Exhibit H

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

SEP 2 8 2007

CERTIFIED MAIL: RETURN RECEIPT REQUESTED (P 7004 1160 0003 0358 8000)

REPLY TO: 6WQ-NP

San Jacinto River Authority
Donald R. Sarich, Division Manager
P.O. Box 7537
Woodlands, TX 77387

Re: Application to Discharge to Waters of the United States Permit No. TX0054186 San Jacinto River Authority, Woodlands POTW No. 1.

Dear Mr. Sarich:

This package constitutes EPA's final permit decision for the above referenced facility. Enclosed are the responses to comments received during the public comment period and the final permit. According to EPA regulations at [40 CFR 124.19], within 30 days after a final permit decision has been issued, any person who filed comments on that draft permit or participated in the public hearing may petition the Environmental Appeals Board to review any condition of the permit decision.

Should you have any questions regarding the final permit, please feel free to contact Laurence Giglio of the NPDES Permits Branch at the above address or by telephone: (214) 665-6639, by fax: (214) 665-2191, or by E-mail: giglio.larry@epa.gov. Should you have any questions regarding compliance with the conditions of this permit, please contact the Water Enforcement Branch at the above address or by telephone: 214-665-6468.

Sincerely yours,

Miguel I. Flores
Director
Water Quality Protection Division

Enclosures

cc (with enclosures):

L'Oreal Stepney, Water Quality Director, TCEQ

RECEIVED
OCT 0 4 2007
San Jacinto River Authority
The Woodlands Division

NPDES PERMIT NO. TX0054186
RESPONSE TO COMMENTS

RECEIVED ON THE SUBJECT DRAFT NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT IN ACCORDANCE WITH REGULATIONS LISTED AT [40 CFR 124.17]

APPLICANT: San Jacinto River Authority
P.O. Box 7537
Woodlands, TX 77387

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

PREPARED BY: Laurence E. Giglio
Environmental Engineer
Phillip Jennings
Environmental Scientist
NPDES Permits Branch (6WQ-PP)
Water Quality Protection Division

PERMIT ACTION: Final permit decision and response to comments received on the draft NPDES permit publicly noticed on December 7, 2006.

DATE PREPARED: September 21, 2007

Unless otherwise stated, citations to [40 CFR] refer to promulgated regulations listed at Title 40, Code of Federal Regulations, revised as of September 14, 2007.

SUBSTANTIAL CHANGES FROM DRAFT PERMIT

There are changes from the draft NPDES permit publicly noticed on December 7, 2006.

1. The final permit will have a dissolved oxygen limit for Outfall 001 of 4.0 mg/l.
2. The final permit will have a dissolved oxygen limit for Outfall 002 of 5.0 mg/l.
3. The final permit will limit E. coli to a daily maximum of 394 cfu per 100 ml and the 30-day average of 126 cfu per 100 ml.
4. Nitrate-nitrogen and dibromochloromethane report requirements have been eliminated from the final permit.
5. The critical dilution used for WET testing has been changed to 69%.

STATE CERTIFICATION

Letter from L'Oreal Stepney, Texas Commission on Environmental Quality (TCEQ) to Miguel I. Flores, (EPA) dated March 1, 2007.

CONDITIONS OF CERTIFICATION

TCEQ waived state certification.

COMMENTS RECEIVED ON DRAFT PERMIT

Letter from Lauren Kalisek, attorney with Lloyd Gosselink, representing San Jacinto River Authority (SJRA) to Diane Smith, EPA, dated February 19, 2006.

RESPONSE TO TCEQ COMMENTS

In general, TCEQ stated differences between the State permit and the NPDES draft permit but made no specific requests or recommendations.

COMMENT 1: There is no effective date or expiration date for the proposed NPDES permit.

RESPONSE 1: EPA does not include expiration dates on draft permits since the exact effective date is not known at the time the draft permit is proposed.

COMMENT 2: The NPDES permit requires a 6.0 mg/L minimum Dissolved Oxygen limit with a 3 month compliance schedule from effective date of permit. The TCEQ permit requires a 4.0 mg/L minimum Dissolved Oxygen limit.

RESPONSE 2: The final NPDES permit includes a DO limit of 4.0 mg/l for Outfall 001 and establishes a DO limit of 5.0 for Outfall 002.

COMMENT 3: The NPDES permit establishes flow limits at a daily frequency, measured instantaneously. The TCEQ permit requires continuous monitoring with a totalizing meter, in accordance with 30 TAC Section 319.9(a), Table 1.

RESPONSE 3: The final permit includes flow monitored using continuous monitoring with a totalizing meter.

COMMENT 4: The NPDES permit includes slightly different daily average mass loadings for CBOD and TSS when compared to the TCEQ permit.

RESPONSE 4: The 1 pound difference in CBOD is attributed to rounding.

COMMENT 5: The NPDES permit includes 7-day average mass limits for CBOD, TSS, and Ammonia. The TCEQ permit only requires concentration-based 7-day average limits.

RESPONSE 5: EPA provides mass loading limits for all pollutants when a concentration limit is given.

COMMENT 6: The NPDES permit does not include daily maximum limits, as specified in 30 TAC Section309.4.

RESPONSE 6: Secondary treatment regulations contained in 40 CFR do not impose daily limits for CBOD or TSS.

COMMENT 7: The NPDES permit requires a 12-hour composite sample for CBOD, TSS, and Ammonia. The TCEQ permit requires a "composite" sample which is defined as a sample made up of a minimum of three effluent portions collected in a continuous 24-hour period, in accordance with 30 TAC Section 319.9(a), Table 1.

RESPONSE 7: The final permit includes 24-hour composite sampling for CBOD, TSS and ammonia. See EPA Response 6-A1 in SJRA Response to Comments document.

COMMENT 8: The NPDES permit requires E. coli limits of 394 col/100 mL daily average and 126 col/100 mL daily max (with a three month compliance schedule). These limits appear to be erroneously reversed, since the daily average should be less than the daily max.

RESPONSE 8: A typographical error was made and the final permit has corrected the error to reflect 394 col/100 mL daily maximum and 126 col/100 ml daily average for E. coli. See EPA Response 3-C1 in SJRA Response to Comments document.

COMMENT 9: The NPDES permit includes monitoring and reporting at a 2/month monitoring frequency for Nitrate-Nitrogen, Dibromochloromethane, and Total Copper. The TCEQ permit does not include monitoring for these parameters. The average effluent screening concentrations for Total Copper and Dibromochloromethane were less than 70% of the effluent concentration that would attain water quality standards, and monitoring for these parameters is therefore not required according to the Procedures to Implement the Texas Surface Water Quality Standards (IPs).

RESPONSE 9: EPA has eliminated monitoring and reporting for dibromochloromethane and nitrate-nitrogen but not copper. Copper is still required to be monitored and reported in the final permit. See EPA Response 5-E1in SJRA Response to Comments document.

COMMENT 10: In the NPDES permit, the monitoring frequency for Total Residual Chlorine on Page 1 is daily. However, the footnote (*8) for Total Residual Chlorine in Part 1, Page 1 is defined on Page 3 and refers to monitoring at 5 days per week.

RESPONSE 10: EPA notes the inconsistency, and has corrected the final permit to reflect daily monitoring as the Fact Sheet specified.

COMMENT 11: The NPDES permit requires reporting the daily average flow and 7-day average flow. The TCEQ permit requires reporting the annual average flow in place of the daily average flow and does not require reporting of the 7-day average flow.

RESPONSE 11: Noted in the administrative record.

COMMENT 12: In the NPDES permit, the final effluent set in Part 1, Page 4 (related to the WET limits) becomes effective three years from the effective date of the permit, and this effluent set appears to incorrectly continue the compliance schedule for the dissolved oxygen limit that is in place three months from the effective date of the permit.

RESPONSE 12: The Tables in Part I of the permit have been changed and footnotes specify times and dates for compliance schedules.

COMMENT 13: In the NPDES permit, the final effluent set in Part 1, Page 4 includes footnote (*4) related to the E. coli limit, which is defined on Page 5 and allows a three month compliance schedule. The interim report requirement for E. coli has been appropriately deleted in the final effluent set. However, the placement of the footnote is confusing, and it might be clearer if this footnote were deleted.

RESPONSE 13: The Tables in Part I of the permit have been changed and footnotes specify times and dates for compliance schedules.

COMMENT 14: In the NPDES permit, footnotes are included for the E. coli limits in the interim effluent set (*7) and the final effluent set (*6) which conflict with each other. (*7) on

Page 3 directs the permittee to utilize specific analytical testing methods, while (*6) on Page 5 states that EPA has yet to approve a test method for E. coli.

RESPONSE 14: The Tables in Part I of the permit have been changed and footnotes have also been appropriately changed.

COMMENT 15: The NPDES permit includes Narrative Limits on Page 6 of Part 1 of the permit. These provisions appear to require that the receiving water comply with various water quality provisions (such as free of oil and grease, free of floating solids, etc.). The TCEQ permit includes similar provisions; however, those provisions refer to the effluent quality of the discharge rather than to the conditions of the receiving waters.

RESPONSE 15: EPA concurs, and the following language has been added to the final permit; "Discharges shall be such that the following narrative standards are maintained in the receiving waters." See EPA Response 17-A1 in SJRA Response to Comments document.

COMMENT 16: In the NPDES permit, Section B on Page 6 of Part 1 under Subparagraph B.e. identifies a compliance schedule for the WET limits of three years from the effective date of the permit. Other sections of the proposed permit indicate compliance is required on 1/1/2010.

RESPONSE 16: The permit includes a revised compliance schedule for WET limits, which become effective three years after the effective date of the permit.

COMMENT 17: In the NPDES permit, Section D on Page 8 of Part 1 includes Pollution Prevention Requirements, which are not required in the TCEQ permit.

RESPONSE 17: EPA includes Pollution Prevention Requirements in NPDES permits.

COMMENT 18: The NPDES requirements in the Contributing Industries and Pretreatment Requirements are not the same as the requirements of the TCEQ. The TCEQ has required the permittee to develop a full TCEQ pretreatment program for all three of the SJRA facilities. The TCEQ has issued two TCEQ permits (WQ0012597001/TX0091715 and WQ0011401001/TX0054186) that include the seven activities for the SJRA to develop a full TCEQ pretreatment program, and one permit (WQ0011658001/TX0063461) that includes language referencing the requirement to develop a pretreatment program through the tracking plant WQ0012597001. 40 CFR Part 403.8(a) states that any POTW (or combination of POTWs operated by the same authority) with a total design flow greater than 5 mgd and receiving from Industrial Users pollutants which Pass Through or Interfere with the operation of the POTW or are otherwise subject to pretreatment standards will be required to establish [develop] a POTW pretreatment program. The draft NPDES permit appears to differ from this regulation.

RESPONSE 18: Noted in the administrative record.

COMMENT 19: The NPDES permit does not define a mixing zone, as specified by 30 TAC Section 307.8(b)(9).

RESPONSE 19: Noted for the Administrative Record.

COMMENT 20: 24-hour acute biomonitoring is required in the TCEQ permit in accordance with the IPs, but this requirement is not included in the NPDES permit.

RESPONSE 20: Comment noted in the Administrative Record.

COMMENT 21: The NPDES permit includes chronic WET (Whole Effluent Toxicity) limits for both test species, even though the Toxicity Reduction Evaluation (TRE) that the permittee had previously performed was for the water flea (Ceriodaphnia dubia) only. This approach appears to be inconsistent with the IPs, since the fathead minnow (Pimephales promelas) never demonstrated any statistically significant lethality.

RESPONSE 21: The WET limit for the fathead minnow was deleted from the permit.

COMMENT 22: The WET limits in the NPDES permit are for "toxicity" (lethal and/or sublethal effects), whichever number is lower. Since the sublethal testing is usually lower, as test organisms have other functions impaired before they actually die, the permit in effect has sublethal WET limits. Sublethal WET limits are not required in the current IPs.

RESPONSE 22: Noted for the Administrative Record. See also EPA Response 21-A3 in SJRA Response to Comments document.

COMMENT 23: According to the fact sheet for the NPDES permit, the analysis for WET Reasonable Potential (RP) analysis (Appendix B) is inconsistent with the IPs. The NPDES analysis results in a toxicity WET limit for the fathead minnow after only two demonstrations of a statistically significant growth effect in the past five years. In addition, the NPDES permit precludes the permittee from performing a TRE before WET limits are added to the permit, and this approach is also inconsistent with the IPs.

RESPONSE 23: See previous comment regarding removal of the fathead minnow from the WET limit. Also, the permit does not preclude a TRE, it simply does not require a TRE.

COMMENT 24: Throughout Part II.D. (Whole Effluent Toxicity Limits) of the NPDES permit, the term "at and below" is used when referencing the critical dilution in terms of determining whether a significant effect has or has not occurred. This definition contradicts EPA's WET method manuals, and it is more stringent than the language included in TCEQ permits with WET testing requirements in Part 2.B., Statistical Interpretation. This may cause a difference in the NOEC values reported to EPA and TCEQ.

RESPONSE 24: See EPA Response 48-E1 in SJRA Response to Comments document.

COMMENT 25: In Part II.D.1.a. of the NPDES permit (untitled), the Ceriodaphnia dubia test is required to be terminated when 60% of the surviving females in the control produce three broods or at the end of eight days, whichever comes first. In the TCEQ permit, the test is terminated when 60% of the surviving adults in the control produce three broods or at the end of eight days, whichever comes first.

RESPONSE 25: See item 4.9.1 on page 11 of the most recent freshwater WET methods manual (November 2002), which states: "In Ceriodaphnia dubia controls, 60% or more of the surviving females must have produced their third brood in 7 ± 1 days, and the number of young per surviving female must be 15 or greater."

COMMENT 26: In Part II.D.2.a.ii. of the NPDES permit (Test Acceptance), the mean number of neonates is evaluated on surviving females in the control, while in the TCEQ permit it is evaluated on surviving adults (males and females).

RESPONSE 26: See Response 25

COMMENT 27: In Part II.D.1.a..iii.. of the NPDES permit (Test Acceptance), 60% of the surviving control females must produce three broods. In the TCEQ permit, the test is valid if 60% of the surviving adults in the control produce three broods or at the end of eight days, whichever comes first.

RESPONSE 27: See Response 25

COMMENT 28: In Part II.D.2.a..vii. and viii. of the NPDES permit (Test Acceptance), tests are invalidated if the Percent Minimum Significant Difference (PMSD) falls below a specified criterion for a particular species. This is inconsistent with the language in the TCEQ permits as well as the EPA methodology manual, which has specific procedures to address PMSD values below the specified criteria, but the tests are not automatically invalidated.

RESPONSE 28: Noted for the Administrative Record.

COMMENT 29: Part II.D.2.b. of the NPDES permit (Statistical Interpretation) differs from the TCEQ permit. For example, in the NPDES permit there is no Lowest Observed Effect Concentration (LOEC) definition and no discussion of interpreting anomalous results.

RESPONSE 29: Noted for the Administrative Record.

COMMENT 30: In Part II.D.2.c. of the NPDES permit (Dilution Water), the defined dilution water collection site is inconsistent with the one in the TCEQ permit.

RESPONSE 30: Noted for the Administrative Record. No changes were made to the permit.

COMMENT 31: In Part II.D.4., the NPDES permit allows a chronic testing frequency reduction after one year of quarterly testing for the fathead minnow if conditions of no toxicity are met. Conversely, the TCEQ permit and the IPs do not prescribe consideration of a testing frequency reduction for species with WET limits until five years of testing have been performed.

RESPONSE 31: This final permit does not include a WET limit for the fathead minnow.

COMMENT 32: In Part II.D.2.d. of the NPDES permit (Samples and Composites), the composite sample definition (which references Item 1.a. which in turn references Part I) is inconsistent with the definition in the TCEQ permit.

RESPONSE 32: See EPA Response 6-A1 in SJRA Response to Comments document.

COMMENT 33: In Part II.D.2.d.iii. of the NPDES permit (Samples and Composites), the composite samples are required to be chilled to 4 degrees Centigrade. This differs from the TCEQ permit and the EPA method manual, which allows the samples to be maintained at a temperature range of 0-6 degrees Centigrade.

RESPONSE 33: See EPA Response 11-F1in SJRA Response to Comments document.

RESPONSE TO SJRA COMMENTS

The attached document iincludes the comments from SJRA and the responses by EPA.

EPA REGION 6 RESPONSE TO COMMENTS
SAN JACINTO RIVER AUTHORITY
DRAFT NPDES PERMIT NO. TX0054186
WOODLANDS WASTEWATER TREATMENT PLANT NO. 1

SEPTEMBER 28, 2007

DEFINITIONS AND ABBREVIATIONS

1989 NPDES Permit – The current NPDES permit under which SJRA operates WWTP No.1 issued by EPA in 1989. (See Appendix).

2004 Texas 303(d) List – TCEQ's list of waterbodies that do not meet TSWQS for designated uses. May 13, 2005. (Available at http://www.tceq.state.tx.us/assets/public/compliance/monops/water/04twqi/04_303d.pdf).

7Q2 – The lowest average stream flow for seven consecutive days with a recurrence interval of two years, as statistically determined from historical data. 30 TAC § 307.3(26).

Application – SJRA's NPDES Permit Application filed with EPA June 1, 2006, and related documents.

BPJ – Best Professional Judgment.

CBOD5 – 5 day Carbonaceous oxygen demand.

C. dubia – Ceriodaphnia dubia.

CFR – Code of Federal Regulations.

cfu – Colony forming units.

Chronic Freshwater Methods - *Promulgated at 40 CFR Part 136 in 1995 and updated in 2002.* – U.S. Environmental Protection Agency. Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms. Fourth Edition; October 2002. (Available at http://www.epa.gov/waterscience/wet/disk3/ctf.pdf).

> *Chronic Toxicity - Toxicity which continues for a long-term period after exposure to toxic substances. Chronic exposure produces sub-lethal effects, such as growth impairment and reduced reproductive success, but it may also produce lethality. The duration of exposure applicable to the most common chronic toxicity test is seven days or more. (Definition from the Texas Water Quality Standards)*

CV – Coefficient of Variation - a statistical measure of dissimilarity, defined as the ratio of the standard deviation to the mean in a set of data.

DMR – Discharge monitoring report.

DO – Dissolved oxygen.

Draft Permit – The draft NPDES Permit No. TX0054186 issued by EPA on December 18, 2006 for WWTP No. 1.

E. coli – Escherichia coli bacteria.

EPA – Environmental Protection Agency.

EPA NPDES Permit Writer's Manual – U.S. Environmental Protection Agency. EPA Permit Writers' Manual EPA Document No. EPA-833-B-96-003. December 1996. (Available at http://www.epa.gov/npdes/pubs/owm0243.pdf).

Fathead Minnow – *Pimephales promelas*.

IC_{25} – 25-percent Inhibition Concentration. The toxicant concentration that would cause a 25 percent reduction in mean young per female for a *C. dubia* test population or a 25 percent reduction in mean growth for a Fathead Minnow test population.

IP – Procedures to Implement the Texas Surface Water Quality Standards. Document No. RG-194 (Revised). January 2003. (See Appendix).

Interlaboratory Variability Study – U.S. Environmental Protection Agency, Office of Water. Final Report: Interlaboratory Variability Study of EPA Short-term Chronic and Acute Whole Effluent Toxicity Test Methods, Vol. 1. Document No. EPA 821-B-01-004. U.S. Environmental Protection Agency, Office of Water, Washington, D.C. (Available at http://www.epa.gov/waterscience/WET/finalwetv1.pdf).

MAL – Minimum Analytical Level.

mg/L – Milligrams per liter.

ml – Milliliter.

NH_3-N – Ammonia nitrogen.

NOEC – No Observed Effects Concentration.

NPDES – National Pollutant Discharge Elimination System.

PFD – The Administrative Law Judge's Proposal for Decision in TCEQ Docket No. 2003-1213-MWD; SOAH Docket No. 582-04-1194. (See Appendix).

POTW – Publicly Owned Treatment Works

R6 – EPA Region 6

SJRA – The San Jacinto River Authority.

SOAH – The State Office of Administrative Hearings, Texas.

Standard Methods for the Examination of Water and Wastewater – American Public Health Association, American Water Works Association, and Water Environment Federation. Standard Methods for the Examination of Water and Wastewater. 19th Edition. 1995.

State Permit – The permit issued by the TCEQ on January 17, 2006 for WWTP No. 1. (See Appendix).

TAC – Texas Administrative Code.

TCEQ – Texas Commission on Environmental Quality.

TCEQ Order – TCEQ's "Order Regarding Application by San Jacinto River Authority for Renewal of TPDES Permit No. 11401-001 in Montgomery County; TCEQ Docket No. 2003-1213-MWD; SOAH Docket No. 582-04-1194." (See Appendix).

TCEQ Record – The record associated with TCEQ Docket No. 2003-1213-MWD; SOAH Docket No. 582-04-1194, including the hearing transcripts, SJRA's Exhibits, the Executive Director's Exhibits, the PFD, the TCEQ Order and the State Permit. (See Appendix).

TEXTOX – Texas Toxic evaluation spreadsheet

TPDES – Texas Pollutant Discharge Elimination System.

TRC – Total residual chlorine.

TRE – Toxicity Reduction Evaluation. An organized stepwise investigation designed to identify pollutant(s), sources, and controls for toxic effluents.

TSD - Technical Support Document for Water Quality-based Toxics Control, EPA/505/2-90-001, 2nd Printing, U.S. Environmental Protection Agency, Office of Water, Washington, D.C.
(Available at: http://www.epa.gov/npdes/pubs/owm0264.pdf)

TSS – Total suspended solids.

TSWQS – Texas Surface Water Quality Standards, 30 TAC § 307.1-307.10.

WERF Report – Warren-Hicks, Ph.D., William; Benjamin R. Parkhurst, Ph.D.; and Song Qian, Ph.D. Accounting for Toxicity Test Variability in Evaluating WET Test Results. Document No. 00-ECO-1. 2006. (See Appendix).

WET Variability Document – U.S. Environmental Protection Agency, Office of Wastewater Management. Understanding and Accounting for Method Variability in Whole Effluent Toxicity

Applications Under the National Pollutant Discharge Elimination System. Document No. EPA 833-R-0-003. 2000. (Available at http://www.toxicity.com/pdf/epa2000june.pdf).

> *WET Method Guidance - Method Guidance and Recommendations for Whole Effluent Toxicity (WET) Testing (40 CFR Part 136), EPA 821-B-00-004, July 2000. Available at: http://www.epa.gov/npdes/pubs/wetguide.pdf*

WET – Whole Effluent Toxicity.

WQAS – TCEQ Water Quality Assessment Section

WQMP – Water Quality Management Plan

WWTP No. 1 – The Woodlands Wastewater Treatment Plant No. 1 that is the subject of the Draft Permit.

INTRODUCTION *(EPA)*

The only comments received on the draft permit were those made by the permittee. Due to the nature of some comments and complexity of both the comments and responses, EPA has reorganized the structure of the comments however the actual comments are presented verbatim. Comments and responses related to whole effluent toxicity (WET) are lengthy and have been grouped in the last two sections. The last section (V - Non-Permit Related Comments) of the permittee's comments addresses issues that went beyond the terms and conditions of the proposed permit (e.g., comments on the WET methods, sublethal endpoints etc.) EPA's has provided responses to those comments. EPA's responses to comments on the Draft Permit are categorized as follows: specific effluent limits and monitoring requirements; procedural sampling, reporting, and record-keeping requirements; correction of information in the Fact Sheet, typographical errors, and minor language clarification, whole effluent limits and monitoring requirements. SJRA text is not italicized and not indented. It includes headings for SJRA's Comments and SJRA's Recommendations. All EPA responses are interjected within the text of SJRA's comments and are presented, indented and in italics, after the heading "EPA Response." EPA responses are numbered both sequentially for ease of reference within the document but also with the original SJRA comment identification (e.g. EPA Response 1 – A1; where the first 1 is the sequential number, A is the original comment section identifier and the second 1 identifies it as EPA's first response for SJRA Comment A) for retaining continuity with their original comment document.

I. SPECIFIC EFFLUENT LIMITS AND MONITORING REQUIREMENTS

A. Data Used in Development of Draft Permit (Fact Sheet at p. 2)

Comment: Section X of the Fact Sheet states that data provided in the EPA Permit Application Form 2A and "other salient data" were used to determine the average and maximum concentrations for parameters listed in Table I of the Fact Sheet from which the permit monitoring requirements are derived.

The Fact Sheet should specifically identify EPA's source, or sources, of other "salient data." In addition, the Fact Sheet should identify the methodology used by the EPA to determine average concentrations for the listed parameters for which some of the data results were below the MAL.

EPA Response 1-A1: *In addition to the information included in application Form 2A, data identified as "salient data" in the Fact Sheet, Section X, "Effluent Characteristics", was pollutant data EPA requested on other pollutants that were not on the Form 2A. These other pollutants are unique to Texas WQS, not included on Form 2A. The data was provided by the applicant* *in four e-mails identified in Section XV, Part D, "Letters/Memoranda/Records of Communication, Etc."*

Regarding the methodology EPA uses to determine average concentrations when some data are below the Minimum Analytical Level (MAL), and others above the MAL, the process is to take one-half the MAL for those concentrations shown as below the MAL and calculate a geometric mean using the other concentrations for those samples above the MAL. However, the listing of pollutant averages and maximums listed in Section X, "Effluent Characteristics" of the fact sheet were taken directly from the document "Summary of Data Used for Report 3510-2A", provided by the applicant as part of its application package

B. **Dissolved Oxygen Limit** (Draft Permit Part I Item A.1 at p. 1; Part I Item A.2 at p. 4; Fact Sheet at pgs. 2, 8)

Comment: The Draft Permit imposes a new DO limit of 6.0 mg/L with a three month compliance period. The Fact Sheet justifies this increase based on modeling performed by TCEQ in 2000, the results of which are contained in an October 5, 2000 memorandum from Charles Marshall. The Fact Sheet states that although the TCEQ modeled for both Outfall 001 and 002 with regard to SJRA's discharge, EPA uses the "most stringent" set of DO models for permitting purposes. The current 1989 NPDES Permit contains a 4.0 mg/L DO limit.[1] The Fact Sheet also notes that a three month compliance period is adequate because the data SJRA submitted in its Application demonstrate it can meet the more stringent DO limit now.

The October 5, 2000 modeling memorandum was prepared in order to identify the appropriate effluent set applicable to each outfall associated with SJRA's discharge—Outfall 001 in Panther Branch or Outfall 002 into Lake "B," the upper portion of Harrison Lake. The memorandum provides the results for three possible effluent sets for Outfall 001 and two possible effluent sets for Outfall 002. With regard to Outfall 002, the memorandum adopts a presumed DO criterion of 5.0 mg/L for Harrison Lake and concludes that an effluent set containing a DO limit of 5.0 mg/L is sufficient to maintain this criterion.

For Outfall 001, the memorandum adopts a presumed DO criterion of 5.0 mg/L for Panther Branch and concludes that an effluent set containing a DO limit of 6.0 mg/L is necessary to maintain this criterion. However, the memorandum fails to recognize that the portion of Panther Branch into which SJRA discharges from Outfall 001 is the subject of a site-specific criterion in Appendix D of the TSWQS.[2] The TSWQS adopt a site-specific DO criterion of 4.0 mg/L for Panther Branch from its confluence with Spring Creek upstream to the dam that impounds Lake Woodlands. As shown in the memorandum, any one of the effluent sets modeled for Outfall 001 meet the site specific criterion for this portion of Panther Branch, including the set containing a DO limit of 4.0 mg/L. Indeed, the final permit issued by TCEQ

[1] 1989 NPDES Permit at p. 2 of Part I.

[2] *30 TAC § 307.10, Appendix D.*

includes a DO limit of 4.0 mg/L.[3] EPA should not impose a permit limit based on the application of an incorrect water quality criterion.

If EPA retains the increased DO limit of 6.0 mg/L despite these comments and the use of an incorrect water quality criterion, it should at least include a compliance period greater than three months. It is not correct to assume that because WWTP No.1 can meet a 6.0 mg/L DO limit now, that it will still be capable of doing so in its current configuration as flows at the facility increase. The facility is currently operating at approximately 47% of its design capacity. SJRA needs additional time to study what impact an increased DO limit will have on the system and identify and implement any necessary changes to ensure that this new limit will be maintained at higher flows.

In addition, a separate DO limit for Outfall 002 should be maintained since a different water quality criterion applies to this discharge. The Fact Sheet provides no justification for EPA's use of the "most stringent set" of DO models for permitting purposes. There is no reason why separate DO limits may not be applied to Outfalls 001 and 002.

Recommendation: Modify the DO limit for Outfall 001 from 6.0 mg/L to 4.0 mg/L. Include a separate DO limit for Outfall 002 of 5.0 mg/L. *See* Proposed Limitations and Monitoring Requirements Table at Attachment A. If the increased DO limit of 6.0 mg/L is maintained, provide a compliance period of one year to allow sufficient time to identify and implement any facility changes.

> ***EPA Response 2-B1:** The DO limit for Outfall 001 in the draft permit was established at 6.0 mg/l based on information in the Texas water quality management plan (WQMP) provided by the State. Upon further review a more recent WQMP update was identified. Based on this new information the corrected DO limit for Outfall 001 is 4.0 mg/ and the limitation for Outfall 002 is maintained at 5.0 mg/l. The final permit will reflect that the DO for Outfall 001 shall be 4.0 mg/l and for Outfall 002, the DO limitation shall be 5.0 mg/l.*

C. **E. coli Limit** (Draft Permit Part I Item A.1 at p. 1; Part I Item A.2 at p.4; Fact Sheet at pgs. 2, 7, 9)

Comment: The Draft Permit includes a new limit for E. coli. The permit limit tables at Part I pages 1 and 4 specify a "30-Day Avg." limit of 394 cfu per 100 ml and a "Daily Max" limit of 126 cfu per 100 ml. Page 7 of the Fact Sheet notes that Segment 1008 has established numeric criteria for E. coli and states that this criteria is included as the limit in the Draft Permit. Page 7 states that the facility, in the past, has been required to provide for bacteria control. Page 9 of the Fact Sheet states that Segment 1008 is listed on the 2004 Texas 303(d) List for bacteria.

As described in the Application, WWTP No. 1 disinfects the treated effluent prior to discharge to Panther Branch.[4] In accordance with both the 1989 NPDES Permit and the State Permit for the facility, the treated effluent maintains a minimum of 1.0 mg/L of TRC for 20

[3] State Permit at p.2 Item 6.
[4] Application at 2A, at p. 6 of 21 and Attachment 5.

minutes (at peak flow) prior to dechlorination.[5] This minimum chlorine residual and detention time are accepted treatment practices for wastewater. Based on data provided in the Application, the geometric mean for fecal coliform in the effluent is less than 15 cfu per 100 ml,[6] indicating that the disinfection process is effective.

The fact that Segment 1008 has specific criteria for bacteria assigned to it by the TSWQS does not, in and of itself, automatically require the implementation of an effluent limit for the same parameter. The TSWQS states that the geometric mean of E. coli should not exceed 126 cfu per 100 ml and the maximum single-sample concentration of E. coli should not exceed 394 cfu per 100 ml for all water bodies designated for contact recreation uses (not just Segment 1008).[7] However, TCEQ does not impose permit limits for bacteria on facilities that disinfect using chlorine (such as WWTP No. 1). No TPDES permit for a facility that achieves disinfection using chlorine requires E. coli monitoring or contains an E. coli limitation.[8] Only facilities that disinfect with ultraviolet lamps are required to test for bacteria.[9] Therefore, there is no factual or legal basis for the simple conversion of the numeric criteria/standard for E. coli into a permit limit.

The inclusion of Segment 1008 on the 2004 Texas 303(d) List does not mandate that bacteria limits be included in permits issued to facilities that discharge to that segment. The IP states that effluents that are disinfected prior to discharge are unlikely to result in degradation of the receiving waterbody due to increased loading of recreational indicator bacteria.[10] Accordingly, TCEQ does not include bacteria limits in permits based on 303(d) listing for bacteria. EPA has provided no information or analysis in the Fact Sheet explaining how the proposed E. coli limit for WWTP No. 1 is necessary to maintain this criterion.

Page 7 of the Fact Sheet is unclear regarding the statement that the facility "has in the past been required to provide for bacteria control." If this is in reference to the requirement to disinfect, then this is a requirement of all mechanical wastewater treatment plants, but does not address why a coliform limit is needed in addition to disinfection by chlorination. If the statement refers to some other issue with bacteria, SJRA is unaware of what that issue could be. Neither the 1989 NPDES Permit nor the State Permit contains an E. coli limit.

Neither state policy nor historic practices of EPA require an E. coli limit. Therefore, it should be removed.

Recommendation: The following modifications should be made to the Draft Permit:

- The E. coli limit should be removed.

[5] 1989 NPDES Permit at p. 2 of Part I; State Permit at p. 2.
[6] Application at Attachment 3. Fecal coliform concentrations in the three tests conducted for the Application were <10 cfu per 100 ml, 32 cfu per 100 ml, and <10 cfu per 100 ml. If 10 cfu per 100 ml is used as a conservative value for the two less-than results, the geometric mean of these three tests is 14.74 cfu per 100 ml.
[7] 30 TAC 307.7(b)(1)(A)(i).
[8] Telephone conversation with Firoj Vahora, TCEQ (R. Hunt; February 5, 2007).
[9] Telephone conversation with Firoj Vahora, TCEQ (R. Hunt; February 5, 2007).
[10] IP at p. 33; third bullet in list.

- The following language should be used in lieu of the E coli limit:

  "The effluent shall contain a total residual chlorine (TRC) of at least 1.0 mg/L, prior to final dechlorination and disposal, after a detention time of at least 20 minutes (based on peak flow). The TRC in the chlorinated effluent shall be monitored daily by grab sample."

- However, if the E. coli limit is maintained in the final permit, the 30-Day Average limit and the Daily Maximum limits should be corrected. The Daily Maximum should be 394 cfu per 100 ml and the 30-Daily Average should be 126 cfu per 100 ml. These values are switched in the effluent limit tables on pages 1 and 4 of the Draft Permit.

These changes are reflected in the Proposed Limitations and Monitoring Requirements Table at Attachment A.

> ***EPA Response 3-C1:*** *EPA does not concur with the request for the removal of E. coli bacteria limits. The commenter references the State Implementation Procedures (IP) document in support of their argument. The IP 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. The Texas Surface Water Quality Standards may be found in 30 Texas Administrative Code (TAC) Sections (§§) 307.1-.10."). 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 TNRCC and EPA, but this does not constitute approval of the IP as a water quality standard under CWA section 303(c). Therefore, EPA is not bound by the IP alone in establishing bacteria limits in this permit – but rather, must ensure that the bacteria limits are consistent with the EPA-approved state water quality standards. Where a permit has been federalized, EPA does attempt to follow State IPs in determining bacteria limits – but only to the extent that the IP is consistent with EPA-approved state water quality standards.*
>
> *As you have noted, the Texas Commission on Environmental Quality (TCEQ) has historically included a minimum chlorine residual limit (1 mg/L for at least a 20 minute contact time) in these permits, but has not included monitoring requirements or water quality effluent limits to verify that State water quality standards for bacteria are being met. It is true that EPA used a similar approach in Texas prior to the State's authorization for implementation of the NPDES program in 1998. However, as we have discussed, EPA believes this historical practice is not in keeping with the requirements of the Clean Water Act (CWA) and 40 CFR Part 122.*

EPA does not disagree with TCEQ's use of chlorination as a means of disinfection. We believe that chlorination is an effective means of eliminating bacteria from municipal waste water. Neither do we disagree with the State's use of a maximum chlorine residual limit to ensure that chlorine is not discharged in treated waste water in toxic amounts. Our concern involves the use of this minimum chlorine residual limit as a "surrogate" for bacteria monitoring and limits in assessing whether bacteria discharges have been controlled as stringently as necessary to meet water quality standards, as required by 40 CFR 122.44(d)(1).

Under 40 CFR §122.44, NPDES permits are required to include not only technology-based effluent limits, but also any more stringent requirements necessary to "[a]chieve water quality standards established under section 303 of the CWA, including State narrative criteria for water quality." (40 CFR §122.44(d)(1)). Under this provision, limitations must control ***all*** *pollutants that "are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality." 40 CFR §122.44(d)(1)(i) (emphasis added). Also, pursuant to 40 CFR 122.44(d)(1)(iii), if it is determined "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."*

Texas has established numerical water quality standards for bacteria in Texas waters. The Texas Standards for freshwater contact and noncontact recreation uses the geometric mean of E. coli should not exceed 126 per 100 ml for contact recreation (single samples of E. coli should not exceed 394 per 100 ml) and 605 per 100 ml for noncontact recreation.

Because municipal waste water treatment facilities receive primarily domestic sewage from residential and commercial customers, the waste stream from these facilities will naturally include large amounts of bacteria. As discussed above, the waste water is treated with chlorine in an effort to remove bacteria to an acceptable level. However, if treatment is inadequate or unsuccessful, (e.g., through operator error or other operational issues) waste water may be discharged containing levels of bacteria that are not controlled as stringently as necessary to meet Texas water quality standards. As a result, EPA believes 40 CFR §122.44(d) requires NPDES permits for municipal waste water treatment facilities to include monitoring requirements and water quality based bacteria limits to ensure bacteria discharges are controlled as stringently as necessary to meet State water quality standards. Although the minimum chlorine residual limit currently used by TCEQ provides evidence that chlorine was used to disinfect the waste water, it does not provide any *concrete information on whether the disinfection was sufficient to control discharges of bacteria as stringently as necessary to meet water quality standards as required by the federal regulations.*

Again, as noted above, EPA does not disagree that chlorination is generally an effective means of bacteria elimination. However, it is not foolproof. EPA has documented numerous examples of bacteria violations at waste water facilities that disinfect with chlorine. For instance, data from EPA's Permit Compliance System (PCS) indicates at least 30 Publicly Owned Treatment Works (POTWs) in New Mexico and 85 in Oklahoma have reported bacteria violations in the last 5 years, despite the fact that these facilities use chlorine for disinfection.

In drafting the permit EPA relied on the regulations found in 40 CFR §122.44(d)(1)(i) through (iii), to establish limitations for E. coli bacteria, as this is the only direct method to determine compliance with the State WQS. The preamble to the above regulations clearly establishes the intent of the regulation: "Today's regulations do not allow the permitting authority to use indicator parameters under paragraphs (d)(1) (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)(1) (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)(1)(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." (See 54 Fed. Reg. 23868, 23878 (June 2, 1989). Furthermore, the fact sheet stated that this receiving water body is a Section 303(d) listed stream impaired for bacteria concerns, and establishing a limitation for E. coli bacteria is the only way to guarantee compliance with the listed pollutant. The permit will maintain the permit limitations for E. coli bacteria.

EPA does concur in that a typographical error was made in switching the 30-day average and daily maximum limitations between the fact sheet and the draft permit. EPA will correct this typographical error in the final permit. The final permit will show the daily maximum limitation of 394 cfu per 100 ml and the 30-day average of 126 cfu per 100 ml.

D. **Reporting Requirement for Nitrate-Nitrogen and Dibromochloromethane** (Draft Permit Part I Item A.1 at p. 2; Part I Item A.2 at p. 4; Fact Sheet pgs. 2, 7; Fact Sheet at Appendix A)

Comment: The Draft Permit requires monitoring for nitrate-nitrogen and dibromochloromethane. Page 7 of the Fact Sheet states that the effluent data provided by SJRA for these parameters exceeds 70% of the daily average effluent limits determined necessary to maintain TSWQS, thereby mandating a report requirement. The Fact Sheet explains that the calculation of the daily average effluent limits for nitrate-nitrogen and dibromochloromethane were based on critical conditions provided by the TCEQ Water Quality Assessment Section and the use of TEXTOX Menu 3 with a 7Q2 of 2.2 cfs and a harmonic mean flow of 4.17 cfs. These flows apply to Panther Branch. This information is also contained in Appendix A of the Fact Sheet.

EPA has incorrectly applied human health criteria to Panther Branch, which is not a classified segment with a designated public water supply use according to the TSWQS.[11] In the TSWQS, Human Health Criteria from Table 3 only apply to water bodies used as a public water supply. Because the water quality standards for nitrate-nitrogen and dibromochloromethane are human health standards applicable to segments with a designated use as a public water supply, it is inappropriate to apply the criteria to Panther Branch and use Panther Branch critical conditions in the development of the water quality based effluent limits.[12] However, if EPA wishes to evaluate the potential impact of WWTP No. 1 on Spring Creek, the TEXTOX analysis should be rerun using the appropriate flow values for Spring Creek. Enclosed is a revised TEXTOX analysis at Attachment B, which uses the correct flow conditions for Spring Creek. As is indicated in this corrected analysis, the daily average effluent limit for nitrate-nitrogen is 64 mg/L and the daily average effluent limit for dibromochloromethane is 59 ug/L. The Fact Sheet (Table 1 on page 3) states that the average concentration of nitrate-nitrogen in the effluent is 15.4 mg/L, which is approximately 24% of the daily average limit for nitrate-nitrogen. Table 1 also reports that the average concentration of dibromochloromethane is 7.85 ug/L, which is approximately 13% of the daily average limit for dibromochloromethane. Clearly, the concentrations of these compounds in the effluent are well below 70% of the daily average limits. A reporting requirement is, therefore, not justified.

Recommendation: The monitoring requirements for dibromochloromethane and nitrate-nitrogen should be removed from the Draft Permit; and the Fact Sheet should be revised accordingly.

EPA Response 4-D1: *EPA concurs with the request to eliminate "Report" monitoring for nitrate-nitrogen and dibromochloromethane from the final permit.*

[11] Panther Branch is an unclassified perennial stream with an assigned Intermediate aquatic life use. 30 TAC § 307.10(4), Appendix D.

[12] *See* TSWQS discussing application of human health criteria, including specific criteria for nitrate-nitrogen and dibromochloromethane, to freshwaters designated as public water supplies at 30 TAC § 307.6(a)(3). *See also*, 30 TAC §§ 307.6(d)(2)(A); 307.4(d).

Upon review of the comment by SJRA, EPA agrees with the conclusion made by the commenter that EPA had made a technical error in using drinking water as a designated use at Panther Branch. The criteria applicable to Panther Branch are human health criteria for consumption of fresh water fish in addition to criteria for aquatic life protection. During this review, EPA consulted with the TCEQ WQAS, requesting a verification of the flow data used in the calculations. The data that the WQAS provided EPA for the draft permit was the data set on file for the stream segment as of September 21, 2000. That data was based on a single flow data point, 2.2 cfs 7Q2 for Panther Branch and a harmonic mean of 4.17 cfs. More recent flow data was provided by the WQAS in an e-mail dated February 27, 2007. The newer flow data increased the 7Q2 to 5.32 cfs and the harmonic mean increased to 11.43 cfs. The revised flow data has resulted in a change in the critical dilution from 85% effluent to 69% effluent. This flow data was used to update TEXTOX Menu 3, shown as an attachment as SJRA Run #1. Run #1 shows the impact of the discharge from Outfall 001 to Panther Branch, to which human health criteria for consumption of fish apply, in addition to aquatic life criteria. The WQAS also provided flow data to evaluate human health criteria for consumption of water and fish for the impact to Spring Creek, which is within 3-miles of Outfall 001. The WQAS provided the human health harmonic flow for Spring Creek of 29.12 cfs. TEXTOX SJRA Run #2 is Menu 3 for this impact and is also included as an attachment. The most stringent limit derived from the two runs is used to assess permit limitations.

The following tabulation reflects Run's #1 and 2 daily average effluent limits for nitrate-nitrogen and dibromochloromethane.

Pollutant	*Run #1*	*Run #2*
Nitrate-Nitrogen	*N/A*	*46.6 mg/l*
Dibromochloromethane	*191 ug/l*	*43 ug/l*

The most stringent limit based on the two TEXTOX runs would be 46.6 mg/l nitrate-nitrogen and 43 ug/l for dibromochloromethane. The fact sheet stated that the average concentration of nitrate-nitrogen is 15.4 mg/l, which is 33 percent of the daily average limit. The fact sheet showed that the average concentration of dibromochloromethane is 7.85 ug/l, or 18 percent of the daily average limit. Based on this updated analysis, EPA agrees to remove "Report" requirements from the final permit for nitrate-nitrogen and dibromochloromethane.

E. <u>Reporting for Total Copper</u> (Draft Permit Part I Item A.1 at p. 2; Part I Item A.2 at p. 4; Fact Sheet at pgs. 2, 7, Fact Sheet Appendix A)

<u>Comment:</u> The Draft Permit requires monitoring for total copper. Page 7 of the Fact Sheet states that the data provided by SJRA indicate that the concentration of total copper in the effluent exceeds 70% of the daily average effluent limit necessary to maintain TSWQS, thereby mandating a monitoring requirement. The Fact Sheet explains that the EPA permit writer used

BPJ in establishing the report requirement and based his decision on the fact that SJRA's effluent data contained a single value exceeding this 70% threshold.

The Fact Sheet identifies the IP as a basis for the contents of the Draft Permit. The IP drafted by TCEQ establishes the procedures and methods by which the TSWQS are implemented through permitting. EPA approved the IP on November 22, 2002 as consistent with NPDES permitting requirements.[13] The IP clearly provides that, in establishing water quality based effluent limits and monitoring requirements, the "*average concentration* of the effluent data is . . . compared to the daily average limit" and if the "*average* of the effluent data equals or exceeds 70% but is less than 85% of the calculated daily average limit" monitoring is usually included as a permit condition for the parameter of concern.[14] Page 7 of the Fact Sheet states that EPA is replacing the clear policy established in the IP regarding use of the average concentration of the effluent data with the BPJ of the permit writer that a single value is sufficient to justify a monitoring requirement.

The Fact Sheet provides no justification for use of a single value rather than the average concentration as stated in the IP. EPA should provide sufficient justification for deviation from the policy it previously approved as stated in the IP.

Generally, the use of BPJ by a permit writer is only specifically authorized by the Clean Water Act in certain instances such as in the drafting of technology-based limits for industrial dischargers where effluent limit guidelines are not yet available[15] and permit conditions governing sludge disposal prior to the promulgation of applicable federal regulations.[16] There is no legal authorization for the permit writer to replace clear written policy with his BPJ to establish a monitoring requirement for a water quality based parameter based on a single data point. Such an action is arbitrary and capricious and an abuse of EPA's discretion.[17]

<u>Recommendation</u>: Delete the monitoring requirement for total copper in Part I, Item A.1 at page 2 of Part I and Item A.2 at page 4 of Part I. In addition, the Fact Sheet pages 2 and 7, should be modified to remove the discussion of the copper monitoring requirement.

> ***EPA Response 5-E1:*** *EPA does not concur with the removal of copper reporting requirements in the permit. See EPA response 3 for applicability of the State IP. Regulations contained in 40 CFR §122.44 (d)(1)(i) state that "Limitations must control all pollutants or pollutant parameters (either conventional, nonconventional, or toxic pollutants) which the Director determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality." Further, 40 CFR §122.44 (d)(1)(ii) specifies that the permitting authority shall*

[13] IP at p. 1.
[14] IP at p. 83.
[15] 33 U.S.C.A. § 1342(a)(1)(B); 40 CFR § 125.3; *see also* EPA NPDES Permit Writers' Manual at p. 68 (only discusses the use of BPJ in the context of technology based limits for industrial dischargers).
[16] 33 U.S.C.A. § 1345(d)(4).
[17] 5 U.S.C.A. § 706(2)(A) (2004).

use procedures which account for the variability of the pollutant or pollutant parameter in the effluent. The copper concentration data provided in the application had one reported value of 12.6 ug/l, and two additional data points reported below the 10 ug/l MAL. This limited data set was over a period of just six days; May 5, 2006, through May 11, 2006. The data shows that even over this short span there is demonstrated variability in the copper effluent concentrations.

The attached revised flow TEXTOX Run #1 shows that copper limits would be established for effluent concentrations that exceeded 14.917 ug/l. Using only the states IP as guidance, the pollutant would have a "Report" requirement if the effluent concentration were 12.284 ug/l or greater. EPA believes that based on the concentrations of copper and the demonstrated variability in the effluent, that a "Report" requirement for copper is warranted. This requirement is retained in the final permit.

II. PROCEDURAL SAMPLING, REPORTING, AND RECORD-KEEPING REQUIREMENTS

A. Composite Sampling Requirements (Draft Permit Part I Item A.1 at pgs. 1-2; Part I Item A.2 at p. 4; Part III Item F.22.d at p. 10)

Comment: The Draft Permit requires 12-hour, flow-weighted, composite samples for CBOD, TSS, and Ammonia Nitrogen analyses. The permit later defines the 12-hour composite sample as consisting of 12 effluent portions collected no closer together than one hour. The sampling interval is to include the highest flow periods of the day.

SJRA has three objections to this requirement:

- The objective of water quality sampling is to obtain samples that are representative of the effluent being produced. Results based on 12-hour composite samples are less representative than results based on 24-hour composite samples.

- SJRA's current State Permit also requires monitoring for CBOD, TSS, and Ammonia Nitrogen, but using 24-hour, flow-weighted composite samples. In addition, the Draft Permit requires 24-hour, flow-weighted composite samples for WET tests. It is unnecessarily burdensome to have to collect two different types of flow-weighted composite samples.

- The required sampling regime is unnecessarily restrictive in two respects:

  1. The objective of the sampling is to obtain a representative, flow-weighted sample over the sampling period. This can be achieved by collecting samples at equal time intervals and varying the volume of each sample based on the flow at the time of the sample. It can also be achieved by collecting equal-volume samples at time intervals proportional to flow. Automatic samplers can be programmed to collect flow-weighted composite samples using the second method. The second method is the method used by SJRA. At WWTP No. 1, the frequency of sampling is proportional to flow in the plant. Each individual sample consists of a set volume. The interval of time between samples varies according to flow. The interval is shorter during higher flow periods and longer during lower flow periods. The current procedure for collecting composite samples was established in consultation with EPA compliance inspectors in April 2005. However, this sampling method would not be allowed under the provisions of the Draft Permit.

  2. It is physically impractical to adhere strictly to the requirement to collect 12 samples no closer than one hour apart during a 12-hour period, if interpreted literally. Time is required to collect each sample so the time between the end of one sampling event and the beginning of the next

> sampling event will always be less than 60 minutes. In addition, it is not practical for the operational staff to collect each sample exactly 60 minutes apart.

The State Permit provides a more flexible definition of the sampling requirement. It defines the required composite sample as a sample made up of a minimum of three effluent portions collected no closer than two hours apart in a continuous 24-hour period, combined in volumes proportional to flow.[18] This is a better approach than the approach in the Draft Permit.

Recommendation: The Draft Permit should be revised to require 24-hour composite sampling for these parameters. The Draft Permit should use a definition of 24-hour composite sample that is consistent with the definition provided in the State Permit.

If 12-hour composites are to be required, the definition of 12-hour composite should be modified to read as follows:

> "12-HOUR COMPOSITE SAMPLE consists of a minimum of three effluent portions collected no closer together than two hours and composited according to flow. The daily sampling intervals shall include the highest flow periods."

EPA Response 6-A1: *The NPDES and State permits are independent of each other. The NPDES permit may be adopted by the State, but the State permit was not approvable by EPA, which is the reason EPA is issuing this permit. However, on this specific requirement, EPA concurs with the requested change to 24-hour composite sampling for CBOD, TSS and ammonia-nitrogen. The final permit will show 24-hour composite samples with a minimum of 12 effluent portions collected at equal time intervals over the 24-hour period and combined proportional to flow. For consistency, the final permit shall also use this same 24-hour composite sample procedure for the Whole Effluent Toxicity (WET) sampling requirements.*

B. Reporting Period and Report Due Date for the Annual Sludge Report (Draft Permit Part I Item C.3 at p. 7)

Comment: The Draft Permit requires an Annual Sludge Report covering the period January 1 through December 31 of each year. It also requires submission of this annual report by February 19 of the subsequent year.

The Annual Sludge Report required by the Draft Permit is similar to that required by the State Permit. However, the reporting period required for the purposes of the State Permit covers a period from August 1 of one year to July 31 of the next. The due date for the State Annual Report is September 1 after the end of the period.[19] In order to eliminate needless time and expense in duplicating efforts in order to meet two competing sets of reporting requirements

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[18] State Permit at p. 4 Item 3.a.

[19] The reporting period is defined in reporting instructions to SJRA from the TCEQ.

established in the Draft Permit and the State Permit (and even requiring duplicate sampling in some instances), these requirements should be revised so they are consistent with State Permit requirements.

Recommendation: Modify the Draft Permit to require the reporting period for the Annual Sludge Report to cover a period of August 1 to the following July 31. The due date for the Annual Sludge Report should be changed to September 1 following the end of the reporting period.

EPA Response 7-B1: *EPA concurs with the change in the sludge report date. The final permit will show a due date of September 1 with the reporting period of August 1 to July 31.*

During a review of the permit regarding this comment, EPA determined that the version of the sludge language as shown in Part IV of the draft permit was incorrect. Part IV of the draft permit document inadvertently included sludge reporting requirements for an EPA minor facility. The Part IV sludge language has been corrected in the final permit to reflect the requirements of a major facility along with the change to the sludge report date requested by the applicant. The correction of this error will not add any additional burden to the permittee as they are already meeting these requirements as part of their state permit and can submit one report to each authority.

C. DMR as Evidence of Violation (Draft Permit Part I Item C.5 at p. 7)

Comment: The Draft Permit states that any 30-day average, 7-day average, or daily maximum value reported in the required Discharge Monitoring Report which is in excess of the specified effluent limitation shall constitute evidence of violation of such effluent limitation and of the permit.

This language exceeds EPA's authority in that it attempts to pre-determine the legal weight given to information contained in DMRs prior to the commencement of an enforcement action or litigation. EPA does not have the statutory authority to predetermine the admissibility of evidence outside the scope of a judicial determination.

Recommendation: Part I Item C.5 should be deleted from the Draft Permit.

EPA Response 8-C1*: EPA disagrees. The applicable EPA regulations are found at:*

40 CFR Part 122.41(a) – "Duty to comply. The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application." and;

40 CFR Part 122.41(l)(4)(i) and (ii) –

(4) Monitoring reports. Monitoring results shall be reported at the intervals specified elsewhere in this permit.

(i) Monitoring results must be reported on a Discharge Monitoring Report (DMR) or forms provided or specified by the Director for reporting results of monitoring of sludge use or disposal practices.

(ii) If the permittee monitors any pollutant more frequently than required by the permit using test procedures approved under 40 CFR part 136 or, in the case of sludge use or disposal, approved under 40 CFR part 136 unless otherwise specified in 40 CFR part 503, or as specified in the permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR or sludge reporting form specified by the Director.

In addition the following language has been included in the final permit.

"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."

D. **Sampling Frequency for Certain Pollutants** (Draft Permit Part I Item A.1 at pgs. 2-3, note 9; Part I Item A.2 at pgs. 4-5, note 8; Fact Sheet at p. 12)

Comment: The Draft Permit calls for twice monthly testing for total copper, dibromochloromethane, and nitrate-nitrogen, with samples taken at least 10 days apart.

If the monitoring requirements for these parameters are retained despite the comments at Sections I.D and I.E, they should be modified. The 10-day minimum separation time between samples is too restrictive for the proposed frequency of testing. A minimum separation of five days between samples would allow sufficient time for SJRA to re-sample, in case of equipment malfunction, laboratory error or shipping problems, but would still provide a good temporal distribution of samples.

Recommendation: Modify the Draft Permit to require a minimum separation between samples of five days.

EPA Response 9-D1: *EPA does not concur with the request to change the separation between samples to five days. EPA notes that previously in **EPA Response 4D-1**, EPA agreed to eliminate reporting requirements for dibromochloromethane and nitrate-nitrogen, so this comment now only pertains to total copper. EPA's intent for the twice per month sample requirement was to obtain representative sampling for the pollutant of* *concern. After careful consideration of the comment EPA has decided to adopt an alternative approach that will address both EPA's concerns and those presented by the commenter. The final permit will require a sampling frequency for total copper of once per two-weeks.*

E. **Flow Measurement Requirement** (Draft Permit Part I Item A.1 at p. 2; Part Item A.2 at p. 4)

Comment: The Draft Permit requires daily, instantaneous flow measurements.

The Draft Permit does not define "instantaneous" as it pertains to flow measurements, and use of the term is not consistent with the parameter. The State Permit requires flow to be measured continuously, using a totalizing meter.[20] In addition, the 1989 NPDES Permit requires continuous measurement of flow using a totalizing meter.[21] TCEQ regulations also require use of a totalizing meter for a facility of this size.[22] Continuous flow measurements using a totalizing meter are more representative of plant operations.

Recommendation: Modify the Draft Permit to require continuous flow measurement using a totalizing meter.

***EPA Response 10-E1:** EPA concurs with the request and the final permit will show "continuous" flow measurements.*

F. **Temperature Requirement for WET Samples** (Draft Permit Part II Item D.2.d.iii, p. 6)

Comment: The Draft Permit states that effluent samples for WET tests should be chilled to 4°C.

EPA guidance on WET testing protocol now provides that samples should be chilled from 0°C to 6°C. [23]

Recommendation: Modify the reference in the Draft Permit to reflect current EPA guidance on this issue.

***EPA Response 11-F1:** EPA concurs and has revised the permit language.*

G. **Notice for Listed Conditions** (Draft Permit Part II Item C.3 at p. 2)

Comment: The Draft Permit requires that "adequate notice" be provided of the introduction of pollutants from certain indirect dischargers, and any substantial change in the volume or character of pollutants.

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[20] State Permit at p. 2 Item 1.
[21] 1989 NPDES Permit, at p. 2 of Part I, Section A.
[22] 30 TAC § 319.9 (Table 1).
[23] Chronic Freshwater Guidance at p. 31, Section 8.5.1.

This requirement is vague in that it fails to specify to whom notice should be given.

Recommendation: Modify the Draft Permit to provide that notice of the introduction of pollutants from certain indirect dischargers and any substantial change in the volume or character of pollutants be given to the "Director" as provided in 40 § CFR 122.42(b)(2).

> ***EPA Response 12-G1:*** *The comment is correct; information should be sent to the Director. Part III, Section D, sub-section 4 of the permit directs the permittee to send reports, DMRs, letters, WET analyses and/or interpretations and/or other communications to the Compliance Assurance and Enforcement Division. No permit changes are necessary as a result of this comment.*

H. **Reporting Toxicity Results** (Draft Permit Part II Items D.3.c.i.A and D.3.c.ii.A at p. 8)

Comment: Permit provisions regarding reporting of WET test results stipulate coding on the discharge monitoring report according to whether the Fathead Minnow or *C. dubia* NOEC is less than the critical dilution.

These items should be clarified so that they relate to lethal toxicity only.

Recommendation: Modify the Draft Permit to add the word "lethal" before "toxicity" in Part II Items D.3.c.i.A and D.3.c.ii.A.

> ***EPA Response 13-H1:*** *EPA disagrees. The permit limits for WET were established on the basis of test data indicating that reasonable potential exists for the effluent discharged from this facility to cause or contribute to an exceedance of the State's narrative criteria for the protection of aquatic life. The State of Texas water quality standards identify both lethal and sublethal effects, specifically including growth and reproduction, as being protected by its narrative criterion. The permit must ensure compliance with all State water quality standards, therefore it must protect against both lethal and sub-lethal effects, not just lethal effects.*

I. **Reporting for Monitoring More Frequently than Required** (Draft Permit Part III, Item 5 at p. 5)

Comment: The Draft Permit states that if monitoring is done more frequently than required by the permit, using authorized test procedures, the results must be reported with the DMR.

The State Permit states that if the permittee monitors any pollutant at the locations designated in the permit more frequently than required by the permit, the results must be included in calculations and must be reported on approved self-reporting forms.[24] This is appropriate since compliance can only be determined on measurements of wastewater quality at

[24] State Permit at p. 5 Item 4.

the compliance point. For example, the results of a TSS analysis taken on samples of wastewater collected before and after the filters for the purposes of reviewing filter efficiency could technically be required to be reported under the current draft permit language but would be meaningless for the purposes of permit compliance. It should be clarified that reporting of additional monitoring is only applicable for sampling at the designated point of compliance.

Recommendation: The first sentence of this requirement should be modified to read as follows:

> "If the permittee monitors any pollutant at the point of compliance with the monitoring requirements more frequently than required by this permit…."

EPA Response 14-I1: *EPA does not concur with the request. The language in Part III referenced in this comment is directly from 40 CFR §122.41(l)(4)(ii), "If the permittee monitors any pollutant more frequently than required by the permit using test procedures approved under 40 CFR Part 136…." The phrase, "...at the point of compliance..." is not included in the Federal Regulation. No changes were made to the final permit based on this comment.*

J. Reporting of Violations of Discharge Limitations (Draft Permit Part II Item A at p. 1)

Comment: Part II.A of the Draft Permit requires the permittee to orally report effluent limit violations for E. coli and TRC to EPA within 24 hours, citing to the provisions of Part III.D.7 of the Draft Permit. Part III.D.7 of the Draft Permit requires 24 hour reporting for noncompliance which "may endanger health or the environment."

An E. coli limit should not be imposed in the permit for the reasons discussed in Section I.C and reference to it should be deleted from this section. In addition, the entire Part II.A should be deleted even if the E. coli limit is retained because it is unnecessary and overly burdensome. It is possible to have a minor exceedance of an E. coli or TRC limit that does not endanger human health or the environment. Federal regulations at 40 CFR § 122.41(l)(6) and Part III.D.7 of the Draft Permit, which are referenced in Part II.A, only require 24 hour oral notification for an exceedance that endangers health or the environment. EPA provides no basis or justification for the proposition that every noncompliance with an E. coli or TRC limit constitutes endangerment of human health or the environment. Without such basis or justification, this provision should not be in the Draft Permit.

Recommendation: Delete Part II.A from the Draft Permit in its entirety.

EPA Response 15-J1: *EPA does not concur with this request. The language at the heart of this requirement is regulatory, contained in 40 CFR §122.41(l)(6)(ii)(A-C), which states that: "the following shall be included as information which must be reported within 24 hours under this paragraph." The permittee shall report: "A) Any unanticipated bypass which exceeds any effluent limitation in the permit."; B) "Any upset which exceeds any effluent limitation." and; "C) Violation of a maximum daily discharge limitation for* *any pollutants listed by the Director in the permit to be reported within 24 hours." The discharge of the pollutants listed, E. coli and TRC may endanger aquatic communities and/or human health. A permitting authority cannot predetermine the impact any noncompliance may have on the aquatic community or human health. The final permit shall have no changes made as a result of this comment.*

K. **Requirement to Notify the Texas Historical Commission and Other Sludge Record Keeping Requirements** (Draft Permit Part IV, Element 1, Section II Items 5.i.-k at p. 10)

Comment: The Draft Permit requires the permittee to provide the location of all existing sludge disposal/use sites to the State Historical Commission. In addition, provisions in the Draft Permit regarding sludge disposal recordkeeping require the permittee to (i) maintain information describing future geographical areas where sludge may be land applied; (ii) maintain information identifying site selection criteria regarding land application sites not identified at the time of the permit application submission; and (iii) maintain information regarding how future land application sites will be managed.

Any sludge disposal site used by SJRA is permitted by TCEQ, and to the extent that it is required by the TCEQ, the Texas Historical Commission has already been provided notice of such site. This requirement is unnecessary and overly burdensome, and should be removed from the Draft Permit.

In addition, the Fact Sheet provides no basis for the provisions regarding information on potential future disposal sites. It is impossible for a permittee to meet these requirements for future, undetermined and unspecified disposal sites. These requirements, in essence, require a permittee to maintain records that do not exist. These requirements do not appear in federal regulations governing sludge disposal at 40 CFR Chapter 503. Because they create recordkeeping requirements that are impossible to meet, these provisions should be deleted.

Recommendation: Delete the following provisions of Part IV: Section II.4.c; Section II.5.i; Section II.5.j; and Section II.5.k.

EPA Response 16-K1: *These requirements are included as part of EPA issued permits to allow us to meet our obligations on cross cutting issues including the National Historical Preservation Act. Simply put, if the permittee is proposing to include or change to locations not included as part of the permit application EPA is requiring notification of the location, site selection criteria and management procedures to be used at this new location. EPA does not consider the notification process an undue burden. The permit shall have no changes made as a result of this comment.*

III. CORRECTION OF INFORMATION IN THE FACT SHEET, TYPOGRAPHICAL ERRORS, AND MINOR LANGUAGE CLARIFICATION

A. Narrative Limitations Requirements (Draft Permit Part I.A at p.6)

Comment: The Draft Permit includes narrative limitations that track the language of applicable TSWQS. However, the language of these limitations does not, in every instance, relate the standard back to the effluent discharge. For example, a simple statement that "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" does not indicate that such conditions should be the result of the discharge.

Recommendation: A statement should be added at the beginning of this section reading, "Discharges shall be such that the following narrative standards are maintained in the receiving waters."

EPA Response 17-A1: *EPA concurs with the request. Part I, "Narrative Limitations", on Page 6 of Part I, shall state, "Discharges shall be such that the following narrative standards are maintained in the receiving waters."*

B. Outfall 002 (Fact Sheet at p. 2)

Comment: The second paragraph of Section IX of the Fact Sheet states that Outfall 002 is "built but not used."

Recommendation: To avoid confusion about whether SJRA may use this outfall, the phrase should be modified to read "built but not currently used."

EPA Response 18-B1: *Noted in the administrative record.*

C. The List of Parameters above the MAL (Fact Sheet at p. 3)

Comment: Table I in the Fact Sheet is based on an incorrect interpretation of MAL. MALs have been designated by EPA only for specific parameters; primarily priority pollutants. The only conventional parameters for which MALs have been established are fluoride and nitrate-nitrogen.

Recommendation: The only parameters that should be included in Table 1 are nitrate+nitrite, copper, zinc, chloroform, dibromochloromethane, and dichlorobromomethane.

EPA Response 19-C1: *The comment contains an inaccurate statement when it states that fluoride and nitrate-nitrogen are conventional pollutants. Fluoride and nitrate-nitrogen are non-conventional pollutants.*

EPA notes for the administrative record that Table 1 in the fact sheet should have placed the comment, "Detected at concentrations above MAL" as a footnote and added an asterisk referring to that comment for fluoride, nitrate+nitrite, dibromochloromethane, dichlorobromomethane, zinc, copper, and chloroform.

D. **Incorrect Reference for Implementation Procedures** (Fact Sheet at p. 7)

Comment: The reference to Table 5 in the fourth sentence of the first paragraph on page 7 of the Fact Sheet is incorrect. It should be referenced as "Table 5 of the ITWQS." The ITWQS is the acronym used in the Fact Sheet for the IP.

***EPA Response 20-D1:** Noted in the administrative record.*

E. **Reference to Dichlorobromomethane** (Draft Permit Part II at p. 9)

Comment: If the monitoring requirement is to be retained in the permit despite comments at Section I.D, the reference to dichlorobromomethane should be changed to dibromochloromethane. The proposed monitoring requirement applies to "dibromochloromethane."

***EPA Response 21-E1:** Noted in the administrative record.*

IV. WET LIMITS AND MONITORING REQUIREMENTS

A. **General Comments on WET Limits** (Draft Permit Part I Item A.2 at p. 5; Part II Item D; Fact Sheet at pgs. 9-12; Fact Sheet at Appendix B)

Comment: The Draft Permit contains lethal and sublethal WET limits for two test species, *C. dubia* and the Fathead Minnow. The Fact Sheet states at Page 11 that reasonable potential exists for discharges from the facility to cause or contribute to an exceedance of "Texas water quality standard and narrative criterion established to protect aquatic life." Page 10 of the Fact Sheet also states that WET test results submitted by SJRA as a part of the Application were analyzed using EPA's "Technical Support Document for Water Quality Based Toxics Control" (TSD) and EPA Region 6's "WET Permitting Strategy" (May, 2005). It notes that all data were reviewed and "the majority" of the data were found to be acceptable. It concludes that the "duration and magnitude of the effluent's toxic effects have been significant." It states that the WET Limits contained in the Draft Permit are "based primarily on sub-lethal effects demonstrated to the *C. dubia* test species." Appendix B of the Fact Sheet contains the "TSD Reasonable Potential Analysis."

The Fact Sheet does not indicate the standards or guidelines EPA used to determine which portions of SJRA's WET testing data were "acceptable." The Fact Sheet's statement that only a "majority" of the data was "acceptable" indicates that EPA rejected some data. Given that some WET testing data provided by SJRA were not used by EPA in its WET analysis, EPA should clearly identify the particular data and the reasons why such data were not acceptable. Appendix B of the Fact Sheet includes test data from all of SJRA's WET tests since January 2001, which is inconsistent with the statement in the Fact Sheet that only a "majority" of the data was "acceptable." Without a clear statement of the specific test data upon which EPA is basing its decision regarding the proposed WET limits, and explanation of the reasons why some data were not accepted, it is impossible to know EPA's true basis for its decision.

EPA Response 22-A1: *The Reasonable Potential analysis attachment to the draft permit fact sheet listed each test date, each result for survival, and each result for sub-lethal effects for each test species. EPA reviewed 74 Ceriodaphnia dubia tests performed by SJRA between January 2001 and July 2006. Of the data submitted by SJRA, EPA determined that two tests might be deleted from the reasonable potential calculations. In one test (07/30/01) the lab failed to include the 86% effluent dilution and in another test (12/06/05) the sub-lethal results did not meet the lower bound for the percent minimum significant difference, although a significant difference from the control was found. Of these 72 remaining tests the NOEC values reported for sub-lethal effects to C. dubia in 21 tests (29% of the total) were lower than the revised critical dilution of 69% (i.e. 29% of tests did not pass). NOEC values for these tests ranged from 86% (the highest effluent dilution tested) effluent down to <23% effluent. In performing the reasonable potential analysis, at both the previous 85% and current 69% levels, it was found that there was virtually no difference in the actual value generated, and that reasonable potential exists.*

Comment: The Fact Sheet also provides no explanation supporting the conclusion that the "duration and magnitude of the effluent's toxic effects has been significant." It contains no discussion showing how SJRA's test results indicate any length of time or "duration" of the alleged toxic effects or how such test results indicate the "magnitude" of the effects to be "significant." Such explanation is critical to understanding EPA's reasonable potential assessment as the basis for imposition of WET Limits in the Draft Permit.

EPA Response 23-A2: The duration (or frequency) and magnitude of toxicity can be easily discerned by reviewing the Reasonable Potential Analysis attached to the draft permit fact sheet. In the context of the fact sheet, the duration (frequency) of toxicity relates to the period between toxic events. EPA's TSD establishes the minimum acceptable period between exceedances of a water quality criterion as once in three years. Where toxic events occur more frequently than once per three years, the stream cannot recover from the effects of one event before the next toxic event occurs. SJRA's effluent has routinely exceeded this hallmark. For example, significant sub-lethal effects at or below the critical low flow dilution (69%) were reported in seven of the last twelve tests collected over the last year of the data submitted for review.

Magnitude of toxicity is a measure of how toxic the effluent is. This is measured by the NOEC. The lower the NOEC value, the more toxic the effluent is. That is, the lower the effluent dilution at which a significant difference is found, the greater the toxic potential in the receiving stream. From the data submitted and used for the RP determination, SJRA reported its effluent demonstrated significant sub-lethal effects at effluent dilutions of ≤ 23%, the lowest effluent dilution tested, in six tests, 32% in two tests, 45% in five tests, 55% in two tests and 62% in six tests If 100% effluent demonstrated significant toxic effects, but lower effluent dilutions (e.g., 75%, 56%, 42% or 32%) did not, then there was less potential damage to the receiving stream than if significant toxic effects were also shown in the 75% and 56% effluent dilutions. The lower the effluent dilution at which significant toxic effects are demonstrated, (demonstrating a greater magnitude of toxicity) the greater the potential impacts to the stream. For SJRA, the critical dilution in the proposed permit is 69%, but the facility has reported test failures as low as <23% effluent, the lowest dilution they tested.

Comment: EPA's inclusion of WET limits in the Draft Permit conflicts with the clear policies it has approved for the drafting of discharge permits contained in the IP. The Fact Sheet notes throughout that the IP was used to develop permit limits and requirements contained in the Draft Permit. However, EPA ignores the IP in drafting the WET limits. First, the Draft Permit contains sublethal WET limits. The IP does not identify any basis pursuant to which sublethal WET limits are to be imposed. The IP only provides for the imposition of lethal WET limits and, then, only in specific cases.[25]

[25] IP at pgs. 101-125.

EPA Response 24-A3: *In establishing WET limits in this permit, EPA must ensure that such limits are as stringent as necessary to meet state water quality standards, as required by CWA section 301(b)(1)(C) and 40 CFR §122.44(d)(1). The State Implementation Procedures (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. The Texas Surface Water Quality Standards may be found in 30 Texas Administrative Code (TAC) Sections (§§) 307.1-.10."). 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 (CPP) required under 40 CFR §130.5(c) and the Memorandum of Agreement between TNRCC and EPA, but this does not constitute approval of the IP as a water quality standard under CWA section 303(c). Therefore, EPA is not bound by the IP in establishing WET limits in this permit – but rather, must ensure that the WET limits are consistent with the EPA-approved state water quality standards.*

Where a permit has been federalized, EPA does attempt to follow State IPs – but only to the extent that the IP is consistent with EPA-approved state water quality standards. Here, EPA has determined that the State IP is not sufficient to ensure compliance with the State's narrative water quality standards for the protection of aquatic life. Specifically, while the narrative standards require protection against sub-lethal toxicity, including growth and/or reproduction, the IP does not include procedures for ensuring such protection. Section 307.6(b)(2) of the Texas water quality standards specifically state that "Water in the state with designated or existing aquatic life uses shall not be chronically toxic to aquatic life...." Section 307.3(a)(10) of the Texas water quality standards defines chronic toxicity as demonstrating lethal or sub-lethal effects. Sub-lethal effects are further defined as growth or reproductive effects. While the TCEQ IPs do not preclude the imposition of WET limits based on sub-lethal effects, they do not specifically contain procedures for including such limits, and therefore would not be sufficiently protective of the state narrative standards when reasonable potential for sub-lethal toxicity is shown to exist.

EPA notified TCEQ of this conflict in a letter dated February 24, 2005, when it began efforts to correct the inconsistency. Further, in its letter of objection on the State drafted permit for SJRA, dated January 6, 2006, EPA notified both TCEQ and SJRA that if the conditions of EPA's objection were not addressed and authority to issue the SJRA permit passed to EPA, the permit would, if reasonable potential for sublethal toxicity was shown, include a limit for sublethal toxicity, as required by 40 CFR §122.44(d)(1)(i) ("Limitations must control all pollutants or pollutant parameters... which the Director determines are or may be discharged at a level which will cause, have the reasonable potential to cause or contribute to an excursion above any State water quality *standard, including State narrative criteria for water quality.") EPA therefore conducted an independent technical review to determine whether the discharges have reasonable potential to cause or contribute to an excursion above the state narrative standards and criteria for sublethal toxicity, and based on such finding, included sublethal WET limits in the permit.*

TCEQ has determined that the low-flow dilution is the point at which impacts may be expected to affect aquatic life in the receiving stream. Repeated failures at this dilution as reported by SJRA in discharge monitoring reports demonstrate that reasonable potential is not only predicted, it clearly exists. Where reasonable potential to cause or contribute to an excursion of the State's narrative standards for the protection of aquatic life has been demonstrated, NPDES permitting regulations require a WET limit be included in the permit (40 CFR 122.44(d)(1)(v)). As noted above, SJRA has submitted, as part of their NPDES permit reporting requirements, numerous WET tests that have demonstrated significant sub-lethal toxic effects at and well below the critical low flow dilution established by the State of Texas (69%). Effluent limits for sub-lethal effects of WET to ensure attainment of the State's narrative criterion would be necessary unless chemical-specific limits for the effluent are sufficient to attain the applicable standard (40 CFR 122.44(d)(1)(v)). The causative pollutant of the sub-lethal effects has not been identified and the permit therefore does not include chemical-specific limits to ensure protection against sub-lethal effects consistent with the narrative criterion.

Comment: Second, the Fact Sheet notes that the WET limits are based "primarily" on the sublethal effects demonstrated for C. dubia. The IP does not identify any basis pursuant to which WET limits are imposed due to sublethal effects. In addition, the use of the term "primarily" indicates other data were used, but fails to specify this data. Again, EPA should clearly identify all data used to justify these permit limits.

***EPA Response 25-A4:** As discussed in the previous response, EPA based its WET limits on the State's narrative criteria for protection of aquatic life, which specifically requires protection against sub-lethal effects. EPA did not rely on the reasonable potential (RP) procedures provided in the State's IP because EPA determined that such procedures were not fully protective of the State's narrative water quality criterion for sublethal toxicity. Instead, in determining whether to include WET limits, EPA relied on the RP procedures specified in EPA's Region 6 "WET Permitting Strategy," which are based on EPA's Technical Support document for Water Quality Based Toxics Control (TSD).*

As stated in the fact sheet: "The test results submitted by the permittee were analyzed using EPA's "Technical Support Document for Water Quality-based Toxics Control" (EPA/505/2-90/001, second printing) and EPA Region 6's "WET Permitting Strategy" (May, 2005), which establish procedures for *assessing an RP for both lethal and sub-lethal toxic effects in a receiving stream." The specific calculation used for this determination was referenced in the permit fact sheet and provided via email to the permittee's contractor, Dr. Peggy Glass, on March 10, 2006. The first page of the Region 6 WET Implementation Strategy states: "As applicable, reasonable potential to cause or contribute to an exceedance of State narrative criteria for the protection of aquatic life will be determined by the method established in EPA's Technical Support Document for Water Quality-based Toxics Control, EPA/505/2-90-001, second printing (see Box 3-2, page 53)." The referenced box provides a five-step example of how to perform the RP calculation.*

Comment: As noted previously, the IP has been approved by EPA and serves as the guiding document establishing how permit limits and requirements are developed to maintain TSWQS. EPA's failure to abide by the written policy it has approved and implemented in its review of permits for TSWQS, and in the creation of this specific Draft Permit, is arbitrary and capricious and an abuse of its discretion.[26]

***EPA Response 26-A5:** As previously stated, the TCEQ Water Quality Standards, not the IPs are the "guiding" document in this permit issuance. EPA followed the TCEQ IPs to the extent that it could do so without contravention of the TCEQ water quality standards specific to protection of aquatic life.*

Comment: EPA's inclusion of WET limits in the Draft Permit also directly conflicts with the TCEQ's specific findings of fact and conclusions of law made after an evidentiary hearing conducted before SOAH in 2005 regarding TCEQ's renewal and issuance of the State Permit and the inclusion of a WET limit in that permit. Based on the recommendation of the presiding Administrative Law Judge and her review of the evidentiary record (including testimony and evidence offered by EPA), the TCEQ found that, when applying the policies regarding WET limits contained in the IP to SJRA's WET testing data, WET limits were not warranted in SJRA's permit.[27] TCEQ specifically found that the November 2001 and January 2002 tests for *C. dubia* were "too unreliable to constitute a part of the basis for including a WET limit in SJRA's permit."[28] With regard to the sublethal test effects, TCEQ found them to be "inadequate evidence of toxicity to trigger a WET limit; their primary significance is their tendency to corroborate any toxicity exhibited in tests for survival."[29]

***EPA Response 27-A6:** EPA disagrees with TCEQ's findings that WET limits are not warranted in the permit. First, EPA notes that ALJ's recommendation, upon which TCEQ based its findings, assessed the need for WET limits based on the state's IP, which provides for WET limits only where there is a showing of "persistent, significant lethality" following termination of a TRE. This is inconsistent with EPA's regulations which provide that a finding of reasonable*

[26] 5 U.S.C.A. § 706(2)(A).
[27] TCEQ Order at p. 16.
[28] TCEQ Order at p. 12, Finding of Fact Nos. 74, 80.
[29] TCEQ Order at p. 12, Finding of Fact No. 83.

potential to cause or contribute to an excursion of state water quality standards constitutes a basis for WET limits. That reasonable potential analysis must include consideration of the variability of the pollutant (WET, in this case) in the effluent. See 40 CFR 122.44(d)(1)(ii). See also Edison Electric Institute v. EPA, 391 F.3d 1267 (DC Cir. 2004) (upholding EPA's WET test methods). In addition, for the reasons discussed in ***EPA Response 24-A3*** *above, this provision of the IP is not sufficiently protective of the state water quality standards, which require protection against both lethal and sub-lethal toxic effects.*

Second, EPA notes that the ALJ's recommendation was based solely on the consideration of two test results (the November 2001 and January 2002 C. dubia tests), which the ALJ found to be unreliable. EPA disagrees that these tests were unreliable (for the reasons discussed in the evidentiary record from the ALJ hearing), and furthermore, disagrees that the WET determination should be based on these two tests alone. Rather, the specific results of these two tests cited by the commenter are only a small part of the total record of toxicity evaluated by EPA in the current permitting action. Even if these two tests are not considered as part of EPA's analysis, the RP determination shows that RP exists for sublethal effects.

Also, in point of clarification, at the Commission meeting where the Administrative Law Judge (ALJ) presented her recommendation to the Commission, the TCEQ Executive Director, based on recommendations from the TCEQ technical permitting staff and their attorneys, argued for requiring WET limits and recommended that the ALJ's recommendation not be adopted. The Commissioners nonetheless voted to adopt the ALJ findings in opposition to the TCEQ technical recommendation.

Finally, EPA disagrees with TCEQ's finding that sub-lethal test effects are "inadequate evidence of toxicity to trigger a WET limit." As previously discussed in ***EPA Response 24-A3*** *above, the Texas WQS require protection against sub-lethal toxic effects to aquatic life, and therefore sub-lethal testing and test results are of significance in determining whether a WET limit is necessary to meet such water quality standards.*

Comment: EPA objected to the State Permit issued by the TCEQ and federalized the permit, leading to its issuance of the Draft Permit that is the subject of these comments. However, nowhere in its objection or the Fact Sheet for the Draft Permit, does EPA explain how TCEQ erred in its application of governing laws, regulations or EPA approved polices (i.e., the IP) or interpretation of the facts regarding SJRA's WET test data. Rather than justifying its disagreement with TCEQ's decision based on the facts determined by the evidentiary hearing and the laws, regulations, and policies at issue, EPA is now simply changing the rules to fit the outcome it desires. It is ignoring that portion of the IP that does not support the imposition of WET limits in the Draft Permit and ignoring the fact-finding performed by the TCEQ on the issue of WET limits.

EPA Response 28-A7: *In EPA's letter of objection to the TPDES permit and in* ***Response*** *24-A3 of this document EPA has clearly stated that the permit did not adequately address the State's narrative water quality standards criterion for protection against sublethal toxic effects. The IP document is not a state water quality standard, but rather, a non-binding, non-regulatory guidance document. Where a permit has been federalized, EPA does attempt to follow State IPs, but only to the extent that the IP is consistent with EPA-approved State water quality standards. As part of this action EPA has determined that the State IPs are not fully protective of the State narrative toxicity criteria. In the objection letter EPA clearly stated that if EPA were to issue this permit, it would include a limit for sub-lethal toxicity, based on a showing of reasonable potential to cause or contribute to an excursion of the state's water quality criteria for protection against sublethal toxic effects.*

Comment: For permitted discharges in Texas, the "reasonable potential" review mandated by 40 CFR § 122.44(d)(1)(v) is found in the IP. It is not the TSD Reasonable Potential Calculation contained in Appendix B of the Fact Sheet. EPA should abide by the policies it has approved within the IP with regard to the imposition of WET Limits in Texas permits.

EPA Response 29-A8: *The TCEQ IP does not include procedures for determining reasonable potential which are consistent with 40 CFR §122.44(d)(1)(v). This provision requires WET limitations where a discharge has reasonable potential to cause an excursion above state narrative criteria. Here, while the State narrative criteria require protection against both lethal and sublethal toxicity, the IP only includes procedures for establishing WET limits based on multiple failures for lethal toxic effects. Therefore, the IP is not fully protective of the State narrative criteria, and EPA must rely on its own procedures for determining RP consistent with EPA's regulations. Region 6 has developed a WET strategy, including an RP analysis consistent with EPA's regulations, and has implemented this process for permits issued under its permitting authority since May 2005.*

The TCEQ IP also fails to include a predictive reasonable potential approach, as required by 40 CFR 122.44(d)(1). See *54 Fed. Reg. 23868, 23873 (June 2, 1989) ("Some effluents may prevent a water quality standard from being maintained even though individual measurements do not show an actual excursion above the water quality criterion. Without effluent limitations on those discharges, there is a reasonable potential that the water quality criteria would be exceeded at some time"). The applicable Federal regulations and EPA's RP analysis are designed to ensure that toxic discharges are prevented, not something to be corrected after repeated toxic discharges have already occurred. The RP procedure is therefore predictive, establishing whether it is reasonable to infer that a toxic discharge is likely to occur at a level that would cause an excursion of the State WQS criterion for protection of aquatic* *life. See also EPA's Whole Effluent Toxicity (WET) Control Policy, July 1994. EPA 833-B-94-002 at http://www.epa.gov/npdes/pubs/owm0117.pdf.*

Comment: The specific errors made by EPA in its justification for WET limits in the Draft Permit include:

- Sublethal test results are not an appropriate basis to impose WET limits.[30] EPA provides no justification for deviation from the IP, the TCEQ Record, and the TCEQ Order.

EPA Response 30-A9: *EPA disagrees. The permit was issued by EPA to meet the minimum requirements of the State narrative criteria for the protection of aquatic life, which requires protection against both lethal and sub-lethal effects. The fact that the IP does not specifically recommend WET limits based on sub-lethal effects does not preclude EPA from including such limits in the permit; the IPs as previously stated are only guidance. The Texas water quality standards do specifically provide that waters of the State shall not be sub-lethally toxic to aquatic life, and specifically define sub-lethal toxicity as growth and/or reproduction. The TCEQ Record and Order are incorrectly based on the IP guidance. The correct basis is the Texas water quality standard. See also* ***EPA Response 24-A3.***

Comment:

- The November 2001 and January 2002 test results for *C. dubia* are unreliable.[31] EPA fails to explain why it believes these test results are reliable and how both TCEQ and the Administrative Law Judge erred at the state evidentiary hearing.

EPA Response 31-A10: *EPA disagrees. EPA's analysis includes evaluation of the magnitude of toxicity demonstrated and the variability of toxicity measured in the effluent. Again, the specific results of these two tests cited by the commenter are only a small part of the total record of toxicity demonstrated by this effluent. If these tests were not considered as part of EPA's analysis, the RP determination would still show that RP exists for sublethal effects.*

Comment:

- IP, not TSD, is the appropriate policy to follow in making a reasonable potential determination as required in 40 CFR 122.44. The IP has been approved by EPA, and EPA provides no justification for deviation from it.

EPA Response 32-A11: *EPA disagrees. See previous* ***EPA Responses 24-A3, 29-A8.***

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[30] *See* IP at pgs. 101-125; TCEQ Order at p. 12, Finding of Fact No. 83.

[31] *See* TCEQ Record; PFD; TCEQ Order at p. 12, Findings of Fact Nos. 74, 80.

Comment: EPA's deviation from the IP in this case, and its failure to consider or apply the TCEQ Record, including specific findings of fact and conclusions of law established by TCEQ, constitutes an abuse of EPA's discretion and is arbitrary and capricious.[32] EPA cannot simply ignore the policy it has previously approved regarding WET limits in Texas or ignore the extensive TCEQ Record and TCEQ Order addressing the imposition of WET limits in SJRA's permit. EPA must provide a meaningful, thorough and thoughtful response to the TCEQ Record and TCEQ's decision in order to justify its imposition of any WET limit in the Draft Permit. Copies of documents comprising the TCEQ Record are submitted as an Appendix to these comments and are incorporated herein for all purposes.

> *EPA Response 33-A12: EPA disagrees that it is required to follow the IP, for the reasons stated in **EPA Responses 24-A3, 29-A8, and 30-A9** above. EPA also disagrees that it is bound by the TCEQ Record/Order for the reasons stated in **EPA Response 27-A6**.*

B. **WET Limits for Fathead Minnow** (Draft Permit Part I Item A.2 at p. 5; Fact Sheet at pgs. 2, 9; Fact Sheet Appendix)

Comment: The Draft Permit contains sublethal and lethal WET limits for the Fathead Minnow.

SJRA WET testing data do not include any significant lethal effects for the Fathead Minnow. Furthermore, as shown in Appendix B of the Fact Sheet, a finding of no reasonable potential for lethal effects for the vertebrate species is indicated, and a recommendation for WET monitoring only is made. A lethal WET limit for this species is not justified even based on EPA's own determination.

> *EPA Response 34-B1: EPA agrees that RP does not exist for the fathead minnow test species and the WET limit requirements for the fathead minnow have been dropped. For the fathead minnow, a monitoring-only requirement with standard toxicity requirements will be established in the permit.*

Comment: Neither is the sublethal WET limit for the Fathead Minnow justified. As previously discussed, the IP does not provide for establishing sublethal WET limits.

> *EPA Response 35-B2: As stated in **EPA Response 34-B1** the fathead minnow WET limit requirement has been dropped from the final permit based on the finding of no RP.*

Comment: It should also be recognized that the results reported by SJRA for its Fathead Minnow testing for March 2004 are not reliable. As noted in its DMR for this testing, SJRA did not certify the test results because it considered them to be invalid for the reasons explained in its accompanying documentation provided by Risk Sciences. The DMR and analysis by Risk

[32] 5 U.S.C.A. § 706(2)(A).

Sciences, provided at Attachment C, are incorporated herein by reference. The March 2004 test results should not be considered by EPA in its reasonable potential analysis.

Even the results of the December 2003 test are borderline. The Percent Minimum Significant Difference (PMSD) for this test is below the lower bound established in EPA guidance.[33] For tests where the PMSD is less than the established lower bound, additional statistical tests are required to determine when differences between the samples and the control are significant. When a follow-up statistical test is applied to determine if the difference between the control and the 86% effluent sample is sufficient to be "significant," the conclusion is dependent on whether the results are judged based on the original number of organisms or the surviving number of organisms. In addition, the IC_{25} for the test is 86% effluent. In general, the NOEC and IC_{25} should be comparable for a valid test.

EPA Response 36-B3 *EPA disagrees with the arguments and conclusions presented in the Risk Sciences paper and the author's Whole Effluent Toxicity Test Variability: Accounting for Variance referenced in the WERF study (see additional comments in Section V) concerning WET test validity. However as stated previously, EPA has determined that RP does not exist sufficient to require a WET limit for the fathead minnow and has therefore deleted such limits. See* ***EPA Responses 34-B1 and 35-B2.***

With respect to questions concerning test validity EPA Region 6 has a standard practice of performing a technical review of any test data that appears unusual, or possibly invalid, to a permittee prior to submission of the data on the DMR. The permittee may call EPA and fax the data for rapid review. Many permittees and State agencies have taken advantage of this service.

With respect to certification of DMRs. EPA issued notice on March 3, 2000, clarifying the purpose of the DMR certification. This notice reaffirms that "certification" is related to the fact that the permittee is faithfully reporting the data provided by the testing lab to the permittee, it is not certification that the data submitted is necessarily valid or invalid. Available online at: http://www.epa.gov/npdes/pubs/memo_wet.pdf

Recommendation: On page 5 of Part I, delete the WET limits for the Fathead Minnow.

EPA Response 37-B4: *See* ***EPA Responses 34-B1 and 35-B2*** *above.*

C. **WET Limits for *C. dubia*** (Draft Permit Part I Item A.2 at p. 5; Fact Sheet at pgs 2, 9; Fact Sheet at Appendix B)

Comment: The Draft Permit contains sublethal and lethal WET limits for the *C. dubia*.

[33] *See* Chronic Freshwater Guidance and Interlaboratory Study.

See previous general comments on WET Limits at Section II.A above. The November 2001 and January 2002 *C. dubia* test results are invalid. The bases for this conclusion are described in the TCEQ Order issuing the State Permit and the TCEQ Record.

Sublethal test results should not be used to support a finding of reasonable potential because to do so contravenes the IP previously approved by EPA. The TCEQ has also found, with respect to this specific permit, that sublethal test results are "inadequate evidence of toxicity to trigger a WET limit; their primary significance is their tendency to corroborate any toxicity in tests for survival."[34]

EPA Response 38-C1: EPA disagrees with the commenter's assertion that the November 2001 and January 2002 tests are invalid and the sub-lethal test results are inadequate evidence of toxicity. See ***EPA Response 27-A6*** *above.*

Recommendation: On page 5 of Part I, delete the WET limits for *C. dubia.*

EPA Response 39-C2: EPA disagrees. Even at the new critical low-flow dilution of 69% effluent, the RP analysis conducted by EPA shows potential to cause or contribute to an excursion above the State narrative criterion for the protection of aquatic life exists and a WET limit is warranted.

The DMR results supplied over the last 5 years show that >30% of all SJRA results reported some measure of toxicity. Toxicity has been demonstrated at all effluent dilutions tested, from 86% down to 23% effluent, with multiple test failures at the lowest effluent dilution tested. Often, significant sub-lethal effects were demonstrated for two months followed by one or two months with passing results, followed by another two months of test failures reported. Results of this nature speak directly to the magnitude, frequency and duration of toxic discharges from the facility. The applicable Federal regulations and EPA's RP analysis are designed to ensure that toxic discharges are prevented, not something to be corrected after repeated toxic discharges have already occurred. The RP procedure is therefore predictive, establishing whether it is reasonable to infer that a toxic discharge is likely to occur at a level that would cause an exceedance of the State WQS criterion for protection of aquatic life. If the RP determination finds that the discharge is reasonably expected to cause or contribute to an excursion of water quality standards during the term of the permit, the regulation requires a WET limit unless the specific compound responsible for toxicity has been found and can be controlled via a chemical specific limit. See 40 CFR 122.44(d)(1)(v).

D. **Use of IC_{25} in Lieu of NOEC** (Draft Permit Part I Item A.1 at p. 2; Part I Item A.2 at p. 5; Part II Item D; Fact Sheet at pgs. 10-12; Fact Sheet at Appendix B)

Comment: The WET limits contained in the Draft Permit require the use of NOEC to determine test results and response actions.

[34] TCEQ Order at p. 12, Finding of Fact No. 83.

The use of the NOEC in calculating end points in WET testing relies on hypothesis testing techniques for statistical analysis. However, both the Chronic Freshwater Guidance[35] and the EPA WET Variability Document[36] state that point estimation techniques, which produce values such as IC_{25}, are the preferred statistical methods in calculating end points for effluent toxicity tests, rather than hypothesis testing techniques. EPA guidance provides the option of using either NOEC or IC_{25} in reviewing and determining sublethal WET test results.[37] Use of IC_{25} is preferable because it is less variable and a more robust analysis that is based on all of the test data.

Recommendations:

- Specify the value to be reported as IC_{25} rather than NOEC in the following sections of the permit: page 2 of Part I, page 5 of Part I, page 4 of Part II (Section D.1.c), page 7 of Part II (Section D.3.b), and page 9 of Part II (Section D.4.b).
- Replace the definition of NOEC on page 3 of Part II (Section D.1.a) with the definition of IC_{25}.
- Replace the section on page 5 of Part II (Section D.2.b) that describes the statistical tests required for determining NOEC with a description of the statistical tests required for determining IC_{25}.
- Replace the parameter codes on page 8 of Part II (Section D.3.c) for reporting WET test results on DMRs with the appropriate codes for IC_{25} rather than NOEC.

EPA Response 40-D1: *EPA disagrees that a toxicity endpoint of IC_{25} is preferable to one based on the EPA Region 6 NOEC. The NOEC testing methods employed by EPA Region 6 and its States require a more robust analysis of WET test data. This is due to the fact that all permits require that the test design includes the low-flow critical dilution as one of the five effluent dilutions tested. This approach ensures that information is developed at the actual instream dilution level as established by the State based on its permitting implementation procedures used for WET and chemical-specific limit determinations. The IC_{25} approach estimates the effluent dilution that would cause a 25% impact to the test organism; however, it is only an estimate, and the test design does not require testing at the actual instream effluent dilution. In addition to requiring testing of the actual low flow critical dilution, the NOEC approach employed by EPA Region 6 and its States requires five replicates (rather than the minimum of four) of each effluent dilution and, where the critical dilution allows for it, bracketing of the critical*

[35] Chronic Freshwater Guidance at p. 41, Section 9.5.1.
[36] WET Variability Document, Chapter 3, Section 3.4.1 states that the "greater variability of the NOEC underscores the desirability of using point estimates to characterize effluent toxicity."
[37] Section 9 of the Chronic Freshwater Guidance discusses both hypothesis testing (i.e. NOEC) and point-estimate (i.e. IC_{25}) analysis as viable endpoint techniques.

dilution between higher and lower effluent dilutions to ensure a robust statistical analysis of the data. In addition, EPA notes that the TCEQ permit recently issued to SJRA also establishes the NOEC as the test endpoint. If SJRA wishes to include the IC_{25} endpoint, EPA will consider establishing permit limits for both NOEC and IC_{25}.

H. **Toxicity Reduction Evaluation Provision, If Permits Contain a WET Limit** (not currently in Draft Permit)

Comment: If there are persistent failures of a WET test, a Toxicity Reduction Evaluation (TRE) will need to be conducted to identify the cause of the failures and to determine a strategy for achieving permit compliance. Completing a TRE requires a minimum of several months. Depending on the nature of the WET test failure (acute, chronic, lethal, or sublethal) and the consistency of test failures, it can take two years or more to complete a TRE.

If the permittee is diligently conducting a TRE, it should not be subject to continuing to accrue permit violations during that period. This is especially of concern because additional WET tests may be conducted during a TRE, in the effort to complete the TRE. The permittee should not be penalized for diligence in attempting to obtain permit compliance.

Recommendation: The Draft Permit should contain the following provision as Section D.1.e:

"Upon failure of the WET permit limit, the permittee may notify EPA of its intent to conduct a TRE. The notification will be accompanied by a work plan for conducting a TRE. Subsequent WET test failures will not be permit violations, so long as the permittee is diligently pursuing the TRE. The permittee will submit quarterly reports to EPA documenting TRE activities and results to date."

***EPA Response 41-H1:** Insofar as the commenter is suggesting that WET test failures trigger solely a TRE requirement, EPA disagrees. Where WET test failures indicate a reasonable potential to exceed a state's narrative toxicity criteria, EPA regulations require that the permit include an effluent limit for WET (See 40 CFR 122.44(d)(1)(v)). A TRE does not constitute an "effluent limitation" within the meaning of the CWA section 502(11) because it is not a "restriction... on quantities, rates and concentrations" of pollutants discharged. Moreover, it is merely a study requirement and does not ensure that discharges will be controlled as stringently as necessary to meet the state narrative criteria, as required by CWA section 301(b)(1)(C) and 40 CFR 122.44(d)(1). Therefore, based on a finding of reasonable potential, EPA has included a WET limit in the permit – not a TRE requirement. NPDES permits may require a TRE in addition to, but not in lieu of, WET limits where WET reasonable potential exists. EPA notes that if the permittee is concerned about potentially toxic discharges, the permittee may self-institute TRE activities at any time.*

Even once a permit contains a WET limit based on a showing of reasonable potential, EPA recognizes that further WET testing and TREs may be needed to determine a strategy for achieving compliance with the WET limit. In such cases, where appropriate and authorized by the CWA and EPA's implementing regulations, Region 6 includes in the permit a compliance schedule to meet the limit. During this time, the permittee can conduct any necessary testing and TREs necessary to enable it to meet the WET limit once it becomes effective at the end of the compliance schedule period. A compliance schedule was provided in the SJRA permit for this purpose.

SJRA has already been the beneficiary of this process on at least two separate occasions in the past due to persistent lethal effects demonstrated in tests in previous years. In addition, this permit provides a three-year compliance schedule during which the permittee may test at any additional frequency it desires and perform any and all TRE or toxicity identification evaluations (TIE) activities it desires, in order to be in compliance when the WET limit comes into effect.

A TRE (toxicity reduction evaluation) is an organized investigation of the causes of, and potential controls for, effluent toxicity.

A TIE (toxicity identification evaluation) is a specific set of procedures using defined manipulations (increasing/decreasing pH, aeration, carbon filtration, etc) of toxic effluent samples to determine the specific chemical(s) or class of toxicant(s) causing an effluent to be toxic. EPA Region 6 normally allows the permittee significant latitude in performing a TRE, and recommends, but does not require that TIEs be performed as part of a TRE.

I. **Addition of Chemical Specific Limit During WET Limit Compliance Period** (Draft Permit Part I Item A.2 at p. 5; Part II Item D at pgs. 3-9; Fact Sheet at p. 11)

Comment: The Draft Permit provides a period of three years for achieving compliance with the WET limits.[38] The Fact Sheet at page 11 states that SJRA can request a chemical-specific limit in lieu of a WET limit, if a specific toxicant is identified and controlled during this three-year period. The language in the permit provides for the addition of chemical-specific limits, but not removal of the applicable WET limits.[39]

The IP provides that, when appropriate, a Best Management Practice can also be established in lieu of a WET limit.[40] The language of the Draft Permit should be amended to document that a chemical-specific limit or Best Management Practices may be substituted for the proposed WET limit during the three-year compliance period. The language should be clear that the permit will not impose WET Limits and a chemical-specific limit for the same toxicant.

[38] Draft Permit Part I at p. 1.
[39] Draft Permit Part II Item 1.d at p.4.
[40] IP at p. 113.

Recommendation: Revise the permit to include Section D.1.f, to read as follows:

"Prior to the effective date of a WET limit, a chemical-specific limit or Best Management Practice(s) may be substituted for the WET limit, if a specific toxicant and an appropriate control(s) are identified, and if it is demonstrated that the control works through twelve monthly tests. If a chemical-specific limit or Best Management Practice is added to the permit in accordance with this provision, the related WET limit(s) will be removed from the permit."

EPA Response 42-I1: *EPA regulations, 40 CFR §122.44(d)(1)(v) specifically provide that limits on WET are not necessary where chemical specific limits for the effluent are sufficient to attain and maintain applicable state standards It is unclear what the commenter means by Best Management Practice but the regulations are clear that either a WET limit or a chemical specific limit is required where reasonable potential has been shown to exist. As with any permit, EPA will consider commuting the WET limit to a chemical-specific limit should SJRA provide EPA sufficient data identifying and confirming the toxicant(s) responsible for toxicity, and develops an appropriate control prior to the effective date of the WET limit*

J. WET Testing Reporting Requirements (Draft Permit Part I Item A.1 at p. 2; Part I Item A.2 at p. 5; Part II. Item D.3.b at pg. 7)

Comment: The Draft Permit specifies in Part I that the results of WET tests are to be reported as the "7-Day Minimum" and a "30-Day Avg." Part II of the Draft Permit requires the permittee to report the "Daily Average Minimum NOEC", the "30-Day Average Minimum," and, finally, states that "only ONE" set of biomonitoring data for each species is to be recorded on the DMR for each "reporting period." Parameter codes are not provided for any of these reporting requirements in Section D.3.c of the Draft Permit.

The reporting requirements use terms that are not defined in the permit. Of the reporting requirements identified above, only the 30-Day Average is defined. "Reporting period" is also undefined.

In addition, the terms are confusing and appear to be contradictory. Examples of confusing provisions are as follows:

- The requirement in Section D.3.b of the Draft Permit to report the "Daily Average Minimum NOEC" for each "reporting period" is confusing not only because it is undefined but also because, while it represents an average of measurements over a "reporting period," it is described as a "minimum."

- It is not clear how a 7-day value is to be reported for a 7-day test that uses three samples collected over multiple days.

- It is also confusing whether one test is to be reported on the DMR or whether average values are to be reported when more than one test is conducted during some specified period.

As previously stated, SJRA believes that the results of WET tests should be reported as a median of the results over a twelve-month period. However, even if EPA determines not to grant SJRA's request, the reporting requirements in Part I and Part II must be significantly redrafted.

Recommendation: Revise the WET test reporting requirements using defined terms and parameter codes appropriate for WET testing.

EPA Response 43-J1: *The WET limit reporting requirements have been standardized for many years in both EPA and TCEQ permits. For example, the following excerpt is from the TCEQ permit recently re-issued to Chevron Phillips Chemical, TX0004839):*

"The permittee shall report the Whole Effluent Lethality values for the 30-day Average minimum and the 7-day Minimum under Parameter No. 22414 on the DMR for the appropriate reporting period. If more than one valid test for a species was performed during the reporting period, the test NOECs will be averaged arithmetically and reported as the Daily Average Minimum NOEC for that reporting period. A valid test must be reported on the DMR during each reporting period specified on Page 2 of this permit. Only one set of biomonitoring data is to be recorded on the DMR for each reporting period. The data submitted should reflect the lowest survival 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 submitted for review."

However, for purposes of clarification for SJRA, the term "Daily Average Minimum NOEC" has been revised to "7-Day Minimum" and the term "30-Day Average Minimum" has been revised to "30-Day Avg." to correspond with the terms used in Part I of the permit.

DMR reporting is limited to a single set of responses per reporting period due to the Permit Compliance System (PCS) data requirements. The reporting period for WET is not necessarily constant. The initial reporting period for WET is once per quarter, however upon violation of the WET limit, the testing frequency (and thus the reporting period) changes to once per month until the effluent passes for three consecutive months.

The parameter code to report compliance with the WET limit, listed in both Part I and Part II of the permit, is 22414. The 7-day test has a single result for each test species and endpoint (vertebrate and invertebrate, lethal and sublethal) measured at the end of the test and reported. Standard language in

EPA and TCEQ permits requires the lowest test results to be reported on the DMR under the 7-Day Minimum column. Where a test failure occurs, test results from additional tests performed during the test period may be averaged and reported in the 30-Day Average column. The purpose of performing and reporting the additional tests is to allow the permittee an opportunity to limit the duration of any potential non-compliance, it is not to suggest that a single test result is not reliable or that a permit limit violation or potential instream impact has not occurred.

K. **Monitoring Dates for Quarterly Whole Effluent Toxicity Testing** (Draft Permit Part I Item A.1 at p. 3, note 10)

Comment: The Draft Permit requires quarterly biomonitoring beginning on the effective date of the permit. The quarters are unlikely to correspond to calendar quarters.

The State Permit also requires quarterly biomonitoring, but the quarters are defined as calendar quarters (January-March, April-June, July-September, October-December). It is unnecessarily burdensome for the permittee to have to maintain two different analysis and reporting schedules.

Recommendation: Revise note 10 on page 3 of Part I and note 9 on page 5 of Part I to read as follows:

"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."

***EPA Response 44-K1:** EPA agrees and has revised the permit to reflect these changes.*

F. **Sublethal WET Limits** (Draft Permit Part I Item A.2 at page 5)

Comment: The Draft Permit proposes a limit of a NOEC of 85% effluent for both lethal and sublethal tests for both *C. dubia* and the Fathead Minnow.

If, subsequent to issuance of the permit, the WWTP No. 1 effluent exhibits lethal or sublethal effects in a WET test at the critical dilution of 85%, the facility will be deemed to be in violation of the permit. The responsible action for SJRA to take at that point is to initiate a TRE to determine the cause of the test failures so that a strategy can be developed to eliminate the test failures.

However, SJRA may not be able to implement a TRE successfully. Frequently, it is not possible to obtain meaningful TRE results when the test failures are chronic and only occur at relatively high effluent concentrations.

In fact, the Region 6 WET Strategy states, "Due to the potential difficulty of resolving toxicity related, in some cases, to identifying toxicants responsible for sublethal effects, EPA Region 6 will take a graduated approach to TREs and implementation of WET limits where significant sub-lethal effects are demonstrated only in effluent concentrations greater than 75% effluent." The Region 6 WET Strategy later states, "...Region 6 will implement limits for sublethal limits at the 80% effluent level at this time." It is not clear whether 75% effluent or 80% effluent is intended to be the upper limit; but, clearly, it is recognized that, if a sublethal limit is to be established, it should be less than the 85% effluent limit currently proposed, according to EPA policy.

The Region 6 WET Strategy recognizes that it is inequitable to impose a limit that cannot be met by reasonable diligence on the part of the permittee. Establishing a permit limit of 85% effluent for sublethal test failures is inequitable because of the unavailability of tools that will allow SJRA to identify the cause of test failures at that level. If the causes of test failures cannot be determined, appropriate control actions cannot be identified that will result in compliance with the permit.

As previously stated, SJRA objects to the establishment of a WET limit(s) in the permit for WWTP No. 1. However, if EPA proceeds with issuance of a WET limit, different limits should be established for the lethal and sublethal tests.

Recommendations: If WET limits are imposed, revise item A.2 of Part I at page 5 to establish different limits for lethal and sublethal tests. The recommended limits are as follows:

- Lethal: IC_{25} = 85% effluent
- Sublethal: IC_{25} = 75% effluent

*EPA Response 45-F1: As previously discussed, with the critical dilution revised to 69% effluent, the above differentiation is now moot. WET limits are established at 69% effluent, well below the 85% and 75% levels proposed by the permittee, and well within the range of effluent dilutions with proven success in the performance of both lethal and sub-lethal TREs. Also see **EPA Responses 4-D1 and 40-D1**.*

G. **Compliance Determination for Chronic Tests** (Draft Permit Part I pgs. 2, 5; Part II Item D.1.C at p. 4)

Comment: The Draft Permit provides that for the WET limits, a permit violation occurs for every test where the organism response at the critical dilution is statistically different from the organism response in the control.

SJRA strongly objects to the inclusion of WET limits in the permit. However, if a limit is included, the basis for determining compliance with the limit should be substantially revised. The importance of basing decisions on the IC_{25} endpoint rather than NOEC has already been discussed.

> ***EPA Response 46-G1:*** *For the reasons discussed in* ***EPA Response 40-D1,*** *EPA disagrees that the WET limits should be based on the* IC_{25} *endpoint, rather than the NOEC endpoint.*

Comment: In addition, the Draft Permit provides that every test where the organism response at the critical dilution is statistically different from the organism response in the control is a permit violation. Imposing a compliance requirement that every test must pass is inconsistent with the known variability of WET tests, particularly the 7-day *C. dubia* survival and reproduction tests. It imposes a standard that cannot be consistently achieved regardless of the diligence of the permittee. There are many sources that document chronic test variability. For brevity sake, only the *C. dubia* test is discussed below. The variability of the Fathead Minnow test is only slightly less than the variability of the *C. dubia* test. Examples of studies documenting chronic test variability follow.

> ***EPA Response 47-G2:*** *EPA disagrees. EPA's WET testing methods have been upheld in court. See Edison v. EPA, 391 F.3d 1267 (DC Cir. 2004). The DC Circuit Court of Appeals determined that while WET, like all testing, has some associated variability, the variability associated with WET testing is not excessive and results of WET testing are reliable with respect to use in the NPDES permitting and compliance programs. In point of fact, of the seventy-seven C. dubia chronic tests conducted for SJRA by three different contract laboratories over a five year period (2001 – mid-2006), only 3 tests (4%) were invalid or not successfully completed. The record at SJRA in this regard is not unusual in EPA's experience and is in keeping with the actual results of EPA's Interlaboratory Study.*

In addition to comments on the terms and conditions of the proposed permit SJRA also provided the following comments that were general in nature and have no direct bearing on EPA's final permit decision. However, because EPA found numerous errors and mis-statements of fact in these comments EPA has included responses to these comments for the record.

V. NON-PERMIT SPECIFIC COMMENTS

E. Definition of NOEC (Draft Permit, Part II Items D.1.b and D.1.c at pgs. 3-4; Part II Items D.4.a at p. 9)

Comment: The Draft Permit defines NOEC as the "greatest effluent dilution at *and below* which lethality that is statistically different from the control (0% effluent) at the 95% confidence level does not occur." (emphasis added). The Draft Permit goes on to define a chronic lethal test failure as a "demonstration of a statistically significant lethal effect at test completion to a test species *at or below* the critical dilution." It defines a chronic sublethal test failure as a "demonstration of a statistically significant sublethal effect (i.e., growth or reproduction) at test completion to a test species *at or below* the critical dilution." In addition, section D.1.c defines a WET limit violation as occurring when "the effluent fails a test endpoint *at or below* the critical dilution." Finally, the provisions for reducing the monitoring frequency for the Fathead Minnow state that the permittee may apply for testing frequency reduction upon completion of the first four consecutive quarters of testing with "no lethal or sub-lethal effects demonstrated *at or below* the critical dilution."

NOEC should not be retained as the endpoint for chronic tests. However, if it is, the definition in the Draft Permit must be revised. The NOEC definitions, and all permit provisions dependent on a determination of NOEC, should be revised to delete the phrase "and below." This definition is inconsistent with EPA's own guidance[41] and the current definition used by the TCEQ in TPDES permits. A finding of a significant effect at a dilution below the critical dilution does not constitute a test failure. This inappropriate modification of the definition of NOEC substantially increases the risk of having to report a test as exhibiting toxicity when it would be inappropriate to do so. The Draft Permit should be modified to define NOEC in accordance with EPA's own guidance.

At one time TCEQ included the phrase "or below" in the definition of NOEC in TPDES permits. The definition was revised to delete the phrase "or below," in accordance with EPA guidance, and EPA approved the revision.[42] It is not appropriate for EPA now to include this incorrect definition in the Draft Permit.

Recommendation: Delete the phrase "or below" from the following sections of the Draft Permit: page 3 of Part II (Section D.1.b), page 4 of Part II (Section D.1.c), and page 9 of Part II (Section D.4.a).

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[41] Chronic Freshwater Guidance at p. 37, Section 9.1.1.2.
[42] *See* email correspondence from Phillip Jennings, EPA, to Mike Pfeil, TCEQ, dated April 29, 2004, at Attachment D.

EPA Response 48-E1: *EPA disagrees. The definition is not incorrect. Although we recognize the WET method manual definition of NOEC, the original intent of the definition was based on a linear dose response, with toxicity increasing as the effluent dilution increases. However, as demonstrated in EPA's Method Guidance and Recommendations for Whole Effluent Toxicity (WET) Testing (40 CFR Part 136), EPA 821-B-00-004, July 2000, there are several acceptable non-linear dose response curves. NPDES permits issued by EPA Region 6 and its other States began using the phraseology in our standard permit language to ensure that data is reported accurately. Some permittees have reported tests as passing at the highest effluent dilution tested, even if the effluent failed at every other effluent dilution tested. At a minimum, the permitting authority should review such test results. As has been previously pointed out, where a permittee has a question about test results, they should immediately contact the permitting authority and request a technical review of the test. EPA Region 6 has been providing this assistance for over ten years and will continue to do so. EPA provides timely review, usually within one to two days, and guidance on how to report the test results, whether retesting is required, etc.*

<u>Comment:</u> EPA Interlaboratory Variability Study Split Sample Testing

The Interlaboratory Variability Study was conducted by EPA from September 1999 to April 2000.[43] As part of this study, EPA split samples of a reference toxicant, an effluent, and a receiving water and sent the split samples to multiple laboratories. EPA asked the laboratories to identify the lethal and sublethal NOEC for each sample. There were 34 participating laboratories. Collectively, these laboratories performed 48 tests of the reference toxicant sample, 27 tests of the effluent sample, and 13 tests of the receiving water sample. Some tests were unsuccessful or invalid so the total number of test results reported is less than the number of tests performed. (In fact, only 10 of the 88 resulted in reportable results, i.e., only 80% of the tests were successfully completed. It is unlikely that EPA would accept this low rate of test competition from a permittee). Also, apparently, the reference toxicant sample was incorrectly formulated because most (but not all) laboratories reported NOEC values for survival and reproduction in the reference toxicant of 100%, which suggests there was no toxicant present.

The results of this testing are presented in Table 9.12 of the EPA Interlaboratory Variability Study. The results are also presented in <u>Table A</u> herein. As can be seen from <u>Table A</u>, the laboratories reported a wide range of results for what should have been identical samples. In each case, the median value is the value reported by most (65% – 97%) of the laboratories. It could be presumed that the median value is the "correct" value for each sample. (There is no truly "correct" value because the test result is defined by organism response, which is variable between organisms. No one group of organisms is the "correct" group.) However, for most (4 out of 6) samples and endpoints (survival or reproduction), <u>approximately 30% of the laboratories reported a value different than the correct value</u>. Further, when the test result was different than the correct value, it was much more likely to be less than the correct value (which would be a false positive) than to be greater than the correct value (which would be a false

[43] *See* Interlaboratory Study.

negative). This indicates permittees are significantly more likely to have a test indicate a failure, when it should be a pass than to have a test indicate a pass, when it should be a failure.

Table A

Variability of 7-day *Ceriodaphnia dubia* Survival and Reproduction Test

Sample Type	Endpoint	NOEC Frequency (% Sample)						Median NOEC (% Sample)	Total Number of Tests	% of Tests Results
		<6.25%	6.25%	12.5%	25%	50%	100%			
Reference Toxicant	Survival	0	0	0	1	0	35	100	36	3
	Reproduction	0	2	3	1	4	26	100	36	30
Effluent	Survival	0	2	6	15	0	0	25	23	35
	Reproduction	0	3	17	4	0	0	12.5	24	12
Receiving Water	Survival	0	0	0	9	1	0	25	10	0
	Reproduction	0	0	3	7	0	0	25	10	30

As determined in the EPA Interlaboratory Variability Study[1]

EPA Response 49-E2: *EPA disagrees. This comment suggests a bias on the part of laboratories that, if their results are inconsistent with the median value (of all labs and tests), the results are more likely to indicate more, not less, toxicity than the median value. This comment shows a lack of understanding with respect to data that have a constrained value (i.e., 100% sample). With WET data, one does not expect a normal distribution of the endpoint around a median value when that value is at a near 100% sample because it is impossible to have definitive NOEC values > 100%. Therefore, any discernible variation in NOEC values in this situation can only be less than 100%. The actual distribution of values > 100% is unknown. This situation is analogous to chemistry analyses at the method detection limit (i.e., no quantifiable analyte present). If one were to look at inter-lab variability of reported chemical concentrations in a sample below the detection limit, undoubtedly the same situation would arise as reported by the commenter here: most labs would record a median value of below detection while a few labs would report values greater than the median value of no detection. Again, the results appear biased only because the variability observed below detection cannot be quantified.*

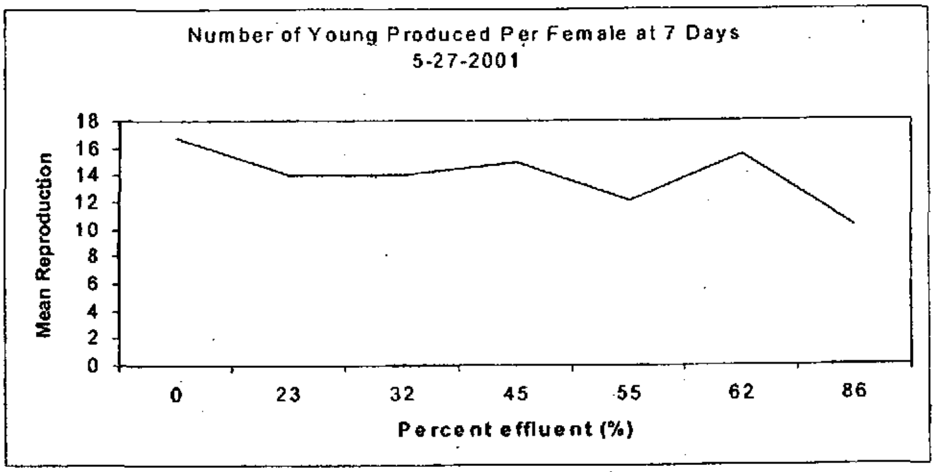
In fact, an actual lack of bias is shown in EPA's data for the effluent in Table A, provided by the commenter. For that sample, approximately equal numbers of tests were recorded on either side of the median value. This would not have occurred if there was bias as the commenter suggests.

In addition it is not apparent how SJRA came to some of its observations, e.g. "In fact, only 10 of the 88 resulted in reportable results, i.e., only 80% of the tests were successfully completed." In fact, EPA's study, a peer-reviewed public document also included 34 blank samples, so 122, not 88, C. dubia chronic tests were initiated and completed (see the first line of section 9.3.1 on page 76 of the document). The 80% completion rate was based on 22 tests which were ruled invalid for failing to meet test acceptability criteria and two cases of unacceptable interrupted dose-response. The document also specifically notes that these tests would have been invalidated and not used for purposes of regulatory compliance. As demonstrated by its actions with regards to the fathead minnow tests from December 2003 and March 2004 above, SJRA is already familiar with the invalidation of WET test results. The blank sample analysis showed that a single false positive result was detected. This resulted in a false positive rate of 3.7%, well within the statistical 5% margin of error and significantly less than SJRA's undocumented 30% false positive rate. In fact the only means for determining a true lab false positive rate is to do what EPA did, send out unidentified non-toxic blank samples and see which labs report toxicity. A false positive cannot be identified using either effluent or ambient water samples, because they may have toxicant(s) in them.

In standard hypothesis testing such as the NOEC analyses used in SJRA's permit, the false positive rate is controlled by the alpha level, which is typically set at 0.05. This means only 1 in 20 tests on average might reject the null hypothesis, and declare an effluent toxic when in fact it is not. False negatives, on the other hand are uncontrolled, which means that the false negative rate could be far greater than 0.05.

NOEC analysis is designed to ensure that when one rejects the null hypothesis (that the effluent is not toxic), one is fairly certain that this hypothesis is not true given the test data. The result is that variable control reproduction data makes it more likely, not less, that the effluent will pass the test. This was evidenced more than once in SJRA's testing history. For example, the May 27, 2001 test the reported NOEC = 86% (i.e., test "passed", see EPA Figure 1), despite the fact that mean reproduction at the critical effluent concentration was 10.2 offspring per female (minimum allowable control reproduction is 15 offspring per female) and only 60.7% of the control mean reproduction in this test. This example shows how the analysis approach, designed primarily to control against false positive test results, is a weak control for false negatives; the effluent was declared non-toxic when it should have been considered toxic (i.e., false negative).

EPA did a power analysis of several types of WET test methods as part of its WET Variability Guidance (USEPA, 2000) and determined that, compared to the controls, a large percentage (over half) of C. dubia chronic tests demonstrated relatively poor power to detect a 25% decrease in reproduction. This underscores the fact that the false negative rate, rather than the false positive rate, is fairly high for the C. dubia test (maybe as high as 0.25, or one out of four tests).



EPA Figure 1. Mean number of young per female reported by effluent concentration for the SJRA effluent in the May 27, 2001 test. The analysis indicated no effect of the effluent (NOEC = 86%).

EPA also notes that if an IC_{25} rather than NOEC were used to evaluate WET compliance, SJRA would have likely failed more tests than they did. In other words, there were many tests for this effluent in which a 25% effect on reproduction could not be detected at a critical effluent concentration using the NOEC analysis, but which would have been detected as test failures if an IC_{25} had been established as the endpoint. Again, this demonstrates that false negatives, not false positives, are of much higher concern in this permit.

It is also important to note that three different labs reported several (a total of 23) failed tests for this facility over the past five years. The fact that toxicity has been observed by these different labs, yielding a combined test fail rate > 30% (almost 1 out of every 3 tests conducted on average), indicates that the test variability issues raised by the commenter are irrelevant and the test failures are not related to variability.

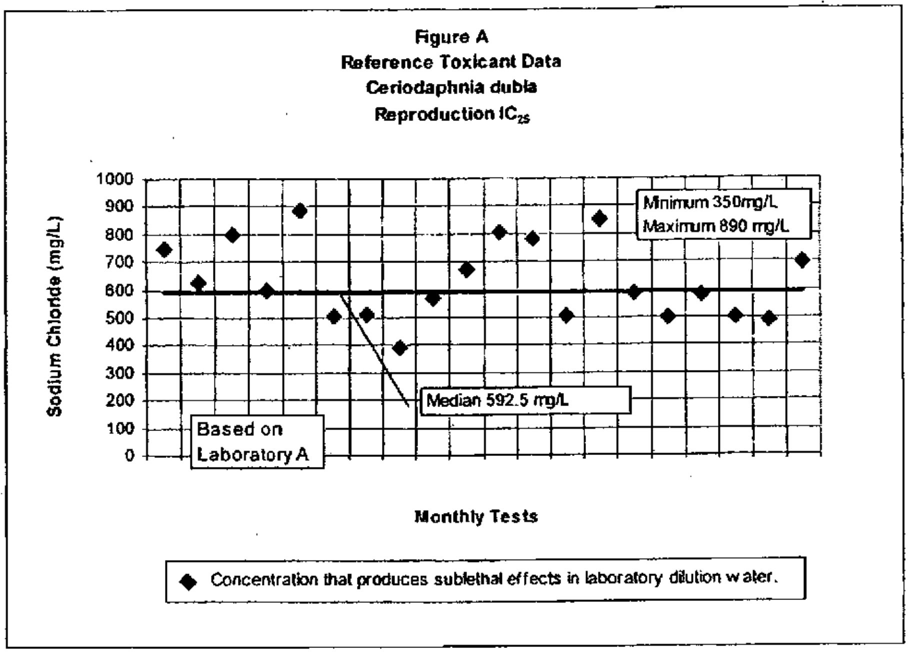
Finally, EPA notes that SJRA Table A differs from EPA's Table 9.12. The last two columns of EPA's Table 9.12 have been replaced with different headers and values in the various boxes.

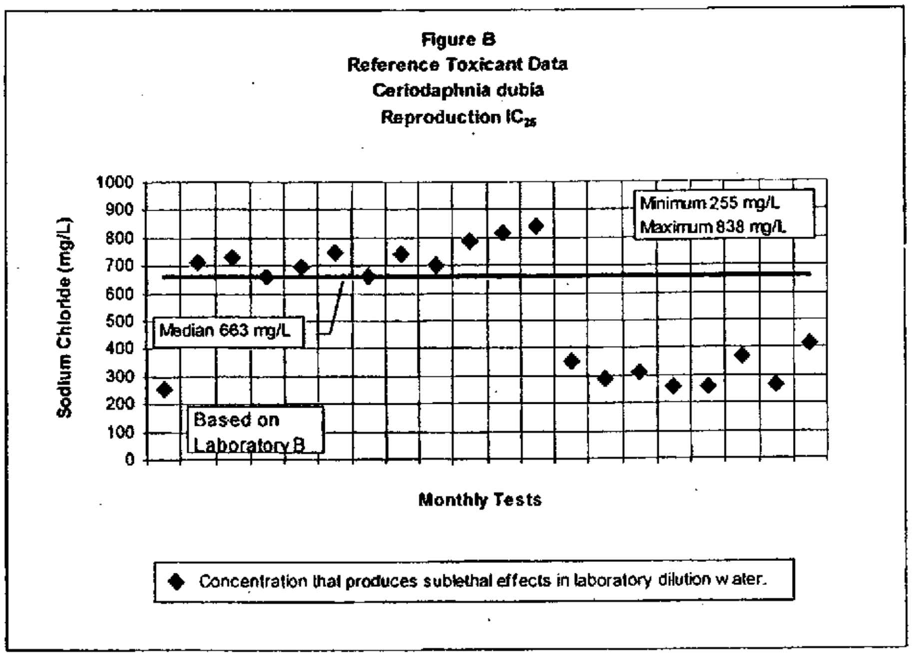
Comment: Reference Toxicant Charts

The variability of the test also can be observed by inspecting reference toxicant charts prepared by the laboratories that conduct WET tests. At least once each month, a WET laboratory runs a WET test with a known toxicant in order to confirm that its organisms are responding within an acceptable range. The result of each test is plotted on a 24-month graph to indicate the normal range of variability for that specific laboratory. Figures A and B are reference toxicant charts (*C. dubia*) for two laboratories that conduct WET testing.[44] These laboratories use sodium chloride as the toxicant and report the IC_{25} value for the test, which is the concentration of sodium chloride that produces a 25% reduction in reproduction.

For the two laboratories whose results are presented on Figures A and B, the median IC_{25} is approximately 600 mg/L of sodium chloride. However, depending on the laboratory and the month, the IC_{25} ranged from approximately 260 mg/L sodium chloride to approximately 890 mg/L, a difference of approximately plus or minus 50%.

[44] *See* Attachment E for underlying laboratory reports.





This variability can be compared to the variability of chemical analyses for chloride concentrations in this range. Standard Methods for the Examination of Water and Wastewater indicates that the relative standard deviations for the results of chloride tests typically used for concentrations in this range (Argentometric Method and Mercuric Nitrate Method) are 3-4%.

This means that 95% of the time (1 out of 20 samples) the values reported for a standard sample containing 600 mg/L of sodium chloride would be between 540 mg/L to 640 mg/L.

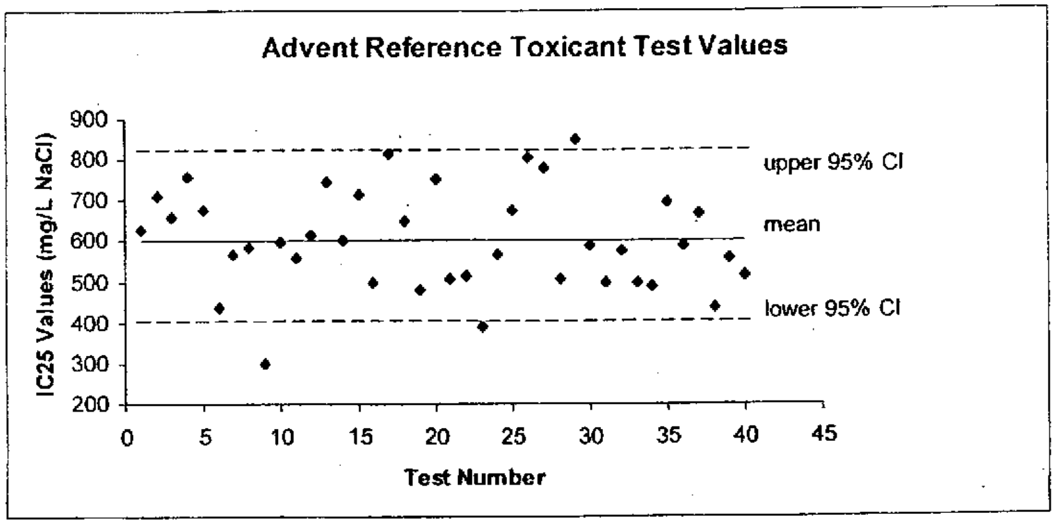
These charts confirm that, as observed in the data from the EPA Interlaboratory Variability Study, while a median value of multiple tests may approximate the "correct" answer, any single test can be significantly wrong. Further, inspection of the reference toxicant charts confirms that results may differ from the median for several months at a time. Therefore, conducting one or two additional tests in consecutive months has a low likelihood of producing the correct value.

EPA Response 50-E3: *EPA agrees with SJRA's statement that WET variability is comparable to the variability associated with chemical analysis, with chloride concentrations given as the example chemical compound. However, this does not support SJRA's contention that WET limits should be excluded from the permit. WET testing variability is comparable to chemical testing variability and both, as established by EPA regulations at 40 CFR 122.44 and 40 CFR 136, provide a fully adequate basis for NPDES permitting, limits and compliance. See Edison Elec. Inst. v. EPA, 391 F.3d 1267 (upholding validity of EPA's WET test methods).*

However, the comparison made is at best unfair and inaccurate. A more appropriate comparison here might be between WET test variability for sublethal endpoints with variability in chemical results near the method detection limit. A chloride concentration of 600 mg/L, as discussed by the commenter, is a very high concentration for the method and a range that is easily and accurately measured. The same would be true for samples that are extremely acutely toxic (i.e., very high toxicity); labs would have little difficulty in identifying low WET endpoints (e.g., LC_{50}, IC_{25}, etc.) for such a sample. However, for samples that have more subtle toxic effects (e.g., only sublethal effects), inter-lab variability is more akin to the type of analytical chemistry variability observed in low-level analyses. Such analyses often report higher inter-lab or inter-sample differences.

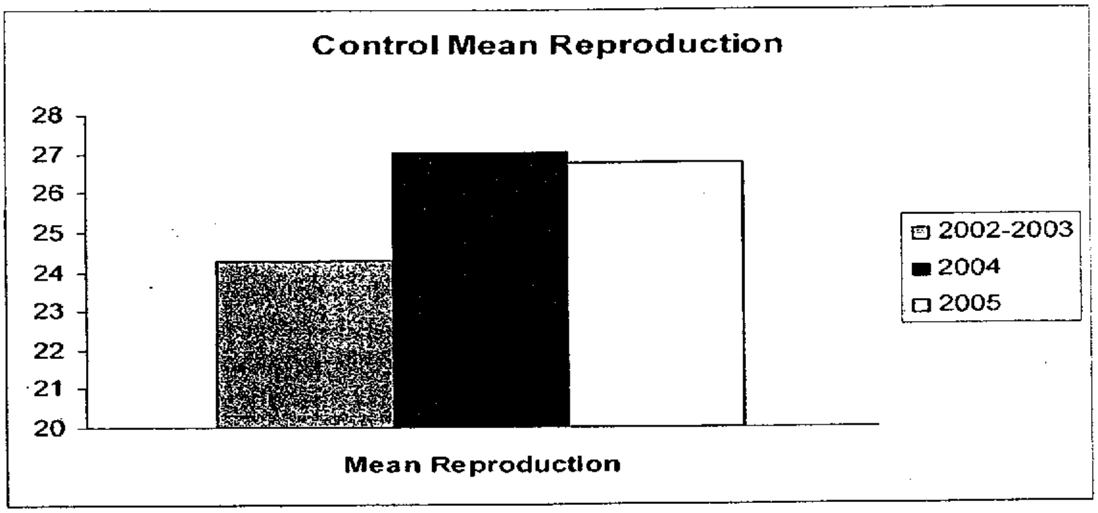
The reference toxicant charts presented by the commenter as "evidence" show some of the types of variability that may be observed over time in a laboratory, however, these are far from the norm in EPA's experience. Particularly for Lab "B" (Figure B), the data indicate a fairly sudden radical change in organism response that persists over several months. Good laboratory practices would call into question this change and should initiate a full Quality Control inspection to determine: (1) if the change real and not an artifact of incorrect dilutions, change in reagent quality, etc. and (2) if it is real, why, and should control limits be reset? The examples provided by the commenter demonstrate that fairly consistent results can be obtained if a laboratory maintains a Quality Management Program (such as that required for NELAC accreditation) and doesn't blindly accept any and all reference toxicant test results.

As a case in point, EPA analyzed reference toxicant (NaCl) data supplied to the permittee by Advent Labs, the lab that conducted WET tests for SJRA from 2002 – present. During this time, out of a total of 40 tests examined, 33 (82.5%) had an IC_{25} between 500 and 815 mg/L NaCl (EPA Figure 2). The coefficient of variation (CV) for these data was 21%. These data demonstrate reasonable consistency in the IC_{25} value over time.

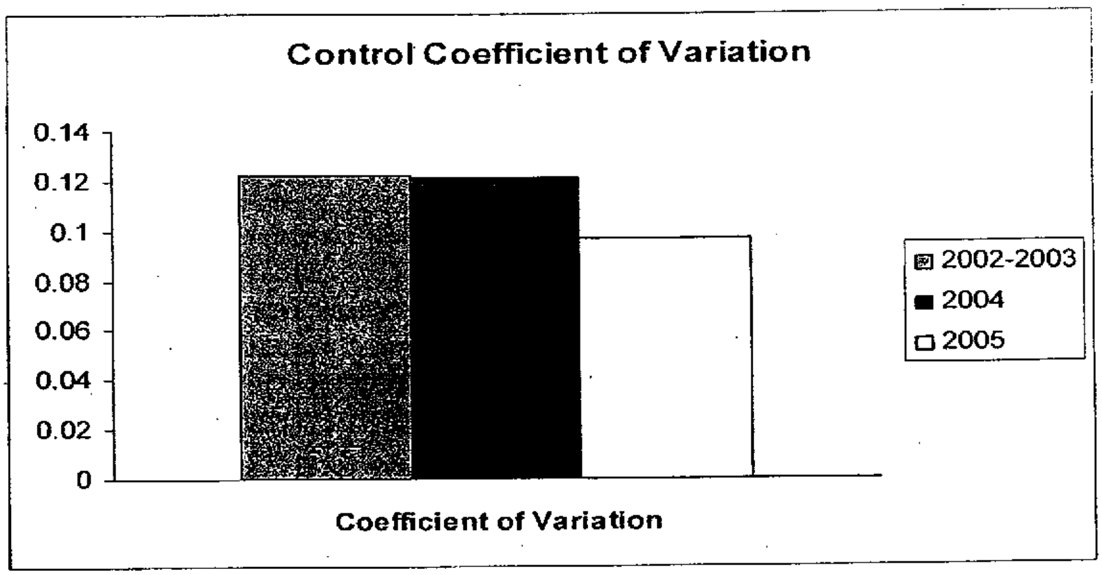


EPA Figure 2. Reference toxicant IC_{25} values reported by Advent Labs, the primary contract lab used by SJRA, for *C. dubia* reproduction and NaCl.

This point is made even more clearly in the control reproduction values from WET tests conducted for SJRA. Using again the data generated by Advent Labs (because this lab conducted most of the tests for this facility), EPA observed that mean control reproduction for each year ranged between 24.3 and 27.0 between 2002 and 2006 (EPA Figure 3) and had an overall mean = 25.9 ± 3.15 (sd) (EPA Figure 3). Even more important, the coefficient of variation (CV) for reproduction in any given year was never higher than 12.2% (EPA Figure 4). These data indicate high reproducibility in the control performance from test to test over time and therefore, high confidence in the results, including those that indicate noncompliance with WET triggers.



EPA Figure 3. Mean *C. dubia* reproduction reported by Advent Labs in controls from effluent tests conducted between 2002 and 2005.



EPA Figure 4. Mean coefficient of variation in reproduction of controls from effluent tests conducted by Advent Labs for SJRA.

Comment: National Reference Toxicant Database

As wide as the results are that are reflected on the two reference toxicant charts presented herein, the actual variability of the test is much greater. This is reflected in the data maintained by EPA in the National Reference Toxicant Database.

The WERF Report determined test variability using reference toxicant data compiled by EPA. The database and the quality assurance protocols applied by EPA are described in Section 3 of the WET Variability Document. The WET Variability document states that for each test in the database, EPA personnel or an EPA contractor calculated the effect concentration, verified that all test acceptability criteria has been met, and verified that the statistical flow chart for evaluating the raw data had been followed correctly. The WET Variability Document further states that "thus, all summary statistics and estimates were calculated from the replicate data and strictly followed the most current EPA test methods."[45]

The WERF Report on test variability presents a graphical summary of the IC_{25} values for the chronic 7-day *C. dubia* reproduction test as reported in the National Reference Toxicant Database. The reference toxicant in these tests was the same reference toxicant that was used by the two laboratories for which results are presented on Figure A and Figure B, sodium chloride. The summary in the WERF Report of the reproduction test results is reproduced on Figure C.

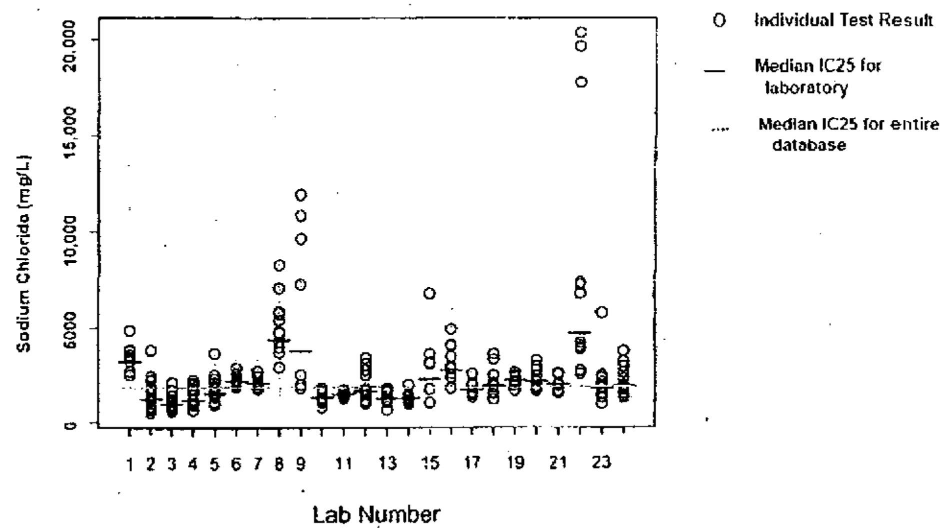
Data from 24 laboratories are presented on Figure C. Circles document the results of individual tests reported by the laboratory. The short, solid, horizontal line on each vertical line represents the median of the IC_{25} values reported by that laboratory. The dotted horizontal line that crosses the entire chart is the median of all of the IC_{25} values reported by the different laboratories.

As indicated on Figure C, the median IC_{25} for reproduction, based on all of the tests in the EPA National Database, is almost 2,000 mg/L of sodium chloride (which is much greater than the 600 mg/L values reported by the two laboratories whose results are presented on Figures A and B). Median IC_{25} reproduction values for individual laboratories range from approximately 1,000 mg/L to approximately 5,000 mg/L. Individual test results range from approximately 600 mg/L to over 20,000 mg/L.

Similar widely distributed results can be observed for the 7-day chronic *C. dubia* survival test. Figure D is also from the WERF Report. It presents a graphical summary of the test results in the EPA National Reference Toxicant Database for the survival test. As indicated on Figure D, the median IC_{25} for survival, based on all of the tests in the EPA database is approximately 1,800 mg/L. Median IC_{25} survival values for individual laboratories range from just over 1,000 mg/L to approximately 3,500 mg/L. Individual test results range from approximately 300 mg/L to well over 6,000 mg/L.

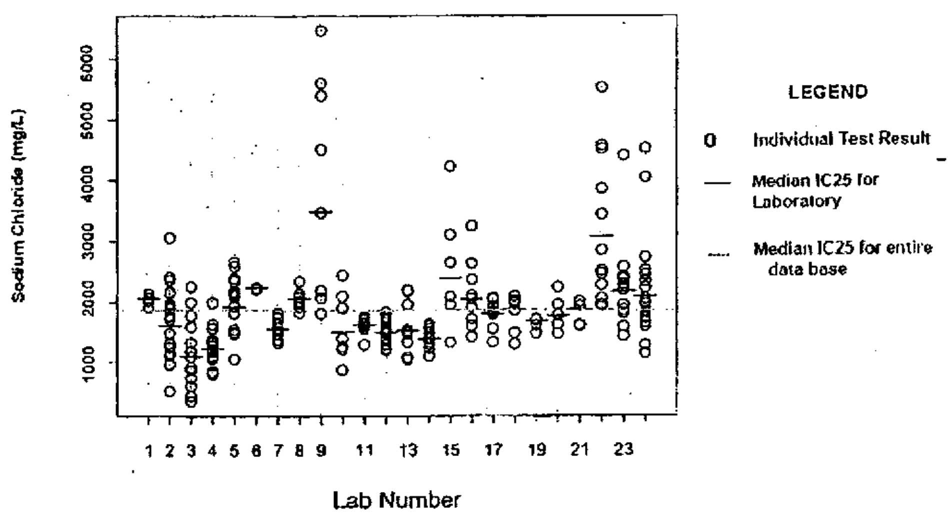
[45] WET Variability Document, Chapter 3, Section 3.1.

Figure C
Reference Toxicant Data
Ceriodaphnia dubia Reproduction IC25



Based on EPA National Reference Toxicant Data Base. Reproduced from the WERF Report

Figure D
Reference Toxicant Data
Ceriodaphnia dubia Survival IC25



Based on EPA National Reference Toxicant Data Base, Reproduced from Reference(3)

Conclusion: A permit limit based on any chronic WET test is inappropriate because of the test variability documented above. There are no actions a permittee can take to ensure it consistently passes the test, since many factors other than effluent quality can determine test results.

However, if a limit is imposed, it should be reflective of the variability of the test. The determination of permit compliance should not be based on an individual test result because of the high likelihood that any single test can be unrepresentative.

There is no truly "correct" result for a WET test because the test result is defined by the responses of the specific organisms used in that individual test (organisms are not equivalent to meters that consistently respond the same way to the same concentration of a substance). The fact that different sets of organisms respond differently is documented in the WET test results reported in the EPA National Reference Toxicant Database for *C. dubia*. All of these tests were conducted on solutions containing the same toxicant, sodium chloride, and all other variables were controlled in accordance with test protocols. Nevertheless, the test results are very different. The results for the Fathead Minnow tests are not distributed over quite as wide a range as the *C. dubia* tests, but are still highly variable.

If compliance is to be judged based on the chronic WET test, it should be based on the central tendency of the data. As shown in the Interlaboratory Variability Study, there can be a moderate degree of agreement among tests and laboratories regarding the median value for a sample. However, both the Interlaboratory Variability Study and the reference toxicant charts show that the median must be determined based on a sufficient number of tests. As shown on the reference toxicant charts, testing on three successive months is not sufficient to define the central tendency of the data.

Recommendation: If a WET limit is imposed, the method for determining compliance set forth on page 4 of Part II (Section D.1.c) should be revised to read as follows:

"The conditions of this item are effective beginning with the effective date of the WET limit. When the median of all tests conducted during the previous twelve months exceeds the IC_{25} value set forth in Part I of this permit, the permittee shall be considered in violation of this permit limit, and the testing frequency for the affected species will increase to monthly until such time as compliance with the IC_{25} effluent limitation is demonstrated, at which time the permittee may return to the testing frequency stated in Part I of the Draft Permit. The median value shall be recalculated and reported each month based on the results during the previous twelve-month period."

EPA Response 51-E4: *EPA disagrees with the presumptions presented. Over 250 TREs have been performed in EPA Region 6, with WET limits included in over 150 permits since 1989, and many permittees have operated under significantly more stringent WET limit critical dilutions for years without reported violations or penalties for occasional violations. The lack of use of an* IC_{25} *or median approach has not been found to be problematic for any of the other Region 6 permittees with WET limits in their permits. When* *previously queried on this issue, the Region 6 States have not indicated interest or requested revisions to the current approach and EPA Region 6 does not anticipate such significant revisions to reporting WET limit compliance in the near future.*

EPA has significant concerns with the manner in which the WERF Variability Study was conducted. Although it is unclear in the report, it appears that the data sets used in the analysis referenced in this comment: 1) contained test data indicative of performance using obsolete methods (e.g., conducted between 1988 and 1994), 2) only one of the data sets was included in the report and that one was extensively censored (e.g., the number of tests included in the data base does not match the number of tests included in the analysis, nor does the number of tests included in the data base match the number of tests included in the National WET data base from which the data were reportedly drawn). The rationale and methods used to censor the data are not discussed, and the second data set is not even included in the appendices of the report. As such, it is impossible for readers or reviewers of this report to understand which data were used in the analyses, and possibly of greater importance, to understand why some data were not used.

In examining the C. dubia chronic data reported by WERF, it is also clear that the authors and reviewers did not critically evaluate the accuracy or quality of the data. For example, the report indicates IC_{25} values for C. dubia reproduction and NaCl up to 20 ppt salinity (in fact the authors report several IC_{25} values > 5 ppt salinity for this test method and reproduction). These results are clearly impossible and indicate either transcription errors or poor judgment on the part of the authors and reviewers as to what constitutes accurate data for this endpoint. It is well established in the peer reviewed literature that the IC_{25} for C. dubia reproduction and NaCl is approximately 1.0 ppt and certainly no greater than 2.0 ppt.

EPA's analysis of the reference toxicant database (the same one used for the WERF Report) for this test method indicated a CV = 27% for the reproduction EC_{25} (USEPA, 2000). In this analysis, EPA observed that the variability in IC_{25} values was significantly higher for those tests conducted prior to 1995, when the test method was updated by EPA (90^{th} percentile CVs = 0.55 and 0.37 for pre-1995 and post-1995, respectively). This result is understandable because labs received improved method guidance in 1995 to help ensure higher quality data from this test. Furthermore, laboratories had greater experience conducting the method by 1995. Despite the author's assertion that they used the most recent data, in fact, by including test data as far back as 1988, they did not. They included data from when the test method was first published in EPA manuals and labs had had little experience conducting the test. Thus, the WERF Report did not accomplish one of its main objectives, which is to report the current status of WET test performance and test variability. Had the authors been truly professional and unbiased, they should *have examined IC_{25} variability as a function of the year in which the test was conducted, and analyzed only the truly current test data for this test method.*

Another issue with the data is that the representation of laboratories for the C. dubia test was sparse and unbalanced despite claims made otherwise by the authors. The database supposedly relied on by the authors (in Appendix C of the WERF Report) had only 15 labs represented, several of which had few tests represented. A handful of labs were apparently responsible for most of the data. This calls into question the generality of the results and underscores the unreliability of study conclusions given the data quality issues raised above.

The analysis used in the WERF Report was based on C. dubia reference toxicant tests that tested only three toxicant concentrations (0.5, 1.0, and 2.0 ppt NaCl) in addition to the control. This is too few concentrations with which to derive precise IC_{25} endpoints, particularly given the fact that nearly all of the tests have an IC_{25} somewhere between 0.5 and 1.0 ppt NaCl, as the WERF Report demonstrates. The concentration spacing used in the WERF analysis is too wide for this species and endpoint, therefore artificially inflating the apparent variability among laboratories. Toxicologists recognize that concentrations need to be more closely spaced in order to develop an accurate and precise concentration-response curve and, therefore, more precise endpoints. Three toxicant concentrations, as used in the WERF Report, is generally insufficient for this purpose and, for most state accreditation programs, would not be considered a valid reference toxicant test.

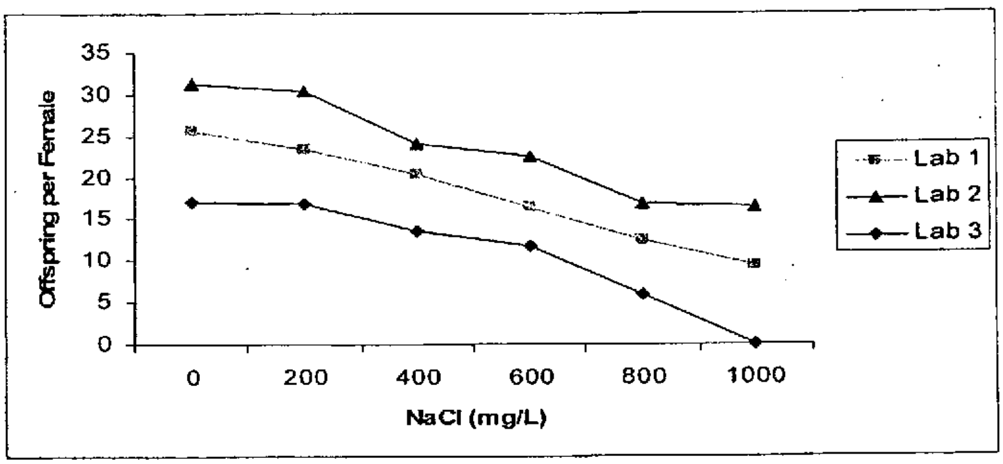
Finally, EPA notes that NaCl IC_{25} values for C. dubia are reported in parts per thousand. This is a very crude measure of the exposure concentrations used in NaCl reference toxicant tests. Most laboratories, if not all, report the NaCl concentration in mg/L, as shown in the reference toxicant figures used by the commenter and the one from Advent Labs presented in EPA Figure 2 of these responses. This is because as pointed out earlier, the IC_{25} for this endpoint is typically below 1000 mg/L (1 ppt) and most labs, therefore, run NaCl concentrations in the mg/L range. In fact, in EPA's experience, most labs conduct tests using several concentrations between 0 and 1000 mg/L because the IC_{25} is generally within this range. To use only one concentration between 0 and 1000 mg/L, as was done in the WERF analysis, is insufficient for obtaining inter-lab variability estimates. Furthermore, rounding the concentration to parts per thousand is likely to induce a large margin of error given the NaCl range applicable to C. dubia (0-0.8 ppt). As a result, the specific test concentrations that the authors relied on in their variability analyses are associated with unknown (and probably high) error.

In addition to data issues with the WERF Report, EPA has issues with some of the statistical procedures as noted below.

Mixed Effects Model

Warren-Hicks et al. analyze the reference toxicity data for variance components in two ways, first via a standard random effects model, then via a hierarchical Bayes approach.

The random effects model was performed using SAS statistical analysis software, specifically the VARCOMP procedure, and apparently presented severe difficulties to the researchers in obtaining stable results. They first attempted a pure random effects model then switched to a mixed effects model with test concentration as a fixed effect. In order to do this, the data set had to be pared down significantly to select only specific consistent concentration levels. Further paring was then required to supposedly create a "balanced data set." As a result, only about 10% of the available data was actually used in the WERF analyses. Choosing to treat NaCl concentration as a fixed effect in their statistical analysis tremendously exaggerated the effect of this factor on WET variability results. Test concentration, in and of itself is meaningless when divorced from the endpoint actually used to judge WET performance and compliance. In data evaluation toxicologists are less concerned with effects at a specific concentration than the concentration-response pattern developed. It is therefore, quite possible to have some variability in response among labs at a given concentration but to have much less variability in the endpoint of interest. Figure 5 shows a simple example demonstrating this fact. In addition, as discussed previously, the NaCl concentration is generally not measured by the lab in these tests and in fact, the authors chose to use data reported in ppt salinity, a crude measure of exposure in these tests. Given the unknown but likely substantial error associated with the factor "concentration" as admitted by the authors, it is nonsensical to treat concentration as a fixed effect in their analyses.



EPA Figure 5. Example concentration-response curves from three labs in *C. dubia* reference toxicant tests using NaCl demonstrating high variability in response at any given concentration but very similar mean IC_{25} values (IC_{25} = 532 mg/L, 541 mg/L and 524 mg/L, for Labs 1, 2, and 3, *The primary motivation by the authors for reduction in data was dissatisfaction with the VARCOMP results. As the authors note, "In almost all cases, models applied to the full data set provided nonsensical results. In particular, the models returned negative variance components..." Negative variances are commonly returned when highly unbalanced data are analyzed using traditional analysis of variance methods. Therefore, for the purpose of this project, the researchers only ran the mixed effects model on the relatively balanced data containing consistent concentrations among the individual WET tests in the data set."*

In fact, negative variance estimates are often obtained in random effects models, and "have bothered statisticians for many years, as is evidenced by the great variety of attempts which have been made to resolve the problems" (Box and Tiao, 1973, see: Box, George E. P. and George C. Tiao. "Bayesian Inference in Statistical Analysis (with Errata)". Reading, Massachusetts: Addison-Wesley Publishing Company, 1973). They arise when the total variance measured at the aggregated levels (i.e. across labs) is greater than the variance component within labs. Then, the estimate of between lab variance, which should be the aggregated variance minus the sum of the within lab variances, comes out negative. Among other things this reflects uncertainty in small sample estimates of the individual variance components. In this case, treating the concentration as a fixed effect and ignoring its effect on variance may also contribute to the problem.

In general, editing the data set because one does not like the results is not advisable without strong justification. Negative variance estimates seem to arise frequently in random effects models, although they are seldom published (for obvious reasons). However, the estimate of negative between-laboratory variance actually reveals some important points about the importance of this variance component (concentration), the structure of the mixed effects model, and the general quality of the data.

What are the potential results of the data paring exercise? As noted above, this problem will arise when the sample variance at the higher level of the hierarchical design is smaller than the sum of variances at the lower level. So, paring the data to get a positive estimate of between-laboratory variance must have the effect either of increasing the apparent between-laboratory variance or decreasing the apparent within-laboratory (plus error) variance. As a result, conclusions about the relative magnitude of between-laboratory and within-laboratory variance from the mixed effects model are suspect at best. Even with the reduced data set, the estimated between laboratory variances are quite low, and range from less than 1 to about 30 percent of the total variance.

The authors then claim "similar findings" for the new results relative to those published in Warren-Hicks et al. (2000), which used supposedly older test *methods. As discussed above, this claim by the authors is unfounded. The variance analysis approach was also different, with the older (2000) study using a full random effects model, including concentration as a random effect. Results for among-laboratory variance and the sum of test plus error variance can be examined for seven tests (EPA Table 2). The actual variance sums show some consistency, at least in terms of relative magnitude. Of interest is the ratio of among laboratory to test plus error variance. In every case, these ratios are higher for the 2006 study than for the 2000 study, often by a substantial amount. In other words, the selective paring of data appears to have artificially enhanced the estimated importance of among-laboratory variability, just as predicted above.*

EPA Table 2. Comparison of Variance Components in Warren-Hicks et al. (2006) and Warren-Hicks et al. (2000)

Species	Reference Toxicant	Endpoint	Sum of among Lab, Test, and Error Variance		Ratio of among Lab to Test plus Error Variance	
			2006	2000	2006	2000
P. promelas	NaCl	Survival	0.09	0.029	0.125	~0
P. promelas	NaCl	Growth	0.012	0.037	0.20	0.057
C. dubia	NaCl	Reproduction	39.3	99.1	0.26	0.057
C. dubia	NaCl	Survival	0.15	0.11	0.25	0.051
H. rufescens	$ZnSO_4$	Larval	0.05	0.056	0.25	0.12
M. pyrifera	CuCl	Germination	0.025	0.027	0.25	0.039
M. pyrifera	CuCl	Tube	4.87	6.79	0.42	0.087

Hierarchical Bayes Model

The second approach taken by the authors to evaluate variance components is a hierarchical Bayes approach. This is exactly the approach recommended by (and developed at great length by) Box and Tiao (1973) to address the problems inherent in a sampling-theory, classical approach to variance components.

However, EPA notices that the results from the hierarchical Bayes approach are apparently inconsistent with the results from the mixed effects model. In almost every case, the sum of variance components and the individual variance components reported from the hierarchical analysis are much greater than the sum of variance components reported from the mixed effects model on the same data. (While the individual variances in the hierarchical model are not necessarily additive, the variances reported are partitioned from total variance into two components "using a traditional random effects model.") Further, the results (Table 2-3 in the WERF Report) for the hierarchical analysis show that among-lab variance is generally greater than within-lab variance, which seems to contradict the findings of the mixed effects model.

EPA notes that the hierarchical analysis does not require data paring and a larger data set was used in this analysis than for the mixed effects model. Another important distinction that makes direct comparison of the mixed effects and hierarchical models difficult is that the hierarchical analysis used a generalized linear model (GLIM) approach to relate the observations to the underlying meta-parameters. Specifically, responses were assumed to depend on a one-parameter distribution (binomial for mortality, Poisson for counts). A transformation of the parameter of the response model (Logit for the binomial parameter, log for the Poisson parameter) is then described as a linear model of the log of concentration. Evidently, the form and the transformations/back-transformations involved in the GLIM approach result in almost all variance components being larger. Sufficient detail is not provided to ascertain exactly what has occurred in this approach. Given the unexplained and undiscussed differences between the two methods, it is impossible to draw firm conclusions from either approach and results from both approaches are suspect.

SJRA also comments that the high inter-lab variability reported in the WERF Report for the C. dubia test means that there is a high false positive rate as well. This statement is factually incorrect. As EPA already discussed in the above responses, the WERF Report artificially inflated the between-lab variability by using only a fraction of the tests available to them, using older test data and data that were clearly incorrect, using test data only from three widely-spaced concentrations of NaCl, and treating concentration as a fixed effect in their model. EPA's analysis of truly current test data (over 600 tests and 30 labs) that have been quality assured for accuracy, indicate CVs and minimum significant differences (MSDs) for this test method that are well within those reported for many promulgated chemical methods.

Furthermore, test variability is not synonymous with false positive rate. As noted in previous EPA responses, the false negative rate is uncontrolled in current WET analysis approaches and available information compiled by EPA indicates false negatives can be as, or more common, than false positives.

Finally, with respect to the proposal for an annual averaging for a WET limit, the stochastic nature of toxic excursions at wastewater treatment plants are influenced by many factors (e.g., inputs of toxic materials to the sewer systems, rain events, and the timing of various other upsets). As such, it is expected that if toxicity is observed in the effluent from a wastewater treatment plant that is operating normally, it may occur on a periodic and episodic basis, as evidenced by toxicity at the SJRA facility. Because only a small portion of the effluent is tested to determine toxicity (three days a month under a monthly chronic testing scheme), there is a significant concern that any toxicity detected in such tests is representative of longer-term toxic impacts to the receiving stream. The damage associated with such impacts is done at the time of discharge. As such, even though annual averaging of test results may *appear to indicate no net impacts or exceedances of the WET limits, the periodic excursions of WET limits are of significant concern and should not be discounted. In fact, the period required for recovery of stream systems is expected to require up to a year or more (TSD, pages 29, 36, 72, 98, 134). Therefore, it is necessary to continue to monitor and limit whole effluent toxicity on a more frequent basis in order to prevent longer-term impacts that might be masked by an annual averaging period.*

TEXTOX MENU #3 - PERENNIAL STREAM OR RIVER

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

- Table 1, 1997 Texas Surface Water Quality Standards (30 TAC 307) for Freshwater Aquatic Life
- Table 3, 2000 Texas Surface Water Quality Standards for Human Health
- "Procedures to Implement the Texas Surface Water Quality Standards," Texas Commission on Environmental Quality, January 2003.

PERMITTEE INFORMATION:

Permittee Name:	SJRA RUN #1
TPDES Permit No:	TX0054186
Outfall No:	001
Prepared By:	LEG
Date:	May 1, 2007

DISCHARGE INFORMATION:

Receiving Waterbody:	Panther Creek - FW Fish only
Segment No:	1008
TSS:	13
pH:	6.7
Hardness:	30
Chloride:	53
Effluent Flow for Aquatic Life (MGD)	7.8
Critical Low Flow [7Q2] (cfs)	5.32
Chronic Effluent % for Aquatic Life:	69.40
Acute Effluent % for Aquatic Life:	90.07
Effluent Flow for Human Health (MGD):	7.8
Harmonic Mean Flow (cfs):	11.43
Human Health Effluent %:	51.36
Public Water Supply Use:	No

CALCULATE TOTAL/DISSOLVED RATIO:

Stream/River Metal	Intercept (b)	Slope (m)	Partition Coefficient (Kpo)	Dissolved Fraction (Cd/Ct)		Water Effects Ratio (WER)	
Aluminum	N/A	N/A	N/A	1.00	Assumed	1.00	Assumed
Arsenic	5.68	-0.73	73590.432	0.51		1.00	Assumed
Cadmium	6.60	-1.13	219403.733	0.26		1.00	Assumed
Chromium (Total)	6.52	-0.93	304812.436	0.20		1.00	Assumed
Chromium (+3)	6.52	-0.93	304812.436	0.20		1.00	Assumed
Chromium (+6)	N/A	N/A	N/A	1.00	Assumed	1.00	Assumed
Copper	6.02	-0.74	156921.308	0.33		1.00	Assumed
Lead	6.45	-0.80	362114.002	0.18		1.00	Assumed
Mercury	N/A	N/A	N/A	1.00	Assumed	1.00	Assumed
Nickel	5.69	-0.57	113514.748	0.40		1.00	Assumed
Selenium	N/A	N/A	N/A	1.00	Assumed	1.00	Assumed
Silver	6.38	-1.03	170859.192	0.31		1.00	Assumed
Zinc	6.10	-0.70	209044.937	0.27		1.00	Assumed

AQUATIC LIFE
CALCULATE DAILY AVERAGE AND DAILY MAXIMUM EFFLUENT LIMITATIONS

Parameter	Acute Standard (ug/L)	Chronic Standard (ug/L)	WLAa	WLAc	LTAa	LTAc	Daily Avg. (ug/L)	Daily Max. (ug/L)
Aldrin	3.0	N/A	3.331	N/A	1.908	N/A	2.805	5.935
Aluminum[d]	991	N/A	1100.214	N/A	630.423	N/A	926.721	1960.614
Arsenic[d]	360.	190	782.033	535.653	448.105	412.452	606.305	1282.727
Cadmium[d]	8.664	0.441	37.053	2.446	21.231	1.883	2.769	5.858
Carbaryl	2.0	N/A	2.220	N/A	1.272	N/A	1.870	3.957
Chlordane	2.4	0.0043	2.664	0.006	1.527	0.005	0.007	0.015
Chlorpyrifos	0.083	0.041	0.092	0.059	0.053	0.045	0.067	0.141
Chromium (+3)[d]	647.799	77.214	3569.027	552.094	2045.052	425.112	624.915	1322.098
Chromium (+6)[d]	16	11	17.763	15.849	10.178	12.204	14.962	31.655
Copper[d]	6.173	4.574	20.834	20.033	11.938	15.426	17.549	37.127
Cyanide (free)	45.78	10.69	50.825	15.402	29.123	11.860	17.434	36.884
4,4'-DDT	1.1	0.001	1.221	0.001	0.700	0.001	0.002	0.003
Dementon	N/A	0.1	N/A	0.144	N/A	0.111	0.163	0.345
Dicofol	59.3	19.8	65.835	28.528	37.724	21.967	32.291	68.317
Dieldrin	2.5	0.0019	2.776	0.003	1.590	0.002	0.003	0.007
Diuron	210	70	233.143	100.858	133.591	77.660	114.161	241.524
Endosulfan (alpha)	0.22	0.056	0.244	0.081	0.140	0.062	0.091	0.193
Endosulfan (beta)	0.22	0.056	0.244	0.081	0.140	0.062	0.091	0.193
Endosulfan sulfate	0.22	0.056	0.244	0.081	0.140	0.062	0.091	0.193
Endrin	0.18	0.0023	0.200	0.003	0.115	0.003	0.004	0.008
Guthion	N/A	0.01	N/A	0.014	N/A	0.011	0.016	0.035
Heptachlor	0.52	0.0038	0.577	0.005	0.331	0.004	0.006	0.013
Hexachlorocyclohexane (Lindane)	2.0	0.08	2.220	0.115	1.272	0.089	0.130	0.276
Lead[d]	17.632	0.687	111.726	5.650	64.019	4.351	6.396	13.531
Malathion	N/A	0.01	N/A	0.014	N/A	0.011	0.016	0.035
Mercury	2.4	1.3	2.664	1.873	1.527	1.442	2.120	4.485
Methoxychlor	N/A	0.03	N/A	0.043	N/A	0.033	0.049	0.104
Mirex	N/A	0.001	N/A	0.001	N/A	0.001	0.002	0.003
Nickel[d]	512.148	56.935	1407.652	203.090	806.585	156.379	229.877	486.339
Parathion (ethyl)	0.065	0.013	0.072	0.019	0.041	0.014	0.021	0.045
Pentachlorophenol	6.709	4.235	7.449	6.103	4.268	4.699	6.274	13.274
Phenanthrene	30	30	33.306	43.225	19.084	33.283	28.054	59.353
Polychlorinated Biphenyls (PCBs)	2.0	0.014	2.220	0.020	1.272	0.016	0.023	0.048
Selenium	20	5	22.204	7.204	12.723	5.547	8.154	17.252
Silver, (free ion)	0.92	N/A	15.130	N/A	8.670	N/A	12.744	26.962
Toxaphene	0.78	0.0002	0.866	0.0003	0.4962	0.0002	0.0003	0.0007
Tributlytin (TBT)	0.13	0.024	0.144	0.035	0.083	0.027	0.039	0.083
2,4,5 Trichlorophenol	136	64	150.988	92.213	86.516	71.004	104.376	220.822
Zinc[d]	42.344	38.21525	174.767	204.695	100.142	157.616	147.208	311.440

HUMAN HEALTH
CALCULATE DAILY AVERAGE AND DAILY MAXIMUM EFFLUENT LIMITATIONS

Parameter	Water and FW Fish (ug/L)	FW Fish Only (ug/L)	WLAh	LTAh	Daily Avg. (ug/L)	Daily Max. (ug/L)
Acrylonitrile	1.28	10.9	21.223	19.738	29.015	61.385
Aldrin	0.00408	0.00426	0.008	0.008	0.011	0.024
Arsenic[d]	50	N/A	N/A	N/A	N/A	N/A
Barium[d]	2000	N/A	N/A	N/A	N/A	N/A
Benzene	5	106	206.393	191.946	282.160	596.952

Parameter	Water and FW Fish (ug/L)	FW Fish Only (ug/L)	WLAh	LTAh	Daily Avg. (ug/L)	Daily Max. (ug/L)
Benzidine	0.00106	0.00347	0.007	0.006	0.009	0.020
Benzo(a)anthracene	0.099	0.810	1.577	1.467	2.156	4.562
Benzo(a)pyrene	0.099	0.810	1.577	1.467	2.156	4.562
Bis(chloromethyl)ether	0.00462	0.0193	0.038	0.035	0.051	0.109
Cadmium[d]	5	N/A	N/A	N/A	N/A	N/A
Carbon Tetrachloride	3.76	8.4	16.356	15.211	22.360	47.306
Chlordane	0.0210	0.0213	0.041	0.039	0.057	0.120
Chlorobenzene	776	1380	2687.008	2498.918	3673.409	7771.634
Chloroform	100	1292	2515.663	2339.566	3439.163	7276.051
Chromium[d]	100	3320	6464.397	6011.889	8837.476	18696.974
Chrysene	0.417	8.1	15.772	14.668	21.561	45.616
Cresols	3313	13116	25538.260	23750.582	34913.356	73864.311
Cyanide (free)	200	N/A	N/A	N/A	N/A	N/A
4,4'-DDD	0.0103	0.010	0.019	0.018	0.027	0.056
4,4'-DDE	0.00730	0.007	0.014	0.013	0.019	0.039
4,4'-DDT	0.00730	0.007	0.014	0.013	0.019	0.039
2,4'-D	70	N/A	N/A	N/A	N/A	N/A
Danitol	0.709	0.721	1.404	1.306	1.919	4.060
Dibromochloromethane	9.20	71.6	139.413	129.654	190.591	403.224
1,2-Dibromoethane	0.014	0.335	0.652	0.607	0.892	1.887
1,3-Dichloropropene (1,3-Dichloropropylene)	22.8	161	313.484	291.540	428.564	906.691
Dieldrin	0.00171	0.002	0.004	0.004	0.005	0.011
p-Dichlorobenzene	75	N/A	N/A	0.000	N/A	N/A
1,2-Dichloroethane	5	73.9	143.891	133.819	196.714	416.177
1,1-Dichloroethylene	1.63	5.84	11.371	10.575	15.545	32.889
Dicofol	0.215	0.217	0.423	0.393	0.578	1.222
Dioxins/Furans (TCDD Equivalents)	1.34e-07	1.40e-07	2.73e-07	2.54e-07	3.73e-07	7.88e-07
Endrin	1.27	1.34	2.609	2.426	3.567	7.546
Fluoride	4000	N/A	N/A	N/A	N/A	N/A
Heptachlor	0.00260	0.00265	0.005	0.005	0.007	0.015
Heptachlor Epoxide	0.159	1.1	2.142	1.992	2.928	6.195
Hexachlorobenzene	0.0194	0.0198	0.039	0.036	0.053	0.112
Hexachlorobutadiene	2.99	3.6	7.010	6.519	9.583	20.274
Hexachlorocyclohexane (alpha)	0.163	0.413	0.804	0.748	1.099	2.326
Hexachlorocyclohexane (beta)	0.570	1.45	2.823	2.626	3.860	8.166
Hexachlorocyclohexane (gamma) (Lindane)	0.2	2.00	3.894	3.622	5.324	11.263
Hexachloroethane	84.2	278	541.296	503.405	740.006	1565.590
Hexachlorophene	0.0531	0.053	0.103	0.096	0.141	0.298
Lead[d]	4.98	25.3	49.262	45.813	67.346	142.480
Mercury	0.0122	0.0122	0.024	0.022	0.032	0.069
Methoxyclor	2.21	2.22	4.323	4.020	5.909	12.502
Methyl Ethyl Ketone	5.29e+04	9.94e+06	1.94e+07	1.80e+07	2.65e+07	5.60e+07
Nitrate-Nitrogen (as Total Nitrogen)	10000	N/A	N/A	N/A	N/A	N/A
Nitrobenzene	37.3	233	453.676	421.919	620.220	1312.167
N-Nitrosodiethylamine	0.0382	7.68	14.954	13.907	20.443	43.251
N-Nitroso-di-*n*-Butylamine	1.84	13.5	26.286	24.446	35.936	76.027
PCB's (Polychlorinated Biphenyls)	1.30e-03	1.30e-03	2.53e-03	2.35e-03	3.46e-03	7.32e-03
Pentachlorobenzene	6.10	6.68	13.007	12.096	17.781	37.619
Pentachlorophenol	1.0	135	262.860	244.459	359.355	760.269
Pyridine	88.1	13333	25960.783	24143.528	35490.986	75086.372

Parameter	Water and FW Fish (ug/L)	FW Fish Only (ug/L)	WLAh	LTAh	Daily Avg. (ug/L)	Daily Max. (ug/L)
Selenium	50	N/A	N/A	N/A	N/A	N/A
1,2,4,5-Tetrachlorobenzene	0.241	0.243	0.473	0.440	0.647	1.368
Tetrachloroethylene	5	323	628.916	584.892	859.791	1819.013
Toxaphene	0.005	0.014	0.027	0.025	0.037	0.079
2,4,5-TP (Silvex)	47.0	50.3	97.940	91.084	133.893	283.270
2,4,5-Trichlorophenol	953	1069	2081.458	1935.756	2845.561	6020.200
Trichloroethylene	5	612	1191.630	1108.216	1629.077	3446.551
1,1,1-Trichloroethane	200	12586	24506.294	22790.853	33502.554	70879.553
TTHM (Sum of Total Trihalomethanes)	100	N/A	N/A	N/A	N/A	N/A
Vinyl Chloride	2	415	808.050	751.486	1104.685	2337.122

CALCULATE 70% AND 85% OF DAILY AVERAGE EFFLUENT LIMITATIONS

Parameter	70%	85%	Effluent
Aquatic Life			
Aldrin	1.964	2.385	
Aluminum	648.705	787.713	
Arsenic	424.414	515.359	
Cadmium	1.938	2.353	
Carbaryl	1.309	1.590	
Chlordane	0.005	0.006	
Chlorpyrifos	0.047	0.057	
Chromium (+3)	437.440	531.177	
Chromium (+6)	10.474	12.718	
Copper	12.284	14.917	
Cyanide (free)	12.204	14.819	
4,4'-DDT	0.001	0.001	
Demeton	0.114	0.139	
Dicofol	22.604	27.448	
Dieldrin	0.002	0.003	
Diuron	79.913	97.037	
Endosulfan (alpha)	0.064	0.078	
Endosulfan (beta)	0.064	0.078	
Endosulfan sulfate	0.064	0.078	
Endrin	0.003	0.003	
Guthion	0.011	0.014	
Heptachlor	0.004	0.005	
Hexachlorocyclohexane (Lindane)	0.091	0.111	
Lead	4.477	5.436	
Malathion	0.011	0.014	
Mercury	1.484	1.802	
Methoxychlor	0.034	0.042	
Mirex	0.001	0.001	
Nickel	160.914	195.396	
Parathion (ethyl)	0.015	0.018	
Pentachlorophenol	4.392	5.333	
Phenanthrene	19.638	23.846	
Polychlorinated Biphenyls (PCBs)	0.016	0.019	
Selenium	5.708	6.931	
Silver, (free ion)	8.921	10.833	
Toxaphene	0.0002	0.0003	
Tributyltin (TBT)	0.027	0.033	

Parameter	**70%**	**85%**	**Effluent**
2,4,5 Trichlorophenol	73.063	88.719	
Zinc	103.046	125.127	
Human Health			
Acrylonitrile	20.310	24.662	
Aldrin	0.008	0.010	
Arsenic	N/A	N/A	
Barium	N/A	N/A	
Benzene	197.512	239.836	
Benzidine	0.006	0.008	
Benzo(a)anthracene	1.509	1.833	
Benzo(a)pyrene	1.509	1.833	
Bis(chloromethyl)ether	0.036	0.044	
Cadmium	N/A	N/A	
Carbon Tetrachloride	15.652	19.006	
Chlordane	0.040	0.048	
Chlorobenzene	2571.386	3122.398	
Chloroform	2407.414	2923.288	
Chromium	6186.234	7511.855	
Chrysene	15.093	18.327	
Cresols	24439.349	29676.352	
Cyanide (free)	N/A	N/A	
4,4'-DDD	0.019	0.023	
4,4'-DDE	0.013	0.016	
4,4'-DDT	0.013	0.016	
4,4'-D	N/A	N/A	
Danitol	1.343	1.631	
Dibromochloromethane	133.414	162.003	
1,2-Dibromoethane	0.624	0.758	
1,3-Dichloropropene (1,3-Dichloropropylene)	299.995	364.280	
Dieldrin	0.004	0.005	
p-Dichlorobenzene	N/A	N/A	
1,2-Dichloroethane	137.700	167.207	
1,1-Dichloroethylene	10.882	13.214	
Dicofol	0.404	0.491	
Dioxins/Furans (TCDD Equivalents)	2.61e-07	3.17e-07	
Endrin	2.497	3.032	
Fluoride	N/A	N/A	
Heptachlor	0.005	0.006	
Heptachlor Epoxide	2.050	2.489	
Hexachlorobenzene	0.037	0.045	
Hexachlorobutadiene	6.708	8.145	
Hexachlorocyclohexane (alpha)	0.770	0.934	
Hexachlorocyclohexane (beta)	2.702	3.281	
Hexachlorocyclohexane (gamma) (Lindane)	3.727	4.525	
Hexachloroethane	518.004	629.005	
Hexachlorophene	0.099	0.120	
Lead	47.142	57.244	
Mercury	0.023	0.028	
Methoxychlor	4.137	5.023	
Methyl Ethyl Ketone	1.85e+07	2.25e+07	
Nitrate-Nitrogen (as Total Nitrogen)	N/A	N/A	

Parameter	70%	85%	Effluent
Nitrobenzene	434.154	527.187	
N-Nitrosodiethylamine	14.310	17.377	
N-Nitroso-di-*n*-Butylamine	25.155	30.545	
PCB's (Polychlorinated Biphenyls)	2.42e-03	2.94e-03	
Pentachlorobenzene	12.447	15.114	
Pentachlorophenol	251.549	305.452	
Pyridine	24843.690	30167.338	
Selenium	N/A	N/A	
1,2,4,5-Tetrachlorobenzene	0.453	0.550	
Tetrachloroethylene	601.853	730.822	
Toxaphene	0.026	0.032	
2,4,5-TP (Silvex)	93.725	113.809	
2,4,5-Trichlorophenol	1991.893	2418.727	
Trichloroethylene	1140.354	1384.715	
1,1,1-Trichloroethane	23451.788	28477.171	
TTHM (Sum of Total Trihalomethanes)	N/A	N/A	
Vinyl Chloride	773.279	938.982	

TEXTOX MENU #3 - PERENNIAL STREAM OR RIVER

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

- Table 1, 1997 Texas Surface Water Quality Standards (30 TAC 307) for Freshwater Aquatic Life
- Table 3, 2000 Texas Surface Water Quality Standards for Human Health
- "Procedures to Implement the Texas Surface Water Quality Standards," Texas Commission on Environmental Quality, January 2003.

PERMITTEE INFORMATION:

Permittee Name:	SJRA RUN #2
TPDES Permit No:	TX0054186
Outfall No:	001
Prepared By:	LEG
Date:	May 1, 2007

DISCHARGE INFORMATION:

Receiving Waterbody:	Spring Creek - PWS & FW Fish
Segment No:	1008
TSS:	13
pH:	6.7
Hardness:	30
Chloride:	53
Effluent Flow for Aquatic Life (MGD)	7.8
Critical Low Flow [7Q2] (cfs)	5.32
Chronic Effluent % for Aquatic Life:	69.40
Acute Effluent % for Aquatic Life:	90.07
Effluent Flow for Human Health (MGD):	7.8
Harmonic Mean Flow (cfs):	29.12
Human Health Effluent %:	29.30
Public Water Supply Use:	Yes

CALCULATE TOTAL/DISSOLVED RATIO:

Stream/River Metal	Intercept (b)	Slope (m)	Partition Coefficient (Kpo)	Dissolved Fraction (Cd/Ct)		Water Effects Ratio (WER)	
Aluminum	N/A	N/A	N/A	1.00	Assumed	1.00	Assumed
Arsenic	5.68	-0.73	73590.432	0.51		1.00	Assumed
Cadmium	6.60	-1.13	219403.733	0.26		1.00	Assumed
Chromium (Total)	6.52	-0.93	304812.436	0.20		1.00	Assumed
Chromium (+3)	6.52	-0.93	304812.436	0.20		1.00	Assumed
Chromium (+6)	N/A	N/A	N/A	1.00	Assumed	1.00	Assumed
Copper	6.02	-0.74	156921.308	0.33		1.00	Assumed
Lead	6.45	-0.80	362114.002	0.18		1.00	Assumed
Mercury	N/A	N/A	N/A	1.00	Assumed	1.00	Assumed
Nickel	5.69	-0.57	113514.748	0.40		1.00	Assumed
Selenium	N/A	N/A	N/A	1.00	Assumed	1.00	Assumed
Silver	6.38	-1.03	170859.192	0.31		1.00	Assumed
Zinc	6.10	-0.70	209044.937	0.27		1.00	Assumed

AQUATIC LIFE

CALCULATE DAILY AVERAGE AND DAILY MAXIMUM EFFLUENT LIMITATIONS

Parameter	Acute Standard (ug/L)	Chronic Standard (ug/L)	WLAa	WLAc	LTAa	LTAc	Daily Avg. (ug/L)	Daily Max. (ug/L)
Aldrin	3.0	N/A	3.331	N/A	1.908	N/A	2.805	5.935
Aluminum[d]	991	N/A	1100.214	N/A	630.423	N/A	926.721	1960.614
Arsenic[d]	360	190	782.033	535.653	448.105	412.452	606.305	1282.727
Cadmium[d]	8.664	0.441	37.053	2.446	21.231	1.883	2.769	5.858
Carbaryl	2.0	N/A	2.220	N/A	1.272	N/A	1.870	3.957
Chlordane	2.4	0.0043	2.664	0.006	1.527	0.005	0.007	0.015
Chlorpyrifos	0.083	0.041	0.092	0.059	0.053	0.045	0.067	0.141
Chromium (+3)[d]	647.799	77.214	3569.027	552.094	2045.052	425.112	624.915	1322.098
Chromium (+6)[d]	16	11	17.763	15.849	10.178	12.204	14.962	31.655
Copper[d]	6.173	4.574	20.834	20.033	11.938	15.426	17.549	37.127
Cyanide (free)	45.78	10.69	50.825	15.402	29.123	11.860	17.434	36.884
4,4'-DDT	1.1	0.001	1.221	0.001	0.700	0.001	0.002	0.003
Dementon	N/A	0.1	N/A	0.144	N/A	0.111	0.163	0.345
Dicofol	59.3	19.8	65.835	28.528	37.724	21.967	32.291	68.317
Dieldrin	2.5	0.0019	2.776	0.003	1.590	0.002	0.003	0.007
Diuron	210	70	233.143	100.858	133.591	77.660	114.161	241.524
Endosulfan (alpha)	0.22	0.056	0.244	0.081	0.140	0.062	0.091	0.193
Endosulfan (beta)	0.22	0.056	0.244	0.081	0.140	0.062	0.091	0.193
Endosulfan sulfate	0.22	0.056	0.244	0.081	0.140	0.062	0.091	0.193
Endrin	0.18	0.0023	0.200	0.003	0.115	0.003	0.004	0.008
Guthion	N/A	0.01	N/A	0.014	N/A	0.011	0.016	0.035
Heptachlor	0.52	0.0038	0.577	0.005	0.331	0.004	0.006	0.013
Hexachlorocyclohexane (Lindane)	2.0	0.08	2.220	0.115	1.272	0.089	0.130	0.276
Lead[d]	17.632	0.687	111.726	5.650	64.019	4.351	6.396	13.531
Malathion	N/A	0.01	N/A	0.014	N/A	0.011	0.016	0.035
Mercury	2.4	1.3	2.664	1.873	1.527	1.442	2.120	4.485
Methoxychlor	N/A	0.03	N/A	0.043	N/A	0.033	0.049	0.104
Mirex	N/A	0.001	N/A	0.001	N/A	0.001	0.002	0.003
Nickel[d]	512.148	56.935	1407.652	203.090	806.585	156.379	229.877	486.339
Parathion (ethyl)	0.065	0.013	0.072	0.019	0.041	0.014	0.021	0.045
Pentachlorophenol	6.709	4.235	7.449	6.103	4.268	4.699	6.274	13.274
Phenanthrene	30	30	33.306	43.225	19.084	33.283	28.054	59.353
Polychlorinated Biphenyls (PCBs)	2.0	0.014	2.220	0.020	1.272	0.016	0.023	0.048
Selenium	20	5	22.204	7.204	12.723	5.547	8.154	17.252
Silver, (free ion)	0.92	N/A	15.130	N/A	8.670	N/A	12.744	26.962
Toxaphene	0.78	0.0002	0.866	0.0003	0.4962	0.0002	0.0003	0.0007
Tributlytin (TBT)	0.13	0.024	0.144	0.035	0.083	0.027	0.039	0.083
2,4,5 Trichlorophenol	136	64	150.988	92.213	86.516	71.004	104.376	220.822
Zinc[d]	42.344	38.21525	174.767	204.695	100.142	157.616	147.208	311.440

HUMAN HEALTH

CALCULATE DAILY AVERAGE AND DAILY MAXIMUM EFFLUENT LIMITATIONS

Parameter	Water and FW Fish (ug/L)	FW Fish Only (ug/L)	WLAh	LTAh	Daily Avg. (ug/L)	Daily Max. (ug/L)
Acrylonitrile	1.28	10.9	4.369	4.063	5.972	12.635
Aldrin	0.00408	0.00426	0.014	0.013	0.019	0.040
Arsenic[d]	50	N/A	333.900	310.527	456.474	965.738
Barium[d]	2000	N/A	6825.856	6348.046	9331.628	19742.423
Benzene	5	106	17.065	15.870	23.329	49.356

Parameter	Water and FW Fish (ug/L)	FW Fish Only (ug/L)	WLAh	LTAh	Daily Avg. (ug/L)	Daily Max. (ug/L)
Benzidine	0.00106	0.00347	0.004	0.003	0.005	0.010
Benzo(a)anthracene	0.099	0.810	0.338	0.314	0.462	0.977
Benzo(a)pyrene	0.099	0.810	0.338	0.314	0.462	0.977
Bis(chloromethyl)ether	0.00462	0.0193	0.016	0.015	0.022	0.046
Cadmium[d]	5	N/A	65.737	61.136	89.869	190.132
Carbon Tetrachloride	3.76	8.4	12.833	11.934	17.543	37.116
Chlordane	0.0210	0.0213	0.072	0.067	0.098	0.207
Chlorobenzene	776	1380	2648.432	2463.042	3620.672	7660.060
Chloroform	100	1292	341.293	317.402	466.581	987.121
Chromium[d]	100	3320	341.293	317.402	466.581	987.121
Chrysene	0.417	8.1	1.423	1.324	1.946	4.116
Cresols	3313	13116	11307.030	10515.538	15457.841	32703.324
Cyanide (free)	200	N/A	682.586	634.805	933.163	1974.242
4,4'-DDD	0.0103	0.010	0.035	0.033	0.048	0.102
4,4'-DDE	0.00730	0.007	0.025	0.023	0.034	0.072
4,4'-DDT	0.00730	0.007	0.025	0.023	0.034	0.072
2,4'-D	70	N/A	238.905	222.182	326.607	690.985
Danitol	0.709	0.721	2.420	2.250	3.308	6.999
Dibromochloromethane	9.20	71.6	31.399	29.201	42.925	90.815
1,2-Dibromoethane	0.014	0.335	0.048	0.044	0.065	0.138
1,3-Dichloropropene (1,3-Dichloropropylene)	22.8	161	77.815	72.368	106.381	225.064
Dieldrin	0.00171	0.002	0.006	0.005	0.008	0.017
p-Dichlorobenzene	75	N/A	255.970	238.052	349.936	740.341
1,2-Dichloroethane	5	73.9	17.065	15.870	23.329	49.356
1,1-Dichloroethylene	1.63	5.84	5.563	5.174	7.605	16.090
Dicofol	0.215	0.217	0.734	0.682	1.003	2.122
Dioxins/Furans (TCDD Equivalents)	1.34e-07	1.40e-07	4.57e-07	4.25e-07	6.25e-07	1.32e-06
Endrin	1.27	1.34	4.334	4.031	5.926	12.536
Fluoride	4000	N/A	13651.712	12696.092	18663.255	39484.847
Heptachlor	0.00260	0.00265	0.009	0.008	0.012	0.026
Heptachlor Epoxide	0.159	1.1	0.543	0.505	0.742	1.570
Hexachlorobenzene	0.0194	0.0198	0.066	0.062	0.091	0.192
Hexachlorobutadiene	2.99	3.6	10.205	9.490	13.951	29.515
Hexachlorocyclohexane (alpha)	0.163	0.413	0.556	0.517	0.761	1.609
Hexachlorocyclohexane (beta)	0.570	1.45	1.945	1.809	2.660	5.627
Hexachlorocyclohexane (gamma) (Lindane)	0.2	2.00	0.683	0.635	0.933	1.974
Hexachloroethane	84.2	278	287.369	267.253	392.862	831.156
Hexachlorophene	0.0531	0.053	0.181	0.169	0.248	0.524
Lead[d]	4.98	25.3	16.996	15.807	23.236	49.159
Mercury	0.0122	0.0122	0.042	0.039	0.057	0.120
Methoxyclor	2.21	2.22	7.543	7.015	10.311	21.815
Methyl Ethyl Ketone	5.29e+04	9.94e+06	1.81e+05	1.68e+05	2.47e+05	5.22e+05
Nitrate-Nitrogen (as Total Nitrogen)	10000	N/A	34129.280	31740.230	46658.139	98712.117
Nitrobenzene	37.3	233	127.302	118.391	174.035	368.196
N-Nitrosodiethylamine	0.0382	7.68	0.130	0.121	0.178	0.377
N-Nitroso-di-*n*-Butylamine	1.84	13.5	6.280	5.840	8.585	18.163
PCB's (Polychlorinated Biphenyls)	1.30e-03	1.30e-03	4.44e-03	4.13e-03	6.07e-03	1.28e-02
Pentachlorobenzene	6.10	6.68	20.819	19.362	28.461	60.214
Pentachlorophenol	1.0	135	3.413	3.174	4.666	9.871
Pyridine	88.1	13333	300.679	279.631	411.058	869.654

Parameter	Water and FW Fish (ug/L)	FW Fish Only (ug/L)	WLAh	LTAh	Daily Avg. (ug/L)	Daily Max. (ug/L)
Selenium	50	N/A	170.646	158.701	233.291	493.561
1,2,4,5-Tetrachlorobenzene	0.241	0.243	0.823	0.765	1.124	2.379
Tetrachloroethylene	5	323	17.065	15.870	23.329	49.356
Toxaphene	0.005	0.014	0.017	0.016	0.023	0.049
2,4,5-TP (Silvex)	47.0	50.3	160.408	149.179	219.293	463.947
2,4,5-Trichlorophenol	953	1069	3252.520	3024.844	4446.521	9407.265
Trichloroethylene	5	612	17.065	15.870	23.329	49.356
1,1,1-Trichloroethane	200	12586	682.586	634.805	933.163	1974.242
TTHM (Sum of Total Trihalomethanes)	100	N/A	341.293	317.402	466.581	987.121
Vinyl Chloride	2	415	6.826	6.348	9.332	19.742

CALCULATE 70% AND 85% OF DAILY AVERAGE EFFLUENT LIMITATIONS

Parameter	70%	85%	Effluent
Aquatic Life			
Aldrin	1.964	2.385	
Aluminum	648.705	787.713	
Arsenic	424.414	515.359	
Cadmium	1.938	2.353	
Carbaryl	1.309	1.590	
Chlordane	0.005	0.006	
Chlorpyrifos	0.047	0.057	
Chromium (+3)	437.440	531.177	
Chromium (+6)	10.474	12.718	
Copper	12.284	14.917	
Cyanide (free)	12.204	14.819	
4,4'-DDT	0.001	0.001	
Demeton	0.114	0.139	
Dicofol	22.604	27.448	
Dieldrin	0.002	0.003	
Diuron	79.913	97.037	
Endosulfan (alpha)	0.064	0.078	
Endosulfan (beta)	0.064	0.078	
Endosulfan sulfate	0.064	0.078	
Endrin	0.003	0.003	
Guthion	0.011	0.014	
Heptachlor	0.004	0.005	
Hexachlorocyclohexane (Lindane)	0.091	0.111	
Lead	4.477	5.436	
Malathion	0.011	0.014	
Mercury	1.484	1.802	
Methoxychlor	0.034	0.042	
Mirex	0.001	0.001	
Nickel	160.914	195.396	
Parathion (ethyl)	0.015	0.018	
Pentachlorophenol	4.392	5.333	
Phenanthrene	19.638	23.846	
Polychlorinated Biphenyls (PCBs)	0.016	0.019	
Selenium	5.708	6.931	
Silver, (free ion)	8.921	10.833	
Toxaphene	0.0002	0.0003	
Tributyltin (TBT)	0.027	0.033	

Parameter	70%	85%	Effluent
2,4,5 Trichlorophenol	73.063	88.719	
Zinc	103.046	125.127	
Human Health			
Acrylonitrile	4.181	5.076	
Aldrin	0.013	0.016	
Arsenic	319.532	388.003	
Barium	6532.139	7931.884	
Benzene	16.330	19.830	
Benzidine	0.003	0.004	
Benzo(a)anthracene	0.323	0.393	
Benzo(a)pyrene	0.323	0.393	
Bis(chloromethyl)ether	0.015	0.018	
Cadmium	62.909	76.389	
Carbon Tetrachloride	12.280	14.912	
Chlordane	0.069	0.083	
Chlorobenzene	2534.470	3077.571	
Chloroform	326.607	396.594	
Chromium	326.607	396.594	
Chrysene	1.362	1.654	
Cresols	10820.489	13139.165	
Cyanide (free)	653.214	793.188	
4,4'-DDD	0.034	0.041	
4,4'-DDE	0.024	0.029	
4,4'-DDT	0.024	0.029	
4,4'-D	228.625	277.616	
Danitol	2.316	2.812	
Dibromochloromethane	30.048	36.487	
1,2-Dibromoethane	0.046	0.056	
1,3-Dichloropropene (1,3-Dichloropropylene)	74.466	90.423	
Dieldrin	0.006	0.007	
p-Dichlorobenzene	244.955	297.446	
1,2-Dichloroethane	16.330	19.830	
1,1-Dichloroethylene	5.324	6.464	
Dicofol	0.702	0.853	
Dioxins/Furans (TCDD Equivalents)	4.38e-07	5.31e-07	
Endrin	4.148	5.037	
Fluoride	13064.279	15863.767	
Heptachlor	0.008	0.010	
Heptachlor Epoxide	0.519	0.631	
Hexachlorobenzene	0.063	0.077	
Hexachlorobutadiene	9.766	11.858	
Hexachlorocyclohexane (alpha)	0.532	0.646	
Hexachlorocyclohexane (beta)	1.862	2.261	
Hexachlorocyclohexane (gamma) (Lindane)	0.653	0.793	
Hexachloroethane	275.003	333.932	
Hexachlorophene	0.173	0.211	
Lead	16.265	19.750	
Mercury	0.040	0.048	
Methoxychlor	7.218	8.765	
Methyl Ethyl Ketone	1.73e+05	2.10e+05	
Nitrate-Nitrogen (as Total Nitrogen)	32660.697	39659.418	

Parameter	70%	85%	Effluent
Nitrobenzene	121.824	147.930	
N-Nitrosodiethylamine	0.125	0.152	
N-Nitroso-di-*n*-Butylamine	6.010	7.297	
PCB's (Polychlorinated Biphenyls)	4.25e-03	5.16e-03	
Pentachlorobenzene	19.923	24.192	
Pentachlorophenol	3.266	3.966	
Pyridine	287.741	349.399	
Selenium	163.303	198.297	
1,2,4,5-Tetrachlorobenzene	0.787	0.956	
Tetrachloroethylene	16.330	19.830	
Toxaphene	0.016	0.020	
2,4,5-TP (Silvex)	153.505	186.399	
2,4,5-Trichlorophenol	3112.564	3779.543	
Trichloroethylene	16.330	19.830	
1,1,1-Trichloroethane	653.214	793.188	
TTHM (Sum of Total Trihalomethanes)	326.607	396.594	
Vinyl Chloride	6.532	7.932	