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REGION 6
1445 ROSS AVENUE
DALLAS, TEXAS 75202-2733

NPDES Permit No TX0054186

AUTHORIZATION TO DISCHARGE UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Clean Water Act, as amended, (33 U.S.C. 1251 et. seq; the "Act"),

San Jacinto River Authority (SJRA)
Woodlands Wastewater Treatment Plant No. 1
2436 Sawdust Road
The Woodlands, TX 77380

is authorized to discharge from a facility located at 2436 Sawdust Road, The Woodlands, Montgomery County, Texas,

from Outfall 001 located at Latitude 30° 08' 06" North, Longitude 95° 28' 38" West, to Panther Branch, thence Spring Creek and Outfall 002 located at Latitude 30° 08' 31.5" North, Longitude 95° 28' 14.9" West, to Lake "B", the upper portion of Harrison Lake, thence to a tributary of Panther Branch, thence to Panther Branch, thence to Spring Creek, both in Segment 1008 of the San Jacinto River Basin,

in accordance with this cover page and the effluent limitations, monitoring requirements, and other conditions set forth in Part I, Part II, Part III and Part IV hereof.

This is a modification of a permit previously issued September 28, 2007, with a permit effective date of November 1, 2007, and a permit expiration date of October 31, 2012.

This permit and the authorization to discharge shall expire at midnight, October 31, 2012.

Issued on

Miguel I. Flores
Director
Water Quality Protection Division (6WQ)

Prepared by

Laurence E. Giglio
Environmental Engineer
Permits & Technical Section (6WQ-PP)

PART I – REQUIREMENTS FOR NPDES PERMITS

SECTION A. LIMITATIONS AND MONITORING REQUIREMENTS

1. Final Effluent Limits – Outfall 001 - 7.8 MGD Design Flow

During the period beginning the effective date of the permit and lasting until the expiration date, unless otherwise noted, the permittee is authorized to discharge treated wastewater to Panther Branch, thence Spring Creek in Segment 1008 of the San Jacinto River Basin. Such discharges shall be limited and monitored by the permittee as specified below:

EFFLUENT CHARACTERISTICS		DISCHARGE LIMITATIONS mg/l unless noted		MONITORING REQUIREMENTS	
POLLUTANT	STORET CODE	MINIMUM	MAXIMUM	MEASUREMENT FREQUENCY	SAMPLE TYPE
Ph, standard units (*1)	00400	6.0	9.0	Five Days/Week (*2)	Grab
Dissolved Oxygen (*1)	00300	4.0	N/A	Five Days/Week (*2)	Grab

EFFLUENT CHARACTERISTICS		DISCHARGE LIMITATIONS lbs/day, unless noted			DISCHARGE LIMITATIONS mg/l, unless noted			MONITORING REQUIREMENTS	
POLLUTANT	STORET CODE	30-Day Avg	7-Day Avg	Daily Max	30-Day Avg	7-Day Avg	Daily Max	MEASUREMENT FREQUENCY	SAMPLE TYPE
Flow, MGD (*1)	50050	N/A	N/A	N/A	Report	Report	Report	Continuous	Totalizing Meter
Carbonaceous Biochemical Oxygen Demand (5-day) (*1)	80082	651	976	N/A	10	15	N/A	Five Days/Week (*2)	24-Hr Composite (*3)
Total Suspended Solids (*1)	00530	976	1627	N/A	15	25	N/A	Five Days/Week (*2)	24-Hr Composite (*3)
Ammonia Nitrogen (Total As N) (*1)	00610	195	391	N/A	3	6	N/A	Five days/Week (*2)	24-Hr Composite (*3)
Total Residual Chlorine (*1)	50060	N/A	N/A	N/A	N/A	N/A	0.1	Daily	Instantaneous Grab (*4)
E. coli Bacteria (*5)	51040	N/A	N/A	N/A	Report	N/A	Report	Daily	Grab
E. coli Bacteria (*6)	51040	N/A	N/A	N/A	126 (*7)	N/A	394 (*7)	Daily	Grab
Copper, Total	01042	Report	N/A	Report	Report	N/A	Report	Once/Two Weeks	Grab

EFFLUENT CHARACTERISTICS	DISCHARGE MONITORING		MONITORING REQUIREMENTS	
Whole Effluent Toxicity Monitoring (7-Day NOEC) (See Part II, Section E) (*8)	30-DAY AVG	7-DAY MINIMUM	MEASUREMENT FREQUENCY	SAMPLE TYPE
Pimephales promelas	Report	Report	Once/Quarter	24-Hr Composite (*3)

EFFLUENT CHARACTERISTICS	DISCHARGE MONITORING		MONITORING REQUIREMENTS	
Whole Effluent Toxicity Monitoring (7-Day NOEC) (See Part II, Section F) (*9)	30-DAY AVG	7-DAY MINIMUM	MEASUREMENT FREQUENCY	SAMPLE TYPE
Ceriodaphnia dubia	Report	Report	Once/Quarter	24-Hr Composite (*3)

EFFLUENT CHARACTERISTICS	DISCHARGE MONITORING		MONITORING REQUIREMENTS	
Whole Effluent Toxicity Limit (PCS 22414) (7-Day NOEC) (See Part II, Section F) (*10)	30-DAY AVG 78%	7-DAY MINIMUM 78%	MEASUREMENT FREQUENCY	SAMPLE TYPE
Ceriodaphnia dubia	Report	Report	Once/Quarter	24-Hr Composite (*3)

Footnotes:

*1 Permit limits not subject to comment in this draft permit.

*2 Five Days/Week means at least one sample each normal workday; Monday through Friday. The first sample of any day shall be at least sixteen (16) hours after the first daily sample of the previous day.

*3 24-hour composite sample consists of a minimum of 12 effluent portions collected at equal time intervals over the 24-hour period and combined proportional to flow or a sample collected at frequent intervals proportional to flow over the 24-hour period.

*4 The chlorine residual shall be monitored daily by instantaneous grab sample. Regulations at 40 CFR Part 136 define "instantaneous grab" as analyzed within 15 minutes of collection.

*5 Requirements for E. coli bacteria are effective during the period beginning the effective date of the permit and lasting through one (1) day prior to three (3) months from the effective date of the permit.

*6 Requirements for E. coli bacteria are effective during the period beginning three (3) months from the effective date of the permit and lasting through the expiration date of the permit.

*7 Colony forming units per 100 ml.

*8 Monitoring and reporting requirements begin on the effective date of this permit. Measurement and reporting frequency shall be by calendar quarters. Quarterly biomonitoring test results are due on or before April 20, July 20, October 20, and January 20 for biomonitoring conducted during the previous calendar quarter. See PART II, Whole Effluent Toxicity Testing Requirements for additional WET monitoring and reporting conditions.

*9 Requirements for Whole Effluent Toxicity Monitoring are effective during the period beginning the effective date of the permit, and lasting through three (3) years after the permit effective date. Measurement and reporting frequency shall be by calendar quarters. Quarterly biomonitoring test results are due on or before April 20, July 20, October 20, and January 20 for biomonitoring conducted during the previous calendar quarter.

*10 Requirements for Whole Effluent Toxicity Limits are effective during the period beginning three (3) years after the permit effective date, and lasting through the expiration date of the permit. Measurement and reporting frequency shall be by calendar quarters. Quarterly biomonitoring test results are due on or before April 20, July 20, October 20, and January 20 for biomonitoring conducted during the previous calendar quarter.

2. Final Effluent Limits – Outfall 002 – 0.6 MGD Maximum Design Flow

During the period beginning the effective date of the permit and lasting until the expiration date, unless otherwise noted, the permittee is authorized to discharge treated wastewater to Lake "B", the upper portion of Harrison Lake, thence to a tributary of Panther Branch, thence to Panther Branch, thence to Spring Creek, in Segment 1008 of the San Jacinto River Basin. Such discharges shall be limited and monitored by the permittee as specified below:

EFFLUENT CHARACTERISTICS		DISCHARGE LIMITATIONS mg/l unless noted		MONITORING REQUIREMENTS	
POLLUTANT	STORET CODE	MINIMUM	MAXIMUM	MEASUREMENT FREQUENCY	SAMPLE TYPE
Ph, standard units (*1)	00400	6.0	9.0	Five Days/Week (*2)	Grab
Dissolved Oxygen	00300	6.0	N/A	Five Days/Week (*2)	Grab

EFFLUENT CHARACTERISTICS		DISCHARGE LIMITATIONS lbs/day, unless noted			DISCHARGE LIMITATIONS mg/l, unless noted			MONITORING REQUIREMENTS	
POLLUTANT	STORET CODE	30-Day Avg	7-Day Avg	Daily Max	30-Day Avg	7-Day Avg	Daily Max	MEASUREMENT FREQUENCY	SAMPLE TYPE
Flow, MGD	50050	N/A	N/A	N/A	Report	Report	0.6 MGD	Continuous	Totalizing Meter
Carbonaceous Biochemical Oxygen Demand (5-day)	80082	35	60	N/A	7	12	N/A	Five Days/Week (*2)	24-Hr Composite (*3)
Total Suspended Solids (*1)	00530	75	125	N/A	15	25	N/A	Five Days/Week (*2)	24-Hr Composite (*3)
Total Residual Chlorine (*1)	50060	N/A	N/A	N/A	N/A	N/A	0.1	Daily	Instantaneous Grab (*4)
Ammonia Nitrogen (Total As N)	00610	10	25	N/A	2	5	N/A	Five days/Week (*2)	24-Hr Composite (*3)

Footnotes:

*1 Permit limits not subject to comment in this draft permit.

*2 Five Days/Week means at least one sample each normal workday; Monday through Friday. The first sample of any day shall be at least sixteen (16) hours after the first daily sample of the previous day.

*3 24-hour composite sample consists of a minimum of 12 effluent portions collected at equal time intervals over the 24-hour period and combined proportional to flow or a sample collected at frequent intervals proportional to flow over the 24-hour period.

*4 The chlorine residual shall be monitored daily by instantaneous grab sample. Regulations at 40 CFR Part 136 define "instantaneous grab" as analyzed within 15 minutes of collection.

NARRATIVE LIMITATIONS

Discharges shall be such that the following narrative standards are maintained in the receiving waters.

The effluent shall contain no visible film of oil or globules of grease on the surface or coat the banks or bottoms of the watercourse.

Surface water shall be essentially free of floating debris and suspended solids that are conducive to producing adverse responses in aquatic organisms or putrescible sludge deposits or sediment layers which adversely affect benthic biota or any lawful uses.

Surface waters shall be essentially free of settleable solids conducive to changes in flow characteristics of stream channels or the untimely filling of surface water in the state.

Waste discharges shall not cause substantial and persistent changes from ambient conditions of turbidity or color.

There shall be no foaming or frothing of a persistent nature.

SAMPLING LOCATION

Samples taken in compliance with the monitoring requirements specified above shall be taken at the discharge from the final treatment unit prior to the receiving stream.

B. SCHEDULE OF COMPLIANCE

The permittee shall comply with the following schedule of activities for the attainment of Whole Effluent Toxicity.

a. Determine exceedance cause(s);
b. Develop control options, if needed;
c. Evaluate and select control mechanisms;
d. Implement corrective action; and
e. Attain final effluent limitations no later than three (3) years after the permit effective date.

The permittee shall submit quarterly progress reports to EPA, in accordance with the following schedule. The requirement to submit quarterly progress reports shall expire three (3) years after the permit effective date. No later than three (3) years after the permit effective date or 15 days after compliance has been achieved, whichever occurs first, the permittee shall submit a written final report to EPA, stating that compliance has been completed. If at any time during the compliance period the permittee determines that full compliance will not be met within the time

allowed, a separate report shall be sent to EPA and the State stating the explanation for this delay and proposed remedial actions.

PROGRESS REPORT DATES
January 1
April 1
July 1
October 1

Send progress and final reports to the following address:

EPA:
Compliance Assurance and Enforcement Division
Water Enforcement Branch (6EN-W)
U.S. EPA, Region 6
1445 Ross Avenue
Dallas, TX 75202-2733

C. MONITORING AND REPORTING (MAJOR DISCHARGERS)

The permittee shall effectively monitor the operation and efficiency of all treatment and control facilities and the quantity and quality of the treated discharge.

Monitoring information shall be on Discharge Monitoring Report Form(s) EPA 3320-1 as specified in Part III.D.4 of this permit and shall be submitted monthly.

1. Reporting periods shall end on the last day of the month.

2. The first Discharge Monitoring Report(s) shall represent facility operations from the effective date of the permit through the last day of the month.

3. Thereafter, the permittee is required to submit regular monthly reports as described above postmarked no later than the 25th day of the month following each reporting period. The annual sludge report required in Part IV of the permit is due on September 1 of each year and covers the previous calendar year from August 1 through July 31.

4. If any 7-day average or daily maximum value exceeds the effluent limitations specified in Part I.A, the permittee shall report the excursion in accordance with the requirements of Part III.D.

5. Any 30-day average, 7-day average or daily maximum that is in excess of the effluent limitation specified in Part I A may constitute evidence of a violation of such effluent limitation and of this permit and must be reported in the required

Discharge Monitoring Report. The Discharge Monitoring Report may be used as evidence of such violation in an enforcement proceeding.

6. Other measurements of oxygen demand (e.g., TOC and COD) may be substituted for five-day Biochemical Oxygen Demand (BOD_5) or for five-day Carbonaceous Biochemical Oxygen Demand ($CBOD_5$), as applicable, where the permittee can demonstrate long-term correlation of the method with BOD_5 or $CBOD_5$ values, as applicable. Details of the correlation procedures used must be submitted and prior approval granted by the permitting authority for this procedure to be acceptable. Data reported must also include evidence to show that the proper correlation continues to exist after approval.

7. The permittee shall report all non-compliance overflows with the Discharge Monitoring Report submittal. These reports shall be summarized and reported in tabular format. The summaries shall include: the date, time, duration, location, estimated volume, and cause of the overflow; observed environmental impacts from the overflow; actions taken to address the overflow; and ultimate discharge location if not contained (e.g., storm sewer system, ditch, tributary).

   Overflows that endanger health or the environment shall be orally reported to EPA at (214) 665-6595, within 24 hours from the time the permittee becomes aware of the circumstance. A written report of overflows that endanger health or the environment shall be provided to EPA within 5 days of the time the permittee becomes aware of the circumstance.

D. POLLUTION PREVENTION REQUIREMENTS

The permittee shall institute a program within 12 months of the effective date of the permit (or continue an existing one) directed towards optimizing the efficiency and extending the useful life of the facility. The permittee shall consider the following items in the program:

1. The influent loadings, flow and design capacity;
2. The effluent quality and plant performance;
3. The age and expected life of the wastewater treatment facility's equipment;
4. Bypasses and overflows of the tributary sewerage system and treatment works;
5. New developments at the facility;
6. Operator certification and training plans and status;
7. The financial status of the facility;
8. Preventative maintenance programs and equipment conditions and;
9. An overall evaluation of conditions at the facility.

PART II - OTHER CONDITIONS

A. 24-HOUR ORAL REPORTING: EFFLUENT LIMITATION VIOLATIONS

Under the provisions of Part III.D.7 of this permit, violations of effluent limitations for the following pollutants shall be reported orally to EPA Region 6, Compliance and Assurance Division, Water Enforcement Branch (6EN-W), Dallas, Texas within 24 hours from the time the permittee becomes aware of the violation followed by a written report in five days.

TRC
Bacteria

B. PERMIT MODIFICATION AND REOPENER

In accordance with 40 CFR Part 122.44(d), the permit may be reopened and modified during the life of the permit if relevant portions of Texas's Surface Water Quality Standards or its Procedures to Implement the Texas Surface Water Quality Standards are revised, or new State Surface Water Quality Standards are established and/or remanded and/or if any revisions to applicable Total Maximum Daily Loads are completed.

In accordance with 40 CFR Part 122.62(s)(2), the permit may be reopened and modified if new information is received that was not available at the time of permit issuance that would have justified the application of different permit conditions at the time of permit issuance. Permit modifications shall reflect the results of any of these actions and shall follow regulations listed at 40 CFR Part 124.5.

C. CONTRIBUTING INDUSTRIES AND PRETREATMENT REQUIREMENTS

1. The following pollutants may not be introduced into the treatment facility:

   (a) Pollutants which create a fire or explosion hazard in the publicly owned treatment works (POTW), including, but not limited to, wastestreams with a closed cup flashpoint of less than 140 degrees Fahrenheit or 60 degrees Centigrade using the test methods specified in 40 CFR 261.21;

   (b) Pollutants which will cause corrosive structural damage to the POTW, but in no case discharges with pH lower than 5.0, unless the works are specifically designed to accommodate such discharges;

   (c) Solid or viscous pollutants in amounts which will cause obstruction to the flow in the POTW, resulting in Interference;

(d) Any pollutant, including oxygen demanding pollutants (BOD, etc.), released in a discharge at a flow rate and/or pollutant concentration which will cause Interference with the POTW;

(e) Heat in amounts which will inhibit biological activity in the POTW resulting in Interference, but in no case heat in such quantities that the temperature at the POTW treatment plant exceeds 40 degrees Centigrade (104 degrees Fahrenheit) unless the Approval Authority, upon request of the POTW, approves the alternate temperature limit;

(f) Petroleum oil, non biodegradable cutting oil, or products of mineral origin in amounts that will cause interference or pass through;

(g) Pollutants which result in the presence of toxic gases, vapors, or fumes within the POTW in a quantity that may cause acute worker health and safety problems; and

(h) Any trucked or hauled pollutants, except at discharge points designated by the POTW.

2. The permittee shall require any indirect discharger to the treatment works to comply with the reporting requirements of Sections 204(b), 307, and 308 of the Act, including any requirements established under 40 CFR Part 403.

3. The permittee shall provide adequate notice of the following:

(a) Any new introduction of pollutants into the treatment works from an indirect discharger which would be subject to Sections 301 and 306 of the Act if it were directly discharging those pollutants; and

(b) Any substantial change in the volume or character of pollutants being introduced into the treatment works.

(c) Any notice shall include information on (i) the quality and quantity of effluent to be introduced into the treatment works, and (ii) any anticipated impact of such change in the quality or quantity of effluent to be discharged from the publicly owned treatment works.

D. **WHOLE EFFLUENT TOXICITY MONITORING (7 DAY CHRONIC NOEC FRESHWATER)** Fathead Minnow (*Pimephales promelas*)

It is unlawful and a violation of this permit for a permittee or his designated agent, to manipulate test samples in any manner, to delay sample shipment, or to terminate or to cause to terminate a

toxicity test. Once initiated, all toxicity tests must be completed unless specific authority has been granted by EPA Region 6.

1. SCOPE AND METHODOLOGY

a. The permittee shall test the effluent for toxicity in accordance with the provisions in this section.

APPLICABLE TO FINAL OUTFALL(S):	001
REPORTED ON DMR AS FINAL OUTFALL:	TX1
CRITICAL DILUTION (%):	78%
EFFLUENT DILUTION SERIES (%):	0, 25, 33, 44, 59, 78, 100%
COMPOSITE SAMPLE TYPE:	Defined at PART I
TEST SPECIES/METHODS:	40 CFR Part 136

Pimephales promelas (Fathead minnow) chronic static renewal 7-day larval survival and growth test, Method 1000.0, EPA 821 R 02 013, or the most recent update thereof. A minimum of five (5) replicates with eight (8) organisms per replicate must be used in the control and in each effluent dilution of this test.

b. Chronic lethal test failure is defined as a demonstration of a statistically significant lethal effect at test completion to a test species at the effluent critical dilution. Chronic sub-lethal test failure is defined as a demonstration of a statistically significant sub-lethal effect (i.e., growth or reproduction) at test completion to a test species at the critical dilution.

c. This permit may be reopened to require whole effluent toxicity limits, chemical specific effluent limits, additional testing, and/or other appropriate actions to address toxicity.

2. PERSISTENT LETHAL and/or SUB-LETHAL EFFECTS

The requirements of this subsection apply only when a toxicity test demonstrates significant lethal and/or sub-lethal effects at or below the critical dilution. The purpose of additional tests (also referred to as 'retests' or confirmation tests) is to determine the duration of a toxic event. A test that meets all test acceptability criteria and demonstrates significant toxic effects does not need additional confirmation. Such testing cannot confirm or disprove a previous test result.

If any valid test demonstrates significant lethal or sub-lethal effects to a test species at or below the critical dilution, the frequency of testing for that species is automatically increased to once per quarter for the life of the permit.

a. Part I Testing Frequency Other Than Monthly

i. The permittee shall conduct a total of three (3) additional tests for any species that demonstrates significant toxic effects at or below the critical dilution. The additional tests shall be conducted monthly during the next three consecutive months. If testing on a quarterly basis, the permittee may substitute one of the additional tests in lieu of one routine toxicity test. A full report shall be prepared for each test required by this section in accordance with procedures outlined in Item 4 of this section and submitted with the period discharge monitoring report (DMR) to the permitting authority for review.

ii. IF LETHAL EFFECTS HAVE BEEN DEMONSTRATED If any of the additional tests demonstrates significant lethal effects at or below the critical dilution, the permittee shall initiate Toxicity Reduction Evaluation (TRE) requirements as specified in Item 5 of this section. The permittee shall notify EPA in writing within 5 days of the failure of any retest, and the TRE initiation date will be the test completion date of the first failed retest. A TRE may also be required due to a demonstration of intermittent lethal effects at or below the critical dilution, or for failure to perform the required retests.

iii. IF ONLY SUB-LETHAL EFFECTS HAVE BEEN DEMONSTRATED If any two of the three additional tests demonstrates significant sub-lethal effects at 75% effluent or lower, the permittee shall initiate the Sub-Lethal Toxicity Reduction Evaluation (TRE_{SL}) requirements as specified in Item 5 of this section. The permittee shall notify EPA in writing within 5 days of the failure of any retest, and the Sub-Lethal Effects TRE initiation date will be the test completion date of the first failed retest. A TRE may also be required for failure to perform the required retests.

iv. The provisions of Item 2.a.i. are suspended upon submittal of the TRE Action Plan.

3. REQUIRED TOXICITY TESTING CONDITIONS

a. Test Acceptance

The permittee shall repeat a test, including the control and all effluent dilutions, if the procedures and quality assurance requirements defined in the test methods or in this permit are not satisfied, including the following additional criteria:

i. The toxicity test control (0% effluent) must have survival equal to or greater than 80%.

ii. The mean dry weight of surviving Fathead minnow larvae at the end of the 7 days in the control (0% effluent) must be 0.25 mg per larva or greater.

iii. The percent coefficient of variation between replicates shall be 40% or less in the control (0% effluent) for the growth and survival endpoints of the Fathead minnow test.

iv. The percent coefficient of variation between replicates shall be 40% or less in the critical dilution, unless significant lethal or nonlethal effects are exhibited for the growth and survival endpoints of the Fathead minnow test.

v. A PMSD range of 12 - 30 for Fathead minnow growth.

Test failure may not be construed or reported as invalid due to a coefficient of variation value of greater than 40%. A repeat test shall be conducted within the required reporting period of any test determined to be invalid.

b. Statistical Interpretation

i. For the fathead minnow larval survival and growth tests, the statistical analyses used to determine if there is a significant difference between the control and an effluent dilution shall be in accordance with the methods described in the "Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, Fourth Edition" EPA-821-R-02-013), or the most recent update thereof.

ii. The permittee is responsible for reviewing test concentration-response relationships to ensure that calculated test-results are interpreted and reported correctly. The EPA manual, "Method Guidance and Recommendation for Whole Effluent Toxicity (WET) Testing (40 CFR Part 136)" (EPA 821-B-00-004) provides guidance on determining the validity of test results.

iii. The NOEC is defined as the greatest effluent dilution at which no significant effect is demonstrated. The Lowest Observed Effect Concentration (LOEC) is defined as the lowest effluent dilution at which a significant effect is demonstrated. A significant effect is herein defined as a statistically significant difference at the 95% confidence level between the survival, reproduction, or growth of the test organism(s) in a specified effluent dilution compared to the survival, reproduction, or growth of the test organism(s) in the control (0% effluent).

iv. The use of NOECs and LOECs assumes either a monotonic (continuous) concentration response relationship or a threshold model of the concentration-response relationship. For any test result that demonstrates a non-monotonic (non-continuous) response, the NOEC should be determined based on the guidance manual referenced above and a full report will be submitted to EPA attached to the DMR for that reporting period.

v. Test results that demonstrate a non-monotonic (non-continuous) concentration-response relationship may be submitted, prior to the due date, for technical review. The above-referenced guidance manual will be used when making a determination of test acceptability.

vi. EPA will review test results for consistency with established EPA regulations, policies, procedures, and permit requirements.

If the conditions of Test Acceptability are met in Item 3.a above and the percent survival of the test organism is equal to or greater than 80% in the critical dilution concentration and all lower dilution concentrations, the survival test shall be considered to be a passing test, and the permittee may report a survival NOEC of not less than the critical dilution for the DMR reporting requirements found in Item 4 below.

c. Dilution Water

i. Dilution water used in the toxicity tests will be receiving water collected as close to the point of discharge as possible but unaffected by the discharge. The permittee shall substitute synthetic dilution water of similar pH, hardness, and alkalinity to the closest downstream perennial water for;

(A) toxicity tests conducted on effluent discharges to receiving water classified as intermittent streams; and

(B) toxicity tests conducted on effluent discharges where no receiving water is available due to zero flow conditions.

ii. If the receiving water is unsatisfactory as a result of instream toxicity (fails to fulfill the test acceptance criteria of Item 3.a), the permittee may substitute synthetic dilution water for the receiving water in all subsequent tests provided the unacceptable receiving water test met the following stipulations:

(A) a synthetic dilution water control which fulfills the test acceptance requirements of Item 3.a was run concurrently with the receiving water control;

(B) the test indicating receiving water toxicity has been carried out to completion (i.e., 7 days);

(C) the permittee includes all test results indicating receiving water toxicity with the full report and information required by Item 4 below; and

(D) the synthetic dilution water shall have a pH, hardness, and alkalinity similar to that of the receiving water or closest downstream perennial water not adversely affected by the

discharge, provided the magnitude of these parameters will not cause toxicity in the synthetic dilution water.

d. Samples and Composites

i. The permittee shall collect a minimum of three flow-weighted composite samples from the outfall(s) listed at Item 1.a above.

ii. The permittee shall collect second and third composite samples for use during 24-hour renewals of each dilution concentration for each test. The permittee must collect the composite samples such that the effluent samples are representative of any periodic episode of chlorination, biocide usage or other potentially toxic substance discharged on an intermittent basis.

iii. The permittee must collect the composite samples so that the maximum holding time for any effluent sample shall not exceed 72 hours. The permittee must have initiated the toxicity test within 36 hours after the collection of the last portion of the first composite sample. Samples shall be chilled to 6 degrees Centigrade during collection, shipping, and/or storage.

iv. If the flow from the outfall(s) being tested ceases during the collection of effluent samples, the requirements for the minimum number of effluent samples, the minimum number of effluent portions and the sample holding time are waived during that sampling period. However, the permittee must collect an effluent composite sample volume during the period of discharge that is sufficient to complete the required toxicity tests with daily renewal of effluent. When possible, the effluent samples used for the toxicity tests shall be collected on separate days if the discharge occurs over multiple days. The effluent composite sample collection duration and the static renewal protocol associated with the abbreviated sample collection must be documented in the full report required in Item 4 of this section.

4. REPORTING

a. The permittee shall prepare a full report of the results of all tests conducted pursuant to this section in accordance with the Report Preparation Section of EPA/821/R-02-013, or the most current publication, for every valid or invalid toxicity test initiated whether carried to completion or not. The permittee shall retain each full report pursuant to the provisions of PART III.C.3 of this permit. The permittee shall submit a copy of each full report to EPA for every test initiated during the monitoring period, including any test which fails, is considered invalid or which is terminated early for any reason.

b. A valid test for each species must be reported on the DMR during each reporting period specified in PART I of this permit unless the permittee is performing a TRE which may increase the frequency of testing and reporting. Only ONE set of biomonitoring data for each species is to be recorded on the DMR for each reporting period. The data submitted should

reflect the LOWEST lethal and sub-lethal effects results during the reporting period. All invalid tests, repeat tests (for invalid tests), and retests (for tests previously failed) performed during the reporting period must be attached to the DMR for EPA review.

c. The permittee shall submit the results of each valid toxicity test on the subsequent monthly DMR for that reporting period in accordance with PART III.D.4 of this permit, as follows below. Submit retest information clearly marked as such with the following month's DMR. Only results of valid tests are to be reported on the DMR.

i. Pimephales promelas (Fathead Minnow)

(A) If the No Observed Effect Concentration (NOEC) for survival is less than the critical dilution, enter a '1'; otherwise, enter a '0' for Parameter No. TLP6C

(B) Report the NOEC value for survival, Parameter No. TOP6C

(C) Report the Lowest Observed Effect Concentration (LOEC) value for survival, Parameter No. TXP6C

(D) Report the NOEC value for growth, Parameter No. TPP6C

(E) Report the LOEC value for growth, Parameter No. TYP6C

(F) If the No Observed Effect Concentration (NOEC) for growth is less than the critical dilution, enter a '1'; otherwise, enter a '0' for Parameter No. TGP6C

(G) Report the highest (critical dilution or control) Coefficient of Variation, Parameter No. TQP6C

d. Enter the following codes on the DMR for retests only:

(A) For retest number 1, Parameter 22415, enter a '1' if the NOEC for survival is less than the critical dilution; otherwise, enter a '0'

(B) For retest number 2, Parameter 22416, enter a '1' if the NOEC for survival is less than the critical dilution; otherwise, enter a '0'

5. TOXICITY REDUCTION EVALUATIONS (TREs) (Fathead Minnow only)

TREs for lethal and sub-lethal effects are performed in a very similar manner. EPA Region 6 is currently addressing TREs as follows: a sub-lethal TRE (TRE_{SL}) is triggered based on three sub-lethal test failures while a lethal effects TRE (TRE_L) is triggered based on only two test failures for lethality.

a. Within ninety (90) days of confirming persistent toxicity, the permittee shall submit a Toxicity Reduction Evaluation (TRE) Action Plan and Schedule for conducting a TRE. The TRE Action Plan shall specify the approach and methodology to be used in performing the TRE. A Toxicity Reduction Evaluation is an investigation intended to determine those actions necessary to achieve compliance with water quality-based effluent limits by reducing an effluent's toxicity to an acceptable level. A TRE is defined as a step-wise process which combines toxicity testing and analyses of the physical and chemical characteristics of a toxic effluent to identify the constituents causing effluent toxicity and/or treatment methods which will reduce the effluent toxicity. The goal of the TRE is to maximally reduce the toxic effects of effluent at the critical dilution and includes the following:

i. Specific Activities. The plan shall detail the specific approach the permittee intends to utilize in conducting the TRE. The approach may include toxicity characterizations, identifications and confirmation activities, source evaluation, treatability studies, or alternative approaches. When the permittee conducts Toxicity Characterization Procedures the permittee shall perform multiple characterizations and follow the procedures specified in the documents 'Methods for Aquatic Toxicity Identification Evaluations: Phase I Toxicity Characterization Procedures' (EPA-600/6-91/003) and 'Toxicity Identification Evaluation: Characterization of Chronically Toxic Effluents, Phase I' (EPA-600/6-91/005F), or alternate procedures. When the permittee conducts Toxicity Identification Evaluations and Confirmations, the permittee shall perform multiple identifications and follow the methods specified in the documents 'Methods for Aquatic Toxicity Identification Evaluations, Phase II Toxicity Identification Procedures for Samples Exhibiting Acute and Chronic Toxicity' (EPA/600/R-92/080) and 'Methods for Aquatic Toxicity Identification Evaluations, Phase III Toxicity Confirmation Procedures for Samples Exhibiting Acute and Chronic Toxicity' (EPA/600/R-92/081), as appropriate.

The documents referenced above may be obtained through the National Technical Information Service (NTIS) by phone at (703) 487-4650, or by writing:

U.S. Department of Commerce
National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161

ii. Sampling Plan (e.g., locations, methods, holding times, chain of custody, preservation, etc.). The effluent sample volume collected for all tests shall be adequate to perform the toxicity test, toxicity characterization, identification and confirmation procedures, and conduct chemical specific analyses when a probable toxicant has been identified;

Where the permittee has identified or suspects specific pollutant(s) and/or source(s) of effluent toxicity, the permittee shall conduct, concurrent with toxicity testing, chemical specific analyses for the identified and/or suspected pollutant(s) and/or source(s) of effluent toxicity. Where

lethality was demonstrated within 48 hours of test initiation, each composite sample shall be analyzed independently. Otherwise the permittee may substitute a composite sample, comprised of equal portions of the individual composite samples, for the chemical specific analysis;

iii. Quality Assurance Plan (e.g., QA/QC implementation, corrective actions, etc.); and

iv. Project Organization (e.g., project staff, project manager, consulting services, etc.).

b. The permittee shall initiate the TRE Action Plan within thirty (30) days of plan and schedule submittal. The permittee shall assume all risks for failure to achieve the required toxicity reduction.

c. The permittee shall submit a quarterly TRE Activities Report, with the Discharge Monitoring Report in the months of January, April, July and October, containing information on toxicity reduction evaluation activities including:

i. any data and/or substantiating documentation which identifies the pollutant(s) and/or source(s) of effluent toxicity;

ii. any studies/evaluations and results on the treatability of the facility's effluent toxicity; and

iii. any data which identifies effluent toxicity control mechanisms that will reduce effluent toxicity to the level necessary to meet no significant lethality at the critical dilution.

A copy of the TRE Activities Report shall also be submitted to the state agency.

d. The permittee shall submit a Final Report on Toxicity Reduction Evaluation Activities no later than twenty-eight (28) months from confirming lethality in the retests, which provides information pertaining to the specific control mechanism selected that will, when implemented, result in reduction of effluent toxicity to no significant lethality at the critical dilution. The report will also provide a specific corrective action schedule for implementing the selected control mechanism.

A copy of the Final Report on Toxicity Reduction Evaluation Activities shall also be submitted to the state agency.

e. Quarterly testing during the TRE is a minimum monitoring requirement. EPA recommends that permittees required to perform a TRE not rely on quarterly testing alone to ensure success in the TRE, and that additional screening tests be performed to capture toxic samples for identification of toxicants. Failure to identify the specific chemical compound

causing toxicity test failure will normally result in a permit limit for whole effluent toxicity limits per federal regulations at 40 CFR 122.44(d)(1)(v).

6. MONITORING FREQUENCY REDUCTION

a. The permittee may apply for a testing frequency reduction upon the successful completion of the first four consecutive quarters of testing for the Fathead minnow test species, with no lethal or sub-lethal effects demonstrated at or below the critical dilution. If granted, the monitoring frequency may be reduced to not less than once per six months.

b. CERTIFICATION - The permittee must certify in writing that no test failures have occurred and that all tests meet all test acceptability criteria in item 3.a. above. In addition the permittee must provide a list with each test initiated including test initiation date, species, NOECs for lethal and sub-lethal effects and the maximum coefficient of variation for the controls. Upon review and acceptance of this information the agency will issue a letter of confirmation of the monitoring frequency reduction. A copy of the letter will be forwarded to the agency's Permit Compliance System section to update the permit reporting requirements.

c. SUB-LETHAL OR SURVIVAL FAILURES - If any test fails the survival or sub-lethal endpoint at any time during the life of this permit, three monthly retests are required and the monitoring frequency for the affected test species shall be increased to once per quarter until the permit is re-issued. Monthly retesting is not required if the permittee is performing a TRE.

Any monitoring frequency reduction granted applies only until the expiration date of this permit, at which time the monitoring frequency reverts to once per quarter until the permit is re-issued.

E. WHOLE EFFLUENT TOXICITY LIMITS (7 DAY CHRONIC NOEC FRESHWATER) *Ceriodaphnia dubia*

It is unlawful and a violation of this permit for a permittee or his designated agent, to manipulate test samples in any manner, to delay sample shipment, or to terminate or to cause to terminate a toxicity test. Once initiated, all toxicity tests must be completed unless specific authority has been granted by EPA Region 6.

a. The permittee shall test the effluent for toxicity in accordance with the provisions in this section.

APPLICABLE TO FINAL OUTFALL(S):	001
REPORTED ON DMR AS FINAL OUTFALL:	TX1
CRITICAL DILUTION (%):	78
EFFLUENT DILUTION SERIES (%):	0, 25, 33, 44, 59, 78, 100%

COMPOSITE SAMPLE TYPE: Defined at PART I

TEST SPECIES/METHODS: 40 CFR Part 136

Ceriodaphnia dubia chronic static renewal survival and reproduction test, Method 1002.0, EPA-821-R-02-013, or the most recent update thereof. This test should be terminated when 60% of the surviving females in the control produce three broods or at the end of eight days, whichever comes first.

b. Chronic lethal test failure is defined as a demonstration of a statistically significant lethal effect at test completion to a test species at the critical dilution. Chronic sub-lethal test failure is defined as a demonstration of a statistically significant sub-lethal effect (i.e., growth or reproduction) at test completion to a test species at the critical dilution.

c. The conditions of this item are effective beginning with the effective date of the WET limit. When the testing frequency stated above is less than monthly and the effluent fails a test endpoint at or below the critical dilution, the permittee shall be considered in violation of this permit limit and the frequency for the affected species will increase to monthly until such time compliance with the No Observed Effect Concentration (NOEC) effluent limitation is demonstrated for a period of three consecutive months, at which time the permittee may return to the testing frequency stated in PART I of this permit. During the period the permittee is out of compliance, test results shall be reported on the DMR for that reporting period. The purpose of additional tests (also referred to as 'retests' or confirmation tests) is to determine the duration of a toxic event. A test that meets all test acceptability criteria and demonstrates significant toxic effects does not need additional confirmation. Such testing cannot confirm or disprove a previous test result.

d. This permit may be reopened to require chemical specific effluent limits, additional testing, and/or other appropriate actions to address toxicity.

2. REQUIRED TOXICITY TESTING CONDITIONS

a. Test Acceptance

The permittee shall repeat a test, including the control and all effluent dilutions, if the procedures and quality assurance requirements defined in the test methods or in this permit are not satisfied, including the following additional criteria:

i. The toxicity test control (0% effluent) must have survival equal to or greater than 80%.

ii. The mean number of *Ceriodaphnia dubia* neonates produced per surviving female in the control (0% effluent) must be 15 or more.

iii. 60% of the surviving control females must produce three broods.

iv. The percent coefficient of variation between replicates shall be 40% or less in the control (0% effluent) for: the young of surviving females in the *Ceriodaphnia dubia* reproduction test.

v. The percent coefficient of variation between replicates shall be 40% or less in the critical dilution, unless significant lethal or nonlethal effects are exhibited for: the young of surviving females in the *Ceriodaphnia dubia* reproduction test.

vi. A Percent Minimum Significant Difference (PMSD) range of 13 - 47 for *Ceriodaphnia dubia* reproduction.

Test failure may not be construed or reported as invalid due to a coefficient of variation value of greater than 40%. A repeat test shall be conducted within the required reporting period of any test determined to be invalid.

b. Statistical Interpretation

i. For the water flea survival test, the statistical analyses used to determine if there is a significant difference between the control and an effluent dilution shall be Fisher's Exact Test as described in the "Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, Fourth Edition" (EPA-821-R-02-013), or the most recent update thereof.

ii. For the water flea reproduction test the statistical analyses used to determine if there is a significant difference between the control and an effluent dilution shall be in accordance with the methods described in the "Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, Fourth Edition" EPA-821-R-02-013), or the most recent update thereof.

iii. The permittee is responsible for reviewing test concentration-response relationships to ensure that calculated test-results are interpreted and reported correctly. The EPA manual, "Method Guidance and Recommendation for Whole Effluent Toxicity (WET) Testing (40 CFR Part 136)" (EPA 821-B-00-004) provides guidance on determining the validity of test results.

iv. The NOEC is defined as the greatest effluent dilution at which no significant effect is demonstrated. The Lowest Observed Effect Concentration (LOEC) is defined as the lowest effluent dilution at which a significant effect is demonstrated. A significant effect is

herein defined as a statistically significant difference at the 95% confidence level between the survival, reproduction, or growth of the test organism(s) in a specified effluent dilution compared to the survival, reproduction, or growth of the test organism(s) in the control (0% effluent).

v. The use of NOECs and LOECs assumes either a monotonic (continuous) concentration response relationship or a threshold model of the concentration-response relationship. For any test result that demonstrates a non-monotonic (non-continuous) response, the NOEC should be determined based on the guidance manual referenced above and a full report will be submitted to EPA attached to the DMR for that reporting period.

vi. Test results that demonstrate a non-monotonic (non-continuous) concentration-response relationship may be submitted, prior to the due date, for technical review. The above-referenced guidance manual will be used when making a determination of test acceptability.

vii. EPA will review test results for consistency with established EPA regulations, policies, procedures, and permit requirements.

If the conditions of Test Acceptability are met in Item 2.a above and the percent survival of the test organism is equal to or greater than 80% in the critical dilution concentration and all lower dilution concentrations, the survival test shall be considered to be a passing test, and the permittee may report a survival NOEC of not less than the critical dilution for the DMR reporting requirements found in Item 3 below.

c. Dilution Water

i. Dilution water used in the toxicity tests will be receiving water collected as close to the point of discharge as possible but unaffected by the discharge. The permittee shall substitute synthetic dilution water of similar pH, hardness, and alkalinity to the closest downstream perennial water where the receiving stream is classified as intermittent or where the receiving stream has no flow due to zero flow conditions.

ii. If the receiving water is unsatisfactory as a result of instream toxicity (fails to fulfil the test acceptance criteria of Item 2.a), the permittee may substitute synthetic dilution water for the receiving water in all subsequent tests provided the unacceptable receiving water test met the following stipulations:

(A) a synthetic dilution water control which fulfils the test acceptance requirements of Item 2.a was run concurrently with the receiving water control;

(B) the test indicating receiving water toxicity has been carried out to completion (i.e., 7 days);

(C) the permittee includes all test results indicating receiving water toxicity with the full report and information required by Item 3.a below; and

(D) the synthetic dilution water shall have a pH, hardness, and alkalinity similar to that of the receiving water or closest downstream perennial water not adversely affected by the discharge, provided the magnitude of these parameters will not cause toxicity in the synthetic dilution water.

d. Samples and Composites

i. The permittee shall collect a minimum of three flow-weighted composite samples from the outfall(s) listed at Item 1.a above.

ii. The permittee shall collect second and third composite samples for use during 24-hour renewals of each dilution concentration for each test. The permittee must collect the composite samples such that the effluent samples are representative of any periodic episode of chlorination, biocide usage or other potentially toxic substance discharged on an intermittent basis.

iii. The permittee must collect the composite samples so that the maximum holding time for any effluent sample shall not exceed 72 hours. The permittee must have initiated the toxicity test within 36 hours after the collection of the last portion of the first composite sample. Samples shall be chilled to 6 degrees Centigrade during collection, shipping, and/or storage.

iv. If the flow from the outfall(s) being tested ceases during the collection of effluent samples, the requirements for the minimum number of effluent samples, the minimum number of effluent portions and the sample holding time are waived during that sampling period. However, the permittee must collect an effluent composite sample volume during the period of discharge that is sufficient to complete the required toxicity tests with daily renewal of effluent. When possible, the effluent samples used for the toxicity tests shall be collected on separate days if the discharge occurs over multiple days. The effluent composite sample collection duration and the static renewal protocol associated with the abbreviated sample collection must be documented in the full report required in Item 3 of this section.

3. REPORTING

a. The permittee shall prepare a full report of the results of all tests conducted pursuant to this section in accordance with the Report Preparation Section of EPA-821-R-02-013, or the most current publication, for every valid or invalid toxicity test initiated whether carried to completion or not. The permittee shall retain each full report pursuant to the provisions of PART III.C.3 of this permit. The permittee shall submit a copy of each full report to EPA for every test initiated during the monitoring period, including any test which fails, is considered invalid or which is terminated early for any reason.

b. The permittee shall report the Whole Effluent Toxicity values for the 30-Day Average NOEC and the 7-Day Minimum NOEC under Parameter No. 22414 on the DMR for that reporting period in accordance with PART III.D.4 of this permit.

If more than one valid test for a species was performed during the reporting period, the test NOEC's may be averaged arithmetically and reported as the DAILY AVERAGE MINIMUM NOEC for that reporting period.

The permittee shall report the LOWEST 30-Day Average Minimum NOEC and the lowest 7-Day Minimum NOEC for Whole Effluent Toxicity.

A valid test must be reported on the DMR during each reporting period specified in PART I of this permit. Only ONE set of biomonitoring data for each species tested is to be recorded on the DMR for each reporting period. The data submitted should reflect the LOWEST lethal and sub-lethal effects results for each species during the reporting period. All invalid tests, repeat tests (for invalid tests), and retests (for tests previously failed) performed during the reporting period must be attached to the DMR for EPA review.

c. The permittee shall submit the results of the valid toxicity test on the DMR for that reporting period in accordance with PART III.D.4 of this permit, as follows below. Submit retest information clearly marked as such with the following month's DMR. Only results of valid tests are to be reported on the DMR.

i. Ceriodaphnia dubia

A. If the NOEC for toxicity is less than the critical dilution, enter a "1"; otherwise, enter a "0" for Parameter No. TLP3B

B. Report the NOEC value for survival, Parameter No. TOP3B

C. Report the LOEC value for survival, Parameter No. TXP3B

D. Report the NOEC value for reproduction, Parameter No. TPP3B

E. Report the LOEC value for reproduction, Parameter No. TYP3B

F. If the No Observed Effect Concentration (NOEC) for reproduction is less than the critical dilution, enter a "1"; otherwise, enter a "0" for Parameter No. TGP3B

G. Report the higher (critical dilution or control) Coefficient of Variation, Parameter No. TQP3B

F. MINIMUM QUANTIFICATION LEVEL (MQL)

If any individual analytical test result is less than the minimum quantification level listed below, a value of zero (0) may be used for that individual result for the Discharge Monitoring Report (DMR) calculations and reporting requirements.

Pollutant	MQL (ug/l)
Copper	0.5

NPDES PERMIT NO. TX0054186
FACT SHEET

FOR THE DRAFT NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT TO DISCHARGE TO WATERS OF THE UNITED STATES

I. APPLICANT

San Jacinto River Authority (SJRA)
Woodlands Wastewater Treatment Plant No. 1
2436 Sawdust Road
The Woodlands, TX 77380

II. ISSUING OFFICE

U.S. Environmental Protection Agency
Region 6
1445 Ross Avenue
Dallas, TX 75202-2733

III. PREPARED BY

Laurence E. Giglio
Environmental Engineer
NPDES Permits & Technical Branch (6WQ-PP)
Water Quality Protection Division
VOICE: 214-665-6639
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EMAIL: giglio.larry@epa.gov

IV. DATE PREPARED

January 20, 2009

V. PERMIT ACTION

The Environmental Protection Agency (EPA) proposes to modify the National Pollutant Discharge Elimination System (NPDES) permit issued on September 29, 2007. This permit was the subject of a petition before EPA's Environmental Appeals Board (EAB) before specific contested provisions of the permit were withdrawn. Those provisions of the permit that were not withdrawn remain in effect. This action modifies the existing permit to addresses those then-contested elements that were withdrawn. Unless otherwise stated, citations to "40 CFR" refer to EPA regulations published in Title 40 of the Code of Federal Regulations. Citations to 30 TAC refer to promulgated regulations listed in Title 30 of Texas Administrative Code.

VI. MODIFICATIONS TO EXISTING PERMIT

Modifications to the permit issued on September 28, 2007, with an effective date of November 1, 2007, and an expiration date of October 31, 2012, are:

A. New limitations for E. coli have been added.
B. Report requirements have been added for copper.
C. Whole effluent toxicity limits have been added with a three-year compliance schedule.
D. Outfall 002 has been established as a separate outfall with limitations for 5-day carbonaceous biochemical oxygen demand, ammonia nitrogen and dissolved oxygen more stringent than their limits when they were included in Outfall 001.
E. Outfall 002 has a maximum daily rate limitation.

VII. DISCHARGE LOCATION

As described in the application, the plant site is located at 2436 Sawdust Road, The Woodlands, Montgomery County, Texas. The discharge from the facility is through Outfalls 001 and 002. Outfall 001 is located at Latitude 30° 08' 06" North, Longitude 95° 28' 38" West. Outfall 002 is located at Latitude 30° 08' 31.5" North, Longitude 95° 28' 14.9" West.

VIII. APPLICANT ACTIVITY

Under the Standard Industrial Classification (SIC) Code 4952, the applicant operates a publicly owned treatment works (POTW), serving a population of 37,333.

The treatment provided at the facility includes bar screens, a degritter, aeration basins, secondary clarifiers, tertiary filters to enhance sediment control, followed by chlorine contact chambers, aeration, dechlorination then metering and discharge through the outfall. The design flow for the plant is 7.8 MGD. Sludge is treated by aerobic digesters, gravity thickening and lastly a belt press. Sludge is disposed by land application as Class B biosolids. The facility has a sludge management and disposal plan on file.

IX. REASON FOR PERMIT MODIFICATION

The EPA proposed a draft permit for public notice and comment on December 7, 2007. SJRA filed comments to the draft permit on February 19, 2007. EPA responded to the comments filed by SJRA and issued a final permit on September 28, 2007. On October 29, 2007, SJRA filed a petition for review of certain conditions of the NPDES permit with the EAB. On March 6, 2008, the Texas Commission on Environmental Quality (TCEQ) notified EPA that the TCEQ information used by EPA to determine critical dilution in the permit was incorrect. Based on this notification, on March 14, 2008, EPA filed a notice with the EAB withdrawing the then-contested provisions of the permit. On March 28, 2008, the EAB issued an order dismissing the SJRA's petition with prejudice.

EPA is now proposing modifications to the permit that address whole effluent toxicity (WET) limits, bacteria limitations, and copper monitoring for Outfall 001. Regulations at 40 §CFR 124.19(d) authorize EPA to withdraw contested portions of a permit prior to the EAB rendering a decision granting or denying review of a permit decision, and to prepare a new draft permit.

Additionally, EPA is modifying the 5-day carbonaceous biochemical oxygen demand ($CBOD_5$), ammonia nitrogen (NH_3N), dissolved oxygen (DO) and flow limits for discharges from Outfall 002 to Harrison Lake.

X. DRAFT PERMIT MODIFICATION RATIONALE AND PROPOSED PERMIT CONDITIONS

A. WATER QUALITY SCREENING

1. General Comments

Pursuant to 40 CFR §122.44, the draft permit limits are based on either technology-based effluent limits, pursuant to 40 CFR §122.44(a) or on Texas Surface Water Quality Standards (WQS) and the requirements of 40 CFR §122.44(d), whichever are more stringent.

§ 301(b)(1)(C) of the Clean Water Act (CWA) requires that effluent limitations for point sources include any limitations necessary to meet water quality standards. 40 CFR §122.44(d) provides that if a discharge poses the reasonable potential to cause an in-stream excursion above a water quality criterion, the permit must contain an effluent limit for that pollutant. If the discharge has the reasonable potential to cause an in-stream violation of narrative standards, the permit must contain prohibitions to protect that standard.

Additionally, the WQS provide that "surface waters will not be toxic to man from ingestion of water, consumption of aquatic organisms, or contact with the skin, or to terrestrial or aquatic life." 30 TAC Chapter 307. The methodology to implement those WQS is outlined in the document, "Implementation of the Texas Commission on Environmental Quality Standards via Permitting" (IP). The IP is designed to insure compliance with 30 TAC Chapter 307 which establishes that no source will be allowed to discharge any wastewater which (1) results in instream aquatic toxicity, (2) causes a violation of an applicable narrative or numerical state water quality standard, (3) results in the endangerment of a drinking water supply, or (4) results in aquatic bioaccumulation which threatens human health.

The IP document is not a state water quality standard, but rather, a non-binding, non-regulatory guidance document. See IP at page 2 stating that "this is a guidance document and should not be interpreted as a replacement to the rules." EPA does not consider the IP to be a new or revised water quality standard and has never approved it as such. EPA did comment on and conditionally approve the IP as part of the Continuing Planning Process required under 40 CFR §130.5(c) and the Memorandum of Agreement between Texas Natural Resource Conservation Commission (now TCEQ) and EPA, but this does not constitute approval of the IP as a water

quality standard under CWA §303(c). Therefore, EPA is not bound by the IP in establishing limits in this permit – but rather, must ensure that the limits are consistent with the EPA-approved state WQS. Where IP procedures are consistent with state and federal law, EPA has made an effort to use those procedures.

2. Reasonable Potential - Procedures

Methods for the determination of permit limits are set forth in the IP. Wasteload allocations (WLAs) are calculated using estimated effluent dilutions, criteria outlined in the WQS and partitioning coefficients for metals when appropriate and designated in the IP. The WLA is the end-of-pipe effluent concentration that can be discharged and still meet instream criteria after mixing with the receiving stream. From the WLA, a long-term average (LTA) concentration is calculated for both chronic and acute toxicity, using a log-normal probability distribution, a given coefficient of variation (0.6), and either a 90th or a 99th percentile confidence level. The IP recommends use of the 90th percentile confidence level for discharges to rivers, freshwater streams and narrow tidal rivers with upstream flow data, and the 99th percentile confidence level is for the remainder of cases. For facilities that discharge into receiving streams that have human health standards, a separate LTA will be calculated. The implementation procedures for determining the human health LTA use a 99th percentile confidence level, along with an established coefficient of variation (0.6). The lowest of the calculated LTA's (acute, chronic and/or human health), is used to calculate the daily average and daily maximum permit limits.

The IP procedure for determining reasonable potential for chemical-specific permit limits is to compare the reported analytical data from the discharge monitoring report history and/or the application information against percentages of the calculated daily average water quality-based effluent limitation. The more stringent of the calculated water quality based effluent limitations are compared against analytical data included with the permit application. Under the Texas IP, a discharge would cause, have the reasonable potential to cause, or contribute to non-attainment of a WQS (i.e., permit limitations are required) when analytical data reported in the application exceed 85% of the calculated daily average water quality-based effluent limitation.

3. Rationale for Separate Outfall Limits

The uncontested portions of the permit have identical limitations for both Outfall's 001 and 002. On July 16, 2008, EPA approved an update to the Texas Water Quality Management Plan (WQMP) for discharges to tributaries of Spring Creek, Segment 1008 of the San Jacinto River Basin. (Copy of letter as Attachment E.) This update to the WQMP was the result of a DO model conducted by TCEQ to ensure that discharges from Outfall 001 to Panther Branch and from Outfall 002 to Harrison Lake; both tributaries to Spring Creek would be protective of DO levels in those waters. (Copy of letter as Attachment E) The DO model showed that 30-day average permit limits of 15 mg/l $CBOD_5$, 6 mg/l NH_3N and daily minimum 4 mg/l DO were protective of discharges from Outfall 001 to Panther Branch for the full design flow of 7.8 million gallons per day (MGD). However, those levels would not ensure DO protection for discharges from Outfall 002 to Harrison Lake. The DO model for Harrison Lake indicated that

for the full design flow of 7.8 MGD, no effluent limits could be recommended for Outfall 002. Prior to TCEQ's proposed WQMP update, SJRA consented to reduced flow and more restrictive pollutant treatment levels for Outfall 002 in a letter to TCEQ March 4, 2008. (Copy of letter as Attachment E.) The letter requested that Outfall 002 be permitted to 0.6 MGD, 30-day average permit limits of 7 mg/l $CBOD_5$, 2 mg/l NH_3N and a daily minimum 6 mg/l DO. The DO model limits the combined flow from both outfalls to a maximum of 7.8 MGD, the design flow of the facility.

The maximum flow rate of 0.6 MGD into Outfall 002 is considerably less than the minimum flow from the facility and will require that at any time discharge through Outfall 002 occurs; a significant portion of treated effluent will also have to discharge through Outfall 001. Therefore, when any discharge into Outfall 002 occurs, the most limiting permit conditions of either of the two outfalls will establish permit limits.

4. Reasonable Potential – Calculations

a. CRITICAL DILUTION - OUTFALL 001

The "critical dilution" refers to the amount of effluent flow in-stream relative to the entire stream flow under reasonable "low flow" conditions. NPDES permitting agencies use the critical dilution to determine the likelihood that a chemical pollutant may exceed a numeric criterion in applicable WQS and then, if necessary, to determine applicable permit limits and conditions. NPDES agencies also use the critical dilution to establish Whole Effluent Toxicity (WET) monitoring requirements, to determine the need for WET limits, and where necessary, those applicable WET limits.

The critical dilution, CD, is calculated as:

$$CD = Q_E / Q_E + Q_A$$

Where:
CD is the critical dilution
Q_E is the effluent flow, for a POTW the design flow, in millions of gallons per day (MGD),
Q_A is the low-flow or 7Q2, in MGD

The 7Q2 flow is a critical variable in determination of the critical dilution. The Texas IP states that "[e]ffluent limits in TPDES wastewater discharge permits are designed to maintain the applicable numerical water quality standards for the protection of aquatic life when instream flows are at or above the 7Q2." (See TCEQ IP document at page 43). The 7Q2 is defined in the WQS as "the lowest average stream flow for seven consecutive days with a recurrence interval of two years, as statistically determined from historical data." The EPA requested that TCEQ provide the critical dilution for this permit.

For development of the original draft permit on September 19, 2006, the TCEQ provided EPA with a 7Q2 of 2.2 cubic feet/second (cfs). After EPA had published the draft permit on December 7, 2006, the TCEQ provided EPA with a revised 7Q2 of 5.32 cfs based on a larger dataset of receiving stream flow measurements.

On March 6, 2008, prior to the filing of EPA's substantive response to the SJRA petition for review, the TCEQ notified EPA that the State had incorrectly calculated the revised 7Q2 due to a technical error, and that the correct 7Q2 value is 3.32 cfs. (Copy of email as attachment E).

In developing today's proposal, EPA used this 3.32 cfs value to calculate the critical dilution to be used for discharges into the receiving water, Spring Creek, TCEQ Segment 1008:

$CD = Q_E / Q_E + Q_A$

Where:

$Q_E = 7.8$ MGD

$Q_A = 3.32$ cfs or 2.146 MGD; based on 1 cfs = 0.646 MGD

$CD = 7.8 / 7.8 + 2.146$

$CD = 78.4\%$, rounded to 78%

b. CRITICAL DILUTION - OUTFALL 002

Critical dilutions for lakes are not calculated in the same manner as streams. TCEQ provided a critical dilution of 60% for discharges to Lake Harrison through Outfall 002. Since any flow through outfall 002 is simply a diversion from outfall 001 EPA has determined that all outfalls are required to meet the more restrictive 78% critical dilution

c. OUTFALL 002 LIMITATIONS

Effluent limitations established in the WQMP require more restrictive limits for $CBOD_5$, NH_3N and DO. Consistent with the approved WQMP, the flowing limitations are proposed in the draft permit.

Outfall 002

	lbs/day, unless noted		mg/l, unless noted	
Pollutant	30-Day Avg	7-Day Avg	30-Day Avg	7-Day Avg
$CBOD_5$	37.0	50.1	7	10
NH_3N	10.0	25.0	2	5

	mg/l, unless noted	
Pollutant	Minimum	Maximum
DO	6.0	N/A

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Mass limitations are calculated as follows:

Loading (lbs/day) = Pollutant concentration in mg/l × 8.345 lbs/gal × 0.6 MGD

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d. COPPER – OUTFALL 001

i. IP Procedures Regarding Monitoring-Only Requirements in Permits

The IP provides recommendations for the use of monitoring requirements in permits. The IP at p. 83 reads: "If the average of the effluent data equals or exceeds 70% but is less than 85% of the calculated daily average limit, monitoring for the toxic pollutant will usually be included as a condition in the permit." Monitoring requirements are often established in permits to evaluate levels of pollutant discharges over a longer period of time, particularly if a pollutant exhibits the potential for violating applicable WQS and, depending on this larger data set, may require the establishing of a limit upon permit renewal or through permit modification (through the standard reopener clause in permits).

ii. Effluent Data and Variability

SJRA submitted effluent values for copper shown in the table below as part of the original NPDES permit application, as part of its earlier Petition for Review to the EAB, as part of its Texas permit renewal application or as part of a toxicity investigation evaluation (TIE). The data show variability in copper effluent concentrations over a five-month period.

Date Sampled	Copper, ug/l	Source
May 5, 2006	12.6	NPDES Application
May 9, 2006	<10.0	NPDES Application
May 11, 2006	<10.0	NPDES Application
June 26, 2007	<10.0	Texas Application
July 3, 2006	9.5	TIE
October 2, 2006	9.16	TIE
October 4, 2006	9.4	TIE
October 6, 2006	8.52	TIE

The small sample set shows effluent variability in pollutant levels consistent with the varying nature of a POTW, which does not control the amount, nature or level of pollutant loading of the influent from residential, commercial and industrial sources. Using only the results reported above the level of detection, the mean for the five concentrations is 9.84 µg/l.

iii. TEXTOX Menu 3 Calculations

TCEQ uses a spreadsheet called TEXTOX to calculate the daily average limit. The TCEQ identifies which specific TEXTOX menu to use based on conditions outlined in the IP. Previously, TCEQ determined that for this discharger, the use of TEXTOX Menu 3, "Discharges to Freshwater Streams," is appropriate. As previously discussed, TCEQ provided to EPA the

7Q2 of 3.32 cfs and the harmonic mean flow of 11.43 cfs to be used in the spreadsheet. Additional data needed to perform the calculations are found in the WQS. Table 5 of the WQS presents segment specific values for TSS, pH, hardness, TDS, chlorides and sulfates. For the receiving stream, Segment Number 1008, TSS is 13 mg/l, pH is 6.7 su, hardness is 30 mg/l equivalent CaCO3, TDS is 239 mg/l, chloride is 53 mg/l and sulfate is 10 mg/l.

The EPA approved acute and chronic WQS for copper are hardness dependent (meaning the toxicity of the metal concentration in the effluent varies depending on the hardness of the receiving water) and are described as follows:

Acute: $e^{(0.9422\,[\ln(\text{hardness})] - 1.3844)}$
Chronic: $e^{(0.8545\,[\ln(\text{hardness})] - 1.386)}$

Using the 30 mg/l hardness value from Table 5 of the WQS, the calculated freshwater acute copper standard is 6.17 ug/l and the chronic copper standard is 4.57 ug/l and these values are shown on the attached Menu 3, Page 2, Aquatic Life, under the columns acute and chronic standards. The same page of Menu 3, under the column Daily Avg., shows that the daily average limit is 16.89 ug/l.

iv. Menu 3 Compared to Effluent Data

Based on the Texas IP recommendations, monitoring requirements for copper would normally be established when the effluent data is found to be greater than 70% of the daily average limit or 11.82 ug/l (16.89 ug/l × 0.70 = 11.82 ug/l). At least one data value, 12.6 ug/L, reported in the application is greater than this value.

v. Other Considerations

Among results of SJRA Toxicity Identification Evaluations evaluation report developed by Advent-Environ and presented to SJRA dated October 19, 2005, it was noted that Granular Activated Carbon (GAC) treatment was shown to reduce chronic toxicity measured as an impairment to reproductive success of aquatic life. The report states that only general conclusions can be drawn from these results because samples were not evaluated for chemical constituents. The report does discuss that reductions in toxicity by activated carbon treatment is an indicator of the presence of an "organic probably non-polar or metal such as zinc or copper."

vi. Rationale for Copper Monitoring

Effluent analysis shows that the level of copper in the effluent is variable. At least one sample in the limited data set occurred at a level above the TCEQ threshold level for requiring monitoring. The facility receives wastestreams from industrial activities where variable loadings of pollutants, including copper, may be present. As noted above, the applicant also submitted a TIE report which indicated that copper was a possible a contributor to its toxicity problems.

The inclusion of monitoring requirements is consistent with the CWA. Under CWA §308(a) and 402(b)(2), EPA has broad discretion to establish monitoring conditions in permits. The existence of the single evaluated data point suggests that the discharge may not assure compliance with applicable water quality standards. The proposed sampling and reporting of data over a longer period of time will generate a data set representative of a wider range of operational conditions including, but not limited to, climate conditions, such as wet weather events, varying flow rates and plant operations, upon which a more definitive determination regarding attainment of copper water quality standards can be established. Based on these considerations, EPA believes it is appropriate to establish a monitoring requirement for copper.

e. BACTERIA – OUTFALL 001

The Texas WQS for Spring Creek (Waterbody Segment 1008) include standards for E. coli bacteria to support contact recreation uses. The 30-day geometric mean is 126 colony forming units (cfu)/100 ml, and no single sample shall be greater than 394 cfu/100 ml. Additionally, Spring Creek is listed on the 2008 Texas list for impaired and threatened waters (developed pursuant to CWA § 303(d)) due to elevated bacteria levels. The stream was first listed as impaired for bacteria in 1996 and is classified on the 2008 Integrated Report (developed pursuant to both CWA §§303(d) and 305(b)) as a Category 5a waterbody. A Category 5a waterbody classification means that the waterbody does not meet applicable WQS or is threatened for one or more designated uses by one or more pollutants and that a TMDL is underway, scheduled, or will be scheduled.

The TCEQ has established a rule, "Domestic Wastewater Effluent Limitations and Plant Siting" published at 30 TAC §309, that addresses disinfection at POTWs. This rule "...promulgates a set of effluent quality limitations for treated domestic sewage which will be required of permittees as appropriate to maintain water quality in accordance with the commission's surface water quality standards." This rule further states "[w]here chlorination is utilized, any combination of detention time and chlorine residual where the product of chlorine (Cl_2 mg/l × Time (T minutes) equals or exceeds 20 is satisfactory provided that the minimum detention time is at least 20 minutes and the minimum residual is at least 0.5 mg/l." See 30 TAC 309.3(g)(2). TCEQ has not historically required bacterial monitoring for these facilities to verify whether these control measures are effective at controlling bacteria to levels necessary to protect recreational uses. As a practical matter, the State implicitly recognizes that POTW discharges that require disinfection under 30 TAC § 309 threaten recreational uses of receiving streams, and thus require disinfection per se.

In drafting this permit modification, EPA relied on 40 CFR §122.44(d)(1)(i) - (iii) to establish limitations for E. coli bacteria. EPA does not consider measurement of total residual chlorine to be an adequate "indicator" for the pollutants of concern, human pathogens. E. coli is itself an indicator pollutant for those pathogens and Texas WQS provide numeric criteria for E. coli, which can be measured directly with approved analytic testing procedures. EPA guidance recommends that NPDES permits for POTWs include water quality-based limits on the bacterial indicator pollutant, in this case, E. coli, in order to assure compliance with numeric bacterial

criteria at the end-of-pipe. See memorandum from the EPA Deputy Assistant Administrator for Water Enforcement to the EPA Regional Directors and Permit Branch Chiefs (Feb. 14, 1977). EPA developed this guidance after the Agency had acted on July 26, 1976, to remove fecal coliform bacteria as a pollutant of concern from the technology-based secondary treatment requirements. This guidance recommends that "effluent limitations for fecal coliforms should be set at the same level as are required in-stream." In contrast, the State disinfection (including chlorination) requirements at 30 TAC § 309 are technology controls that may or may not effectively control human pathogenic bacteria.

Permits must include not only those limits that are technology based, but also any more stringent limits that are necessary to meet water quality standards. Pursuant to federal regulation at 40 CFR §122.44(d)(l)(iii), if a discharge causes, has the reasonable potential to cause, or contributes to an in-stream excursion above a numeric criterion of a state water quality standard for an individual pollutant, the discharge permit must contain effluent limitations for that pollutant. Applicable Texas regulations at 30 TAC § 305.531(3) incorporate this federal regulation by reference. In 2004, EPA approved revised Texas water quality standards for Enterococci and E. coli.

EPA's longstanding position was published in the 1989 Federal Register preamble supporting the federal regulation at 40 CFR §122.44:

> Today's regulations do not allow the permitting authority to use indicator parameters under paragraphs (d)(l)(iii) and (iv). Indicator parameters may not be used to develop effluent limitations under these paragraphs because, under these paragraphs, the state has promulgated a numeric criterion for the pollutant of concern. Such a numeric criterion represents a state's affirmative decision with respect to the maximum allowable ambient concentration for the pollutant. If paragraphs (d)(l)(iii) and (iv) provided for the use of indicator parameters, such provisions could frustrate the state's efforts to promulgate and implement water quality standards. EPA is limiting the use of indicator parameters to paragraph (d)(l)(vi) because this paragraph is intended as an interim measure employed in the absence of a state numeric criterion for the pollutant of concern, and because EPA seeks to allow the states flexibility to interpret their narrative water quality criteria. 54 Fed. Reg.23868, 23878 (June 2 1989).

The receiving water body for SJRA's effluent is listed by the State as impaired for bacteria pursuant to CWA § 303(d). Whenever there is a discharge of a pollutant to a waterbody impaired for that pollutant, EPA establishes limits for that pollutant in accordance with 40 CFR §122.44(d)(1)(iii) which states "[w]hen the permitting authority determines, using the procedures in paragraph (d)(1)(ii) of this section, that a discharge causes, has the reasonable potential to cause, or contributes to an in-stream excursion above the allowable ambient concentration of a State numeric criteria within a State water quality standard for an individual pollutant, the permit must contain effluent limits for that pollutant."

Since the spring of 2007 EPA has expressed concerns and objected to State-issued NPDES permits regarding TCEQ's practice of not requiring water quality based effluent limitations and monitoring for bacteria. A letter from Mark R. Vickery, Executive Director of TCEQ dated July 10, 2008, outlines TCEQ's approach to address EPA's concerns.

EPA proposes effluent limitations for bacteria of 126 cfu/100 ml, 30-day geometric mean, and 394 cfu/100 ml, single sample maximum. This limitation will protect the WQS. Since the facility has the equipment needed to disinfect the wastewater, adjustments to that equipment are the only changes needed to come into compliance with the bacteria limits, and a compliance schedule will not be needed to achieve the limits.

B. WHOLE EFFLUENT TOXICITY (WET) EVALUATION

1. Background

In order to ensure compliance with the applicable State water quality standards and federal regulations related to the protection of aquatic life, WET testing is required of all major dischargers and minor discharges with known or suspected toxicity. WET measures the aggregate effects of specific effluents on specific receiving streams and may reflect the discharge of toxic substances either known or not known to be present in the effluent in toxic amounts. Normally, the presence and levels of specific pollutants in an effluent (and thus chemical mixtures) tend to vary over time, as indicated by test results. Lethal and sub-lethal effects (for example, impaired growth or reproductive success) are the test endpoints measured by chronic WET testing. Both test endpoints are biologically significant and ecologically important. The TCEQ water quality standards provide specific protection for aquatic life against stream impairment due to both lethal and sub-lethal toxicity. WET testing is recognized by the TCEQ water quality standards as the tool used to measure these effects. The regulations, water quality standards, and analyses regarding the need for permit limits are designed to protect receiving waters from toxic discharges, not to react to them after such effects become manifest. As such, and depending on the variability of test results, a discharge's reasonable potential to exceed the state narrative water quality standard for the protection of aquatic life effluent toxicity may be reasonably predicted, and WET limits may be required, even where toxicity has not been demonstrated in-stream.

WET testing is vital to the effective control of toxic pollutants in the Nation's waters under the CWA because chemical-specific limits alone may have "blind spots" regarding the full toxic effect of a facility's effluent. A facility's effluent may be toxic to aquatic life, even though the causative chemical may not be identified in the relatively short list of pollutants for which the permitting authority must evaluate the need for water quality based effluent limits (WQBELs). In other cases, a single discharge of several chemicals, any of which may meet individual chemical specific WQBELs, still may be toxic because of the additive and/or synergistic effects of the chemical mixture. This is one of the principal capabilities of whole effluent toxicity testing, as presented on page 21 of EPA's primary NPDES permitting guidance, the Technical

Support Document for Water Quality-based Toxics Control (TSD) EPA/505/2-09-001, 2d printing, March 1991):

The principal capabilities of whole effluent techniques are:

a. The aggregate toxicity of all constituents in a complex effluent is measured, and toxic effect can be limited by limiting one parameter - whole effluent toxicity.

b. Toxicity caused by compounds commonly not analyzed for in chemical tests is detected. Control of the toxicant is not dependent upon established toxicological information that may not yet be available for some pollutants.

c. The bioavailability of the toxic constituents is assessed, and the effects of interactions of constituents are measured. Additivity, synergism, and antagonism between compounds in an effluent are addressed implicitly by whole effluent toxicity.

d. The toxicity of the effluent or ambient water is measured directly for the species tested.

e. This approach allows prediction of ecological impacts before they occur. NPDES permit limits can therefore be developed before an actual ecological impact occurs.

Thus, WET testing can determine the integrated effects of all chemicals in a single effluent sample and detect toxicity caused by pollutant parameters for which there exists no chemical-specific numeric water quality standards, criteria or test methods. Finally, WET testing is the only direct way to measure the toxic effects of the effluent on organisms exposed to that effluent. WET testing applies the same basic principle as all modern biological testing methods: the comparison of a specific biological outcome in an exposed group of organisms (experimental group) to an unexposed group (control group), to test the hypothesis that the biological outcome can be attributed to the exposure. Before any conclusions can be made from such comparisons, the results are analyzed statistically, to ensure – with reasonable certainty – that any observed difference was statistically significant and not due to random chance.

In WET testing, small groups of organisms in representative species of various taxa of aquatic life, e.g., fish, invertebrates, plants, are exposed to specified concentrations of effluent, in a controlled laboratory setting, to determine the acute or chronic effects of the effluent on replicate groupings and exposure of those testing organisms. These test organisms are typically born and cultured in laboratories specifically for the purpose of toxicity testing. Representative WET test species have been proven to be suitable for WET testing because of their availability, ease of maintenance, and short reproductive cycles. WET test methods are designed to test for certain

chronic biological outcomes, e.g., survival, growth and reproduction, per Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, EPA-821-R-02-013, at 37 (4th ed. Oct. 2002) (Methods Manual).

2. Regulatory Basis and Authorities

The Clean Water Act requires that NPDES permits contain limitations necessary to meet water quality standards. See CWA §§ 301(b)(1)(C), 402(a)(2). Under CWA § 303, EPA has approved narrative Texas water quality standards that prohibit toxic effects to aquatic life:

> Surface waters will not be toxic to man from ingestion of water, consumption of aquatic organisms, or contact with the skin, or to terrestrial or aquatic life. (30 TAC §307.4(d))
>
> Water in the state with designated or existing aquatic life uses shall not be chronically toxic to aquatic life, in accordance with §307.8 of this title. (30 TAC §307.6(b)(2))
>
> Water in the state shall be maintained to preclude adverse toxic effects on aquatic life, terrestrial wildlife, livestock, or domestic animals, resulting from contact, consumption of aquatic organisms, consumption of water, or any combination of the three. (30 TAC §307.6(b)(4)
>
> Chronic total toxicity, as determined from biomonitoring of effluent samples, will be precluded in all water in the state with existing or designated aquatic life uses except in mixing zones and at flows less than critical low-flows, in accordance with §307.8 of this title. (30 TAC §307.6(e)(1) (2000).

The Texas WQS provide protection against chronic total toxicity (defined as significant lethal or sub-lethal effects as demonstrated in a defined WET test) at the edge of an established mixing zone. That is, there shall be no significant lethal or sub-lethal toxic effects outside the mixing zone. In its IP the TCEQ recommends a methodology for determining the mixing zone and a site-specific effluent critical dilution as the numeric expression / interpretation of the narrative criterion. For the most part, EPA agrees with these TCEQ recommended procedures. EPA does not accept the TCEQ recommendations in the IP that do not fully support the State's approved WQS, including the State's numeric interpretation of a narrative water quality standard. The following discussion explains those instances where EPA does not accept the IP recommendations to the extent such recommendations do not fully support the Texas WQS.

EPA regulations at 40 CFR §§ 122.44(d)(1)(i), (ii) and (v) require an assessment of the effluent's potential to exceed the State's narrative criteria established for the protection of aquatic life. This assessment of the need for a permit limit ("reasonable potential") considers the variability of toxicity, a pollutant parameter, in the effluent. Previous WET test data, where it exists,

provides the basis for EPA's reasonable potential assessment regarding the discharge's potential to interfere with attainment of the narrative WQS for toxicity.

3. WET Testing

The Texas IPs recommend that permits include specific requirements for WET testing. To the extent that these requirements are consistent with EPA regulations and the State WQS, EPA has adopted those recommendations and proposes permit requirements to implement them. A fundamental principle recognized here is that EPA used the critical dilution to determine whether the WQS would be met. This principle is set forth at page 40 of the IP:

> Critical Conditions for Aquatic Life Protection
>
> Effluent concentration limits for specific toxic materials are calculated for acute and chronic numerical toxic criteria, as appropriate, using an effluent fraction that represents critical mixing conditions (see the section of this document entitled "Deriving Permit Limits for Aquatic Life Protection" on page 52). This effluent fraction, when expressed as a percentage, is also referred to as the critical dilution, and is used as the primary concentration for whole effluent toxicity testing (see the subsection of this document entitled "Dilution Series, Dilution Water, and Type of WET Test" on page 108).

At page 108 the IP recommends that the effluent critical dilution, as determined by TCEQ and provided to EPA, should be the point at which to determine attainment of water quality standards. The effluent critical dilution essentially represents the numeric expression / interpretation of the water quality standard for the protection of aquatic life:

> Dilution Series, Dilution Water, and Type of WET Test
>
> Dilution series. Chronic and 48-hour acute tests are based on the critical dilution in the receiving water. The critical dilution represents the percentage of effluent at the edge of the mixing zone during critical low flow (that is, the 7Q2) or critical mixing conditions. The test results at the critical dilution are statistically compared with the test results at the control dilution (0% effluent) to measure compliance. The permit specifies the critical dilution and the dilution series as well as the type of WET tests required.

4. WET Test Data Evaluation

WET Test Data Analysis

WET test results are measured, analyzed and may be expressed and reported in terms of one or more statistical endpoints. The WET Methods Manual describes two equally acceptable methods: hypothesis testing, using the No Observable Effect Concentration approach; and point

estimation, for example using the Inhibition Concentration (IC). Both endpoints can be determined from the same test. The design and conduct of EPA's toxicity test requires a specific, pre-determined number of effluent concentrations and a non-toxic control, with a standard set of replicates for each concentration. Due to the way in which the organism response data are distributed within a test, a specific test could potentially fail (i.e., indicate toxicity) using both approaches, pass (indicating no toxicity) using both, or, in some cases fail using one approach and pass the other. Nationally, NPDES permitting authorities have required testing under permits using either or both approaches. For chronic toxicity testing requirements in NPDES permits, EPA Region 6 and the NPDES-authorized States within Region 6 have relied on NOEC testing since 1991. Available nearby contract testing laboratories are familiar with and capable of successfully generating valid WET tests using the NOEC, the hypothesis testing approach. The two approaches are further explained below, followed by an example of the test design.

Inhibition Concentration (IC)

The IC is the concentration estimated as a specific "point" at which the effluent concentration would cause a specified percentage reduction IC(p) of test organisms impaired according to the toxic measure, such as impaired survival, reproduction or growth. For IC testing, it is important for the permitting authority to first determine the "acceptable" level of impact (p) on the population that an effluent may demonstrate. To ensure compliance with water quality standards, state WQS agencies specify a standardized IC(p) value rather than specifying the value on a permit-by-permit (or waterbody-by-waterbody) basis. A permitting authority may determine that it is appropriate to allow up to 25% of the test organisms to die or be otherwise impaired (i.e., demonstrate significantly reduced growth or reproduction). The 25% threshold value would be called an IC_{25} and the statistical analysis would indicate the percent of effluent that would result in impairment in survival, growth or reproduction of 25% of the population of affected organisms. A moderately more conservative IC(p) approach would be an IC_{20}, which would project the effluent concentration that would result in only a 20% effect. Usually the IC(p) projected by the test data is not one of the effluent dilutions actually tested; rather, the reported IC(p) is an inferred value based on all the data produced in the test, hence, a "point estimation" of a specific concentration based on all of that data.

No Observable Effect Concentration (NOEC)

The WET method manual defines NOEC as the highest concentration of toxicant that causes no observable (i.e., statistically significant) adverse effect on the organisms. Permits written by EPA Region 6 and authorized States within Region 6 have required that the effluent critical dilution be included as one of the effluent dilutions to be tested. This is to detect any significant effect(s) at the specific effluent concentration that must be protected in the stream receiving the effluent in order to attain the narrative WQS for toxicity. A statistical comparison is made between data from the non-toxic control and pooled data from the replicates of each effluent concentration tested. If a statistically significant difference is detected between the results for an effluent concentration and the control, and the difference is so great that it can be concluded with

reasonable certainty (e.g., with 95% certainty) that the difference is not due to random chance, then that concentration of effluent is noted as having demonstrated significant toxic effects and the tests "fails" assuming that the conduct of the test otherwise meets test acceptability criteria to generate a "valid" result.

Both the IC_{25} and NOEC have inherent statistical advantages and disadvantages and neither method is considered to be necessarily superior to the other. Both analyses are influenced by the concentrations examined in a test, control variability, and the occurrence of perceived outliers. EPA's *Technical Support Document for Water Quality-based Toxics Control* (TSD, EPA 1991) recognizes both NOEC and IC_{25} as valid endpoints (e.g., the examples given for TUc on page 6 and page 58 use NOEC and not IC_{25} in the calculation). Further, the TSD reports that the NOEC is approximately the analogue of IC_{25} for WET tests (p.6). Therefore, large differences in the conclusions drawn based on use of either approach in evaluating WET test results are not expected. In support of this, the TSD (Appendices A-1 and A-2) demonstrates that NOEC values reported by several labs were typically quite similar to the corresponding IC_{25} for the same toxicant or effluent. In support of this, EPA has recently evaluated the results of *Ceriodaphnia dubia* chronic reproduction data gathered by the State of North Carolina (269 tests submitted by discharges). This analysis confirmed that use of the IC_{25} and NOEC analysis methods resulted in the same interpretation of the test results (i.e., pass or fail) more than 90% of the time (see Figure 1).

In general, the NOEC provides greater protection than the IC_{25} (see Figure 2). In tests with normal within-test variability, NOEC can detect at least a 25% effect when it occurs and oftentimes, a slightly lower effect level (i.e., 20-25% effect). IC_{25} can not yield a conclusion of toxicity at an effect lower than 25%, even if a significant biological effect has been measured. A higher level of protection near the 25% effect level is desired for compliance WET testing because such testing is generally carried out fairly infrequently (once per month at most) and the effluent quality is often inherently variable, both conditions which could result in undetected discharges of toxic materials.

The NOEC has the advantage of being based upon a significant difference between performance of control organisms and those exposed to one or more test treatments, rather than a set reduction in performance. The Pellston workshop on WET (1995) stated: "Indeed, so long as the comparison of the control and a single effluent concentration (the RWC) remains the critical point of WET testing, hypothesis testing *(i.e., NOEC)* may remain the statistical method of choice." An additional advantage of the NOEC approach is that it can determine statistical power and Type I and II error rates; these statistical properties can not readily be determined using the IC_{25} approach.

Early studies of the error and variability associated with use of the NOEC indicated problems (e.g., statement in TSD (p.6) regarding "... the error and variability associated with this type of statistical analysis *(the control and one effluent concentration (i.e., the RWC)* is large"). However, this and similar statements were based on early chronic WET data (pre-1990) and associated analyses (e.g., Warren Hicks 1990), before methods were standardized and labs

became familiar with these methods. More recent information regarding point estimates, such as the IC_{25}, indicate that they have a similar amount of error and variability as the NOEC approach when using current WET methods (Warren Hicks et al., 2006).

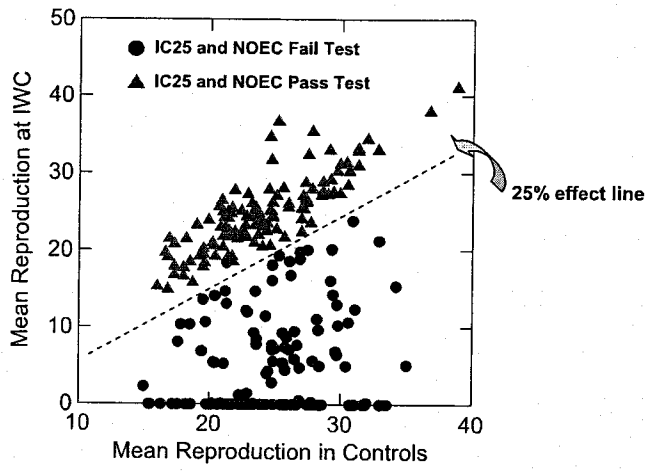

Figure 1. For most *Ceriodaphnia* chronic tests, there is no difference in the test interpretation using either NOEC or IC25 based on reproduction; both approaches either pass a test or fail a test based on normal permitting criteria (such as R6 uses). In an analysis of 269 tests from North Carolina, for example, 250 of them (93%) gave the same result using either NOEC or IC25.

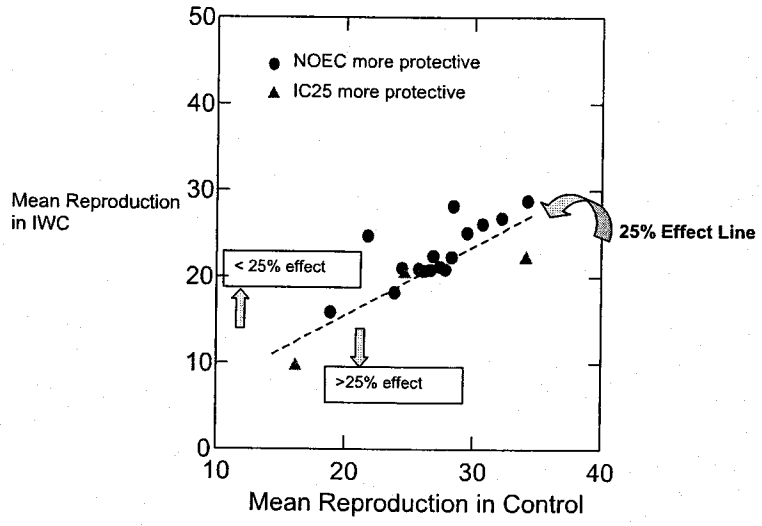

Figure 2. For those few tests where the IC25 and NOEC disagree as to whether a test should pass or fail, the NOEC is more protective in almost all cases. In this example, several tests passed using the IC25 approach even though the mean effect at the IWC was equal to or slightly greater than 25%

EPA proposes to specify WET testing in this permit using the NOEC approach (as adjusted by EPA Region 6, see discussion below) rather than by an IC approach because the Texas WQS provide a basis to define toxicity in terms of a critical dilution, and because Texas has not evaluated or defined the percentage level of impairment that would represent an acceptable level of toxicity for the purposes of the Texas WQS. Texas has provided EPA with the critical dilution applicable to SJRA's discharges in the receiving stream and that critical dilution is the one at which WET tests need to assure that toxicity is not occurring. This critical dilution represents a permit specific numeric expression of the narrative WQS. Conversely, Texas has not recommended a percent reduction criterion, i.e., an acceptable reduction in the endpoint (i.e. IC_P) that would be, if implemented, consistent with their WQS.

NOEC testing establishes a set of discrete concentrations of effluent mixed with non-toxic water and compares the test endpoint results against a non-toxic control to assess whether any or all of the effluent concentrations cause the test organism responses to be significantly different from the control organism responses (i.e., significantly greater mortality, significantly lower reproduction or growth). TCEQ recommends use of the NOEC as the WET test evaluation method in all TPDES permits.

Another strength of the NOEC approach (as adjusted by Region 6), is that the effluent critical dilution is always included as one of the effluent testing concentrations and, where possible, is bracketed by higher and lower effluent dilutions. By testing the actual effluent critical dilution, compliance with the narrative criterion can be determined directly without further interpretation. Test results from the lower effluent concentrations tested provide additional information, such as the magnitude of toxicity in the effluent (a test may fail at the critical dilution, but it may also fail at the lower effluent concentrations tested indicating greater toxicity and potential effects in the stream. In fact, EPA's TSD and the promulgated WET test methods both recommend against WET testing that does not include those additional effluent concentrations. Section 2.2.3 of EPA's Freshwater Chronic testing manual states:

> "Use of pass/fail tests consisting of a single effluent concentration (e.g., the receiving water concentration or RWC) and a control is not recommended. If the NPDES permit has a whole effluent toxicity limit for acute toxicity at the RWC, it is prudent to use that permit limit as the midpoint of a series of five effluent concentrations. This will ensure that there is sufficient information on the dose-response relationship."

In addition, section 8.10.1 on page 36 of the manual, states:

> 8.10.1 The tests recommended for use in determining discharge permit compliance in the NPDES program are multi-concentration, or definitive, tests which provide (1) a point estimate of effluent toxicity in terms of an IC25, IC50, or LC50, or (2) a no-observed-effect-concentration (NOEC) defined in terms of mortality, growth, reproduction, and/or teratogenicity and obtained by hypothesis testing. The tests may be static renewal or static non-renewal.

Thus test results, when measured and reported as NOEC values, are used to determine compliance and, at permit reissuance, the need for permit limits for WET. The limit procedure adopted by EPA is based on EPA's TSD. This analysis is similar to the procedure used to assess the need for permit limits on chemical compounds. However, WET testing is usually performed on a very infrequent basis relative to the testing of other pollutants and pollutant parameters. When it is determined that, "a discharge causes, has the reasonable potential to cause, or contributes to an instream excursion above a narrative criterion within an applicable State water quality standard, the permit must contain effluent limits for whole effluent toxicity" (40 C.F.R. § 122.44(d)(1)(v)).

EPA has addressed potential issues in test sensitivity and data reliability between the IC and NOEC approaches. In a guidance document titled "Understanding and Accounting for Method Variability in Whole Effluent Toxicity Applications Under the National Pollutant Discharge Elimination System", EPA 833-R-00-003, June 2000, EPA provided information on resolving issues between the NOEC and IC approaches. Item 3.4 - Conclusions about Variability of WET Methods, on page 3-10 states: "In principle, NOEC could be estimated more accurately and

precisely by changing the experimental design to use more concentrations at narrower dilution ratios and by using more replicates."

In addition to the measures discussed above, Region 6 WET permitting practices have addressed concerns with the differential uses of NOEC and IC_P data analysis and reliability by the following:

a. NPDES permits establish only the minimum number of effluent concentrations for the test. Permittees concerned about use of hypothesis testing are free to increase the number of effluent concentrations tested as long as they maintain the original test design (e.g., the test design should not be arranged to add two effluent concentration lower then the critical dilutions and none above it. Also, the additional effluent concentrations should be added in pairs, each one being equidistant above or below the critical dilution) to ensure against introducing bias in the analysis of the data. Added appropriately, additional test concentrations and replicates increases the number of organisms tested which can improve statistical reliability. Adding effluent concentrations in an inappropriate manner could skew the test results. For this reason, the effluent dilutions should be 'balanced' around the critical dilution where possible.

b. Region 6 addresses the issue of narrower dilution ratios by using a dilution ratio factor of 0.75, which results in test concentrations being closer together than the 0.5 dilution factor (see the example below). Better resolution around threshold effect concentrations provides better input to mathematical models to predict point estimations of effects and reduce uncertainty in hypothesis tests of effects. Reducing the distance between effluent dilutions also minimizes the need to rely on interpolations of effects between tested concentrations.

Examples of dilution series based on SJRA's critical dilution (78%) using dilution factors 0.3, 0.5 and 0.75 are given below:

0.75 - 100%, 78%, 59%, 44%, 33%

0.50 - 100%, 78%, 40%, 20%, 10%

0.30 - 100%, 78%, 24%, 7%, 2%

In the examples above, both the 100% and 78% effluent concentrations are more likely to be identified as toxic if the test dilution series based on 0.5 or 0.3 is used. Noting the large difference in amount of effluent used in the lower effluent dilutions, one would expect to see less toxicity in the lower effluent concentrations, and the greater the difference, the more likely the higher dilutions (100% and 75%) will appear to be statistically 'different' from the lower ones.

c. With the exception of the *Ceriodaphnia dubia* test, which requires a minimum of ten replicates of each effluent concentration, Region 6 has, since 1995, issued permits that increase the minimum number of effluent replicates from four to five. Note that these are the minimum numbers of concentration and replicates; permittees may increase the number of

concentrations and replicates at their discretion as long as the basic test design is not modified (e.g., should increase the number of replicates for all effluent dilutions and control by the same number; additional effluent concentrations should be equivalently spaced above and below the effluent critical dilution).

d. For chronic testing, Region 6 permits have required reporting of, and adherence to, the percent minimum significant difference (PMSD) variability control as part of the overall test acceptability criteria for sublethal effects determination. Test results that fall outside the PMSD are subject to additional review and censure. This procedure is explained in detail in EPA's guidance document "Understanding and Accounting for Method Variability in Whole Effluent Toxicity Applications Under the National Pollutant Discharge Elimination System", EPA 833-R-00-003, June 2000.

Region 6 implemented the above revisions over a period of several years in order to improve data reliability. However, even without these additional requirements, NOEC testing is supported by EPA's promulgated WET methods for purposes of compliance with NPDES permit limits (see Appendix E).

Mortality, growth and reproduction data are determined after the test and statistically analyzed to assess performance in various effluent concentrations and a non-toxic control. Test failure is indicated where the test meets all test acceptability criteria for performance and the statistical evaluation of raw data indicates a statistically significant difference between survival or reproduction in a non-toxic control and concentrations of effluent that include the effluent instream waste concentration and lower concentrations of effluent. Following its standard practice, as described in §X2.a of this document, the TCEQ has established that the effluent instream waste concentration for this facility is 78%.

Similar to other waste water discharge permits issued by TCEQ and EPA, WET lethal and sub-lethal test results are reported as NOEC values to EPA's Permit Compliance System. The reported test NOECs are used to determine the need (i.e., to calculate reasonable potential) for WET limits, to trigger toxicant source and control studies should toxicity persist, and/or to determine compliance and magnitude of toxicity where the permit includes WET limits. For these reasons, it is important that all test results are reported accurately and reflect the actual test results. Accurate reporting is the responsibility of the permittee. EPA Region 6 has a long history of working with labs and permittees where questions arise about unusual data or data analysis. EPA recommends where there is a concern about test data, the Agency should be contacted in a timely manner for assistance in determining how, or if such data should be reported.

WET Test Design

EPA's promulgated chronic freshwater fish and water flea (*Ceriodaphnia dubia*) tests are designed using a minimum of five effluent concentrations and a non-toxic control. For NOEC testing EPA Region 6 and authorized States within Region 6 have selected effluent dilutions

based on the critical dilution (assigned by the State) and a standardized dilution factor to ensures an appropriate 'spread" between the effluent dilutions tested. In the case of SJRA, the critical dilution is 78% and the effluent dilution series proposed in the NPDES permit is 0%, 25%, 33%, 44%, 59%, 78% and 100% effluent. The non-toxic water used for the control is also used to make up the various dilutions of effluent.

For the control and each effluent concentration tested, the promulgated test method requires a minimum number of replicates. Replicates are duplicate test vessels with identical effluent/diluent concentrations and test organisms for each effluent concentration. For example, for each effluent concentration tested, the *Ceriodaphnia dubia* waterflea test requires a minimum of 10 replicates, with one organism and the same concentration of effluent and non-toxic dilution water in each test vessel. Using only one test organism per vessel facilitates counting the number of young produced per organism.

Figure 1 below depicts the design of EPA's *Ceriodaphnia dubia*, Survival and Reproduction Test promulgated in 1995. This test is designed to determine the effect of effluent on the ability of *Ceriodaphnia dubia* to survive and reproduce expressed statistically as an NOEC or IC_{25}. Each circle in Figure 1 represents a test cup with testing solution in it. At the beginning of the test, each cup contains one juvenile female *Ceriodaphnia dubia* less than 24 hours old, and all born within 8 hours of each other. The top row represents the control group, which is exposed only to clean water containing no effluent or toxicants. The experimental groups of test organisms are exposed to the specified concentrations of effluent (in this example, 32%, 44%, 59%, 79% and 92%). At the end of the test (typically seven days) the total offspring produced by each adult in each cup are summed.

Figure 1. Waterflea (*Ceriodaphnia dubia*) Chronic Toxicity Test Design

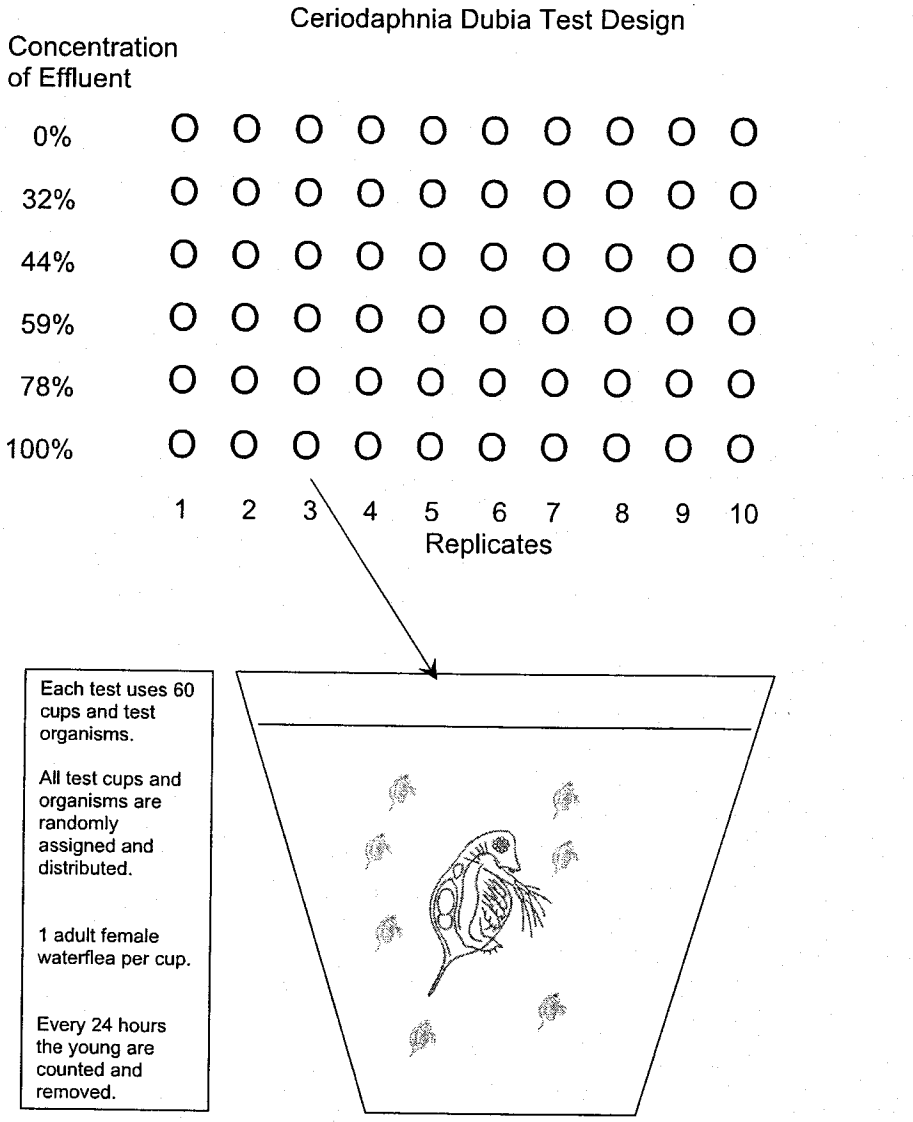

Figure 2, below, provides an example of hypothetical test data collected after the seven-day test period. The results are reported as an average of the number of fleas in each cup, at each effluent level (last column). Each treatment, i.e., effluent dilution, is compared statistically to the control.

In this example, even though the average number of *Ceriodaphnia dubia* in each cup declines after exposure to even the lowest concentration of effluent (32%) and declines progressively as the samples are exposed to increasing concentrations of effluent, the test method requires that the results at each concentration be compared to the control using statistical tools before the analyst can make any conclusions about toxicity.

Figure 2. Example reproduction results for *Ceriodaphnia dubia* toxicity test

Ceriodaphnia dubia Reproduction

Concentration of Effluent	Replicate 1	2	3	4	5	6	7	8	9	10	Avg. No. Young
Control (0%)	31	33	29	28	32	31	35	29	30	32	31.0
32%	20	17	23	18	19	21	14	22	21	19	19.4
44%	23	15	16	16	19	15	19	10	13	12	15.8
59%	14	8	11	5	8	17	10	8	7	7	9.5
78%	8	7	7	1	2	9	9	5	4	9	6.0
100%	5	8	2	2	6	3	11	4	2	7	5.0

Multiexposing not just one organism but, for example, ten organisms to each concentration level of effluent, taking the average of that result, and comparing it to an average based on ten unexposed sets of control organisms – is an integral part of WET test method design. WET test methods using fish or invertebrates typically require the use of 60 to 200 organisms per test. Chemical test methods, in comparison, are based on a single measurement of a sample. The large number of replicates, the use of averaging, and statistical methods account for variability and protect against small changes being interpreted as findings of toxicity.

5. Determination of the Need for WET Limits ("WET Reasonable Potential") - Evaluation

Pursuant to 40 CFR § 122.44(d)(1)(ii), EPA evaluated the need for the lethal and sub-lethal WET test endpoints. Information submitted by the SJRA to the EPA Permit Compliance System reported numerous test failures for sub-lethal effects in the *Ceriodaphnia dubia* 7-day chronic toxicity test. The duration and magnitude of the effluent's toxic effects have been significant (See Appendix F -WET Results Charts). The specific data used in the determination of the need for WET limits and the analysis results are presented in Appendix G. EPA Region 6 used its Whole Effluent Toxicity Permitting Strategy, May 2005 (see Appendix D), in evaluating the need for WET limits for this data set. This Region 6 Strategy follows the procedure given in EPA's Technical Support Document for Water Quality-Based Toxics Control (EPA/505/2-90-001), in Box 3-2 on page 53 and Table 3-2 on page 54. For calculation purposes, the No Observed Effects Concentration (NOEC) values for lethal and sub-lethal effects in tests reported by the permittee were converted to toxic units (TUs). This calculation is 100/NOEC value (e.g., if the NOEC for the sub-lethal endpoint in a test was 78% effluent, then 100 / 78 = 1.3 TUs).

EPA reviewed all WET test data submitted and found the majority of data to be acceptable, i.e., "valid" (data not used is noted and explained at the bottom of the data analysis spreadsheet presented in Appendix G). SJRA's effluent demonstrated significant sub-lethal effects in 14 of 59 tests performed over the past five years, with toxicity demonstrated at all effluent concentrations tested (from 86% effluent down to <23% effluent, the lowest effluent concentration tested. When a test failure occurred at that concentration (23%), following established procedures, EPA applied a default value of 22% for the "reasonable potential" calculation, although the true NOEC may have been much lower, i.e., more toxic. The "reasonable potential" calculation for sub-lethal effects to the *Ceriodaphnia dubia* test species produced the following results:

Effluent Critical Dilution = 78% effluent = 100/78 = 1.28 TU
Lowest NOEC = 22% = 4.55 TU
Coefficient of Variation = 0.6
Standard Deviation = 0.4
Reasonable Potential Multiplying Factor = 1.1
Reasonable Potential Value = 3.95 TU

Because the Reasonable Potential Value exceeds the Effluent Critical Dilution (3.95 > 1.27), the need for a WET limit exists based on sub-lethal effects to *Ceriodaphnia dubia*. SJRA's effluent has actually failed (i.e., been demonstrably toxic) for the sub-lethal test endpoint numerous times at and well below the effluent critical dilution during the previous permit period. This means that EPA determines not only that the discharge has the reasonable potential to cause non-attainment of the narrative criteria for toxicity, but that the discharge will cause non-attainment of the narrative. Reasonable potential is not merely predicted; actual exceedances of the State's narrative water quality standard for the protection of aquatic life have already occurred. It is reasonable to expect that, left uncontrolled; effluent from this facility will continue to cause or

contribute to exceedance(s) of the Texas water quality standards and narrative criterion established for the protection of aquatic life.

6. WET Limits

Because SJRA's discharge has the reasonable potential to cause, and in fact causes, non-attainment of the State's narrative WQS, EPA has developed WET limits for the discharge based on 40 CFR § 122.44(d)(1)(v) and the Texas water quality standards. WET limits are required in order to ensure compliance with the State's narrative criterion for the protection of aquatic life. The Texas WQS provide that a toxicity reduction evaluation (TRE) should be conducted prior to imposition of a WET limit, however the standards, at 30 TAC §307.6(e)(2)(D), do not restrict a permittee from performing a self-imposed TRE at any time, nor do they preclude additional TRE activities during a compliance schedule to meet a limit based on effluent toxicity.

> If toxicity biomonitoring results indicate that a discharge is exceeding the restrictions on total toxicity in this section, then the permittee shall conduct a toxicity identification evaluation and toxicity reduction evaluation in accordance with permitting procedures of the commission. As a result of a toxicity reduction evaluation, additional conditions may be established in the permit. Such conditions may include total toxicity limits, chemical specific limits, and/or best management practices designed to reduce or eliminate toxicity. Where sufficient to attain and maintain applicable numeric and narrative state water quality standards, a chemical specific limit rather than a total toxicity limit may be established in the permit. Where conditions may be necessary to prevent or reduce effluent toxicity, permits shall include a reasonable schedule for achieving compliance with such additional conditions.

The facility has performed toxicity reduction and identification evaluations, but has not identified a specific toxicant that causes the test failures. EPA is providing a three-year compliance schedule to allow for any additional evaluations of process modifications that may be appropriate prior to the WET limit becoming enforceable. EPA believes that a compliance schedule, including time to identify and reduce sources of toxicity from the effluent, would be consistent with both the Texas WQS and EPA regulations.

WET limits are expressed simply as toxicity limits, and the narrative criterion is mathematically interpreted as the effluent critical low-flow dilution (7Q2), 78%, as presented elsewhere in this fact sheet. Based on the reasonable potential analysis performed (Appendix G) the WET limit in this permit is based on sub-lethal effects demonstrated to the *Ceriodaphnia dubia* tests species.

7. WET Testing Frequency

Because the permit includes WET limits to ensure compliance with the narrative criterion to protect aquatic life, the WET monitoring frequency for the *Ceriodaphnia dubia* test species is being reduced from once per month to once per quarter. However, if the WET limit is violated,

the testing frequency will automatically increase to once per month until the effluent demonstrates no significant toxic effects for three consecutive months. The testing frequency for the fathead minnow (*Pimephales promelas*) shall be once per quarter for the first year with allowance to reduce the testing frequency based on performance.

8. Compliance Schedule

A three-year compliance schedule is being provided to allow the SJRA additional opportunity to identify and correct toxicity. Should the specific toxicant be identified and controlled prior to the effective date of the WET limit, the SJRA may request that the permit be modified to substitute a chemical-specific limit in lieu of the WET limit. Specific proof and confirmation of the identified toxicant and demonstration that the control works (twelve monthly tests with no significant lethal or sub-lethal effects demonstrated after toxicant confirmation) will be required.

9. Violation of Permit Limits

The Clean Water Act (CWA), at § 309, specifies that any violation of a permit limitation is subject to enforcement. It is EPA policy that every permit limit violation is a violation, and that a single violation is actionable and subject to an escalating enforcement response. However, per clarification of that policy by EPA memo dated August 14, 1995 (See Appendix H):

> "EPA does not recommend that the initial response to a single exceedance of a WET limit, causing no known harm, be a formal enforcement action with a civil penalty."

The permit includes standard language that would require an increase in the required monitoring frequency after any test failure for lethal or sub-lethal toxicity, assuming the test met the appropriate test acceptability criteria. Monitoring would increase to once per month until effluent testing shows no lethal or sub-lethal toxicity for three consecutive months.

C. TECHNOLOGY BASED VERSUS WATER QUALITY STANDARDS BASED EFFLUENT LIMITATIONS AND CONDITIONS

Pursuant to regulations promulgated at 40 CFR §§122.44(l)(2)(ii), 122.44(d), and 130.32(b)(6), the modified draft permit limits are based on either technology-based effluent limits, pursuant to 40 CFR §122.44(a), on the results of State Water Quality Management Plans, on State Water Quality Standards and requirements pursuant to 40 CFR §122.44(d), the previous NPDES permit, or on the results of an established and EPA approved Total Maximum Daily Load (TMDL), whichever are more stringent.

Water quality-based limits have been placed in the modified permit for E. coli bacteria. Monitoring and WET limits, after a compliance schedule, have also been placed in the modified permit.

D. FINAL EFFLUENT LIMITATIONS

See the draft permit modifications for limits and conditions. Due to the need to create a separate Outfall 002 permit table and the change of previously non-contested permit limitations as a result of a change in the water quality management plan, all pollutants for the facility are shown in the permit. Those previously agreed pollutants are however not subject to comment in this public notice. They are included only to show the entirety of permit conditions.

E. MONITORING FREQUENCY

Regulations require permits to establish monitoring requirements to yield data representative of the monitored activity and to assure compliance with permit limitations. 40 CFR §§ 122.44(i)(1), 122.48(b). The monitoring frequencies are based on the nature of the facility, similar facilities and, if applicable, the existing and/or previous permit. The draft permit modification will propose that E. coli bacteria shall be sampled and monitored daily. Report requirements for copper are established at twice per month with samples to be taken at least 10-days apart. WET monitoring and limit frequencies are discussed above.

XI. ENDANGERED SPECIES CONSIDERATIONS

According to the most recent county listing available at the US Fish and Wildlife Service (USFWS), Southwest Region 2 website, http://ifw2es.fws.gov/EndangeredSpecies/lists/, one species in Montgomery County is listed as endangered or threatened. The lone species is the endangered red-cockaded woodpecker *(Picoides borealis)*. The American bald eagle (*Haliaeetus leucocephalus*) was previously listed in Montgomery County; however, the USFWS, removed the American bald eagle in the lower 48 states from the Federal List of Endangered and Threatened Wildlife Federal Register, July 9, 2007, (Volume 72, Number 130). Based on the following factors, EPA has determined that the modifications to the permit will have *no effect* on either the species or their habitat.

1. Permit limitations for E. coli have been added to the permit.

2. No additions have been made to the USFWS list of threatened and endangered species and critical habitat designation in the area of the discharge since prior to the issuance of the permit.

3. During the permit reissuance process, EPA made a "no effect" determination which has not changed since the issuance of the permit on September 28, 2007.

XII. CERTIFICATION

Pursuant to 40 CFR § 124.53, the permit modifications are being reviewed by TCEQ for certification. The draft permit modifications and draft public notice will be sent to the District

Engineer, Corps of Engineers; to the Regional Director of the USFWS and the National Marine Fisheries Service prior to the publication of the notice.

XIII. FINAL DETERMINATION

The public notice describes the procedures for the formulation of final determinations.

XIV. ADMINISTRATIVE RECORD

The following information was used to develop the proposed permit modifications:

A. APPLICATION(S), CURRENT/PREVIOUS PERMIT

EPA Application received June 8, 2006.
NPDES Permit TX0054186, issued September 29, 2007.

B. 40 CFR CITATIONS

Sections 122, 124, 125, 133, 136

C. CLEAN WATER ACT CITATIONS

CWA §308

D. MISCELLANEOUS REFERENCES

Texas Surface Water Quality Standards, 30 TAC §§307.1 - 307.10 (21 Tex. Reg. 9765, August 17, 2000).

"Procedures to Implement the Texas Surface Water Quality Standards," Texas Commission on Environmental Quality, January 2003.

EPA Region 6 "Response to Comments of the Draft Permit" September 28, 2007.

E. LETTERS/MEMORANDA/RECORDS OF COMMUNICATION, ETC.

Memorandum from Jeffrey G. Miller, Deputy Administrative Administrator for Water Enforcement, EPA Headquarters, to Regional Permit Branch Chiefs, February 14, 1977, "Fecal Coliform Bacteria Limits."

E-mail from Kenda Smith, TCEQ WQAS, March 6, 2008, to Larry Giglio, EPA, providing corrected critical conditions.

F. WET SECTION

Technical Support Document for Water Quality-based Toxics Control (TSD) EPA/505/2-09-001, March, 1991, 2nd printing.

Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, EPA-821-R-02-013, at 37 (4th ed. Oct. 2002).

Clean Water Act - §§ 301(b)(1)(C), 402(a)(2), 33 U.S.C. §§ 1311(b)(1)(C), 1342(a)(2).

"Understanding and Accounting for Method Variability in Whole Effluent Toxicity Applications Under the National Pollutant Discharge Elimination System", EPA 833-R-00-003, June 2000.

EPA Region 6 Whole Effluent Toxicity Permitting Strategy, May 2005.

"Method Guidance and Recommendations for Whole Effluent Toxicity (WET) Testing (40 CFR Part 136)", EPA 821-B-00-004, July 2000.

"Understanding and Accounting for Method Variability in WET Applications Under the NPDES Program", EPA 833-R-00-003, June 2000.