01/25/2013	Maintained and operated as designed
01/31/2013	Maintained and operated as designed
02/05/2013	Maintained and operated as designed
02/15/2013	Maintained and operated as designed
02/20/2013	Maintained and operated as designed
02/25/2013	Maintained and operated as designed
03/06/2013	Maintained and operated as designed
03/13/2013	Maintained and operated as designed
03/21/2013	Maintained and operated as designed
03/29/2013	Maintained and operated as designed
04/03/2013	Maintained and operated as designed
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04/18/2013	Maintained and operated as designed
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03/20/2014	Maintained and operated as designed
03/25/2014	Maintained and operated as designed
04/03/2014	Maintained and operated as designed

VISUAL INSPECTIONS CONTINUED

Date	Condition
04/08/2014	Maintained and operated as designed
04/15/2014	Maintained and operated as designed
04/24/2014	Maintained and operated as designed
04/29/2014	Maintained and operated as designed
05/08/2014	Maintained and operated as designed

Date	Condition
05/13/2014	Maintained and operated as designed
05/20/2014	Maintained and operated as designed
05/28/2014	Maintained and operated as designed
06/03/2014	Maintained and operated as designed
06/09/2014	Maintained and operated as designed

Bryan W. Shaw, Ph.D., P.E., *Chairman*
Toby Baker, *Commissioner*
Zak Covar, *Commissioner*
Richard A. Hyde, P.E., *Executive Director*

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

February 27, 2015
Dennis Runyan
Alan Plummer Associates, Inc.
6300 La Calma, Suite 400
Austin, Texas 78752-3825

Re: Nacogdoches Power LLC
Texas Pollutant Discharge Elimination System (TPDES) Permit No. WQ0004414000
Biological Monitoring Frequency Reduction Request

The Technical Memorandum, *Biological Monitoring Frequency Reduction Request* received by the Texas Commission on Environmental Quality (TCEQ) on June 27, 2014, and the monitoring data therein, satisfies Other Requirements No. 10 of the current TPDES Permit, issued August 18, 2011 as the Phase I Yearly Status Report for the year 2014.

The following provisions supersede and replace the existing provisions of Other Requirements, No. 10 of TPDES Permit No. WQ0004414000. The Biological Monitoring Plan received by the TCEQ on June 27, 2014 as part of the Technical Memorandum, *Biological Monitoring Frequency Reduction Request*, is approved by the TCEQ and supersedes and replaces the Biological Monitoring Plan submitted in accordance with Other Requirements, No. 10 of TPDES Permit No. WQ0004414000.

1. 316(b) – Cooling Water Intake Structure Requirements

   a. Velocity Monitoring

      The permittee shall monitor through screen velocity once per quarter to ensure the design and construction technology continues to perform consistent with design specifications for intake velocity.

   b. Visual or Remote Inspections

      The permittee shall continue to conduct visual inspections or employ remote monitoring devices during the period the CWIS is in operation. Visual inspections must occur at least once per week when the intake structure is in operation for the purpose of withdrawing cooling water to ensure that the design and construction of

the CWIS function as designed. Visual monitoring may be conducted concurrently with velocity monitoring. Alternatively, remote monitoring devices may be used.

c. Biological Monitoring.

The permittee must continue to monitor impingement and entrainment of the commercial, recreational, and forage fish and shellfish as described below, in order to corroborate the results of the velocity monitoring and visual or remote inspections. Samples must be collected once per permit term and submitted with the Biological Monitoring Report. The Biological Monitoring Report is due 180 days prior to the date of each subsequent permit expiration, and may be submitted at any point in time after the date of permit issuance and prior to 180 days from the date of permit expiration. Impingement and entrainment sampling may be conducted concurrently. Biological monitoring conducted to date and reported in the technical memorandum received by the TCEQ on July 27th, 2014 satisfies biological monitoring requirements for the existing permit term.

i. Impingement Sampling

The permittee shall collect samples to monitor impingement rates (simple enumeration) for each species over a 24-hour period.

ii. Entrainment Sampling

The permittee shall collect samples to monitor entrainment rates (simple enumeration) for each species over a 24-hour period. Samples shall be collected during the primary period of reproduction, larval recruitment, and peak abundance (i.e., between March and August).

iii. The permittee shall begin revised biological monitoring (i.e., impingement and entrainment) immediately.

2. Record Keeping Requirements

The permitee shall maintain records and report information and data to the TCEQ Industrial Permits Team (MC-148) as follows:

a. The permittee shall submit a 316(b) Phase I Yearly Status Report annually to the TCEQ, Industrial Permits Team (MC-148), beginning September 1st, 2015. The 316(b) Phase I Yearly Status Report must be submitted to the TCEQ, Industrial Permits Team (MC-148) by the 20th of September of each calendar year. The 316(b) Phase I Yearly Status Report must include the following information:

i. Velocity monitoring records for the CWIS.

ii. Records of visual or remote inspections for the CWIS.

iii. Biological monitoring records for the CWIS, when due in accordance with item (1)(c) of these provisions.

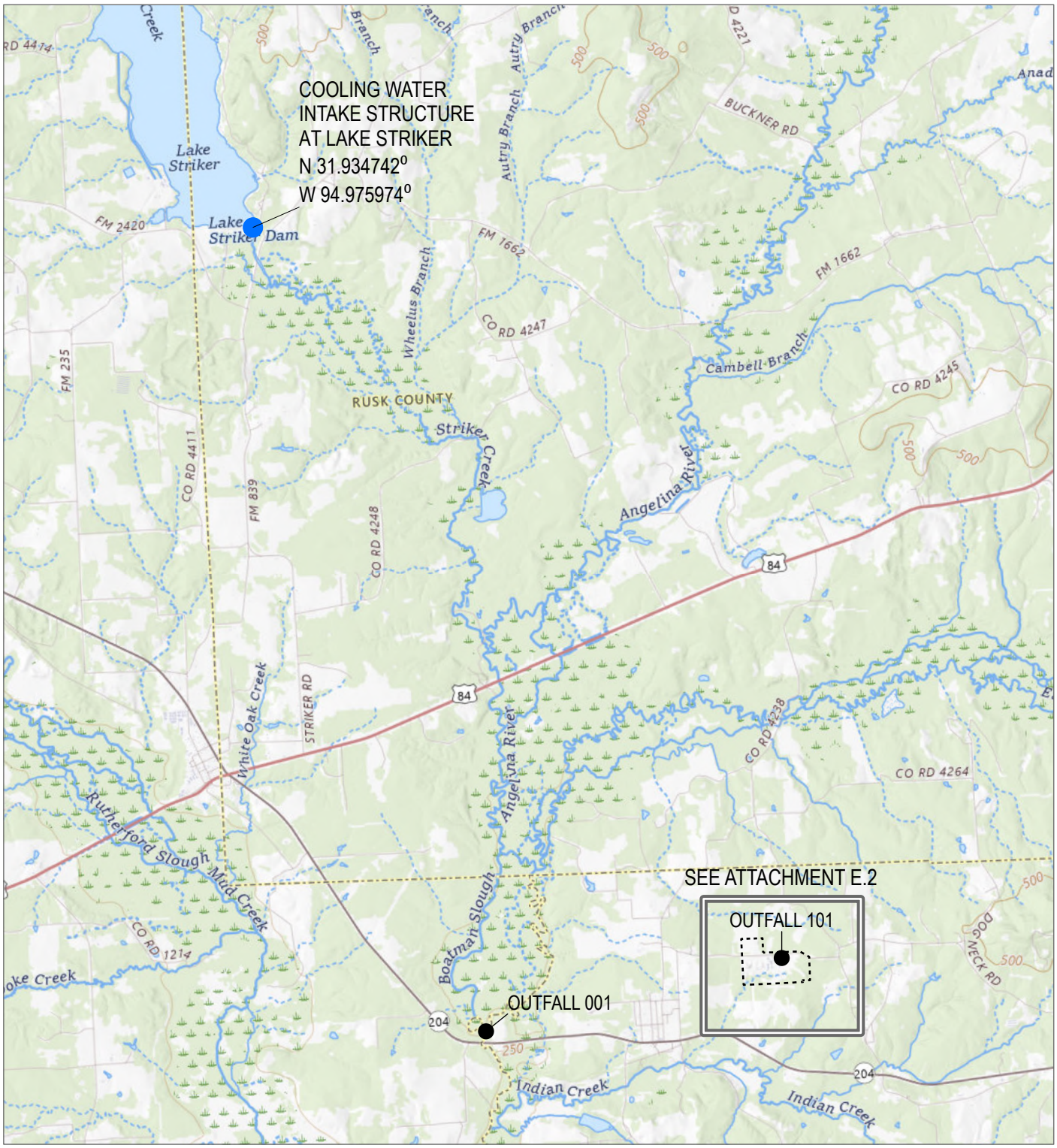
If you have any questions or comments please contact me at (512) 239-4420, by fax at (512) 239-4420, or via e-mail at *merrit.mckelvy@tceq.texas.gov*

Sincerely,

Merrit McKelvy
Industrial Wastewater Permitting Team
Water Quality Division

ATTACHMENT E

Facility Map
Technical Report 1.0
Item 1.d



- OUTFALL
- COOLING WATER INTAKE STRUCTURE AT LAKE STRIKER
- FACILITY BOUNDARY

BASE MAP: ESRI "USGS TOPO" ONLINE SERVICE LAYER
DATA SOURCES: TRC, ESRI, USGS

0 3,500 7,000
FEET
1:84,000 1" = 7,000'



PROJECT: **NAES CORPORATION**
TPDES PERMIT RENEWAL
NACOGDOCHES COUNTY, TEXAS

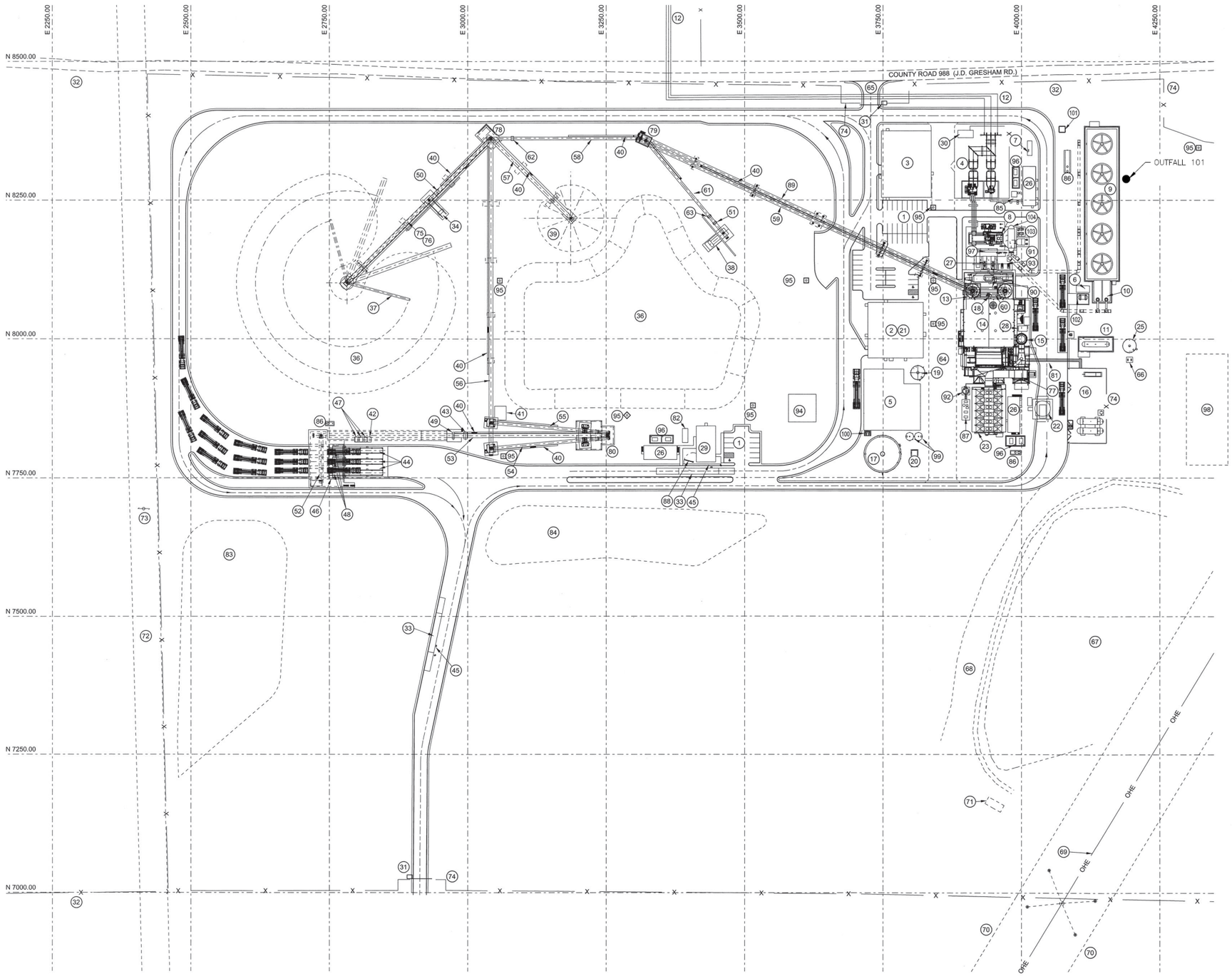
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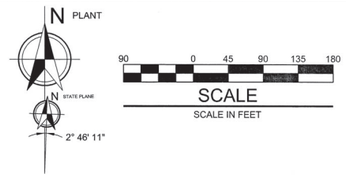
DRAWN BY:	A. CLINE	PROJ. NO.:	606438
CHECKED BY:	B. TRACY		
APPROVED BY:	M. MILLER		**ATTACHMENT E.1**
DATE:	SEPTEMBER 2025		

TRC
505 EAST HUNTLAND DRIVE
SUITE #250
AUSTIN, TX 78752
PHONE: 512.329.6080

FILE: 606438_NAES_TPDES_PERMIT_RENEWAL

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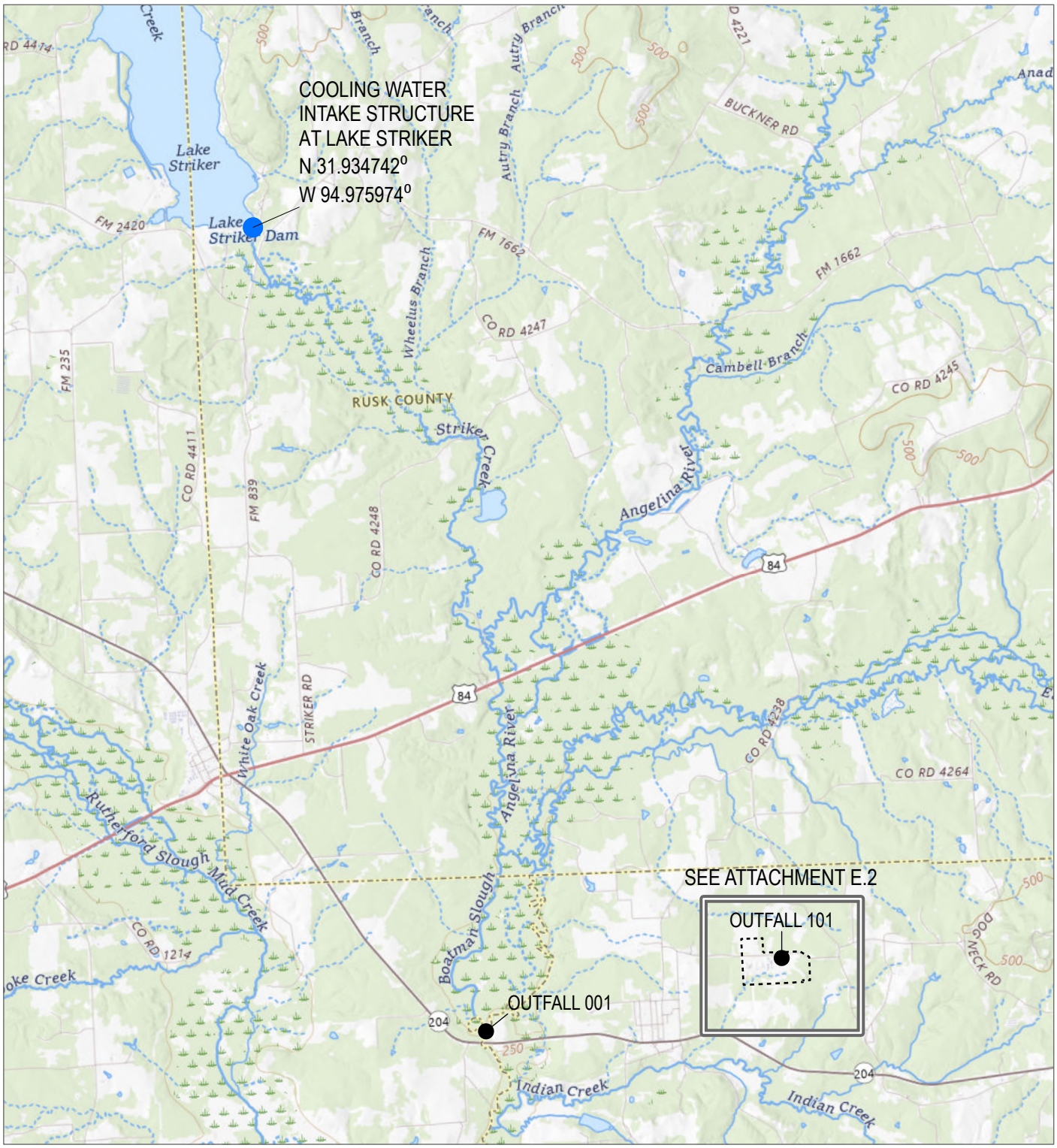
LEGEND

1. PARKING
2. ADMINISTRATION BUILDING
3. WAREHOUSE BUILDING (90' x 120')
4. SWITCHYARD
5. WATER TREATMENT BUILDING
6. CHEMICAL BUILDING (COOLING TOWER)
7. DIESEL GENERATOR & FUEL TANK
8. STEAM TURBINE
9. COOLING TOWER
10. CIRCULATING WATER PUMPS
11. AMMONIA UNLOADING & STORAGE
12. TRANSMISSION LINES
13. BIOMASS BINS (2)
14. BOILER
15. STACK
16. PROPANE UNLOADING & STORAGE
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18. SAND SILO
19. DEMIN WATER TANK
20. FIRE PUMPS & FUEL TANK
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22. FLY ASH SILO
23. BAGHOUSE
24. CONSTRUCTION TRANSFORMER (NOT LOCATED)
25. WASTE WATER TANK
26. PDC BUILDING
27. BOILER FEED PUMPS
28. CEMS
29. SCALEHOUSE
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31. GATE
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35. NOT USED
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37. STACKER RECLAIMER
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40. ELEVATED WALKWAY
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96. 5kV TO 480V TRANSFORMER
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99. OXIDATION TANKS
100. WATER TREATMENT AIR BLOWER
101. POTABLE WATER PUMP BUILDING
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103. CONDENSER VACUUM PUMPS
104. CONDENSER

ATTACHMENT E.2
CITY OF AUSTIN
NACOGDOCHES GENERATING FACILITY
TPDES PERMIT RENEWAL APPLICATION
FACILITY MAP

ATTACHMENT E

Facility Map
Technical Report 1.0
Item 1.d



- OUTFALL
- COOLING WATER INTAKE STRUCTURE AT LAKE STRIKER
- FACILITY BOUNDARY

BASE MAP: ESRI "USGS TOPO" ONLINE SERVICE LAYER
DATA SOURCES: TRC, ESRI, USGS

0 3,500 7,000
FEET
1:84,000 1" = 7,000'



PROJECT: **NAES CORPORATION**
TPDES PERMIT RENEWAL
NACOGDOCHES COUNTY, TEXAS

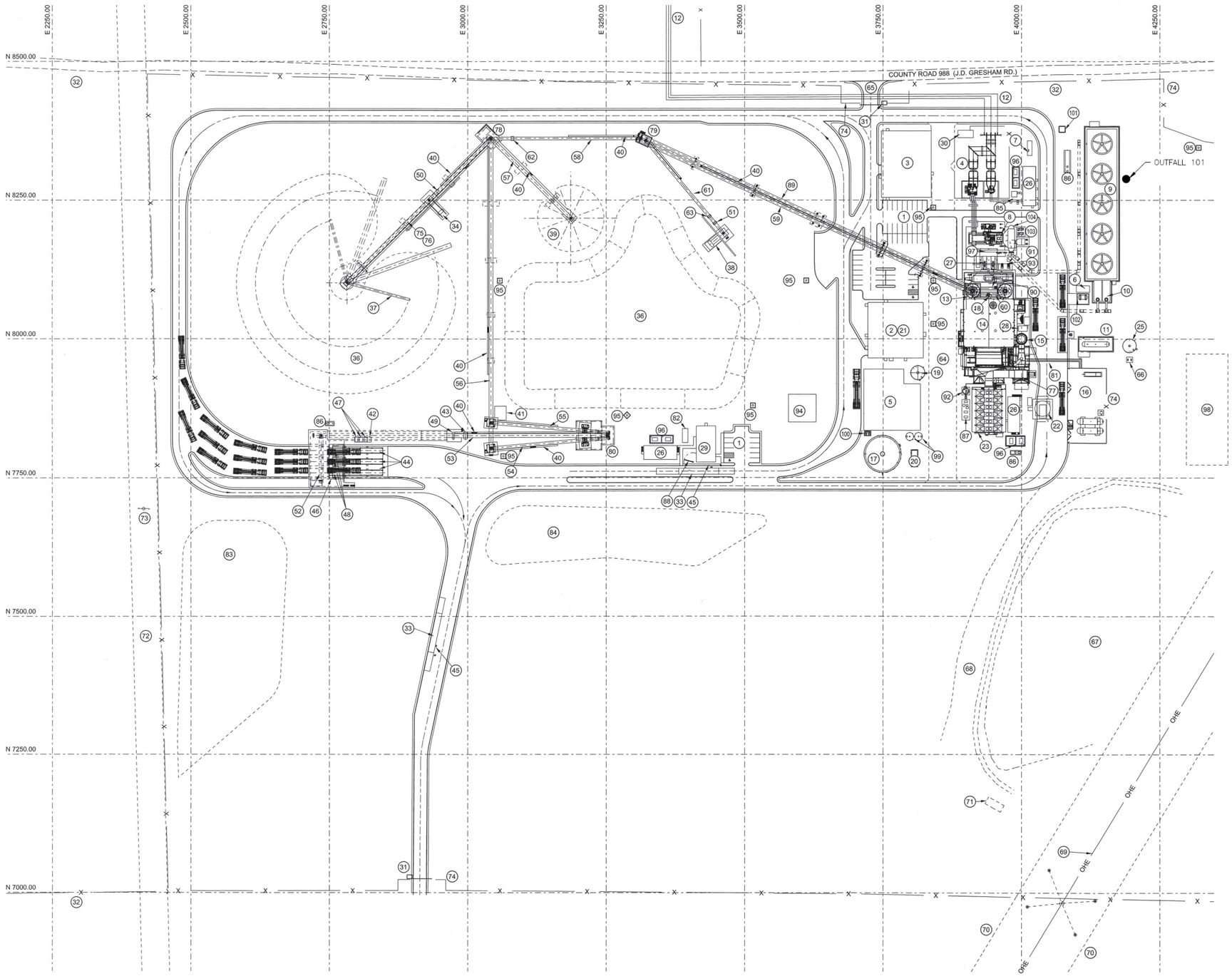
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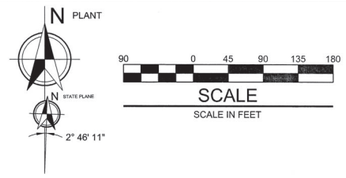
DRAWN BY:	A. CLINE	PROJ. NO.:	606438
CHECKED BY:	B. TRACY		
APPROVED BY:	M. MILLER		**ATTACHMENT E.1**
DATE:	SEPTEMBER 2025		

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ATTACHMENT E.2
CITY OF AUSTIN
NACOGDOCHES GENERATING FACILITY
TPDES PERMIT RENEWAL APPLICATION
FACILITY MAP

ATTACHMENT F

Flow Schematic with Water Balance
Technical Report
Item 2.b

City of Austin
Austin Energy
Town Lake Center • 721 Barton Springs Road • Austin, Texas 78704 - 1145

April 21, 2022

Industrial Permits Team
Wastewater Permitting Section
TCEQ Water Quality Division (MC 148)
P.O. Box 13087
Austin, Texas 78711-3087

Re: City of Austin, Nacogdoches Generating Facility (CN600135198, RN103219127)
Texas Pollutant Discharge Elimination System (TPDES) Permit No. WQ0004414000
Revision to Process Flow Diagram

To Whom It May Concern:

The City of Austin provides the enclosed revised process flow diagrams to supplement Attachment F as provided in the TPDES permit renewal application submitted on January 22, 2021. The application was approved, and the permit was issued on September 23, 2021. There are no proposed changes that would impact or alter the water quality of the water being discharged via Outfall 001, therefore this update does not require an amendment to the TPDES permit.

The Original Flow Diagram is provided as Enclosure A. original. The diagram shows flows from the raw water ultrafiltration (RWU) to the clarifier, thence to the cooling tower collection sump.

The facility has an equalization (EQ) tank between the RWU and the clarifier. When the EQ tank is in use, the clarifier is bypassed, and there are two possible flow routes from the EQ tank:

- Option 1 includes flows from the EQ tank being routed into the make-up water pipe (lake water) that goes directly to the cooling tower. This is the preferred option. The flow diagram for Option 1 is provided as Enclosure B.

- Option 2 includes flows from the EQ tank being routed directly to cooling tower collection sump, thence to the 101 Outfall tank. The flow diagram for Option 2 is provided as Enclosure C.

The Plant reserves the option of changing between Option 1 and Option 2

If you have any questions or comments on this submittal, please do not hesitate to contact me directly at Ravi.Joseph@austinenergy.com or (512) 963-3200.

Sincerely,

City of Austin
Austin Energy Environmental Services



Ravi Joseph, P.E., CIH
Consulting Engineer
Austin Energy

Enclosures (3): Original and Revised Process Flow Diagrams

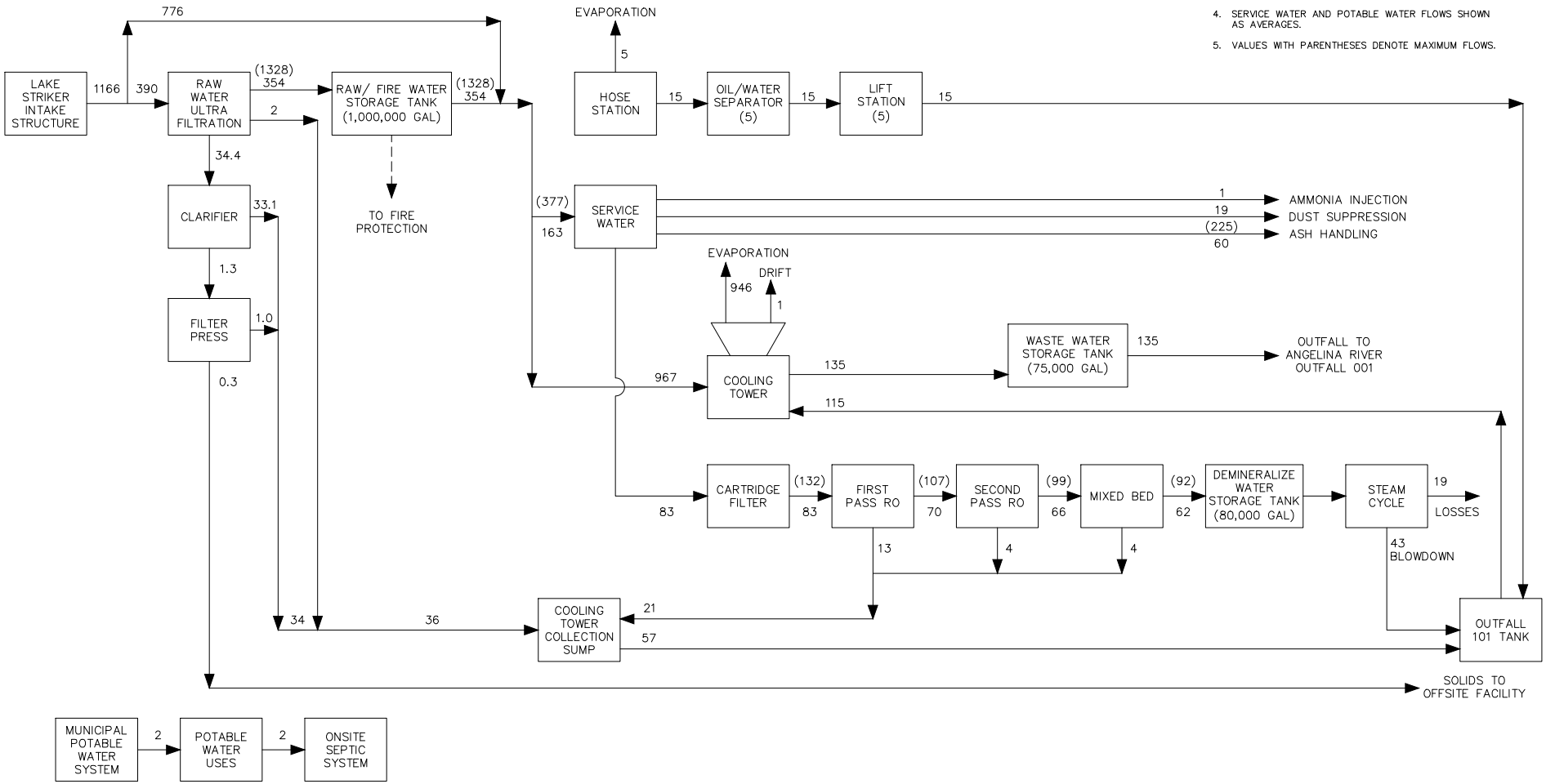
cc: Mr. Tres Koenings, Senior Project Manager, Plummer
Mr. Thomas Johnston, Compliance Manager, NAES: Nacogdoches Generating Facility

ENCLOSURE A
Original Process Flow Diagram

PLUMMER

NOTES:

1. ALL VALUES IN GPM UNLESS OTHERWISE NOTED.
2. DASHED LINES INDICATE THAT THE FLOW IS EXPECTED TO BE INTERMITTENT.
3. COOLING TOWER BLOWDOWN BASED ON EIGHT CYCLES OF CONCENTRATION.
4. SERVICE WATER AND POTABLE WATER FLOWS SHOWN AS AVERAGES.
5. VALUES WITH PARENTHESES DENOTE MAXIMUM FLOWS.



ATTACHMENT F
CITY OF AUSTIN
NACOGDOCHES GENERATING FACILITY
TPDES PERMIT RENEWAL APPLICATION
PROCESS FLOW DIAGRAM

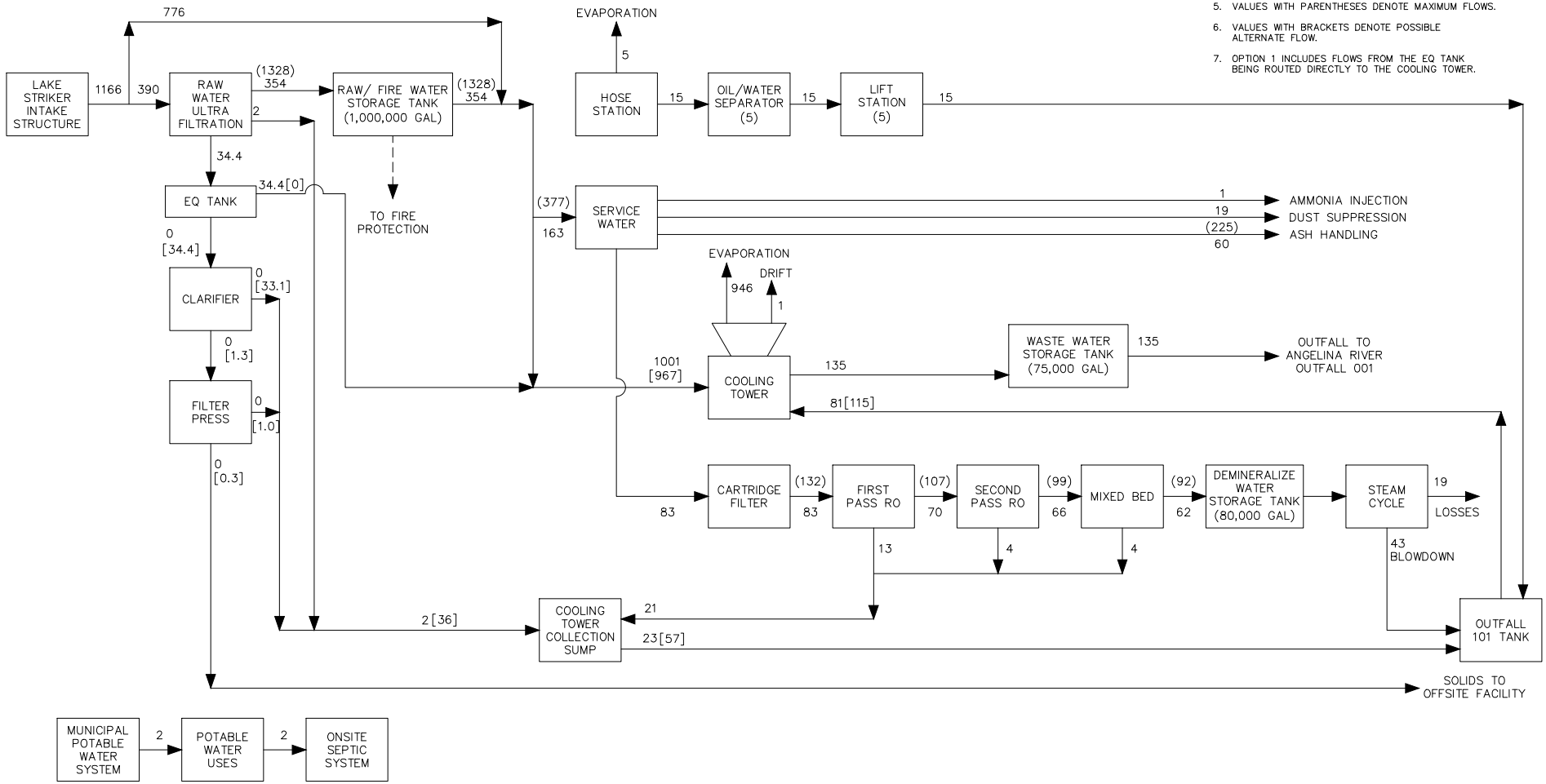
TEXAS REGISTERED ENGINEERING FIRM F-13
1/14/2021 3:06 PM M:\Projects\3516\001-01\2-0 Wrk Prod\2-1 ACAD\FIGURES\ATT-Process Flow.dwg Briand

ENCLOSURE B
Process Flow Diagram Option 1

PLUMMER

NOTES:

1. ALL VALUES IN GPM UNLESS OTHERWISE NOTED.
2. DASHED LINES INDICATE THAT THE FLOW IS EXPECTED TO BE INTERMITTENT.
3. COOLING TOWER BLOWDOWN BASED ON EIGHT CYCLES OF CONCENTRATION.
4. SERVICE WATER AND POTABLE WATER FLOWS SHOWN AS AVERAGES.
5. VALUES WITH PARENTHESES DENOTE MAXIMUM FLOWS.
6. VALUES WITH BRACKETS DENOTE POSSIBLE ALTERNATE FLOW.
7. OPTION 1 INCLUDES FLOWS FROM THE EQ TANK BEING ROUTED DIRECTLY TO THE COOLING TOWER.



ATTACHMENT F
CITY OF AUSTIN
NACOGDOCHES GENERATING FACILITY
TPDES PERMIT RENEWAL APPLICATION
PROCESS FLOW DIAGRAM – OPTION 1

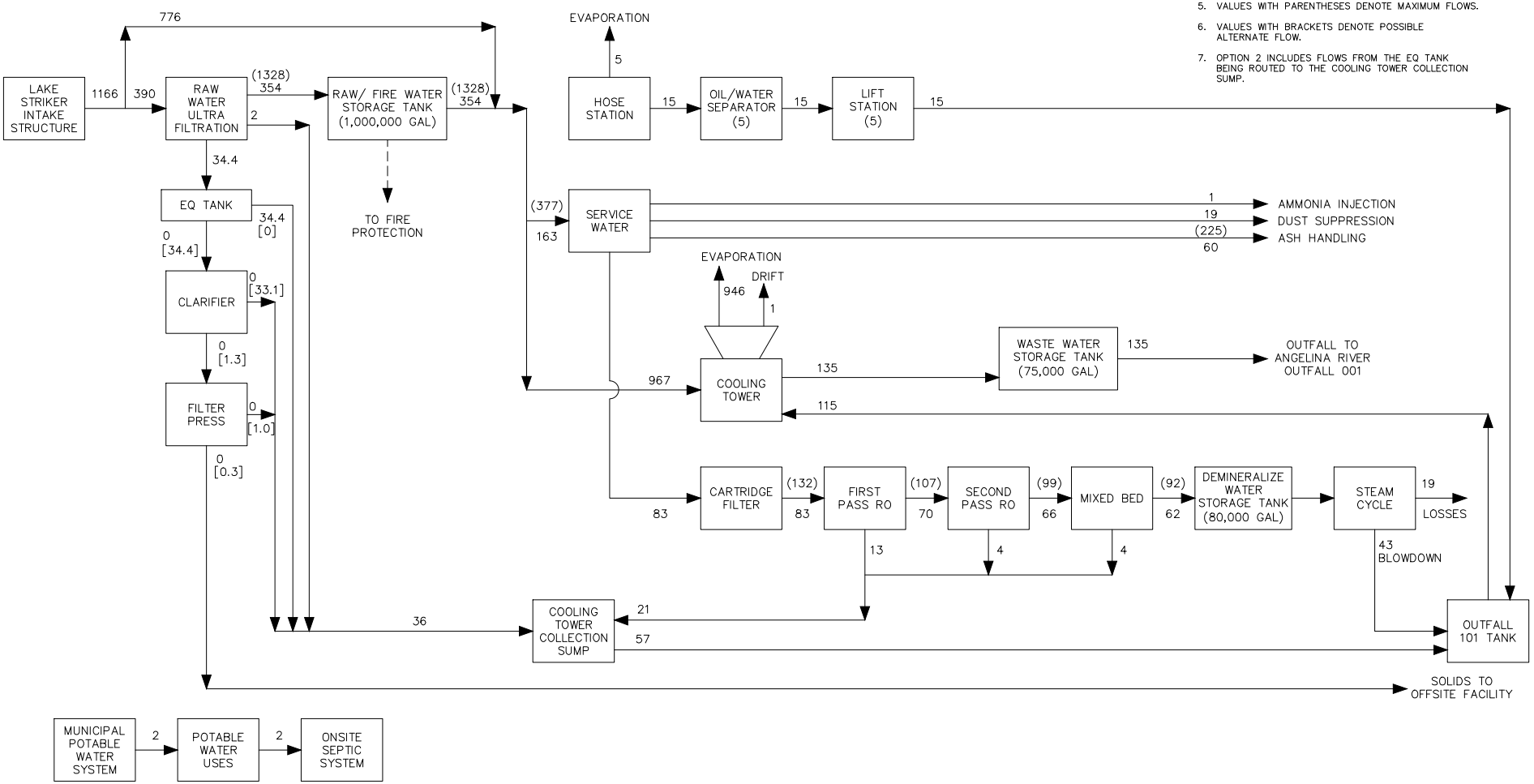
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4/14/2022 3:22 PM M:\Projects\3516\001-01\2-0 Wrk Prod\2-1 ACAD\FIGURES\ATT-Process Flow.dwg Kholzer9096

ENCLOSURE C
Process Flow Diagram Option 2

PLUMMER

NOTES:

1. ALL VALUES IN GPM UNLESS OTHERWISE NOTED.
2. DASHED LINES INDICATE THAT THE FLOW IS EXPECTED TO BE INTERMITTENT.
3. COOLING TOWER BLOWDOWN BASED ON EIGHT CYCLES OF CONCENTRATION.
4. SERVICE WATER AND POTABLE WATER FLOWS SHOWN AS AVERAGES.
5. VALUES WITH PARENTHESES DENOTE MAXIMUM FLOWS.
6. VALUES WITH BRACKETS DENOTE POSSIBLE ALTERNATE FLOW.
7. OPTION 2 INCLUDES FLOWS FROM THE EQ TANK BEING ROUTED TO THE COOLING TOWER COLLECTION SUMP.



ATTACHMENT F
CITY OF AUSTIN
NACOGDOCHES GENERATING FACILITY
TPDES PERMIT RENEWAL APPLICATION
PROCESS FLOW DIAGRAM – OPTION 2

TEXAS REGISTERED ENGINEERING FIRM F-13
4/14/2022 3:19 PM M:\Projects\3516\001-01\2-0 Wrk Prod\2-1 ACAD\FIGURES\ATT-Process Flow.dwg Kholzer9096

Candice Calhoun

From: Bohmfalk, Michael <MBohmfalk@trccompanies.com>
Sent: Monday, November 3, 2025 5:09 PM
To: Candice Calhoun; Joseph, Ravinder (Ravi)
Subject: RE: [EXTERNAL] Application to Renew Permit No. WQ0004414000 (City of Austin) - Notice of Deficiency
Attachments: WQ004414000-NOD1-Response Letter Final 11-3-25.pdf

Good Afternoon Candice,

Attached, please find our responses intended to provide the additional information requested. Please let us know if any additional information is needed.

Thanks, Michael

Michael D. Bohmfalk, CHMM
Senior Program Manager/ Regional Practice Leader

505 East Huntland Drive, Suite 250, Austin,
TX 78752
C 512-925-0662
LinkedIn | Twitter | Blog | TRCcompanies.com

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From: Candice Calhoun <Candice.Calhoun@tceq.texas.gov>
Sent: Wednesday, October 29, 2025 9:59 AM
To: Joseph, Ravinder (Ravi) <Ravi.Joseph@austinenergy.com>
Cc: Bohmfalk, Michael <MBohmfalk@trccompanies.com>
Subject: [EXTERNAL] Application to Renew Permit No. WQ0004414000 (City of Austin) - Notice of Deficiency
Importance: High

This is an **External** email. Do not click links or open attachments unless you validate the sender and know the content is safe.

ALWAYS hover over the link to preview the actual URL/site and confirm its legitimacy.

Good morning, Mr. Joseph,

The attached Notice of Deficiency (NOD) letter dated October 29, 2025, requests additional information needed to declare the application administratively complete. Please send complete response no later than November 12, 2025.

If you have any questions, please let me know.

Regards,

Candice Courville
License & Permit Specialist
ARP Team | Water Quality Division
Texas Commission on Environmental Quality
512-239-4312
candice.calhoun@tceq.texas.gov

How is our customer service? Fill out our online customer satisfaction survey at www.tceq.texas.gov/customersurvey

Candice Calhoun

From: Bohmfalk, Michael <MBohmfalk@trccompanies.com>
Sent: Friday, November 7, 2025 1:04 PM
To: Candice Calhoun; Joseph, Ravinder (Ravi)
Subject: RE: [EXTERNAL] Application to Renew Permit No. WQ0004414000 (City of Austin) - Notice of Deficiency

Hello Candice,

Please see our responses below in blue.

Please let us know if any additional information is needed.

Thanks, Michael

Michael D. Bohmfalk, CHMM
Senior Program Manager/ Regional Practice Leader

505 East Huntland Drive, Suite 250, Austin, TX 78752
C 512-925-0662
LinkedIn | Twitter | Blog | TRCcompanies.com

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From: Candice Calhoun <Candice.Calhoun@tceq.texas.gov>
Sent: Tuesday, November 4, 2025 8:05 AM
To: Bohmfalk, Michael <MBohmfalk@trccompanies.com>; Joseph, Ravinder (Ravi) <Ravi.Joseph@austinenergy.com>
Subject: RE: [EXTERNAL] Application to Renew Permit No. WQ0004414000 (City of Austin) - Notice of Deficiency

This is an **External** email. Do not click links or open attachments unless you validate the sender and know the content is safe.

ALWAYS hover over the link to preview the actual URL/site and confirm its legitimacy.

Good morning, Michael,

Thank you for your response. Please see my comments below.

1) Please confirm if the mailing address, phone number and email address provided for the responsible authority contact will remain the same. If not, please provide a CDF with the correct information. Confirmed. This contact information will remain the same.
2) Please provide the revised PLS as a separate document. Attached.
3) Understood.
4) The discharge route is written in the NORI as it is written in the current permit and as it is approved by TCEQ RWA team. If you would like to make changes to the discharge route, RWA will need to review and approve before any changes can be made. In addition, we do not add the segment number into the NORI. Note that the discharge route has not changed. The suggested revisions in the NORI were made in an effort to better clarify the discharge route description in response to your initial comments and avoid future confusion. The discharge route as described in the original draft NORI is acceptable.

If you have any additional questions, please let me know.

Regards,

Candice Courville
License & Permit Specialist
ARP Team | Water Quality Division
Texas Commission on Environmental Quality
512-239-4312
candice.calhoun@tceq.texas.gov

How is our customer service? Fill out our online customer satisfaction survey at www.tceq.texas.gov/customersurvey

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From: Bohmfalk, Michael <MBohmfalk@trccompanies.com>
Sent: Monday, November 3, 2025 5:09 PM
To: Candice Calhoun <Candice.Calhoun@tceq.texas.gov>; Joseph, Ravinder (Ravi) <Ravi.Joseph@austinenergy.com>
Subject: RE: [EXTERNAL] Application to Renew Permit No. WQ0004414000 (City of Austin) - Notice of Deficiency

Good Afternoon Candice,

Attached, please find our responses intended to provide the additional information requested. Please let us know if any additional information is needed.

Thanks, Michael

Michael D. Bohmfalk, CHMM
Senior Program Manager/ Regional Practice Leader

505 East Huntland Drive, Suite 250 t 512-329-6080
Austin, Texas 78752

November 3, 2025

Ms. Candice Calhoun-Courville
Applications Review and Processing Team (MC148)
Water Quality Division
Texas Commission of Environmental Quality

RE: Application to Renew Permit No.: WQ004414000 (EPA I.D. No. TX0124842)
Applicant Name: City of Austin (CN600135198)
Site Name: Nacogdoches Generating Facility (RN103219127)
Type of Application: Renewal

VIA EMAIL

Dear Ms. Candice Calhoun-Courville,

We have received the Notice of Deficiency (NOD) letter dated October 29, 2025, requesting additional information needed to declare the application administratively complete. Please see the following responses and attached documents.

1. Applicant Information: The responsible authority contact listed does not match the individual who certified the application. These two must match. Please use item 2 of TCEQ form number 10411 to provide the information to match the individual that signed, or use item 13, signature page, from TCEQ form number 10411 to provide a new signed, dated and notarized signature page to match to responsible authority contact listed in the STEERS application.

The responsible party authority contact has been updated to Ravi Joseph. Item 2 on Page 3 of TCEQ form number 10411 has been revised and is included as Attachment 1.

2. Plain Language Summary (PLS): The flow listed in the plain language summary provided does not match the flow listed in the current permit. Please confirm the correct flow and provide a revised PLS as needed.

The PLS has been revised to reflect the correct flow of 1,750,000 gallons per day (as listed in the current permit). The revised text is included below:

The City of Austin (CN600135198) operates Nacogdoches Generating Facility (RN103219127), a steam electricity generation facility. The facility is located at 499 County Road 988, in Cushing, Nacogdoches County, Texas 75760. The application is for a renewal to discharge 1,750,000 gallons per day of cooling-tower blowdown, low-volume waste, and contact storm water.

Discharges from the facility are expected to contain Bromide, Nitrate-Nitrite, Sulfide, Boron, Cobalt, Iron, Magnesium, Manganese, Molybdenum, Tin, and Titanium. Cooling-tower blowdown, low-volume waste, and contact storm water are treated by the addition of sulfuric acid and small amounts of dispersants/antiscalants, filtration, reverse osmosis (RO), and final polishing by demineralization using a mixed bed resin tank or similar process.

3. USGS Topographic Map: The USGS map provided did not include the correct highlighted discharge route. The current permit states that the route is directly to Angelina River Above Sam Rayburn Reservoir. Please provide a revised USGS map to reflect the route listed in the permit.

We have reviewed the USGS Map provided and determined the discharge route is correct. The discharge route is through the 6" pipeline which discharges directly to the segment of the Angelina River segment named "Angelina River Above Sam Rayburn Reservoir".

4. The following is a portion of the NORI which contains information relevant to your application. Please read it carefully and indicate if it contains any errors or omissions. The complete notice will be sent to you once the application is declared administratively complete.

Please see our edits to the NORI in red tracked changes below.

APPLICATION. City of Austin, 4815 Mueller Boulevard, Austin, Texas 78723, which owns a wood-fired steam electric power generation plant, has applied to the Texas Commission on Environmental Quality (TCEQ) to renew Texas Pollutant Discharge Elimination System (TPDES) Permit No. WQ0004414000 (EPA I.D. No. TX0124842) to authorize the discharge of treated wastewater at a volume not to exceed a daily average flow of 1,750,000 gallons per day. The facility is located at 499 County Road 988, near the city of Cushing, in Nacogdoches County, Texas 75760. The discharge route is from the plant site through a pipeline that discharges directly to the Angelina River (Stream Segment 0611 - Angelina River Above Sam Rayburn Reservoir). TCEQ received this application on October 27, 2025. The permit application will be available for viewing and copying at Nacogdoches County Clerk's Office, District Clerk's Office, 101 West Main Street, Suite 120, Nacogdoches, in Nacogdoches County, Texas and at Singletary Memorial Library, Reference Section, 207 East 6th Street, Rusk, in Cherokee County, Texas prior to the date this notice is published in the newspaper. The application, including any updates, and associated notices are available electronically at the following webpage: https://www.tceq.texas.gov/permitting/wastewater/pendingpermits/tpdes-applications. This link to an electronic map of the site or facility's general location is provided as a public courtesy and not part of the application or notice. For the exact location, refer to the application. https://gisweb.tceq.texas.gov/LocationMapper/?marker=-94.900833,31.832222&level=18

Further information may also be obtained from City of Austin at the address stated above or by calling Mr. Ravi Joseph, P.E., Consulting Engineer, Austin Energy Environmental Services, at 512-963-3200.

If you have any questions or if any additional information is needed, please do not hesitate to contact me by phone at 512-925-0662 or by email at mbohmfalk@trccompanies.com.

Sincerely,
TRC Environmental Corporation



Michael D. Bohmfalk, CHMM
Senior Project Manager/Regional Practice Leader

cc: Ravi Joseph, Austin Energy

Attachment 1
Revised Form 10411 Page 3

g. Application Fee

EPA Classification	New	Major Amend. (with or without renewal)	Renewal (with or without changes)	Minor Amend. / Minor Mod. (without renewal)
Minor facility not subject to EPA categorical effluent guidelines (40 CFR Parts 400-471)	☐ $350	☐ $350	☒ $315	☐ $150
Minor facility subject to EPA categorical effluent guidelines (40 CFR Parts 400-471)	☐ $1,250	☐ $1,250	☐ $1,215	☐ $150
Major facility	N/A [2]	☐ $2,050	☐ $2,015	☐ $450

h. Payment Information

Mailed

Check or money order No.: Click to enter text.

Check or money order amt.: Click to enter text.

Named printed on check or money order: Click to enter text.

Epay

Voucher number: 789528 and 789529

Copy of voucher attachment: A-1

Item 2. Applicant Information (Instructions, Pages 26)

a. Customer Number, if applicant is an existing customer: CN600135198

Note: Locate the customer number using the TCEQ's Central Registry Customer Search[3].

b. Legal name of the entity (applicant) applying for this permit: City of Austin

Note: The owner of the facility must apply for the permit. The legal name must be spelled exactly as filed with the TX SOS, Texas Comptroller of Public Accounts, County, or in the legal documents forming the entity.

c. Name and title of the person signing the application. (**Note:** The person must be an executive official that meets signatory requirements in 30 TAC § 305.44.)

Prefix: Mr Full Name (Last/First Name): Ravi Joseph

Title: Consulting Engineer Credential: PE, CIH

d. Will the applicant have overall financial responsibility for the facility?

☒ Yes ☐ No

Note: The entity with overall financial responsibility for the facility must apply as a co-applicant, if not the facility owner.

[2] All facilities are designated as minors until formally classified as a major by EPA.

[3] https://www15.tceq.texas.gov/crpub/index.cfm?fuseaction=cust.CustSearch

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

SUMMARY OF APPLICATION IN PLAIN LANGUAGE FOR TPDES OR TLAP PERMIT APPLICATIONS

Summary of Application (in plain language) Template and Instructions for Texas Pollutant Discharge Elimination System (TPDES) and Texas Land Application (TLAP) Permit Applications

ENGLISH TEMPLATE FOR TPDES or TLAP NEW/RENEWAL/AMENDMENT APPLICATIONS INDUSTRIAL WASTEWATER/STORMWATER

The following summary is provided for this pending water quality permit application being reviewed by the Texas Commission on Environmental Quality as required by 30 TAC Chapter 39. The information provided in this summary may change during the technical review of the application and is not a federal enforceable representation of the permit application.

The City of Austin (CN600135198) operates Nacogdoches Generating Facility (RN103219127), a steam electricity generation facility. The facility is located at 499 County Road 988, in Cushing, Nacogdoches County, Texas 75760. The application is for a renewal to discharge 1,750,000 gallons per day of cooling-tower blowdown, low-volume waste, and contact storm water.

Discharges from the facility are expected to contain Bromide, Nitrate-Nitrite, Sulfide, Boron, Cobalt, Iron, Magnesium, Manganese, Molybdenum, Tin, and Titanium. Cooling-tower blowdown, low-volume waste, and contact storm water are treated by the addition of sulfuric acid and small amounts of dispersants/antiscalants, filtration, reverse osmosis (RO), and final polishing by demineralization using a mixed bed resin tank or similar process.