Exhibit E

SOAH DOCKET NO. 582-04-1194
(TCEQ DOCKET NO. 2003-1213-MWD)

APPLICATION BY	§	**BEFORE THE STATE OFFICE**
SAN JACINTO RIVER AUTHORITY	§	
FOR RENEWAL OF	§	**OF**
TPDES PERMIT NO. 11401-001	§	
	§	**ADMINISTRATIVE HEARINGS**

PROPOSAL FOR DECISION

I. Introduction

The San Jacinto River Authority (SJRA or the Authority) seeks renewal of a permit for a wastewater treatment plant in Montgomery County, Texas.[1] The Executive Director (ED) of the Texas Commission on Environmental Quality (TCEQ or the Commission) has issued a draft permit that includes a whole effluent toxicity (WET) limit. The Authority opposes the inclusion of a WET limit. At the outset of the hearing process, the parties identified the following contested issues:

1. the inclusion in the draft permit of a WET limit;
2. the appropriateness of the critical dilution specified in the draft permit;
3. the appropriateness of the definition of the "No Observable Effects Concentration" (NOEC);
4. the appropriateness of the definition of a "violation" of the WET limitation;
5. the appropriateness of the definition of "passing" a biomonitoring test; and
6. the appropriateness of the chronic biomonitoring requirements in the draft permit that address potential WET limitations for a separate aquatic species than is presently specified.[2]

The primary issue is the first one: the proposed inclusion of a WET limit in the permit. After careful consideration of all the evidence, the Administrative Law Judge (ALJ) recommends that the Commission renew SJRA's permit without the inclusion of a WET limit. The ALJ further recommends that the critical dilution for WET testing in the permit be established at 85%.[3]

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[1] SJRA operates three wastewater treatment plants. SJRA Exhibit 2 at 4 (Adams direct testimony). The facility at issue is the Woodlands Wastewater Treatment Plant No. 1.

[2] It had appeared prior to the hearing that there was a dispute about whether SJRA would be required to perform WET testing at both outfalls. The ED has clarified that SJRA will not be required to perform WET testing at both outfalls; therefore, there is no longer any dispute concerning this issue.

[3] As to the other issues, some were resolved following the hearing; the ALJ's recommendations on the remaining issues are set out in the body of this Proposal for Decision.

II. Background and Procedural History

A. The Permit Application

The history of this permit application is long and involved. The Environmental Protection Agency (EPA) issued a National Pollutant Discharge Elimination System (NPDES) permit for this facility in 1989 (Permit No. TX0054186). In 1991, due to several WET test failures from 1989 through 1991, SJRA initiated a toxicity reduction evaluation (TRE).[4] In 1993, EPA first proposed imposition of a WET limit in the permit because of the earlier test failures.[5] SJRA requested a hearing to contest the inclusion of the WET limit provision, but the matter was not resolved.[6] In 1995, the TCEQ[7] issued the Texas permit that is presently in effect – Permit No. 11401-001.[8] The permit contained no WET limit.

In December 1997, SJRA filed its application for renewal of Permit No. 11401-001.[9] In June and July 1998, SJRA reported WET test failures.[10] In response, the Authority again initiated a TRE.[11]

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[4] SJRA Exhibit 1 at 6 (Adams direct testimony). According to James R. Adams, the present General Manager for the Authority who has been employed there for 15 years, the 1989 through 1991 WET test failures occurred during a period when plant operations were unstable. Mr. Adams testified that the construction of new facilities, coupled with changes in operation and personnel, stabilized the plant. *Id.* At 5-6.

[5] ED Exhibit 11A at 13 (Pfeil direct testimony).

[6] ED Exhibit 11A at 13 (Pfeil direct testimony).

[7] The permit was actually issued by the Texas Natural Resource Conservation Commission, or TNRCC, which was the TCEQ's predecessor agency. For convenience, the ALJ will refer to the TCEQ and its predecessor agencies all as the "Commission" or "TCEQ."

[8] SJRA Exhibit 2.

[9] SJRA Exhibit 1 at 4 (Adams direct testimony).

[10] SJRA Exhibit 1 at 6 (Adams direct testimony); ED Exhibit 11A at 10 (Pfeil direct testimony).

[11] This TRE lasted from September 1998 until May 2001, and did not identify a toxicant. SJRA Exhibit 1 at 6 (Adams direct testimony); ED Exhibit 11A at 13 (Pfeil direct testimony). During the 1998-2001 TRE, SJRA carried out monthly WET testing with no failures. SJRA Exhibit 1 at 6.

The TCEQ was delegated authority to administer the NPDES program in September 1998. In that same month, SJRA split its WET test sample between two laboratories; one reported a pass and one reported a failure.[12]

The ED prepared a draft permit without a WET limit and sent the draft to EPA, which responded by commenting that the permit needed a WET limit. The ED then added a WET limit to the draft permit, and SJRA protested.

In June 2001, the ED approved the closure of the Authority's TRE on the basis of a series of passing WET tests indicating a "cessation of lethality."[13]

In late 2001 EPA agreed to a permit without a WET limit.[14] The Authority's WET test for November 2001 was a failure.[15] In January 2002, SJRA split its WET test sample between two laboratories, and one laboratory reported a pass while the other reported a failure.[16] Also in January 2002, EPA contacted TCEQ staff and again asserted that the permit would need to include a WET limit.[17] TCEQ staff then revised the draft permit to include a WET limit.[18] Following the

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[12] SJRA Exhibit 14.

[13] ED Exhibit 17.

[14] SJRA Exhibit 32.

[15] ED Exhibit 15.

[16] ED Exhibits 16, 17A.

[17] ED Exhibit 6. EPA's determination to require a WET limit was apparently based on the November 2001 testing, before EPA personnel became aware of the January 2002 testing. *Id.*

[18] ED Exhibit 7; ED Exhibit 11A at 23. The draft permit has been updated since 2002. At the hearing, there was some uncertainty about the correct, current version of the draft permit. The ED's Closing Argument includes as an attachment a copy of the most recent iteration of the draft permit. This version of the permit is now admitted in evidence as ED Exhibit 5 and substituted for any prior versions of ED Exhibit 5.

If a WET limit is to be included in a permit, it is standard procedure at the TCEQ for the toxicity team to provide a memo laying out the reasons for including such a provision; however, current TCEQ personnel are unable to locate any such memo in the file. Tr. at 25-28 (Vahora testimony), 33-37 (Klumpp testimony). Further, the agency "Fact Sheet and Technical Summary were apparently not amended to address or clarify the reasons for the inclusion of a WET

presentation of additional information to EPA at a public hearing in October 2002, EPA reiterated its position that a WET limit is appropriate.[19]

At present, SJRA is operating the treatment plant under federal and state permits that do not include WET limits.

B. The SOAH Contested Case

The case was referred to the State Office of Administrative Hearings (SOAH) in November 2003. A preliminary hearing was convened at SOAH's hearings facility in Austin on January 8, 2004. The parties to this case, and their representatives, are:

ED	Kathy H. Brown, Kerrie Qualtrough
SJRA	Lauren Kalisek, Martin C. Rochelle
Public Interest Counsel (OPIC)	Scott A. Humphrey

The hearing on the merits took place February 7 through 9, 2005, in Austin. The parties filed their final written closing arguments on April 20, 2005. On April 29, 2005, SJRA filed a Motion to Strike Portions of the Executive Director's Closing Arguments. The record closed when the ED filed a response to the Authority's motion on May 5, 2005.[20]

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limit in the draft permit. Tr. at 41-46 (Klumpp testimony).

[19] ED Exhibit 18. SJRA had requested a public hearing concerning EPA's objection to the lack of a WET limit in the TCEQ's original draft permit. EPA's rules allow for comment in a public forum by interested persons on draft permits. 40 CFR § 123.44(e). As a result of the hearing, after hearing SJRA's comments, EPA concluded that it would continue to require a WET limit in the permit. ED Exhibit 19A at 9-10 (Jennings direct testimony).

[20] In its motion, SJRA asserts that the ED made a number of arguments in its post-hearing briefing that are unsupported in the evidentiary record. SJRA argues that because the ED had the opportunity to offer rebuttal evidence at the hearing, it is especially unfair now to allow the ED to present new factual assertions and new theories at the closing argument stage. The ED responds that all of is arguments are properly supported by the record.

The ALJ declines to grant SJRA's motion. The ALJ carefully evaluates the parties' arguments on their merits, including the degree to which the arguments are supported by the record. Assertions and theories with little or no evidentiary support are unpersuasive. This PFD sets out in detail the ALJ's analysis of the parties' positions and evidence.

III. Whole Effluent Toxicity Testing and Whole Effluent Toxicity Limits

TCEQ regulations provide that surface waters will not be toxic to aquatic life, and that water in the state shall be maintained to preclude adverse toxic effects on aquatic life.[21] WET testing, also known as biomonitoring,[22] attempts to provide information concerning the aggregate chronic toxic effects of effluent on the receiving stream.[23] The Commission requires facilities to perform routine WET testing if their effluent has a significant potential to cause toxicity in the receiving stream.[24] All domestic wastewater treatment facilities with an average permitted flow of one million gallons per day (MGD) must do WET testing.[25] SJRA's treatment facility in question is presently permitted for an average daily flow not to exceed 6.0 MGDs in the interim phase and not to exceed 7.8 million gallons in the final stage.[26]

The specific requirements for how WET testing is carried out can be found in agency rules, agency implementation procedures (IPs), and in individual facility permits.[27] Chronic

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[21] 30 TEX. ADMIN. CODE § 307.4(d), 307.6(b)(1), (2), & (4). However, the limits on toxicity do not apply at certain very low flow conditions. 30 TEX. ADMIN. CODE § 307.8(a).

[22] WET testing is actually only one form of biomonitoring, but the two terms are often used interchangeably in the NPDES permitting context. ED Exhibit 19A at 4 (Jennings direct testimony).

[23] General discussions of WET testing and limits can be found at: ED Exhibit 11A (Pfeil direct testimony); ED 19A (Jennings direct testimony); SJRA Exhibit 5 (Glass direct testimony). *See also* SJRA Exhibit 34 at 32-35 (Moore direct testimony), where a witness for the Authority takes issue with some of the TCEQ personnel's characterizations of the purposes and value of WET testing.

[24] 30 TEX. ADMIN. CODE § 307.6(e)(2)(A).

[25] ED Exhibit 13 at 101 (*Procedures to Implement the Texas Surface Water Quality Standards*, RG-194, Revised, January 2003).

[26] ED Exhibit 8 at 1.

[27] For the relevant Texas IPs, *see* ED Exhibit 12 at 40-56 (*Implementation of the Texas Natural Resource Conservation Commission Standards Via Permitting*, RG-194, Aug. 1995) and, for the more recent procedures, ED Exhibit 13 and SJRA Exhibit 13 (*Procedures to Implement the Texas Surface Water Quality Standards*, RG-194, Revised, January 2003) at 101-125. TCEQ regulations also refer to a number of EPA guidance documents for appropriate biomonitoring procedures under various circumstances. 30 TEX. ADMIN. CODE § 307.6(e)(2)(c). One of these is *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*, which has been incorporated by reference in the federal and Texas rules. 40 CFR Part 136; 30 TEX. ADMIN. CODE § 307.6(e)(2)(c). An excerpt can be found in the record at SJRA Exhibit 24. Another relevant EPA guidance document can be found at ED Exhibit 27 *(Method Guidance and Recommendations for Whole Effluent Toxicity Testing,*

biomonitoring[28] assesses whether aquatic life will be affected where the effluent is diluted by the receiving stream, outside the initial dilution and mixing zone. Two kinds of effects are observed and recorded in WET testing – lethality (mortality) or sublethality (decline in growth or reproduction). The testing involves exposing certain aquatic organisms to mixtures of effluent and water in five different concentrations (the dilution series), then tracking the survival, reproduction, and growth of the organisms over a series of days – in the case of the tests at issue here, approximately seven days.

The organisms used in the tests at issue here are the *Ceriodaphnia dubia* (water flea) and the *Pimephales promelas* (fathead minnow). The *Ceriodaphnia dubia* is an invertebrate species, while the *Pimephales promelas* is a vertebrate; because invertebrates and vertebrates are sensitive to different compounds, testing both tends to protect a diverse range of organisms, including the organisms up the food chain that consume the species tested. Where *Ceriodaphnia dubia* are used, ten organisms – one organism placed in each of ten beakers – are exposed to each effluent dilution.[29] To ensure the reliability of the test results, all test organisms must be of similar age, parentage, and sensitivity.[30] Every day, deaths are recorded and each organism that is still alive is placed in a beaker with fresh ("renewal") solution. The effluent samples used are 24-hour composite samples, and three samples are used during the course of a 7-day test.

After the first several days of the test, the organisms will begin to reproduce. The numbers of offspring are counted and recorded. The test is terminated when 60% of the surviving organisms in the control samples have produced three broods of offspring.[31]

EPA 821-B-00-004, July 2000).

[28] Facilities are also required to perform acute biomonitoring to assess the toxicity of discharges at the point of entry into the receiving stream. 30 TEX. ADMIN. CODE § 307.6(e)(2)(B); ED Exhibit 11A at 6-7. However, the contested issues in this case involve only chronic biomonitoring.

[29] ED Exhibit 19A at 4 (Jennings direct testimony). There are, in other words, ten "replicates" of each dilution.

[30] ED Exhibit 19A at 4 (Jennings direct testimony).

[31] SJRA Exhibit 5 at 16-18 (Glass direct testimony); SJRA Exhibits 9 and 10.

The "critical dilution" – *one* of the five concentrations – is that ratio of effluent to water, usually expressed as a percentage, that represents the concentration of effluent at the edge of the mixing zone when the highest permitted effluent discharge rate is accompanied by the lowest expected instream flow.[32] The critical dilution and other concentrations used in the testing are specified in a facility's permit. The current applicable critical dilution for SJRA's *Ceriodaphnia dubia* testing is 55%.[33]

In addition to the organisms exposed to five concentrations of effluent mixed with water, the testing employs a control group of organisms exposed to water with no effluent. To determine whether the observed lethal and sublethal effects in the organisms exposed to effluent concentrations are significant, the rates of those effects are compared to the changes observed in the control group. A test failure occurs when this comparison yields a statistically significant difference at the critical dilution.[34] The statistical significance of the difference is determined based on a 95% confidence level – in other words, that there is up to a five percent chance that the degree of difference between the effect at the critical dilution and the control occurred by random chance.[35] The laboratory performing the testing uses a statistical software package to determine whether the testing data demonstrate a statistically significant difference at the critical dilution with a 95% confidence level.

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[32] ED Exhibit 19A at 6 (Jennings direct testimony).

[33] ED Exhibit 4A at 7 (Klumpp direct testimony). Under the current federal permit, however, the critical dilution is 45%. ED Exhibit 19A at 12 (Jennings direct testimony). The disparity is related to changes in flow data and facility design information that occurred during the interval between the issuance of the permits. *Id.*

[34] Most of the testing discussed in this case relates to lethal effects.

[35] The ED's and SJRA's witnesses differ as what the 95% confidence level means. Mr. Pfeil stated that it means that "we are 95% confident that the discharge of effluent tested will result in toxicity in the receiving stream." ED Exhibit 11A at 8-9 (Pfeil direct testimony). In contrast, Dr. Glass and Mr. Moore testified that the 95% confidence level relates to the degree of certainty that there is a true difference between the responses of organisms exposed to the non-toxic control solution and those exposed to the effluent dilutions. SJRA Exhibit 5 at 20 (Glass direct testimony); SJRA Exhibit 34 at 33 (Moore direct testimony). A true difference would imply toxicity. The testimony of Dr. Glass and Mr. Moore is borne out by *EPA's Method Guidance and Recommendations for Whole Effluent Toxicity (WET) Testing*, which states that the "nominal error rate" of .05 is "an intended upper bound on the probability of incorrectly . . . determining that the effluent *is* toxic . . .when in fact . . .the effluent is not toxic." ED Exhibit 27 at 2-1. Even if the effluent is toxic to some degree, whether it causes toxicity in the receiving stream *is* another question.

Another way of expressing a test failure is to say that the "no observed effect concentration" (NOEC) is lower than the critical dilution. The NOEC is the highest concentration of effluent in water at which no significant effect is observed. If significant effects (as compared to the control) are seen at concentrations below the critical dilution, the effluent is deemed too toxic.

The use of a dilution series provides data for the creation of a dose-response (or concentration-response) curve for each test. For most toxicants, higher concentrations would be expected to cause a greater degree of mortality and impairment of growth and reproduction; conversely, lower concentrations of a toxicant would yield a lesser response.[36] In other words, the ideal dose-response curve would be "monotonic."[37] Unexpected dose-response curves could suggest inconclusive or unreliable results; such curves might be "red flags" warranting further investigation.[38] However, EPA guidance indicates that some nonmonotonic dose-response relationships can be valid and acceptable.[39]

Tests are usually required on a quarterly or semi-annual basis.[40] When a facility fails a test with respect to lethality, the facility must re-test. If the re-testing also shows significant lethality at the critical dilution, the facility must perform a TRE,[41] including a toxicity identification evaluation, to try to determine and limit the source of the toxicity.[42]

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[36] ED Exhibit 19A at 7 (Jennings direct testimony).

[37] SJRA Exhibit 5 at 15 (Glass direct testimony).

[38] ED Exhibit 27 at vii, 4-1 through 4-5; SJRA Exhibit 5 at 16 (Glass testimony); Tr. at 296-298 (Jennings testimony).

[39] Tr. 262-269 (Jennings testimony), *citing* ED Exhibit 27.

[40] In the past, tests were routinely required twice a year. More recently, permits have established quarterly testing requirements, which may be reduced to semi-annually after a series of "passing" tests. Tr. at 21 (Vahora testimony).

[41] Sublethal effects, if persistent, can also result in a TRE. ED Exhibit 13 at 106. For a description of the TRE process, *see* SJRA Exhibit 5 at 31-35 (Glass direct testimony).

[42] 30 TEX. ADMIN. CODE § 307.6(e)(2)(D).

TCEQ rules provide:

> As a result of a toxicity reduction evaluation, additional conditions may be established in the permit. Such conditions may include total toxicity limits, chemical specific limits, and/or best management practices designed to reduce or eliminate toxicity.[43]

The corresponding federal rule, which has been incorporated by reference in the TCEQ's rules,[44] states:

> Except as provided in this subparagraph, when the permitting authority determines, using the procedures in paragraph (d)(1)(ii) of this section, toxicity testing data, or other information, *that a discharge causes, has the reasonable potential to cause, or contributes to an in-stream excursion above a narrative criterion* within an applicable State water quality standard, the permit must contain effluent limits for whole effluent toxicity.[45]

The relevant narrative criteria in Texas are the prohibitions on in-stream toxicity established in the TCEQ's rules and discussed above.[46]

When a TRE fails to identify a toxicant or toxicants causing the test failures, the Commission will add a WET limit to the permit.[47] A total toxicity *limit*, or WET limit, is different from a WET

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[43] 30 TEX. ADMIN. CODE § 307.6(e)(2)(D).

[44] 30 TEX. ADMIN. CODE § 305.531.

[45] 40 CFR § 122.44(d)(1)(v). Paragraph (d)(1)(ii) states:

> When determining whether a discharge causes, has the reasonable potential to cause, or contributes to an in-stream excursion above a narrative or numeric criteria within a State water quality standard, the permitting authority shall use procedures which account for existing controls on point and nonpoint sources of pollution, the variability of the pollutant or pollutant parameter in the effluent, the sensitivity of the species to toxicity testing (when evaluating whole effluent toxicity), and where appropriate, the dilution of the effluent in the receiving water.

[46] 30 TEX. ADMIN. CODE § 307.4(d), 307.6(b)(1), (2), & (4).

[47] ED Exhibit 11A at 16 (Pfeil direct testimony). According to TCEQ staff, SJRA's most recent TRE was able to identify a class of toxicant, but could not identify the specific toxicant. *Id* at 17. Witnesses for the Authority dispute the TCEQ's (and EPA's) characterizations of the Authority's TREs. SJRA Exhibit 5 at 60-61, 65-67 (Glass direct testimony); SJRA Exhibit 34 at 36-37 (Moore direct testimony) ("It is true that the TREs failed to identify the cause of toxicity. However, that is because there was no persistent lethality occurring at the time the TREs were conducted. It is impossible to identify a toxicant if there is no toxicity.")

testing requirement. Where a permit includes only a testing requirement, a test failure might trigger a TRE requirement, as has already happened with SJRA's plant. A WET limit means that a test failure is a violation of the permit that can subject the permit holder to an enforcement action for penalties and other relief. WET testing requirements are extremely common in water quality permits; WET limits are not so common.[48]

Sometimes TREs are terminated based on a "cessation of lethality" – meaning that there have been 12 consecutive months with no test failures for lethality. The recurrence of persistent significant lethality can trigger a WET limit.[49]

The draft permit proposed by the ED includes language that would require SJRA to comply with an NOEC effluent limitation of 85% for *Ceriodaphnia dubia* within three years of the permit issue date.[50] In other words, the draft permit would establish the critical dilution as 85%, and any test showing the NOEC to be below the 85% concentration level would constitute a permit violation. The permit specifies that testing would be done on a quarterly basis. Following a test failure, testing frequency would increase to monthly. If monthly testing resulted in no failures for three consecutive months, testing frequency would return to quarterly. On the other hand, if one or more of the monthly tests resulted in a failure, SJRA would be referred for enforcement.[51]

IV. The Relationship Between State and Federal Regulation

In 1998, EPA delegated to Texas authority to administer the NPDES permitting program. As noted above, Texas has its own regulations concerning WET testing and WET limits, but has also

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[48] ED Exhibit 4A at 6 (Klumpp direct testimony); ED Exhibit 19A at 7, 8 (Jennings direct testimony).

[49] ED Exhibit 13 at 112.

[50] ED Exhibit 5 at 2a. The permit would require testing with both the *Pimephales promelas* and the *Ceriodaphnia dubia*, but the WET limit would only apply to the *Ceriodaphnia dubia* because the WET test failures at issue have all related to that organism.

[51] ED Exhibit 5 at 28. The draft permit would also prescribe the circumstances under which a requirement to perform a new TRE would be triggered based on fathead minnow test results. *Id.* at 32.

incorporated by reference the relevant federal regulations. The relationship and interaction between the state and federal authorities concerning individual permitting matters is governed by a memorandum of agreement (MOA) between the TCEQ and EPA.[52] A permit now issued to SJRA by the state but under federal authorization and in compliance with the terms of the MOA would be a Texas Pollutant Discharge Elimination System (TPDES) permit.[53] The MOA provides that EPA can review draft permits prepared by the ED for dischargers with permitted daily average flows greater than 1.0 MGD,[54] such as SJRA. EPA may comment on the draft permit and make objections.[55] If EPA's objections are not resolved, EPA takes over the issuance of the federal permit. Under such circumstances, the TCEQ would continue to administer its state permitting program with respect to the facility.[56]

The MOA further provides that once a permittee has been allowed to stop TRE activities on the basis of a cessation of lethality, any recurrence of lethality will trigger a permit modification to include a WET limit and a compliance period.[57]

V. Burden of Proof

The parties to this case disagreed concerning who should properly bear the burden of proof. The ALJ assigned the burden of proof to the ED with the following explanation:

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[52] ED Exhibit 10, *Memorandum of Agreement Between the Texas Natural Resource Conservation Commission and the U.S. Environmental Protection Agency, Region 6 Concerning the National Pollutant Discharge Elimination System, Chapter I* (May 5, 1998). *See also* ED Exhibit 9A at 4-5 (Vahora direct testimony).

[53] ED Exhibit 19A at 3 (Jennings direct testimony).

[54] ED Exhibit 10 at 27.

[55] ED Exhibit 10 at 29-30. The MOA also establishes a time frame of 45 days after receipt of the draft permit for EPA to submit to the TCEQ any written comments, objections, or recommendations. *Id.*

[56] *See* ED Exhibit 19A at 25-27 (Jennings direct testimony). The EPA representative who testified at the hearing in this case opined that, given SJRA's WET testing history, a WET limit is required by federal law. *Id.*

[57] ED Exhibit 10 at 24.

The rules of the Texas Commission on Environmental Quality (Commission) provide that the burden of proof is on the moving party, with several exceptions not applicable here.[58] The ALJ is not persuaded by the ED's argument that SJRA is the moving party because it asked for a hearing; as SJRA points out, protesting parties routinely ask for hearings in permitting matters but do not carry the burden of proof. Were this an initial application for a permit, SJRA might indeed be the moving party. However, this conflict has arisen in the context of a renewal application. The Commission's rules provide that during the renewal process the ED may amend permits for good cause.[59] The requirement of good cause strongly suggests that the ED bears the burden of justifying the provisions [he] seeks to add to SJRA's permit. Even in the absence of a rule establishing such a good cause requirement, it would make sense that the ED should be compelled to demonstrate the reasonableness of provisions [he] seeks to add to an existing permit. The ALJ therefore concludes that under the circumstances of this case the ED is the "moving party" and bears the burden of proof with respect to permit changes [he] has proposed.[60]

VI. The Appropriateness of Including a WET Limit in SJRA's Permit

With respect to the primary issue in this case – the appropriateness of the inclusion of a WET limit in SJRA's permit – the ED must prove that discharges from SJRA's facility cause, have the reasonable potential to cause, or contribute to instream toxicity to aquatic life.[61]

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[58] 30 TEX. ADMIN. CODE § 80.17.

[59] 30 TEX. ADMIN. CODE §§ 305.62(d), 305.63(a)(6).

[60] Order No. 3, issued March 29, 2004.

[61] 40 CFR § 122.44(d)(1)(v); 30 TEX. ADMIN. CODE § 305.531.

A. The Basis of the ED's Position

Both the TCEQ and EPA have determined that SJRA's WET testing history[62] demonstrates that the facility's effluent has the reasonable potential to cause toxicity. The ED relies primarily on the following events as the basis for including a WET limit in the permit:[63]

- June 1998 – testing showed significant lethality for *Ceriodaphnia dubia*;
- July 1998 – testing showed significant lethality for *Ceriodaphnia dubia*;
- September 1998 – testing showed significant lethality for *Ceriodaphnia dubia*;[64]
- failure of SJRA's TRE activities to identify a toxicant;[65]
- November 2001 – testing showed significant lethality for *Ceriodaphnia dubia*;[66]
- January 2002 – testing showed significant lethality for *Ceriodaphnia dubia*;[67] and
- a number of test failures for sublethality.

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[62] There are several charts in the record that relate to SJRA's history of WET test results. ED Exhibit 22, prepared by SJRA, covers October 1989 through September 2002. However, SJRA contends that the chart is an early draft that contains errors. Tr. at 161-164 (Moore testimony). ED Exhibit 23 is a chart of test failures prepared by the ED. Of the tests showing significant sublethal effects, 18 were for *Ceriodaphnia dubia*, and 13 of those tests were not associated with a corresponding failure for lethality. Tr. at 252-253 (Pfeil testimony). SJRA Exhibit 14 shows failures for lethality from 1998 through 2002.

[63] *See* SJRA Exhibit 14 (summary of SJRA's WET testing results for lethality in *Ceriodaphnia dubia*).

[64] The test results from June, July, and September 1998 are at ED Exhibit 14. In September 1998, split samples sent to two labs resulted in differing results, a fact that, according to TCEQ personnel in 2001 "cast doubts on the validity of these test results." SJRA Exhibit 5 at 51 (Glass direct testimony); ED Exhibit 17.

[65] The Authority maintains that the early test failures that led to the first TRE were fully rectified by plant design changes and significant personnel and operational changes, as evidenced by the fact that it was well over six years before significant lethality at the critical dilution was exhibited. SJRA Exhibit 5 at 61 (Glass direct testimony).

[66] ED Exhibit 15. In his direct testimony Mr. Jennings provides explanations of the various components of the lab report concerning the November 2001 testing. ED Exhibit 19A at 12-13 (Jennings direct testimony).

[67] ED Exhibit 16.

Michael Pfeil, an aquatic toxicologist with the Commission, testified that SJRA's WET testing results, TRE reports, and agency memos and correspondence together indicate that SJRA's discharge causes, has the reasonable potential to cause, or contributes to instream toxicity, and he believes that a WET limit should be added to SJRA's permit.[68] Mr. Pfeil testified:

> SJRA's discharge has the reasonable potential to cause or contribute to an exceedance of the [Texas water quality standards] because of the past demonstrations of toxicity, both lethal and sublethal. SJRA's biomonitoring test results and SJRA's TREs were unsuccessful at identifying and confirming the toxin. SJRA's most recent TRE was able to narrow the biomonitoring test failures to a class of toxicant but not identify the toxicant itself[69]. . . Sublethal failures continue to affirm the assessment that one or more toxicants is still present in SJRA's effluent. Finally, I learned that SJRA documented a fish kill below their outfall (but not above it) which corresponded with a strangely colored effluent during a review of SJRA's files.[70] This, in turn, correlated with a failing test.[71]

Mr. Pfeil further noted that in 2001 the TCEQ had allowed SJRA to halt the second TRE based on a finding of cessation of lethality, but in a letter dated June 15, 2001, Faith Hambleton of the TCEQ informed SJRA that its permit would be amended to include language stating, "If the

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[68] ED Exhibit 11A at 9-14 (Pfeil direct testimony).

[69] SJRA disputes that the TRE yielded information identifying a class of toxicant. SJRA Exhibit 5 at 51-54 (Glass direct testimony).

[70] The Authority asserts that there was indeed a strangely colored *influent*, but there is no evidence that the effluent bore an unusual color. SJRA Exhibit 5 at 60 (Glass direct testimony).

[71] ED Exhibit 11A at 17 (Pfeil direct testimony). Joel Klumpp, Permit Coordinator on the Municipal Permits Team in the Wastewater Permitting Section of the Commission's Water Quality Division, also testified for the ED. Mr. Klumpp was asked why, according to the ED's Statement of Basis/Technical Summary, a WET limit was added to the draft permit. Mr. Klumpp responded by citing to language in that document that talked about survival failures in SJRA's 7-day Ceriodaphnia dubia tests in September 1991, October 1991, June 1998, July 1998, August 1998, and September 1998, as well as10 reproductive test failures. ED Exhibit 4A at 9 (Klumpp direct testimony). However, while Mr. Klumpp cited to the ED's Statement of Basis/Technical Summary for the basis of his statements, the version of that document in evidence does not contain the text Mr. Klumpp described. *See* ED Exhibit 8. Mr. Klumpp testified on cross-examination that his testimony was based on the more detailed "Fact Sheet," which is not in evidence. Tr. at 42. However, the Fact Sheet on which he based his testimony pre-dated the agency's decision to add a WET limit, and Mr. Klumpp testified that the document was not subsequently revised by agency personnel to reflect the underlying rationale for the decision to impose a WET limit. It appears that the language to which he cited may have related to a WET testing requirement, but not to a proposed WET limit. Tr. at 42-46. SJRA takes issue with Mr. Klumpp's list of test failures. *See* SJRA Exhibit 5 at 70-71 (Glass direct testimony). For all these reasons, the ALJ concludes that the Technical Summary and Fact Sheet, and Mr. Klumpp's testimony citing to them, are not helpful in explaining why the agency seeks to impose a WET limit.

effluent again demonstrates significant lethality to the same species, then this permit will be amended to add a WET limit with a compliance period, if appropriate."[72] According to Mr. Pfeil, this statement meant that another test failure would trigger the imposition of a WET limit, and this procedure is specified by the interagency MOA.[73] He also clarified that WET testing records reveal numerous sublethal failures in SJRA's biomonitoring results and that such failures, while not sufficient by themselves to justify the addition of a WET limit, substantiate the presence of some toxicant in the facility's effluent.[74] According to Mr. Pfeil, a WET limit provides inducement – in the form of the threat of an enforcement action for test failures – for a permittee to identify and rectify a toxicity problem.[75]

Numerous studies, stated Mr. Pfeil, have indicated that biomonitoring is a reliable indicator of toxicity in the receiving stream, and in terms of reliability it compares favorably with chemical analytical methods.[76]

Phillip Jennings, an Environmental Scientist working as the WET Coordinator in the NPDES Permits Branch of the Water Quality Protection Division at the EPA Region 6 office in Dallas, testified that the November 2001 and January 2002 test results indicate that SJRA's discharge has

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[72] ED Exhibit 11A at 13 (Pfeil direct testimony), *citing* ED Exhibit 17. The Authority asserts it was never given the chance to comment on a version of the draft permit incorporating the language referred to by Ms. Hambleton. SJRA Exhibit 5 at 63 (Glass direct testimony).

[73] ED Exhibit 11A at 17-18 (Pfeil direct testimony). Mr. Pfeil further stated that the cessation of lethality provision was "wrongfully invoked," but he did not elaborate on what he meant by that comment. *Id.* at 17. The Authority notes that the IPs make clear that the cessation of lethality option is designed to address circumstances in which operational errors, upsets, spills, or sampling errors triggered the TRE, and, according to the Authority, the 1998 test failures triggering the TRE resulted from a short-lived condition like a spill or from a sampling error. SJRA Exhibit 5 at 56-57 (Glass direct testimony).

[74] ED Exhibit 11A at 14 (Pfeil direct testimony). Mr. Pfeil stated there were approximately 13 sublethal failures for *Ceriodaphnia dubia*. Tr. at 205, 252-253 (Pfeil testimony). The Authority takes issue with the use of the expression "sublethal failures," and instead prefers "sublethal effects." Tr. at 431-432 (Glass testimony).

[75] ED Exhibit 11A at 15 (Pfeil direct testimony).

[76] ED Exhibit 11A at 9 (Pfeil direct testimony).

significant lethal effects, and that despite considerable evaluation of the evidence he cannot find reason to doubt the veracity of the testing data.[77] He stated:

> [T]his facility has demonstrated lethal (and sub-lethal) effects at the low flow effluent dilution. The occurrence of these effects was significantly greater than in the individual test controls. In addition, the facility did not identify and confirm the source(s) of toxicity. Based on this information, EPA Region 6 determined that potential for toxicity exists, and that WET limits are appropriate and are a required permit condition for this facility.
>
> Based on the data and information available, including data submitted by the permittee under signature, it is my professional opinion that neither EPA, TCEQ nor the permittee can demonstrate that the effluent discharged from this facility does not have the reasonable potential to cause or contribute to an exceedance of the TCEQ narrative criterion for protection of aquatic life. Further, based on the data submitted, it is reasonable to expect that the effluent discharged from this facility is, at least intermittently, acutely toxic, and on a more frequent basis, chronically toxic.[78]

Mr. Jennings went on to testify that since 1991 Region 6 has required a TRE to be performed when two out of three tests in a 90-day period show significant lethality and a 28-month TRE fails to identify the toxicant(s) responsible for the lethality.[79] Further, Region 6 considers one TRE to be sufficient, and does not usually sanction two TREs prior to the imposition of a WET limit.[80] That SJRA has performed two unsuccessful TREs and had toxic events subsequent to the termination of the second TRE would mandate a WET limit under Region 6 policy. Moreover, according to Mr. Jennings, EPA's national position is even stricter than that of Region 6; the national position

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[77] ED Exhibit 19A at 12, 23 (Jennings direct testimony). Mr. Jennings noted that the November 2001 test was a pass for the EPA critical dilution of 45% but a failure for the TCEQ critical dilution of 55%. Based on current data, EPA is recommending a critical dilution of 85%. *Id* at 24.

[78] ED Exhibit 19A at 18 (Jennings direct testimony). The intermittent acute toxicity to which Mr. Jennings alluded refers to lethality occurring over a short period of time as evidenced in the context of a 7-day *chronic* toxicity test, which employs several samples collected on different days. *Id.* at 19; Pre-hearing Conference Tr. at 6-9.

[79] ED Exhibit 19A at 22 (Jennings direct testimony).

[80] ED Exhibit 19A at 22 (Jennings direct testimony). A witness for the Authority took issue with this statement by Mr. Jennings, countering:

> SJRA performed one TRE in 1991 during the same time substantial operational changes and modifications were being made to the plant. Therefore, that TRE is no longer representative of current treatment plant conditions. Only the TRE done in 1998 should be considered when evaluating the effluent quality presently being produced by SJRA.

SJRA Exhibit 34 at 43 (Moore direct testimony).

is that a single demonstration of toxicity at the critical dilution, for lethal or sublethal effects, provides sufficient evidence that reasonable potential exists to justify imposition of a WET limit.[81] EPA's policy is that WET testing is of adequate reliability to form an independent and sufficient basis for the requirement of a WET limit.[82] At least 73 facilities in Texas have WET limits.[83]

Mr. Jennings noted that a 1995 workshop on WET testing, comprised of participants from the regulated community, academia, and government, concluded that WET testing is an effective tool for predicting instream effects.[84] The workshop participants concluded that appropriate considerations of exposure should be considered, that further laboratory to field validation is not essential for the continued use of WET testing, that difficulties can be avoided if testers adhere to guidance protocols, and that variability associated with toxicity tests, exposure, and receiving stream responses should be taken into account in extrapolating WET test results to receiving stream impacts.[85] Like Mr. Pfeil, Mr. Jennings stated that EPA considers WET test precision as comparable to that of widely-used chemical analysis measurements.[86]

B. SJRA's Challenges and the ED's Rebuttal Evidence

SJRA does not dispute that laboratories in its hire reported the 1998, 2001, and 2002 WET test failures, nor does it dispute that it has not identified a toxicant in the facility's effluent. However, SJRA asserts that the ED has failed to prove the necessary "reasonable potential" for toxicity that mandates a WET limit under the applicable regulations. SJRA argues that WET testing in general is not as dependable a predictor of actual instream toxicity as the TCEQ and EPA

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[81] ED Exhibit 19A at 22 (Jennings direct testimony).

[82] ED Exhibit 19A at 24 (Jennings direct testimony).

[83] ED Exhibit 19A at 25 (Jennings direct testimony). Thirty-seven of them are municipal facilities. *Id.* According to SJRA, this is a very small fraction – about 1.5% – of all municipal facilities in the state. SJRA Exhibit 5 at 70 (Glass direct testimony).

[84] Tr. at 288 (Jennings testimony), *citing* SJRA Exhibit 12 at 69965-69966.

[85] ED Exhibit 19A at 8-9 (Jennings direct testimony).

[86] ED Exhibit 19A at 14 (Jennings direct testimony).

witnesses believe it is, and that the Authority's test failures are well within the expected false positive rate.[87] SJRA further notes that prior to the November 2001 and January 2002 test failures, both the TCEQ and EPA were prepared to issue a permit without a WET limit, and SJRA argues that those two tests in particular bear signs of unreliability. SJRA contends that the TCEQ, in deciding to impose a WET limit, did not follow its own procedures. Finally, SJRA argues that it has done all it can to study the toxicity issue and the imposition of a WET limit will not, therefore, result in any improvement in the quality of the receiving stream.

1. The Reliability of WET Testing

Mr. Timothy Moore, an environmental consultant based in Tennessee and called by SJRA as a witness, stated that because the WET testing required of permittees employs statistical analysis with a 95% confidence level, there is a five percent probability that any given test failure is not a true failure, but a "statistical fluke."[88] Mr. Moore stated that for every 100 tests done, it is likely that approximately five will be "failures" even if the effluent is not toxic.[89] He described a study he has performed in which he has sent nontoxic material, labeled and shipped as if it were effluent, to labs for WET testing. According to Mr. Moore, the study shows that there can be many false test failures.[90] Another study yielded an even greater false failure rate; the water samples submitted had been altered to have hardness, alkalinity, and conductivity similar to the nature of freshwater in western states.[91] Mr. Moore stated that variations in these characteristics can cause biological stress in the test organisms.[92]

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[87] SJRA does not contend that WET testing should never be used for any purpose. The Authority offered testimony that its 1998 WET test failures, although questionable in some specifics, were appropriately used as the trigger for a TRE, especially in light of two concurrent events: an unusual color in the treatment plant's influent and the appearance of some dead fish in the receiving stream. SJRA Exhibit 5 at 38-40 (Glass direct testimony). The Authority's emphasis is on the question of the validity of the particular tests triggering the WET limit provision. *See* Tr. at 157-160 (Moore testimony).

[88] SJRA Exhibit 34 at 8 (Moore direct testimony).

[89] SJRA Exhibit 34 at 8 (Moore direct testimony).

[90] SJRA Exhibit 34 at 8-9 (Moore direct testimony), *citing* SJRA Exhibit 36.

[91] SJRA Exhibit 34 at 10 (Moore direct testimony).

[92] SJRA Exhibit 34 at 10 (Moore direct testimony).

Further, Mr. Moore testified that EPA states the error band for any particular WET test is "plus or minus 100%." This means that if the true NOEC for an effluent sample is 86%, a test result showing the NOEC to be anywhere from 43% to over 100% would be within acceptable performance parameters.[93] EPA's own audits of laboratories have demonstrated considerable variability in the NOEC values reported by different labs for effluent samples with a pre-determined, uniform NOEC; while the average of all the reported results was very close to the actual NOEC, the individual results varied widely.[94]

Furthermore, Mr. Moore emphasizes that, even according to EPA, WET testing was developed as a screening tool to provide early warning of potential environmental effects, but the agency has been unable to demonstrate a qualitative correlation between WET test results and actual instream conditions.[95] Therefore, Mr. Moore suggests, EPA has acknowledged that expanding the use of WET testing beyond its role as a screening step, and turning it into a trigger for enforcement, can be problematic.[96] Mr. Moore agreed with Messrs. Pfeil and Jennings that the accuracy of WET testing may be comparable to that of commonly employed chemical analyses, but Mr. Moore went on to say that the results of chemical methods can be independently corroborated, while WET testing results cannot.[97]

Specifically with respect to SJRA's history of WET testing, Mr. Moore stated between November 1991 and November 2004, SJRA performed approximately 129 chronic WET tests with *Ceriodaphnia dubia*. Five of these tests, or four percent, failed the test with respect to lethality; according to Mr. Moore, this failure rate is within the expected statistical error rate.[98] He cited EPA

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[93] SJRA Exhibit 34 at 11 (Moore direct testimony).

[94] SJRA Exhibit 34 at 12-14 (Moore direct testimony).

[95] SJRA Exhibit 34 at 34-35 (Moore direct testimony), *citing* SJRA Exhibit 45.

[96] *Id.*

[97] SJRA Exhibit 34 at 36 (Moore direct testimony).

[98] SJRA Exhibit 34 at 15 (Moore direct testimony).

guidance documents that indicated analytical variability should not be mistaken for true changes in effluent quality.[99] With dischargers like SJRA, who have performed extremely large numbers of WET tests over the years, it is nearly certain that some false failures will be reported due to the analytical variability – in other words, the statistical imperfection – of the testing.[100] Mr. Moore put it this way: "[I]t is a mathematical impossibility to pass the test 100% of the time when a large number of tests are performed over a long period of time. . . So, in the long run, everybody is guilty under this system."[101]

According to Mr. Moore, to distinguish true failures indicating significant toxicity from false failures, several factors must be examined.[102] First is the pattern of the test failures. If a discharger experiences a long series of passes interrupted by an isolated failure, this pattern could be an indication that the failure was just a reflection of analytical variability. Further, if split samples produce varying results, a test failure would be suspect. Finally, if an examination revealed anomalies or irregularities in the testing procedures, these might be indications that a test failure was not a true test failure. His view is that if a discharger like SJRA usually has nontoxic effluent and only a few failures for lethality over many tests, the available information – such as the dose-response curves and the laboratory bench sheets – should be closely scrutinized to see if the failures are accounted for by something other than toxicity.[103]

Peggy Glass, Ph.D., a chemist testifying on behalf of SJRA,[104] stated that WET testing *may* indicate that a facility's effluent can have a toxic effect on aquatic life in the receiving stream, but is not conclusive proof of toxicity in violation of the narrative prohibitions on toxicity in the TCEQ's

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[99] SJRA Exhibit 34 at 16-17 (Moore direct testimony).

[100] SJRA Exhibit 34 at 17 (Moore direct testimony).

[101] SJRA Exhibit 34 at 40-41 (Moore direct testimony).

[102] SJRA Exhibit 34 at 18 (Moore direct testimony).

[103] Tr. at 441 (Moore testimony).

[104] Dr. Glass has worked on behalf of SJRA since 1993. SJRA Exhibit 5 at 9-10 (Glass direct testimony).

rules.[105] She cited examples of circumstances under which there could be a test failure but no adverse effect on instream aquatic organisms: the test was performed improperly, the failure resulted from inherent uncertainty in the statistical method used, the actual instream concentration of effluent was lower than the critical dilution because the critical dilution assumes very low flow conditions and also assumes the maximum permitted effluent discharge rate,[106] and there were substances in the receiving water that reduced the toxicity of the effluent.[107] A WET test failure does not necessarily mean that there has been an exceedance of a water quality narrative standard for aquatic life protection.[108] Dr. Glass stressed the limitations of WET testing, saying:

> WET tests do not identify or measure a particular chemical constituent in the effluent, only biological responses to the effluent. Therefore, the results are subject to all of the vagaries and variables capable of impacting any living biological system.[109]

Indeed, SJRA disputes or raises questions about the reliability of all the relevant WET testing – in 1998, 2001, and 2002 – involved in this case.

Mr. Pfeil disagreed with Mr. Moore's suggestion that even perfect effluent will fail about 5% of the time. According to Mr. Pfeil, the 5% false positive rate represents an upper limit, and in fact the false positive rate can approach zero.[110] He pointed to two other entities that have performed multiple WET tests over a number of years. TCEQ data compilations reflect that the City of

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[105] SJRA Exhibit 5 at 24 (Glass direct testimony). Mr. Moore made a similar statement: "Biomonitoring only assesses the effect a discharge may have on biota in the receiving water under worst case low flow assumptions that occur during droughts." SJRA Exhibit 34 at 32 (Moore direct testimony).

[106] Dr. Glass stated that most municipal wastewater treatment plants tend to operate at 50% to 75% of their permitted capacity, and therefore a facility will typically discharge at its maximum permitted rate only when there is substantial infiltration and inflow, conditions that occur only when there is rainfall that also affects the instream flow rate and dilutes the effluent. SJRA Exhibit 5 at 25 (Glass direct testimony). Mr. Jennings pointed out, however, that if the effluent is toxic at concentrations less than the critical dilution, the low flow/high discharge rate condition would not be necessary in order for the effluent to be toxic in the receiving stream. Tr. at 315-317 (Jennings testimony).

[107] SJRA Exhibit 5 at 24-26 (Glass direct testimony).

[108] SJRA Exhibit 5 at 69-70 (Glass direct testimony).

[109] SJRA Exhibit 5 at 26-27 (Glass direct testimony).

[110] Tr. at 228-229 (Pfeil testimony).

San Marcos has done 118 tests over five years and never reported a single lethal or sublethal failure.[111] Formosa Plastics performed 49 WET tests from 2000 through 2004 and reported no failures for lethality (although they reported four failures for sublethality).[112] He also testified that recently issued permits provide that even if the WET test analysis finds a statistically significant difference in lethal effects at the critical dilution, the test will not be considered a failure if survival at the critical dilution and all dilutions below it is at least 80 percent. According to Mr. Pfeil, this language, which appears in the draft SJRA permit at section 2.b(1), will cause the false positive rate to approach zero.[113]

In response to the testimony of Mr. Moore and Dr. Glass concerning the reliability of WET testing, Mr. Jennings noted that analytical variability encompasses both false failures as well as false passes, although he acknowledged that the potential for false passes (false negatives) does not mean that it is inappropriate to consider the possibility of false failures (false positives).[114] He testified that the isolated nature of a test failure that occurs in the middle of a series of test "passes" does not suggest that the result is suspect; intermittent or episodic toxicity sometimes occurs. He cited to an example – a treatment plant with effluent occasionally toxic to *Ceriodaphnia dubia* due to the periodic dumping of salt by an aquarium supply business.[115] He stated that it sometimes takes a while for an investigation to identify the source of the toxicity.[116] Mr. Jennings also emphasized that EPA typically requires re-testing before taking any action based on a WET test failure.[117]

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[111] Tr. at 229-232 (Pfeil testimony), *citing* ED Exhibit 25.

[112] Tr. at 232-233, 240-241 (Pfeil testimony). SJRA questions the accuracy of the TCEQ database from which Mr. Pfeil gathered the San Marcos and Formosa Plastics numbers, since SJRA asserts that the same TCEQ database has errors in the information concerning SJRA's biomonitoring history. Tr. at 428-429 (Glass testimony).

[113] Tr. at 243, 247-250, 253-254 (Pfeil testimony).

[114] Tr. at 286-288 (Jennings testimony), *citing* ED Exhibit 20 [*Edison Electric Institute v. EPA*, No. 96-1062 (D.C. Cir. Dec. 10, 2004)].

[115] Tr. at 292-294 (Jennings testimony).

[116] Tr. at 293-294 (Jennings testimony).

[117] Tr. at 328-329 (Jennings testimony).

Mr. Moore testified false negatives (false passing) associated with WET testing for lethality in *Ceriodaphnia dubia* is very low, although false negatives occur at a more significant rate concerning sublethal effects.[118] In other words, according to Mr. Moore, it is very unlikely that a WET test for lethality will show no significant effects when the effluent is, in fact, toxic. As to San Marcos and Formosa Plastics histories, Mr. Moore testified that their "passing" tests still may have included incorrect or false detections of toxicity, but such incorrect detections would show up as passing tests if they only appeared to cause effects at effluent concentrations higher than the critical dilutions specified in the permits.[119] He further stated, "My expectation is that on average an effluent that is nontoxic will appear to be toxic approximately 5 percent of the time over the long run. Any specific group of 64 may or may not have a failure in it. SJRA's effluent went six or seven years with no failures in it at that time."[120]

Finally, concerning the new language in the Texas permits that will count as a "pass" any test in which the survival for all concentrations at and below the critical dilution is not less than 80 per cent, Mr. Moore testified that this language may affect the false positive rate for some WET tests (such as fathead minnow test that uses 40 organisms per replicate), but not for the *Ceriodaphnia dubia* survival test as it is commonly performed. This is because, according to Mr. Moore, the difference between 100 percent versus 80 percent survival will never result in a statistically significant difference in this test.[121]

2. SJRA's November 2001 Testing

In November 2001, the lab used by the Authority, PBS&J, reported a pass for *Ceriodaphnia dubia* survival at the EPA critical dilution of 45%, but a failure at the TCEQ critical dilution of 55%. The reported NOEC for survival was 45%.[122]

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[118] Tr. at 458-459 (Moore testimony).

[119] Tr. at 461-465 (Moore testimony).

[120] Tr. at 466 (Moore testimony).

[121] Tr. at 468-471 (Moore testimony).

[122] ED Exhibit 15.

Dr. Glass testified that she believed the most serious problem with the November 2001 test was the failure of the lab to terminate the test after 60% of the water fleas in the control had their third brood.[123] Mr. Moore also testified that this apparent breach of the testing protocol – in which the lab apparently miscounted the number of broods that had been produced by Day 6 – calls into question the results of the test.[124] Dr. Glass and Mr. Moore agreed that had the test been terminated at that point, it would have been declared invalid. The permit sets out performance criteria for WET testing, one of which relates to the required minimum average number of neonates in the control samples, based on the number of surviving females; had the November 2001 test been terminated on Day 6 when 80% of females in the control had three broods, the average number of neonates would have been too low.[125]

Dr. Glass further expressed concerns about the health of the organisms used in both the November 2001 and January 2002 testing. Her testimony, discussed below with respect to the January 2002 test, is echoed in some particulars by Mr. Moore. Mr. Moore discussed three indications that PBS&J's stock of *Ceriodaphnia dubia* was overly stressed at the time of the November 2001 WET test. First, the control organisms in the test did not appear to be reproducing normally.[126] Second, as also discussed by Dr. Glass below, the reference toxicant testing, in which the PBS&J lab's organisms were exposed to known levels of copper, produced results outside the normal range, indicating that the lab's organisms were stressed and therefore more likely to respond negatively during WET testing.[127] According to Mr. Moore, "This, by itself, should invalidate the

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[123] SJRA Exhibit 5 at 40 (Glass direct testimony).

[124] SJRA Exhibit 34 at 19-23 (Moore direct testimony).

[125] SJRA Exhibit 5 at 40 (Glass direct testimony). *See also* SJRA Exhibit 2 at 21-22 (permit conditions relating to test WET test performance); ED 15 (November 2001 test results and lab notes).

[126] SJRA Exhibit 34 at 23, 25 (Moore direct testimony).

[127] SJRA Exhibit 34 at 23-25 (Moore direct testimony).

test results."[128] Finally, in 2000, EPA gave PBS&J an "unacceptable" rating for WET test performance in the lab's annual performance audit.[129]

Mr. Moore went on to testify that, in his opinion, the dose-response relationship for the November 2001 WET test – as to both the lethality and sublethality data – was not monotonic, and this fact further calls into doubt the results of this test.[130] According to Mr. Moore, the dose-response for chronic survival was weak and unstable, and the dose-response for reproduction non-existent.[131]

Mr. Jennings disagreed that the dose-response curve for the November 2001 survival test was problematic. He testified that the curve indicated that the failure was accurately reported, and he likened the curve to certain examples of acceptable but non-monotonic curves shown in EPA guidance materials.[132] He stated that an unacceptable dose-response curve would be "where you have a scattering completely across the board of results that do not seem to follow any pattern whatsoever with large variations within replicates and with large variation throughout the test, large variation."[133]

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[128] SJRA Exhibit 34 at 25 (Moore direct testimony). Mr. Moore reviewed the PBS&J reference toxicant test data, including "control charts" showing the sensitivity of the lab's organisms as compared with a range of acceptability based on historical data, for the period from October 1996 to October 2001. He stated it appeared from the data that the lab's culture organisms were "crashing" in the summer of 1998 and the second half of 2001. SJRA Exhibit 34 at 45-46 (Moore direct testimony). He further stated that PBS&J's own control chart, ED Exhibit 16 at 21, failed to reflect the severity of the problem because the lab used unacceptable reference test results to calculate the upper and lower boundaries of the acceptable range of organism sensitivity, and this use of acknowledged unacceptable results caused the calculated range of acceptability to widen, making it appear that the lab's *Ceriodaphnia dubia* were within the range of acceptability in late 2001 and early 2002 when in fact they were not. Tr. at 443-458 (Moore testimony).

[129] SJRA Exhibit 34 at 25 (Moore direct testimony). PBS&J disputed the rating. SJRA Exhibit 44.

[130] SJRA Exhibit 34 at 27-31 (Moore direct testimony).

[131] SJRA Exhibit 31 (Moore direct testimony).

[132] Tr. at 272-275, 332 (Jennings testimony), *comparing* ED Exhibit 29 *with* ED Exhibit 27 at 4-11 (Figure 4.7).

[133] Tr. at 334 (Jennings testimony).

In contrast, Dr. Glass did not view the dose-response curve for SJRA's November 2001 test as fitting any of the patterns in EPA's guidance materials. She characterized that curve as showing two non-monotonic responses – with survival better at 45% effluent concentration than at 32%, and with survival slightly better at 86% than at 62%, and with a general flattening out at the three highest concentration points, with rates of survival that are much the same for the three highest concentrations of effluent.[134] According to Dr. Glass, this pattern does not fit any described in EPA's guidance, and so, as she put it, "You just have to look at it and make your own judgment as to what's going on." Concern about the dose-response relationship, however, does not end the inquiry for Dr. Glass. Confronted with an atypical relationship such as the one exhibited in November 2001, she believes an analysis of the underlying data concerning the WET test, such as the laboratory bench sheets, is warranted. And it is this analysis, Dr. Glass contends, that shows the test should have been halted on Day 6.[135]

3. SJRA's January 2002 Testing

In January 2002, PBS&J reported that the survival NOEC for *Ceriodaphnia dubia* was 45% – as in November 2001, this constituted a failure under the state permit but a pass under the federal permit.[136] That same month, the laboratory at the Sabine River Authority (SRA) performed a concurrent set of WET tests, resulting in a survival NOEC for *Ceriodaphnia dubia* of 86%.[137] This value exceeded both the applicable federal and state critical dilutions.

Mr. Moore testified that the disparity in results for the testing of this month's split effluent sample indicate that the test failure reported by the PBS&J lab was likely not a true failure indicating significant toxicity.[138]

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[134] Tr. at 401 Glass testimony), *comparing* ED Exhibit 27 and ED Exhibit 29.

[135] Tr. at 403-410 (Glass testimony).

[136] ED Exhibit 16.

[137] ED Exhibit 17A.

[138] SJRA Exhibit 34 at 25-26 (Moore direct testimony).

Dr. Glass testified that she believes the PBS&J results to be questionable because there was no monotonic dose-response.[139] In addition, she stated that it appeared, based on the testing with the standard reference toxicant, that the PBS&J organisms were impaired.[140] According to Dr. Glass, the toxicant reference testing of PBS&J's organisms by exposing them to copper suggested that the organisms were stressed and overly sensitive from July 2001 until August 2002, results that call into question many of the tests performed by the PBS&J lab with *Ceriodaphnia dubia* during this period.[141] Stressed organisms can show negative responses to minor environmental changes, and Dr. Glass stated that the difference in salt content between the effluent dilution series and the control could account for the PBS&J's reported test failure in January 2002 (and possibly November 2001 as well).

Moreover, Dr. Glass believes that the survival rate in the 55% effluent dilution was misreported in PBS&J's statistical analysis of the raw data – an opinion with which Mr. Moore agrees[142] – and when this data point is corrected it is clear that the dose-response is not monotonic, but random.[143] She stated that a random dose-response would be expected if the test failure were due to overly stressed organisms exposed to effluent with a higher saline content than in the control. These problems with the January 2002 PBS&J test, according to Dr. Glass, are underscored by the fact that a split sample was analyzed by the SRA laboratory and no toxicity was found.[144]

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[139] SJRA Exhibit 5 at 40-41 (Glass direct testimony), *citing* SJRA Exhibit 18.

[140] Reference toxicant tests provide information about the degree of sensitivity of the culture of organisms used in the WET test. ED Exhibit 19A at 13 (Jennings direct testimony).

[141] SJRA Exhibit 5 at 41-43 (Glass direct testimony).

[142] SJRA Exhibit 34 at 31 (Moore direct testimony).

[143] SJRA Exhibit 5 at 43-44 (Glass direct testimony); SJRA Exhibit 34 at 31 (Moore direct testimony) ("The effluent concentration increases by more than 50% but the mortality decreases by 33%? This is a very poor indicator of toxicity.").

[144] SJRA Exhibit 5 at 41 (Glass direct testimony).

Mr. Jennings testified that the dose-response curves for both the PBS&J and SRA tests were acceptable.[145] In addition, Mr. Jennings stated that, according to the control charts reflecting the reference testing at the SRA and PBS&J labs in January 2002, the *Ceriodaphnia dubia* at the two labs reacted very similarly, demonstrating comparable levels of tolerance; they would, therefore, be expected to respond similarly in the WET testing.[146] He also testified that he had reviewed the lab data relating to the PBS&J and SRA WET tests in January 2002. He concluded that the difference in their results could be explained by variation between the tests with respect to the elapsed time from the collection of the first effluent sample until its use.[147] The PBS&J test was initiated at 2:00 p.m. on January 21, 2002. According to Mr. Jennings, all reported lethality occurred on Day 2, and the second effluent sample was not used until Day 3. The SRA test, on the other hand, was initiated at 4:13 p.m. on January 22, 2002. The only lethality reported in that test was on Day 4, and occurred at the lowest effluent dilution tested – 23%. Mr. Jennings stated:

> There was a significant amount of time between when the two tests were initiated, over 26 hours. If the first sample contained a fast acting and volatile toxicant, [though] the sample that was tested within 7 hours was toxic, the toxicant may have volatilized out of the sample that was tested 26 hours later. This type of loss of toxicity during holding has been observed with volatile pollutants.[148]

Dr. Glass responded to Mr. Jennings' statements about the January 2002 test by noting that the holding time used by the SRA lab was within parameters established by EPA guidance documents.[149] She went on to assert that Mr. Jennings' comments about the possible existence of

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[145] Tr. at 272-276 (Jennings testimony).

[146] Tr. at 284-286 (Jennings testimony), *citing* ED Exhibit 31 (SRA control charts). According to Mr. Moore, it is not clear if the upper and lower boundaries in the charts in ED Exhibit 31 were based on the required minimum number of data points according to the EPA method manual. Tr. at 446 (Moore testimony). PBS&J's control chart reflecting reference testing data from August 2000 through January 2002 is at ED Exhibit 16 at 21.

[147] ED Exhibit 19A at 15-16 (Jennings direct testimony).

[148] ED Exhibit 19A at 16 (Jennings direct testimony).

[149] No sample can be held for longer than 36 hours before it is first used in a WET test. SJRA Exhibit 5 at 23 (Glass direct testimony).

a volatile toxicant were speculative and unsubstantiated.[150] She also disputed his assertion that all the lethality in the PBS&J test occurred on Day 2, stating that of the 22 organisms that died in the PBS&J test, *five* died on Day 3 and three died on day 4.[151] According to Dr. Glass, the non-monotonic nature of the PBS&J dose-response relationship indicated a need for further investigation of the WET testing documentation, but the SRA curve represented a "very tight data set."[152] Only one organism in the SRA study died. Dr. Glass stated that if the SRA organisms were as sensitive as the PBS&J organisms, as Mr. Jennings suggested, the SRA organisms would not likely have survived in such numbers.[153]

As another explanation for the difference between the PBS&J and SRA test results, Mr. Jennings suggested that perhaps the labs did not receive true split samples.[154] Mr. Jennings' doubts about the samples stem primarily from the fact that the collection time recorded for the three samples sent to PBS&J was 7:00 to 7:00, while the collection time recorded for the three samples sent to SRA was 8:00 a.m. According to Mr. Jennings, a difference of one hour in sample collection could be significant, and studies have shown that the degree of toxicity in industrial and municipal wastewater treatment facilities can vary by the hour.[155] Based on this uncertainty (and his concern about the holding times), Mr. Jennings concluded that the difference in the results of the PBS&J and SRA tests cannot be considered true variability that might call into question the test results; rather, they do not appear to have been comparable tests.[156]

Dr. Glass, however, did not agree with Mr. Jennings about the potential importance of the recorded sample collection times. She noted that the chain-of-custody forms used by the two

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[150] SJRA Exhibit 5 at 47-48 (Glass direct testimony).

[151] SJRA Exhibit 5 at 48-49 (Glass direct testimony).

[152] Tr. at 411-412 (Glass testimony).

[153] Tr. at 412-413 (Glass testimony).

[154] ED Exhibit 19A at 17 (Jennings direct testimony).

[155] ED Exhibit 19A at 17 (Jennings direct testimony).

[156] ED Exhibit 19A at 18 (Jennings direct testimony).

laboratories were different: the PBS&J form explicitly asked for the time the sample was collected, while the SRA form was ambiguous with respect to what was being asked in terms of the time of the sample.[157] Further, the SRA form indicates that the first sample was completed and sent to the courier at the same time: 8:00 a.m. But preparing a sample for shipping is time-consuming, and it would not be possible to finish collection at 8:00 a.m. and also turn the sample over to the courier at 8:00 a.m.[158] Finally, as a practical matter, SJRA had an automatic sampler, and there was no reason to set up two samplers to collect the composite samples; one sampler was able to collect sufficient quantity for two labs.[159] Dr. Glass believes that the forms reflect different sample times because of differences in what the forms appeared to be asking.

4. Agency Procedures Related to the Imposition of WET Limits

Dr. Glass testified that under the applicable IPs, there are only two conditions that can trigger the imposition of a WET limit, and SJRA meets neither condition.[160] The first is when a TRE has been completed and some type of control mechanism – such as a chemical-specific limit or a best management practice – is not appropriate.[161] The second condition is when a TRE is begun but terminated based on a finding of cessation of lethality, but subsequently there is a recurrence of lethality. According to Dr. Glass, the applicable IPs require "persistent, significant" lethality in the same species in a five-year period for a WET limit to be triggered after a cessation of lethality has been demonstrated.[162] She testified that the first condition is inapplicable because the toxicity of SJRA's effluent, if it exists, is so infrequent and of such short duration that SJRA has not been able

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[157] SJRA Exhibit 5 at 49 (Glass direct testimony).

[158] SJRA Exhibit 5 at 49-50; Tr. at 422-424. (Glass testimony).

[159] SJRA Exhibit 5 at 50 (Glass direct testimony).

[160] SJRA Exhibit 5 at 29-30, 36-37 (Glass direct testimony).

[161] A chemical-specific parameter would not be an option if the toxicity resulted from a substance for which there existed no sufficiently sensitive analytical test to measure concentrations. SJRA Exhibit 5 at 29 (Glass direct testimony).

[162] Dr. Glass cites to *Procedures to Implement the Texas Surface Water Quality Standards* at 112. SJRA Exhibit 13.

to complete a TRE. As for the second condition, she asserted that the November 2001 and January 2002 WET test failures were invalid and that, even if one of the tests were valid, that fact would not amount to a demonstration of "persistent, significant" lethality. Dr. Glass testified that while TCEQ personnel, in granting SJRA permission in 2001 to terminate TRE activities based on a cessation of lethality, stated that the permit would be amended to add a WET limit if the effluent again demonstrated significant lethality, this did not mean that the permit would be amended without an opportunity for SJRA to comment. In fact, the chain of events was such that SJRA was never given a chance to comment on inclusion in the draft permit of the language quoted in the TCEQ letter; instead, a WET limit was included in the draft permit instead.[163] Therefore, SJRA never agreed to the language in the letter.

5. The Value of a WET Limit

Dr. Glass testified:

> . . . SJRA has spent many years investigating and seeking to identify any toxicants in its effluent that may have caused its reported biomonitoring failures. The lack of success of these studies is not due to a lack of diligence on the part of SJRA. A WET limit does not provide any more protection to the receiving stream than does a WET testing protocol, yet it subjects the permittee to agency enforcement actions even where a toxicant cannot be identified, much less eliminated.[164]

According to Dr. Glass, from the many analyses and reviews that comprised the TRE "nothing can be concluded regarding the nature of the substance that produced test lethality."[165] Further, she testified that SJRA has been diligent in responding to the few test failures it has experienced since 1998, including reviewing plant operations data and industrial discharges into the collection system, initiating TRE activities when there is a test failure (or even a test showing significant sublethal effects), and taking steps toward implementing a pre-treatment program.[166] She said that she is not

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[163] SJRA Exhibit 5 at 62 (Glass direct testimony); SJRA Exhibit 1 at 12 (Adams direct testimony).

[164] SJRA Exhibit 5 at 37 (Glass direct testimony). *See also* SJRA Exhibit 1 at 4-10 (Adams direct testimony).

[165] SJRA Exhibit 5 at 54 (Glass direct testimony).

[166] SJRA Exhibit 5 at 53-56 Glass direct testimony). The Authority's recent submission to the TCEQ concerning the pre-treatment program is at SJRA Exhibit 30.

aware of anything more they could do to investigate or control toxicity.[167] Finally, Dr. Glass stated that WET testing, while a useful tool for identifying the potential presence of a toxicant in effluent, is not a reliable or appropriate tool in the enforcement context.[168]

Mr. Jennings testified that there could be a number of reasons for the failure of a TRE to identify a toxicant. Such reasons might include: an insufficient amount of testing, looking for the wrong things, and being led astray by a contractor.[169]

C. OPIC's Position

OPIC supports the ED's determination to include a WET limit in the permit based on SJRA's WET test failures and TREs, EPA's review of the facts and determination that the permit should include a WET limit, procedures established in the MOA for EPA's review of permits, and the validity of WET testing as recognized and upheld by the federal courts.[170] OPIC states, "SJRA is attempting to resolve its conflict with the EPA through the TCEQ permitting process. The appropriate forum for SJRA's concerns is with the EPA."[171]

D. ALJ's Analysis

In December 2004 the United States Court of Appeals for the District of Columbia Circuit issued a decision in *Edison Electric Institute v. Environmental Protection Agency (Edison Electric),*[172] which involved a challenge to the scientific validity of certain WET testing protocols promulgated

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[167] SJRA Exhibit 5 at 57 (Glass direct testimony).

[168] SJRA Exhibit 5 at 30 (Glass direct testimony).

[169] Tr. at 324 (Jennings testimony). He acknowledged that a further possible reason might be the absence of a toxicant in the waste stream. *Id.* at 326-327.

[170] Public Interest Counsel's Closing Argument at 3-6; OPIC's Reply to Closing Arguments at 1-4.

[171] OPIC's Reply to Closing Arguments at 4.

[172] No. 96-1062 (D.C. Cir. Dec. 10, 2004). The opinion can be found at ED Exhibit 20.

by EPA. The Court of Appeals spoke of the reasons for WET testing:

> While... numerical restrictions [on the allowable concentration of particular pollutants in ambient water] comprise the backbone of the permitting system, EPA has found that, standing alone, these limits are not sufficient. Effluents may contain many different pollutants. Even if no single pollutant were present in a harmful amount, the mix of different pollutants stillmight have negative effects upon aquatic organisms. In light of the myriad potential interactions among various pollutants, traditional instrumental tests are ill-suited to making the determination.[173]

The Court went on to address the limitations of WET testing, noting that its use of living organisms, with their "organic idiosyncracy," introduces a "significant potential for variability between and within tests."[174]

In its decision, the Court rejected the challenges to EPA's WET testing requirements, determining that the agency's testing methods were adequate, as a regulatory matter, to minimize the testing variability. However, the Court was careful to point out that its decision related only to the validity of the WET testing protocols:

> There is an important distinction between the validity of a test method and the validity of a particular result from the test when it is used to determine compliance with permit conditions. Even by EPA's calculations, WET tests will be wrong some of the time... Nothing we have written thus far, and nothing we write in the balance of this opinion forecloses consideration of the validity of a particular test result in an enforcement action. That issue is not before us. The case involves only the validity of the WET test methods.[175]

And:

> [W]e are concerned here only with test methodology, not results of particular tests in the field. Our decision does not endorse the validity of any test result in the future, nor does it foreclose a defense that the result is wrong.[176]

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[173] *Edison Electric*, ED Exhibit 20 at 2-3.

[174] *Id* at 3.

[175] *Id.* At 9.

[176] *Id.* at 9 n. 5.

The instant case, like an enforcement action, involves the validity of certain test results and whether the results of those tests should be used to form the basis of an action – imposition of a new permit requirement – against a permittee. The *Edison Electric* opinion helps to clarify the scope and content of this case. In light of the *Edison Electric* ruling, SJRA's assertions that WET testing in general is subject to analytical variability, by themselves, are unpersuasive.[177] WET testing has been found to be a valid and appropriate regulatory tool. That WET testing sometimes produces false positive results does not mean that such testing cannot be used as a basis for adding a WET limit to the Authority's permit; to the degree that SJRA may be arguing that the general unreliability of WET testing means that WET test results cannot constitute the rationale for a WET limit (or a WET limit cannot constitute a permit parameter), the ALJ rejects that argument. However, SJRA's most compelling assertions are that problems with *particular* WET tests render the results of those identified tests too unreliable to trigger a change in the Authority's permit. After a careful review of the evidence and arguments presented by both sides, the ALJ agrees.

As an initial matter, the ED put on a sound *prima facie* case. First, the ED showed that SJRA reported three test failures for *Ceriodaphnia dubia* survival in 1998 and that at about the same time there was a fish kill (although not demonstrated to have been caused by SJRA's effluent).[178] These events properly triggered a TRE; not even SJRA disputes the appropriateness of the TRE requirement. The TRE turned up no identifiable toxicant, and the TRE was terminated due to the apparent lack of lethality. Then, in late 2001 and early 2002, SJRA reported two test failures for *Ceriodaphnia dubia* survival. Further, from June 1998 through August 2004, SJRA reported

[177] The ALJ regards SJRA's evidence about the overall false positive rate of WET testing primarily to be background material, not independently persuasive concerning any contested fact in this case. The parties agree that WET testing may produce false failures in some tests; the parties agree that SJRA failed its tests for lethality in a small percentage of its total survival tests. The critical issues in this case relate to whether the few failures on which the agencies are relying as the basis for the permit amendment show significant signs of unreliability. Therefore, the ALJ does not address the details of Mr. Moore's testimony about false positive rates, and also does not consider in her analysis the ED's emphasis, on rebuttal, of the fact that false negatives may also occur in WET testing, or the ED's evidence about other permittees that have done a number of WET tests without any reported failures.

[178] As discussed above, Authority acknowledges that there was also a strange color in the facility's effluent at the time.

approximately 13 tests showing significant sublethal effects at the critical dilution.[179] The ED's interpretation of all these events is that SJRA's effluent intermittently contains a fast-acting pollutant that causes episodic, short-lived toxicity, and the pollutant escaped detection in the Authority's TRE because of its transience.[180] According to the ED, following the 1998 test failures and the unsuccessful TRE, the two additional failed tests for *Ceriodaphnia dubia* provide justification for the imposition of a WET limit.

If the entire evidentiary record consisted only of the reported test failures and the inconclusive TRE – and there were no evidence suggesting problems with the reliability of the specific test failures at issue – the ED would have met his burden to show that SJRA's effluent has the reasonable potential to cause toxicity.[181] However, SJRA has offered a great deal of highly specific evidence calling into question the reliability of the November 2001 and January 2002 test results. These two tests are crucial because the IPs provide that, following closure of a TRE for

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[179] Mr. Pfeil was clear that the sublethal effects alone were not adequate to justify a WET limit, but that they tend to corroborate the toxicity demonstrated by the failures for lethality. ED Exhibit 11A at 14 (Pfeil direct testimony).

[180] The Executive Director's Closing Argument at 20. However, the ED also argues that the 13 additional sublethal failures over six years of monthly testing "are indicative of one or more toxicants *routinely and persistently* being discharged to the collection system and subsequently into SJRA's effluent into water in the state." The Executive Director's Response to the San Jacinto River Authority's Closing Argument at 1 (emphasis added). It is not clear how this argument jibes with the ED's argument about intermittent toxicity; perhaps the ED is saying that the source of the toxicity causing the lethality is different from the toxicity causing the sublethal effects. As noted above, the ED's own expert, Mr. Pfeil, testified that the sublethal failures were not by themselves enough to trigger a WET limit. *See supra* note 179.

[181] A test indicating significant lethality, even one that is not a false positive (*i.e.*, even when the effluent is toxic to some degree), does not necessarily mean that there has been a violation of a narrative water quality standard. In other words, a *test failure* is not the same thing as a *stream standard violation*. One reason for this difference is that the critical dilution represents an unusual combination of low instream flow and high effluent discharge rate. However, in order to impose a WET limit on SJRA, the ED does not have to show that the WET testing conclusively proves that the facility is violating a narrative criterion in the state water quality standards, but only that there is a reasonable potential for such a violation. The words "potential" and "reasonable" suggest the exercise of judgment in the face of uncertainty; the language of the rule allows the agency to proceed with protective measures even in the face of some doubt about whether there is actual toxicity to aquatic life in the receiving stream. The overall value of WET testing as a tool for predicting instream conditions has been affirmed by EPA. SJRA Exhibit 12 at 12-13. The ALJ concludes that SJRA's biomonitoring history since 1998, in the absence of strong evidence indicating the invalidity of the most recent tests, would be adequate to show such a reasonable potential for toxicity and to justify a WET limit.

cessation of lethality, a WET limit can be imposed if persistent, significant lethality recurs.[182] For the following reasons, the ALJ concludes that the evidence concerning each of the two tests preponderates in favor of SJRA.

The November 2001 test resulted in an NOEC for survival of 45%. This was a failure at the TCEQ critical dilution of 55%, but a pass at EPA's critical dilution of 45%. The most persuasive evidence concerning this test is Dr. Glass's detailed testimony that, had the test been carried out according to the applicable protocols in the permit, it would not have met the minimum performance criteria specified in the permit and it would have been declared invalid. The permit required the test to be stopped when 60% of the water fleas in the control had their third brood. According to Dr. Glass's review of the laboratory notes, this condition was met on Day 6. However, the test was allowed to extend to Day 7. The permit's performance criteria specified that the average number of young per surviving female in the control had to be at least 15 for the test to be considered valid. According to Dr. Glass, the average number of young per surviving female in the control on Day 6, when the test should have been terminated, was only 12.7.

Dr. Glass's opinions on this point were included in her written pre-filed testimony. At hearing, this testimony went entirely uncontroverted. The ED offered live rebuttal testimony from his two WET test experts, Messrs. Pfeil and Jennings, but neither witness addressed Dr. Glass's contention that the November 2001 test had been inappropriately prolonged. Nor did the ED, on cross-examination of Dr. Glass, ask any questions concerning this issue. In its post-hearing written closing argument, however, the ED asserted that Dr. Glass had incorrectly counted the broods, and that some of the releases she counted as more than one brood were in fact a single brood spanning more than one day.[183] As support for this assertion, the ED cited to the same laboratory records on which Dr. Glass relied. The ED also cited to EPA's document, *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*, which recognizes

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[182] SJRA Exhibit 13 (*Procedures to Implement the Texas Surface Water Quality Standards*, RG-194, Revised, January 2003) at 112 ("The permittee may only apply the cessation of lethality provision once every five years. If the effluent again demonstrates persistent, significant lethality to the same species within a five-year period, the [TCEQ] will amend the permit to add a WET limit with a compliance period. . .")

[183] The Executive Director's Closing Arguments at 9-11.

that the release of a brood may sometimes be interrupted during the daily transfer of organisms to fresh test solutions, and in such cases the interrupted brood should be counted as only one brood.[184]

It appears from the ED's argument that one looks solely to the number of neonates released on which days to determine how the broods should be counted. However, the quoted portion of the EPA method document suggests that one critical factor may be the exact timing of the releases, with some occurring "just prior to test solution renewal" and more occurring "just after" renewal. In any event, the ED's assertion that particular releases in the testing in November 2001 were examples of interrupted broods is not supported by the testimony of any expert, was not offered subject to cross-examination or clarifying questions by the ALJ, and therefore is considerably less credible and convincing than the testimony of Dr. Glass, corroborated by the testimony of Mr. Moore.

The conclusion that the November 2001 test, had it been performed correctly, would have failed to meet test performance criteria is bolstered by the testimony from Dr. Glass and Mr. Moore about the condition of the PBS&J lab's test organisms at the time. According to both witnesses, the lab's reference testing indicates that the test organisms were overly stressed and therefore more likely to exhibit negative effects from exposure to effluent than would healthy organisms. On Mr. Moore's corrected control chart for PBS&J's test organisms, the reference testing results for mid-November, when the testing was performed, are outside the control limits.[185]

The ED's witnesses offered nothing to explain or counter SJRA's experts on the question of the health of PBS&J's organisms at the time of the November 2001 test. Mr. Jennings did testify that the dose-response curve for the November test was acceptable and indicated an accurate result, whereas Dr. Glass and Mr. Moore testified that the dose-response curve was indicative of problems. Had the Authority's evidence about the validity of the November 2001 test consisted solely of concerns expressed about the non-monotonic nature of the dose-response relationship, the evidence

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[184] The ED quoted from this document at one point, but also cited to another section of it. The Executive Director's Closing Arguments at 9-11. However, the ED did not offer the relevant portions in evidence. An unrelated excerpt from the same document is in evidence at SJRA Exhibit 24.

[185] SJRA Exhibit 41 at 10, Fig. 2.

on this issue would favor the ED. However, the evidence supports conclusions that: (1) the test was not properly terminated; (2) had it been properly terminated, it would not have met the applicable performance criteria; and (3) reference testing data indicate that the lab's test organisms were overly stressed at the time. In light of these factors, as well as the non-monotonic dose-response relationship, the ALJ concludes that the results of the November 2001 test were unreliable and cannot form part of the basis for a determination that SJRA's effluent has the reasonable potential to cause toxicity.

As for the January 2002 test, the most troubling factor is the difference in results for the split sample. PBS&J reported that the survival NOEC for *Ceriodaphnia dubia* was 45% (a pass under the federal permit but a failure for the Texas critical dilution), while the SRA laboratory reported an NOEC of 86%. The ALJ concludes from the evidence that the sample was indeed a true split.

Mr. Jennings correctly noted an apparent difference in sample times between the PBS&J report and the SRA report. The PBS&J chain of custody forms state that the 24-hour samples were collected from 7:00 to 7:00 on each of the three days of sampling. The SRA forms say "8:00 a.m." under the category "time" on each of those three days, but also reflect that the first sample was relinquished to the courier at 8:00 a.m. The sample could not have been collected and given to the courier at the exact same time, according to Dr. Glass. On the two subsequent sampling days, however, the times at which the SRA samples were relinquished are recorded as 8:30 and 8:15, respectively. The SRA and PBS&J chain of custody forms were filled out by the same SJRA employee.

The ALJ does not find it likely that the samples were collected in different ways or at different times. Dr. Glass testified from personal familiarity with the SJRA facility that there is one automatic sampler at the plant that is dedicated to biomonitoring sampling, and that sampler has sufficient capacity to collect enough effluent on a 24-hour composite basis for two sets of tests. She stated that there would be no reason to set up another sampler to collect effluent separately. In light of this fact, the ALJ finds it more plausible that the difference in times recorded on the forms is, as Dr. Glass suggests, accounted for by the different wording of the two forms than by a conclusion that

SJRA collected two separately-timed samples on the same days. That the SRA chain of custody form for the first sample gave the same time under the "time" category and in the blank for the time of relinquishment to the courier adds weight to the idea that the SRA form was ambiguous.[186] All in all, there seems little reason to doubt that the samples were true splits.

The ALJ is not persuaded by Mr. Jennings' testimony that the difference in the results can be explained by the presence of a short-lived toxicant in the first sample that had volatilized by the time the SRA lab commenced testing. In support of this idea, Mr. Jennings asserted that all lethality in the PBS&J test occurred on Day 2, during the use of the first sample. However, over one third of the total lethality in the PBS&J test in fact occurred on Days 3 and 4 – with five deaths on Day 3 and three deaths on Day 4.[187] The second sample was introduced on Day 3;[188] therefore, the organisms that died on Day 4 clearly had been exposed to the second sample.

Split samples are not required by or addressed in the applicable rules and guidance documents. However, TCEQ staff has indicated to SJRA that the agency views differing split sample results to be significant. In her letter of June 15, 2001, Faith Hambleton of the TCEQ stated concerning an earlier WET test:

> The test "failure" which occurred in September 1998 was not included in this period because testing on the same effluent samples was conducted by two separate laboratories yielding vastly different results. This casts doubt on the validity of these test results.[189]

That the dose-response curve for the PBS&J test was non-monotonic, although by itself

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[186] According to Dr. Glass's description, SJRA has an automatic sampler that discharges its hourly sample amount into a container. At the end of the 24-hour period of sampling, the contents of the container are mixed and poured into biomonitoring sample containers for shipment. SJRA Exhibit 5 at 49-50. The SRA form clearly indicates that the sample was collected from 7:00 to 7:00. The "8:00 a.m." time could reflect the time the sample was ready for the courier.

[187] SJRA Exhibit 5 at 48-49; ED Exhibit 16 at 7-8 (lab notes showing mortality in each replicate of each dilution, with "D" indicating the death of a water flea).

[188] SJRA Exhibit 16 at 6.

[189] ED Exhibit 17. Despite this letter, the ED now relies on the September 1998 test as one of the five failures for lethality that comprise the primary justification for the permit change. The ALJ notes that SJRA has split biomonitoring samples a number of times but usually both labs report the same NOEC. *See* SJRA Exhibit 14.

unpersuasive, lends weight to Dr. Glass's view that the results of the test are unreliable. Taken together, the evidence concerning the January 2002 testing shows that its results are too questionable to be considered evidence of a reasonable potential for toxicity.

The ED argues that the November 2001 and January 2002 tests constitute a cluster of test failures that is inconsistent with the idea that those tests reflect random false positive results.[190] This argument appears in the ED's briefing without any apparent supportive testimony in the record. The ALJ does not find this argument very powerful, in part because of the lack of expert opinion to support it and in part because the Authority's argument, expressed through the testimony of Dr. Glass and Mr. Moore, is that problems with the PBS&J lab were likely responsible for the timing of the test failure results. In particular, those witnesses testified that the PBS&J's brood stock of *Ceriodaphnia dubia* was overly stressed in general during late 2001 and early 2002. While the evidence does not definitively show that such problems at the PBS&J lab caused the failure of the November 2001 test to meet performance criteria as well as the differing results of the January 2002 tests, the evidence certainly suggests that problems with the PBS&J organisms may have been responsible. This would seem to explain the apparent "cluster" effect as readily as would intermittent toxicity in the SJRA facility's effluent.

Somewhat in contrast to its cluster theory, the ED asserts that a single failure for lethality – either the November 2001 or the January 2002 test – when interpreted in light of SJRA's prior history of tests failures, is sufficient to form the basis for adding a WET limit to the permit.[191] As discussed above, the applicable rules require that a WET limit be imposed if SJRA's effluent has the reasonable potential to cause toxicity in the receiving stream. Mr. Jennings testified that EPA's national (as opposed to regional) policy is that a WET limit can be imposed following only one WET test failure, period.[192] However, the TCEQ's current IP, *Procedures to Implement the Texas Surface Water Quality Standards,* provides that after the termination of a TRE based on a finding of

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[190] The Executive Director's Closing Argument at 2.

[191] The Executive Director's Closing Argument at 9, 12.

[192] The Executive Director's Closing Argument at 9. In contrast, in late 2001, before learning of the November 2001 failure, EPA staff agreed to a draft permit without a WET limit – despite the 1998 test failures. SJRA Exhibit 32.

cessation of lethality, a WET limit will be imposed "if the effluent again demonstrates *persistent*, significant lethality to the same species within a five-year period."[193] The use of the word "persistent" strongly implies that more than one test failure would justify amending the permit to add a WET limit; indeed, the IPs talk about persistent lethality as being shown by one failed test and then a subsequent failed test.[194] In contrast, the EPA-TCEQ MOA that is in evidence does not include the word "persistent."[195] However, the current IP is a more recent document and it was approved by both the Commission and EPA.

Since the ALJ does not find a single reliable failure for lethality following the termination of the TRE, the question whether one reliable failing test – as opposed to two – would have been sufficient is not necessary to this analysis. However, the ALJ notes that there is no apparent reason for the Commission to depart from the persistent-failure policy expressed in its most recent IP. SJRA's 1998 TRE could have been terminated for cessation of lethality after 12 consecutive months of passing tests, but in fact SJRA had over 30 consecutive months of passing tests when the TRE was halted in June 2001. Given the considerable length of elapsed time and number of tests between the start of the TRE and the next failure in November 2001, it would be reasonable to require at least two post-TRE failures before imposing a WET limit.

The ED also makes assertions in its closing argument that the Authority submitted its WET test results to the agency "under certification," and that it did not at the time ask the agencies to evaluate the underlying data.[196] These statements imply a waiver argument, but the ALJ is aware of no rule barring a permittee from challenging the accuracy or reliability of WET test results based on some kind of certification made at the time test results are submitted. Further, as SJRA points out,[197]

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[193] ED Exhibit 13 at 112 (emphasis added).

[194] ED Exhibit 13 at 111.

[195] ED Exhibit 10 at 24.

[196] The Executive Director's Closing Argument at 9, 12, 19-20; The Executive Director's Response to SJRA's Closing Argument at 1.

[197] San Jacinto River Authority's Motion to Strike Portions of the Executive Director's Closing Arguments at 2 note 7.

there appears to be no evidence in the record about what sort of certification, if any, accompanied the test results and what it may have meant.

OPIC's argument that this is the wrong forum for SJRA's objection to the inclusion of a WET limit in its permit is incorrect: TCEQ is the issuing authority, TCEQ's draft includes the WET limit, TCEQ personnel have testified in support of the WET limit, and if SJRA does not raise the issue in this proceeding a TPDES permit with a WET limit will issue. As discussed above, the Authority is not challenging (or not *only* challenging) the validity of WET testing as a general matter; it is also challenging the use of specific WET test results to make specific changes to the one permit at issue here. Such a permit-specific challenge must be addressed in this context.

The ALJ recommends that SJRA's permit be renewed without the contested WET limit. The Authority has made a convincing case that the problems its facility experienced in the early nineties were unrelated to the WET testing events from 1998 through early 2002, and in any event Messrs. Pfeil and Jennings pointed primarily to the 1998, 2001, and 2002 WET test failures and related TRE as the bases for the current permit action. The 1998 failures properly triggered a TRE, but that evaluation was stopped because significant lethality was not detected for a very long time, despite monthly tests. For the reasons discussed above, the more recent tests resulting in failures for lethality – November 2001 and January 2002 – have been shown to bear significant signs of unreliability. In the intervening month, December 2001, split sample tests both passed.[198] As for the Authority's WET testing showing sublethal effects, the ED's chief staff witness has stated that those results were corroborative of toxicity indicated by failures for lethality, but were insufficient by themselves to require imposition of a WET limit. Since January 2002, SJRA has been continuing to conduct monthly WET testing; the evidence in the record extends through November 2004 and reflects that there have been no further failures for lethality in the 34 months of testing (including a number of months with split samples) conducted during the interval. This body of evidence fails to show that SJRA's effluent has the reasonable potential to cause in stream toxicity warranting imposition of a WET limit.

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[198] SJRA Exhibit 1 at 6 (Adams direct testimony).

VII. Other Issues

A. The Appropriateness of the Critical Dilution Specified in the Draft Permit

The proposed critical dilution for SJRA's permit is 85%. The critical dilution is calculated by figuring the ratio of the permitted effluent flow (Q_E) to the sum of the permitted effluent flow and the seven day, two year low flow in the receiving stream (7Q2):

$$\frac{Q_E}{Q_E + 7Q2} \times 100\% = \text{critical dilution.}^{199}$$

The IP sets out in detail how the 7Q2 is to be determined.[200] Dr. Glass testified that the critical dilution should be 80%.[201] The difference between the parties' proposed critical dilution numbers is due to their use of different quantities for 7Q2: for the ED, Mr. Pfeil calculated the critical dilution using a 7Q2 of 2.20 cubic feet per second (cfs), while Dr. Glass used 2.97 cfs.[202]

The IPs provide that the 7Q2 should be calculated from "approximately 30 years of flow data at USGS [United States Geological Survey] gages."[203] The procedures allow for the recalculation of the 7Q2 to incorporate new flow data, and also provide alternate calculation procedures where USGS data or any other flow data are absent.[204] Mr. Pfeil testified that his calculation was based on the IPs, including the pages of the IPs devoted to how to determine the value for 7Q2. Dr. Glass testified that she, too, used agency guidance, but that her value for 7Q2 was derived from using "several years of recent daily flow data in the receiving stream and from The Woodlands

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[199] ED Exhibit 13 at 41, 108.

[200] ED Exhibit 13 at 43-44.

[201] SJRA Exhibit 5 at 71-72 (Glass direct testimony).

[202] ED Exhibit 11A at 8 (Pfeil direct testimony); SJRA Exhibit 5 at 72 (Glass direct testimony).

[203] ED Exhibit 13 at 43.

[204] ED Exhibit 13 at 43-44.

WWTP No. 1." It appears from the evidence that Mr. Pfeil's calculation followed approved agency policy. Dr. Glass did notfurther specify the sources or nature of the flow data on which she relied. Therefore, the ALJ sees no reason to recommend SJRA's proposed critical dilution of 80% over the 85% calculated by the ED.[205]

B. The Appropriateness of the Definition of the "No Observable Effects Concentration"

Following clarification by the ED concerning the language in the current proposed draft permit, there is no dispute about the definition of the NOEC.

C. The Appropriateness of the Definition of a "Violation" of the WET limitation

This issue only arises if the Commission determines that the permit should include a WET limit.

The draft permit defines "violation" as a failure to pass the survival endpoint at the critical dilution.[206] In other words, one WET test failure for survival would constitute a violation of the permit. SJRA asserts that it would be more appropriate to provide that the failure of one WET test for survival, plus the failure of a re-test, would constitute a violation.[207]

Nothing in the rules or IPs specifies what a "violation" of a WET limit is. While the ALJ does not believe that a WET limit in SJRA's permit is warranted to begin with, nothing compels the ED to provide for a re-test if such a limit is imposed. SJRA is concerned about the statistical unreliability of the testing; however, as pointed out by the court in *Edison Electric*, SJRA could challenge the validity of any particular test result relied on by the agencies in an enforcement action.

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[205] The ALJ notes that SJRA would still have experienced very few failures for lethality had the ED's proposed critical dilution of 85% been applicable since 1998. However, most tests would have been close; the most common survival NOEC reported for SJRA's affluent has been 86%. *See* SJRA Ex. 14.

[206] ED Exhibit 5 at 28.

[207] SJRA Exhibit 5 at 73-74 (Glass direct testimony).

D. The Appropriateness of the Definition of "Passing" a Biomonitoring Test

The language of ED Exhibit 5 addresses SJRA's concerns, and there is no longer any dispute concerning this issue.

E. The Appropriateness of the Language Addressing Potential WET Limitations for the Fathead Minnow

The draft permit provides that, if a TRE is commenced based on WET test failures concerning the fathead minnow and the TRE is then halted due to a cessation of lethality, a WET limit for the fathead minnow would be added to the permit if the effluent "again demonstrates significant lethality" for that species. SJRA objects to this language because, as discussed above, the IPs provides that a WET limit will be imposed if the effluent again demonstrates *persistent* significant lethality.[208] The ED responds that language of the draft permit makes it clear that the ED would only impose a WETlimit if it deemed it appropriate to do so – in other words, imposition of a WET limit following one additional test failure would not be mandatory under the terms of the draft permit. In addition, the ED notes that the IPs do not have the status of binding rules.[209]

The permit language should reflect the IPs approved by the Commission and EPA unless there is some reason for deviating from them. Since the ED has offered no rationale for departing from the TCEQ's written policy on this matter, the language in the permit should specify that, following the halting of a TRE for cessation of lethality, a WET limit will be imposed if the effluent again demonstrates *persistent,* significant lethality.[210]

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[208] Closing Argument of San Jacinto River Authority at 36. *See* ED Exhibit 5 at 34.

[209] The Executive Director's Closing Argument at 24.

[210] SJRA also asserts that the most recent version of the draft permit – filed with SOAH and provided to SJRA *after* the hearing in this case – changes the requirement from the collection of a single 24-hour composite sample to three samples in the 24-Hour Acute Biomonitoring section. *See* ED Exhibit 5 at 39. SJRA asserts that this change should be deleted from the permit. *See supra* note 18; *see also* San Jacinto River Authority's Reply to Closing Arguments of the Executive Director and the Office of Public Interest Counsel at 28. This language does indeed appear new to the revised permit that is now ED Exhibit 5. Under these circumstances, the ALJ does not see how the ED could include such language over the permittee's objection. The language should be deleted from the permit.

VIII. Summary of Recommendations

The ALJ recommends:

- the deletion from the permit of provisions imposing a WET limit relating to survival tests for *Ceriodaphnia dubia*;[211]
- that the new critical dilution specified in the permit be 85%, as recommended by the ED; and
- clarification of the language of the draft permit to specify that, following the halting of a TRE for cessation of lethality with respect to the fathead minnow, a WET limit will be imposed if the effluent again demonstrates *persistent*, significant lethality.[212]

SIGNED June 15, 2005.

SHANNON KILGORE
ADMINISTRATIVE LAW JUDGE
STATE OFFICE OF ADMINISTRATIVE HEARINGS

[211] If the WET limit is not deleted, the ALJ recommends that the definition of "violation" in the ED's draft permit not be changed to provide for re-testing after an initial failure.

[212] The ALJ also recommends deleting the requirement in the 24-Hour Acute Biomonitoring section that SJRA collect three 24-hour composite samples, and replacing that language with a requirement of one sample. *See supra* note 210.