

EXHIBIT 15  
ADMINISTRATIVE RECORD # 128

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  
 §

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rules.<sup>105</sup> 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,<sup>106</sup> and there were substances in the receiving water that reduced the toxicity of the effluent.<sup>107</sup> A WET test failure does not necessarily mean that there has been an exceedance of a water quality narrative standard for aquatic life protection.<sup>108</sup> 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.<sup>109</sup>

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.<sup>110</sup> 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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<sup>105</sup> 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).

<sup>106</sup> 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).

<sup>107</sup> SJRA Exhibit 5 at 24-26 (Glass direct testimony).

<sup>108</sup> SJRA Exhibit 5 at 69-70 (Glass direct testimony).

<sup>109</sup> SJRA Exhibit 5 at 26-27 (Glass direct testimony).

<sup>110</sup> Tr. at 228-229 (Pfeil testimony).

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San Marcos has done 118 tests over five years and never reported a single lethal or sublethal failure.<sup>111</sup> Formosa Plastics performed 49 WET tests from 2000 through 2004 and reported no failures for lethality (although they reported four failures for sublethality).<sup>112</sup> 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 30 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.<sup>113</sup>

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).<sup>114</sup> 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.<sup>115</sup> He stated that it sometimes takes a while for an investigation to identify the source of the toxicity.<sup>116</sup> Mr. Jennings also emphasized that EPA typically requires re-testing before taking any action based on a WET test failure.<sup>117</sup>

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<sup>111</sup> Tr. at 229-232 (Pfeil testimony), citing ED Exhibit 25.

<sup>112</sup> 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).

<sup>113</sup> Tr. at 243, 247-250, 253-254 (Pfeil testimony).

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

<sup>115</sup> Tr. at 292-294 (Jennings testimony).

<sup>116</sup> Tr. at 293-294 (Jennings testimony).

<sup>117</sup> 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.<sup>118</sup> 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.<sup>119</sup> 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."<sup>120</sup>

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 percent, 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.<sup>121</sup>

## 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%.<sup>122</sup>

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<sup>118</sup> Tr. at 458-459 (Moore testimony).

<sup>119</sup> Tr. at 461-465 (Moore testimony).

<sup>120</sup> Tr. at 466 (Moore testimony).

<sup>121</sup> Tr. at 468-471 (Moore testimony).

<sup>122</sup> ED Exhibit 15.

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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.<sup>123</sup> 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.<sup>124</sup> 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.<sup>125</sup>

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.<sup>126</sup> 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.<sup>127</sup> According to Mr. Moore, "This, by itself, should invalidate the

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<sup>123</sup> SJRA Exhibit 5 at 40 (Glass direct testimony)

<sup>124</sup> SJRA Exhibit 34 at 19-23 (Moore direct testimony).

<sup>125</sup> 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)

<sup>126</sup> SJRA Exhibit 34 at 23, 25 (Moore direct testimony).

<sup>127</sup> SJRA Exhibit 34 at 23-25 (Moore direct testimony).

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

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.<sup>130</sup> According to Mr. Moore, the dose-response for chronic survival was weak and unstable, and the dose-response for reproduction non-existent.<sup>131</sup>

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.<sup>132</sup> 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."<sup>133</sup>

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<sup>128</sup> 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).

<sup>129</sup> SJRA Exhibit 34 at 25 (Moore direct testimony). PBS&J disputed the rating. SJRA Exhibit 44.

<sup>130</sup> SJRA Exhibit 34 at 27-31 (Moore direct testimony).

<sup>131</sup> SJRA Exhibit 31 (Moore direct testimony).

<sup>132</sup> Tr. at 272-275, 332 (Jennings testimony), comparing ED Exhibit 29 with ED Exhibit 27 at 4-11 (Figure 4.7).

<sup>133</sup> Tr. at 334 (Jennings testimony).

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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.<sup>134</sup> 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.<sup>135</sup>

### 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.<sup>136</sup> 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%.<sup>137</sup> 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.<sup>138</sup>

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<sup>134</sup> Tr. at 401 (Glass testimony), comparing ED Exhibit 27 and ED Exhibit 29.

<sup>135</sup> Tr. at 403-410 (Glass testimony).

<sup>136</sup> ED Exhibit 16.

<sup>137</sup> ED Exhibit 17A.

<sup>138</sup> SJRA Exhibit 34 at 25-26 (Moore direct testimony)



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Dr. Glass testified that she believes the PBS&J results to be questionable because there was no monotonic dose-response.<sup>139</sup> In addition, she stated that it appeared, based on the testing with the standard reference toxicant, that the PBS&J organisms were impaired.<sup>140</sup> 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.<sup>141</sup> 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<sup>142</sup> – and when this data point is corrected it is clear that the dose-response is not monotonic, but random.<sup>143</sup> 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.<sup>144</sup>

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<sup>139</sup> SJRA Exhibit 5 at 40-41 (Glass direct testimony), citing SJRA Exhibit 18.

<sup>140</sup> 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).

<sup>141</sup> SJRA Exhibit 5 at 41-43 (Glass direct testimony).

<sup>142</sup> SJRA Exhibit 34 at 31 (Moore direct testimony).

<sup>143</sup> 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.").

<sup>144</sup> SJRA Exhibit 5 at 41 (Glass direct testimony)

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Mr. Jennings testified that the dose-response curves for both the PBS&J and SRA tests were acceptable.<sup>145</sup> 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.<sup>146</sup> 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.<sup>147</sup> 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 5. 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.<sup>148</sup>

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.<sup>149</sup> She went on to assert that Mr. Jennings' comments about the possible existence of

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<sup>145</sup> Tr. at 272-276 (Jennings testimony).

<sup>146</sup> 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.

<sup>147</sup> ED Exhibit 19A at 15-16 (Jennings direct testimony).

<sup>148</sup> ED Exhibit 19A at 16 (Jennings direct testimony).

<sup>149</sup> No sample can be held for longer than 36 hours before it is first used in a WET test. SRA Exhibit 5 at 23 (Glass direct testimony).

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a volatile toxicant were speculative and unsubstantiated.<sup>150</sup> 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.<sup>151</sup> 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."<sup>152</sup> 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.<sup>153</sup>

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.<sup>154</sup> 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.<sup>155</sup> 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.<sup>156</sup>

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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<sup>150</sup> SIRA Exhibit 5 at 47-48 (Glass direct testimony).

<sup>151</sup> SIRA Exhibit 5 at 48-49 (Glass direct testimony).

<sup>152</sup> Tr. at 411-412 (Glass testimony).

<sup>153</sup> Tr. at 412-413 (Glass testimony).

<sup>154</sup> ED Exhibit 19A at 17 (Jennings direct testimony).

<sup>155</sup> ED Exhibit 19A at 17 (Jennings direct testimony).

<sup>156</sup> ED Exhibit 19A at 18 (Jennings direct testimony).

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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.<sup>157</sup> 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.<sup>158</sup> 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.<sup>159</sup> 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.<sup>160</sup> 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.<sup>161</sup> 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.<sup>162</sup> 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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<sup>157</sup> SJRA Exhibit 5 at 49 (Glass direct testimony).

<sup>158</sup> SJRA Exhibit 5 at 49-50; Tr. at 422-424. (Glass testimony).

<sup>159</sup> SJRA Exhibit 5 at 50 (Glass direct testimony).

<sup>160</sup> SJRA Exhibit 5 at 29-30, 36-37 (Glass direct testimony).

<sup>161</sup> 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).

<sup>162</sup> Dr. Glass cites to *Procedures to Implement the Texas Surface Water Quality Standards* at 112. SJRA Exhibit 13.