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In the Matter of: Permits CO-0048054 and CO-0048062, Held by XTO Energy, Inc., **Petitioner.**	Case Number:
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PETITIONER'S NOTICE OF APPEAL, REQUEST FOR ADJUDICATORY HEARING, AND REQUEST FOR STAY

XTO Energy, Inc. ("XTO") brings this Notice of Appeal, Request for Stay, and Request for Adjudicatory Hearing regarding the Water Quality Control Division's (the "Division's") May 29, 2015 decisions concerning discharge permits CO-0048054 and CO-0048062, which authorize the discharge of produced water from XTO's coalbed methane ("CBM") operations to tributaries of the Purgatoire River. Those decisions were conveyed in Renewal Permits, Fact Sheets, and Appendices C. *See* Ex. X-01 (Permit No. CO48054, issued May 29, 2015) (the "48054 Renewal Permit"); Ex. X-02 (Fact Sheet to Permit No. CO0048054, May 29, 2015) (the

"48054 Fact Sheet"); Ex. X-03 (Appendix C Permit CO0048054) (the "48054 Appendix C"); Ex. 24 (Permit No. CO48062, issued May 29, 2015) (the "48062 Renewal Permit"); Ex. X-25 (Fact Sheet to Permit No. CO0048062, May 29, 2015) (the "48062 Fact Sheet"); Ex. X-26 (Appendix C Permit CO0048062) (the "48062 Appendix C").

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I. IDENTIFICATION OF PARTIES AND SUBJECT MATTER OF REQUEST

For more than 15 years, XTO (including its predecessors in interest) has produced CBM from the Raton Basin. CBM lies in underground coal seams where it is interlaced with water molecules – hence, XTO's CBM wells bring methane and water to the surface. Outfalls associated with XTO's CBM wells are located in the tributaries to the Purgatoire River. Since XTO began CBM production, the Purgatoire River has met water quality standards. The water produced by XTO's CBM operations is anything but waste; it is used for crop irrigation, livestock watering, and wildlife habitat. Indeed, XTO's produced water flows through State wildlife areas, and there are ranchers whose operations rely on XTO's produced water.

Notwithstanding the factual evidence of good and usable water in the Purgatoire River, the Division has imposed new, unwarranted requirements regarding the permits' sodium absorption ratio ("SAR"), whole effluent toxicity ("WET") testing, and iron parameters. The Division has also erred in its conclusions regarding other metals monitoring, flow limits, economic reasonableness, and other permit-specific issues, and has failed to adequately address permit comments as required by law. Although they are erroneous for multiple reasons, the Division's actions ultimately fail to acknowledge that the status quo is protective of water quality and beneficial uses. What is more, the Division recognizes that its decisions may require XTO to inject the produced water into the ground rather than discharge it. Given the cost of going to 100 percent injection is estimated to be in excess of $100 million for the CBM operators in the Basin,[1] XTO will likely be forced to shut down its Raton Basin operations rather than inject. This severe, wholly unnecessary consequence shows that the Division's decisions are unsupportable.

[1] Pioneer Natural Resources USA, Inc. ("Pioneer"), another CBM operator in the Basin, has today filed its own Notice of Appeal, Request for Stay, and Request for Adjudicatory Hearing.

CBM production in the Raton Basin could continue for another 20 to 40 years, providing economic benefits to the local communities in excess of $85 million per year. XTO's CBM wells currently produce approximately 2,000 acre feet of water per year, some of which is injected, but most of which—up to 1,780 acre feet per year—is contributed to the parched Purgatoire/Arkansas River basin. The Division's permit modifications will either stop CBM production altogether or require the produced water to be injected, and thereby wasted. The added water would no longer increase the Purgatoire River flows in this arid region, impacting wildlife and possibly even forcing ranchers to cease production on their land.

Some of the Division's final decisions were forecasted in draft renewal permits and draft Fact Sheets issued on February 6, 2015. Recognizing the negative consequences of the Division's proposed actions to its operations and the environment, XTO filed an administrative appeal and requested a stay of the proposed requirements on March 9, 2015. After the Division denied the request for stay on the basis of timeliness, XTO sought a reversal of that decision in Colorado state court. The state court case is now stayed by agreement of the parties. Through XTO's appeals and the negotiations surrounding them, XTO's representatives made the Division acutely aware of the devastating environmental, economic, and hydrologic consequences of its proposed restrictions. In response, Dr. Larry Wolk, the Executive Director of the Colorado Department of Health and Environment, guaranteed XTO that it would not be forced to inject. Yet now, that is exactly what the Division's May 29, 2105 decisions tell XTO to do, citing injection as XTO's "preferred option."

Accordingly, XTO has no choice but to file this appeal and request an adjudicatory hearing regarding the Division's May 29, 2015 permit actions. As explained below, the

Division's decisions are arbitrary, capricious, in excess of the Division's authority, not based on substantial evidence, and an abuse of discretion in violation of Colo. Rev. Stat. § 24-4-106.

XTO also requests that the Division stay its adoption, implementation, and enforcement of the challenged SAR limitations, WET testing approach, and iron limitations in the Renewal Permits.

II. STATUTORY AND REGULATORY AUTHORITY

A. Notice of Appeal and Request for Adjudicatory Hearing.

XTO brings this request for an adjudicatory hearing under the State Administrative Procedure Act (the "APA"), codified at sections 24-4-101 through 108 of the Colorado Revised Statutes, the Colorado Water Quality Control Act (the "WQCA"), codified at sections 25-8-101 through 803 of the Colorado Revised Statutes, and the regulations of the Water Quality Control Commission (the "Commission"), 5 C.C.R. § 1002.

Section 25-8-403 of the WQCA provides that any party directly affected by a final order or determination of the Division may apply for a hearing with respect to such order or determination. Regulation 61.7 in turn provides that the "application [*sic*] . . . affected or aggrieved by the Division's final determination may demand an adjudicatory hearing within thirty (30) days of the issuance of the final permit determination." 5 C.C.R. § 1002-61.7(a). The decisions in the Renewal Permits, Fact Sheets, and Appendices C are final, and XTO is a party directly affected and aggrieved by them.

The hearing may address all the issues of fact and law raised prior to the hearing. *See* 5 C.C.R. § 1002-61.7(c). The hearing shall be subject to the requirements of sections 24-4-105 and 25-8-401 through 406 of the Colorado Revised Statutes, as well as 5 C.C.R. § 1002-21.7.

This request for an adjudicatory hearing is timely under Colo. Rev. Stat. § 24-4-105(14)(a)(II) and 5 C.C.R. § 1002-61.7(a). The Division is the proper forum for this hearing. *See* 5 C.C.R. § 1002-21.4(A)(3).

B. On Appeal, the Division Has the Burden of Proof.

The Division will bear the burden of proof at the adjudicatory hearing, as its actions are not based upon significant changes in the facts relevant to water quality or changes in the applicable statutes or regulations. 5 C.C.R. § 1002-61.7(d)(ii).

C. Request for Stay.

XTO brings its request for a stay under section 25-8-406 of the Colorado Revised Statutes, which provides that the Division may stay any contested terms and conditions of a permit for good cause shown. *See also* 5 C.C.R. § 1002-61.7(c). The permits must be stayed in their entirety to preclude undue, irreparable harm to XTO. If not stayed, XTO would be required to comply with the underlying permit terms and could face enforcement actions for failure to comply, even though the Division's permit decisions may be overturned on appeal (and thereby rendered void *ab initio*) or modified during a facilitated discussion. The basis for a finding of good cause for a stay is discussed in Section V of this Petition.

III. FACTUAL BACKGROUND

Although the Renewal Permits only recently issued, the majority of the challenged permit terms have been debated for months, if not years. In particular, XTO requested permit modifications regarding WET and iron in December 2013, and requested SAR modifications in August 2014. Rather than addressing these requests individually, Division chose to address them

in the 2015 renewal permit process. XTO has met and corresponded with the Division on numerous occasions regarding WET, iron, SAR, and other parameters.

This section will explain the facts pertinent to this appeal, including the present status of the permits; XTO's requested modifications to WET, iron, and EC/SAR; the Division's preliminary denials of XTO's modifications; XTO's administrative appeal of these preliminary denials and its request for stay; the Division's denial of XTO's administrative appeal and request for stay; XTO's judicial appeal of the Division's denial of the stay request; the parties' agreement regarding the contested SAR, iron, and WET parameters; and the Division's issuance of the Renewal Permits, Fact Sheets, and Appendices C.

A. The Permits and Their Current Status.

XTO's CBM operations in the Raton Basin comprise 77 outfalls. The produced water discharged from these outfalls is authorized by the Permits, which were originally authorized under General Permits, then individual permits issued on December 30, 2009, effective February 1, 2010. *See* Ex. X-04 (Permit No. CO0048054 Permit, July 31, 2014) (the "48054 Permit"); Ex. X-27 (Permit No. CO0048062 Permit, July 31, 2014) (the "48062 Permit"). The Permits were set to expire on January 31, 2015. *See id.* Although the normal course of business would be to submit permit renewal applications six months prior to expiration in accordance with 5 C.C.R. § 1002-61.4(1)(D), the Division requested that XTO submit early renewal applications for its permits. *See* Ex. X-69 (Letter from CDPHE re Renewal Notification for CO0048054 (June 27, 2013)); Ex. X-70 (Letter from CDPHE re Renewal Notification for CO0048062 (June 27, 2013)). In accordance with the Division's request that it submit renewal applications earlier than required, XTO filed a Permit Renewal Application on December 23, 2013. *See* Ex. X-66 (Renewal Application).

The Division issued the Renewal Permits on May 29, 2015, but their terms do not take effect until July 1, 2015. *See* Ex. X-01 at 1 (48054 Renewal Permit); Ex. X-24 at 1 (48062 Renewal Permit). In these cases, the requirements of the otherwise expired permits continue until the renewal permits become effective. *See* 5 C.C.R. § 1002-61.8(3)(o) (2015). As a result, compliance deadlines issued under the Permits remain in effect, subject to the expiration date set forth for each Compliance Schedule. Relevant to the current appeal and stay request, the Permits contain July 1, 2015 compliance deadlines for iron and WET. *See* Ex. X-04 at 8-9 (48054 Permit); Ex. X-27 at 9 (48062 Permit). The implications of these deadlines are discussed below in Section V, regarding XTO's request for stay.

B. XTO's Modification Requests.

In August and December of 2014, XTO submitted requests to modify the permits' WET, iron, and EC/SAR parameters. Specifically, XTO filed Permit Modification Forms on December 18, 2013 requesting modification to the Permits to implement alternative approaches for determining compliance with WET chronic testing for outfalls in the Raton Basin. A discussion of XTO's WET modification request appears in Addendum 3. Also on December 18, 2013, XTO submitted a request for a modification of iron limits in the Permits. A discussion of XTO's iron modification request appears in Addendum 4. On August 6, 2014, XTO requested EC/SAR compliance schedules for the Permits. A discussion of XTO's EC/SAR modification request appears in Addendum 5.

C. The Division Issues Draft Renewal Permits and Draft Fact Sheets, and XTO Appeals.

On February 6, 2015, in conjunction with the issuance of Draft Renewal Permits, the Division issued Draft Fact Sheets preliminarily denying XTO's WET, iron, and EC/SAR

modification requests for each of the Permits. *See* Ex. X-05 (Draft Permit No. CO0048054, Feb. 6, 2015); Ex. X-28 (Draft Permit No. CO0048062, Feb. 6, 2015); Ex. X-06 (48054 Permit Feb. 6, 2015 Draft Fact Sheet); Ex. X-29 (48062 Permit Feb. 6, 2015 Draft Fact Sheet). In response to the Draft Fact Sheets, XTO filed a Notice of Appeal, Request for Adjudicatory Hearing, and Request for Stay on March 9, 2015, within the 30-day regulatory deadline. *See* Ex. X- 82. The Division denied XTO's requests in an Order dated March 19, 2015. *See* Ex. 83 (Order Denying Notice of Appeal, Request for Adjudicatory Hearing, and Request for Stay). As to XTO's request for an adjudicatory hearing, the Division found that the Draft Fact Sheets and Draft Renewal Permits did not provide final, appealable orders or determinations. *Id.* at 4. The Division denied XTO's stay request on the basis that it was untimely, and therefore did not reach the merits of the request. *Id.* at 5.

On April 6, 2015, XTO submitted comments regarding the Draft Renewal Permits. *See* 86 (XTO's Comments).

D. <u>The Parties Reach an Agreement to Enter a Facilitated Discussion</u>.

Following the issuance of the Division's Order, XTO's representatives engaged with the Division regarding the possibility of entering a facilitated discussion to address XTO's permit concerns in a non-adversarial setting. While it was still unclear whether the Division would accept Pioneer's offer of a facilitated discussion, XTO filed an appeal of the Division's Order in the District Court for Las Animas County. *See* Ex. X-84 (Complaint for Judicial Review dated April 20, 2015). In its Complaint, XTO sought reversal of the Division's denial of XTO's request for stay pursuant to the Administrative Procedure Act and Water Quality Control Act, and requested preliminary injunctive relief. *Id.*

XTO and the Division reached an agreement regarding a facilitated discussion on May 8, 2015. *See* Ex. X-85 (Agreement to Engage in Facilitated Discussion). Under that agreement, the Division was to issue renewal permits on or before May 29, 2015. *Id.* at ¶ 3. XTO was to file an appeal and request for stay of the WET, iron, and EC/SAR provisions of the renewal permits on or before June 15, 2015, and the Division was to issue the request for stay for good cause shown within five business days. *Id.* at ¶ 4. Subsequently, XTO and the Division were to engage in a non-binding facilitated discussion to conclude by September 30, 2015. *Id.* at ¶ 6. Pursuant to the agreement, the parties filed a motion to stay the District Court proceedings, which the court granted on May 18, 2015.

E. The Division Issues Final Renewal Permits.

The Division issued final Fact Sheets and final Renewal Permits on May 29, 2015. *See* Ex. X-01 (48054 Renewal Permit); Ex. X-02 (48054 Fact Sheet); Ex. X-24 (48062 Renewal Permit); Ex. X-25 (48062 Fact Sheet). For each Renewal Permit, the Division also issued an Appendix C responding to comments submitted in connection with the Draft Fact Sheets and Draft Renewal Permits. *See* Ex. X-03 (48054 Appendix C); Ex. X-26 (48062 Appendix C). This Notice of Appeal, Request for Adjudicatory Hearing, and Request for Appeal followed.

IV. BASIS FOR APPEAL

The Division's decisions regarding the following issues are erroneous:

- WET
- Iron
- SAR
- Other Metals
- Flow Limits

- The Division's Economic Reasonableness Determination, and
- Other Permit-Specific Issues

Pioneer also appeals inconsistencies among the Renewal Permits, Fact Sheets, and Appendices C, as well as the Division's failure to adequately address comments as required by law. These are discussed below in turn.

A. The Division's Decision Regarding WET Is Erroneous.

1. Summary of the Division's Decision Regarding WET.

The Division concluded that chronic WET testing at the outfalls using *C. dubia* remained applicable and appropriate. 48054 Fact Sheet at 25, 29; 48062 Fact Sheet at 23, 27. This was based on the Division's findings that: a reduction in the level of aquatic life protection would be inconsistent with the level of protection applied by the Commission through the adoption of the aquatic life classification and standards, 48054 Fact Sheet at 28; 48062 Fact Sheet at 26; that no exception to chronic WET testing applied because (1) the discharge is continuous, (2) there is no significant dilution effect, and (3) the level of aquatic life protection assigned by the WQCC is not limited, 48054 Fact Sheet at 26-27; 48062 Fact Sheet at 24-25; and that EPA has not approved the use of *D. magna* for WET testing in 40 CFR 136, 48054 Fact Sheet at 27; 48062 Fact Sheet at 25. Citing *The Potential Effects of Sodium Bicarbonate, a Major Constituent of Produced Waters from Coalbed Natural Gas Production, on Aquatic Life*, USGS, 2012 (the "USGS CBM Study"), attached as Exhibit 58, the Division determined that the TDS ions, specifically sodium bicarbonate and bicarbonate, were the pollutants causing chronic toxicity for *C. dubia*, 48054 Fact Sheet at 25; 48062 Fact Sheet at 23, but concluded that the establishment of such effluent limits, in lieu of an effluent limit for WET, is not appropriate at this time, 48054 Fact Sheet at 28; 48062 Fact Sheet at 26.

The Division increased the frequency of chronic WET testing from annually to quarterly, 48054 App. C at 25; 48062 App. C at 25, and added a compliance schedule of 24 months, until July 1, 2017, for chronic WET limitations, 48054 Fact Sheet at 82; 48062 Fact Sheet at 56.

2. Errors in the Division's Decision Regarding WET.

The Division's decisions regarding WET were not only erroneous, but arbitrary, capricious, in excess of the Division's authority, and an abuse of discretion for several reasons:

a) Chronic WET Testing Should Not Apply at the Outfalls.

The Division erred in concluding that chronic WET testing at the outfalls is appropriate. The purpose of chronic WET testing is to evaluate sublethal effects, such as fertilization, growth or reproduction, over test organisms' full life-cycles or significant portions of their life cycles. *See* Ex. X-47 at 39 (EPA Regions 8, 9, and 10 Toxicity Training Tool (Jan. 2010)). However, as explained in February 2013 study submitted to the Division, in many locations, no flow or aquatic life would exist *but for* the outfalls' discharge. *See* Ex. X-12 at 2 (Executive Summary to *Ecological Evaluation of the Effects from XTO and Pioneer NPDES Discharges to Aquatic Life in Lorencito and South Fork Purgatoire River* (the "AECOM Executive Summary"); *see also* Ex. X-14 (*Ecological Evaluation of the Effects from Pioneer and Pioneer NPDES Discharges to Aquatic Life in Lorencito and South Fork Purgatoire River*) ("AECOM WET Study"). Therefore, because aquatic life do not regularly and naturally occur at the points where the CBM produced water is discharged, there is simply no justification for testing the produced water as if they do. While acute WET testing may be appropriate to verify the lack of lethal toxins in the discharged water, the lack of sustained flow and native aquatic life at the outfall makes chronic WET testing at the outfalls unnecessary and inappropriate.

Moreover, although aquatic life exists at confluences that the produced water might, in some instances, reach, the AECOM WET Study found no toxicity at various test locations located at these confluences. *See* Exs. X-14 at 11-12 (AECOM WET Study). In other words, not only is there no logical justification for chronic WET testing at the outfalls, but real-world data show that there is no practical justification for such testing, either. Acute wet testing at the outfall, for which there is a long history and data set, coupled with chronic testing at the confluences, would be more than protective. Neither policy nor practice supports the Division's imposition of chronic WET testing at the outfalls.

b) Treatment for WET Is Not Feasible.

The Division's imposition of chronic WET testing at the outfalls effectively mandates that XTO treat the produced water, but treatment is not feasible. *See* 48054 App. C at 5; 48062 App. C at 5 (suggesting "settling and then membrane filtration to remove sodium bicarbonate for the portion of the discharge necessary to meet the WET limit."). The Division's decision overlooks the fact that there is not one point of discharge, but 77 spread out over hundreds of square miles of rugged terrain. The installation of a treatment facility at each outfall would be a massive and costly undertaking, as would the ongoing operation and maintenance of the facilities. Moreover, for some of the remote outfalls that do not have an accessible source of electricity, installation and operation of a power-intensive treatment facility is simply not possible. Finally, treatment facilities require sustainable volumes and through-puts of water to be processed; many of the outfalls are of very low, and even intermittent discharge.

The Division views treatment as an alternative to shutting down noncompliant outfalls; it is not. Treatment is practically and economically infeasible. Because WET testing was previously subject to a compliance schedule, XTO has already submitted data to the Division

showing that treatment is infeasible. Additionally, XTO pointed out many of the same feasibility issues in connection with a chloride alternatives analysis. *See* Letter from R. Sandquist to A. Neuhart re: Alternatives Analysis for Chloride (Nov. 28, 2012), and XTO submissions for the June 2013 Hearings on Arkansas River certifications and standards. To require such a Herculean (and perhaps Pyrrhic) undertaking or force the injection of the produced water, *especially where testing shows that there is no toxicity at confluences where aquatic life actually occurs*, is arbitrary and capricious.

c) The Division Erred in Its Reasonable Potential Analysis for WET Testing.

The Division's analysis of reasonable potential ("RP") for WET failed to consider "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." 5 C.C.R. § 1002- 61.8(2)(b)(1)(B). XTO submitted substantial toxicology data from its experts on WET testing with *C. dubia* and *D. magna*. *See* Exs. X-14 (AECOM WET Study). Those laboratory studies and evaluations concluded:

> A 4-day *D. magna* short-term chronic WET test, developed by USEPA, was performed over a period of time at the outfalls, and showed less toxicity compared to the *C. dubia* WET test. *D. magna* are equally sensitive to many toxicants while being less sensitive to TDS ions compared to *C. dubia*. Therefore, the 4-day *D. magna* test method may be able to help differentiate between TDS ion toxicity and toxicity from other sources…"

Id. at 1. The AECOM WET Study shows that if *D. magna* were used for toxicity testing, it would be more likely to detect if constituents (e.g. metals, VOCs, SVOCs, etc.) other than TDS were causing toxicity. Although both species are equally sensitive to many toxicants, because *C.*

daphnia is more sensitive to TDS ions, results using *C. daphnia* may mask or fail to identify toxicants from other sources.

Even though the evidence verifies the lack of sustainable aquatic life at the outfalls, the Division conducted an RP analysis at the outfalls and concluded that WET testing should occur at the permit outfalls. XTO would not object to acute WET testing, recognizing that even if all stages of aquatic life are not present at the outfalls, acute WET testing would sufficiently assess the protection of the aquatic life for the short duration of their presence.

d) The Permits Should Provide for Reduced WET Monitoring and Relief from WET Testing

XTO has demonstrated that the produced water is chemically consistent and lacks the potential to have new pollutants introduced. The Division's WET Policy provides that the Division may consider reducing the WET testing monitoring frequency after four consecutive WET test have been passed. *See* Ex. X-48 at 15 (WQCD Implementation of the Narrative Standard for Toxicity in Discharge Permits Using Whole Effluent Toxicity (WET) Testing, Sept. 30, 2010) (the "WET Policy"). This has been done in past permits, which is why under previous permits, the frequency of acute WET testing was eventually reduced from quarterly to annually. Although XTO has passed numerous acute WET tests, the Permits do not provide for such relief.

Additionally, for chronic WET testing the Permits should have been "modified to eliminate the automatic compliance response" because it has been demonstrated that "a parameter that was determined to be the cause of toxicity during a previous TIE was present at a similar concentration(s) and therefore can reasonably be assumed to have caused the newly observed toxicity." *Id.* The Division received not only the TIE/TRE reports prepared by XTO which repeatedly demonstrated that toxicity was due to TDS ions, but additionally a

comprehensive study of WET testing and toxicity for these same outfalls conducted by AECOM concluding that chronic WET testing is not necessary. *See* Exs. X-14 at 8(AECOM WET Study) ("[T]he results of this analysis indicate that while sublethal [chronic] toxicity was observed in *C. dubia* (in LC only), the aquatic community in both tributaries (SFPR and LC) does not appear to be negatively impacted by the CBM discharges.").

The Division utilized a conclusion that the multimetric macroinvertebrate index (MMI) values for Lorencito Canyon in 2012 were low and therefore not protecting aquatic uses; but failed to consider the strong caveats on such conclusions. For example, the Lorencito aquatic community may have been impacted by a high flow event prior to the 2012 data collection. But, moreover, "the analysis showed that taxa richness did not appear to be significantly decreasing over time; suggesting that the BMI community has not been negatively impacted by the CBM discharges in the tributaries." *See* Exs. X-14 at 2 (AECOM WET Study).

e) <u>The Division's Two-Year Compliance Schedule Does Not Leave Enough Time to Obtain an Alternate Test Procedure</u>.

The Division's decision regarding WET leaves XTO with essentially one option for attaining WET compliance—petitioning the EPA for an alternate test procedure ("ATP")—but the two-year compliance schedule does not allow enough time for it. An ATP is necessary due to the fact that EPA does not allow the preferred test species, *D. magna*, to be used in chronic WET testing. The current test species, *C. dubia*, is not at all representative of native species—it is a water flea native to the Midwest. To subject *C. dubia* to the high-altitude, ephemeral stream conditions of the Raton Basin is not a valid or defensible measure of toxicity. An ATP is therefore necessary and appropriate.

The process for petitioning EPA to allow *D. magna* as the species for chronic WET testing could take up to five years, however, and the Division has only allowed a 24-month compliance schedule. Moreover, ATP's are not regularly issued. Indeed, XTO is only aware of one successful ATP in the Western United States (for the Pinto Creek mine site in Arizona). Because an ATP is not attainable by July 1, 2017, when the WET compliance schedule expires, the Division's decision to only issue a 24-month compliance schedule is arbitrary and capricious.

Even if XTO had the time to pursue an ATP and were confident in receiving one, the Division's comments evidence its lack of support for an ATP. To obtain an ATP, the Division must recommend approval before Pioneer can forward its ATP request to EPA. After the ATP is approved, the Division must take the additional step of incorporating the ATP in each of XTO's discharge permits. The Arizona ATP referenced above had the support of the state's Department of Environmental Quality. Here, rather than expressing some indication of the Division's willingness to back an ATP, the Division merely notes: "[e]ven if an ATP request is approved by EPA, the permitting authority must still determine whether the ATP is appropriate for use in the permitting action." *See* 48054 Fact Sheet at 27; 48062 Fact Sheet at 25. Given no hint whether Division would agree to the ATP, XTO is left wondering why it would pursue the difficult and lengthy ATP process in the first place. In light of the unrealistically short timeline it provides for obtaining an ATP and its at-best tepid support for the process, the Division effectively removes the ATP as a reasonable alternative to noncompliance.

f) <u>The Additional Cost of Quarterly Chronic WET Testing Is Unreasonable</u>.

The Division erred by increasing the frequency of chronic WET testing from annually to monthly, a change that would impose unreasonable testing costs on XTO. *See* 48054 App. C at

25; 48062 App. C at 25 ("Per the WET policy, the standard monitoring frequency is quarterly, and therefore the Division applied the standard quarterly monitoring frequency."). As stated in XTO's comments on the draft permits, XTO predicts that quarterly testing would cost approximately $2.52 million for the CBM operators in the basin, an increase of approximately $1.85 million per year over current costs. *See* Ex. X-86 at 33 (XTO Comment Letter). These costs include the addition of a second full-time contractor/employee for data collection. *Id.* Moreover, because of the remote locations of the outfalls, comprehensive quarterly testing may be logistically impossible, particularly during the winter months or periods of heavy precipitation. *Id.* Given that chronic WET testing at the outfalls should not apply, in the first place—both because its use is inappropriate at the outfall and because there is no toxicity downstream (as discussed above)—the Division's decision to increase the frequency of WET testing is unsupportable.

The Division abused its discretion by electing to impose quarterly monitoring and ignoring the prohibitive costs and practical near-impossibility of quarterly monitoring. The WET Policy states: "WET testing shall normally be required on a quarterly basis, although the Division retains authority to vary the frequency as warranted by site-specific circumstances. For instance, frequency may be increased to <u>monthly</u> where there have been instances of WET failures." 48054 App. C at 25; 48062 App. C at 25 (emphasis in the original). Purportedly in accordance with this policy, the Division found that failures of chronic WET testing justified increasing testing from annually to quarterly. Rather than interpreting the WET policy as permitting less-than-quarterly testing, as the first sentence quoted plainly allows, the Division interpreted the second sentence quoted as mandating *at least* quarterly testing. Not only is this interpretation contrary to the plain text of the policy, but this decision entirely ignores the "site-

specific circumstances" explained by XTO, especially the remote locations of the dozens of outfalls and the massive additional costs—almost $2 million per year for the companies, including an additional full-time employee/contractor. The Division's explanation that there are regulatory provisions accounting for failures to obtain samples does nothing to eliminate the risk that such a failure could be deemed a violation of the permits. *See* 48054 App. C at 25-26; 48062 App. C at 25-26. The Division's decision to increase the frequency of chronic WET testing to quarterly is therefore arbitrary, capricious, and an abuse of discretion.

g) The Division's Powder River Comparison Is Inapposite and Based on a Flawed Report.

For two reasons, the Division's reliance on the USGS CBM Study as indicative of CBM produced Raton Basin water quality is misplaced. *See* 48054 Fact Sheet at 25; 48062 Fact Sheet at 23. First, the USGS CBM Study is error-laden to the point it should not be relied upon, and second, notwithstanding the errors in the study, differences between the Raton Basin water and the water on which the study is based make the study inapposite.

As Karen Christensen, ExxonMobil toxicologist, concludes, the USGS CBM Study is plagued with "a variety of technical and quality issues that make it inadvisable to rely on the numeric values generated in these studies to generate water quality criteria." *See* Ex. X-59 (Comments on USGS CBM Study). For example, within the USGS CBM Study, "there are obvious errors (such as incorrect reporting of percent survival), and apparent errors (unrealistic fish weights) which both prohibit the reader from evaluating the data and raise a concern about the accuracy of the other reported values." *Id.* at 2. Similarly, Ms. Christensen concludes that "[t]he absence of detail or reference regarding some procedures (e.g., sacrifice and weighing of fish in the chronic studies, the methodology used for histopathology, ATP measurements, and

ion measurements) render some of the measurements, and especially the biochemical ones, unusable for most inferential purposes since the appropriateness of the specific procedures is unknown." *Id.* at 3. In general, for the reasons cited by Ms. Christensen, it was error for the Division to give significant weight to the USGS CBM Study in making determinations regarding XTO's WET testing requirements.

Notwithstanding the reliability of the USGS CBM Study, the differences between the Tongue and Powder River waters on which the study is based and the waters of the Raton Basin make the USGS CBM Study inapposite. As detailed in a memorandum by Dr. Rami Naddy, there are substantive differences between the Tongue River, Powder River and Raton Basin ion data. *See* Ex. X-60 (Naddy Memorandum). For example, most of the Powder River water samples had higher sodium and sulfate concentrations relative to the Tongue River and Raton Basin water samples. *Id.* Additionally, potassium concentrations tended to be higher in the Powder River samples, as did bicarbonate and alkalinity. *Id.*

The differences in the ion data between the Tongue and Powder Rivers and the Raton Basin water are significant because variability in the presence of other ions may impact the response of organisms in toxicity tests, even if the major ion being assessed in the different studies (e.g., bicarbonate) is the same. *See id.* Thus, drawing conclusions regarding Raton Basin WET testing based on Powder River toxicity studies is likely erroneous because of the Powder River's significantly different ion data. In short, the Division's decision to rely on an error-plagued study concerning materially different water is not supported by substantial evidence.

h) <u>The Division Failed to Approve or Deny XTO's WET Testing Modification Request</u>.

The Division noted that XTO requested WET modifications in December 2013, and that the Division chose to incorporate its consideration of the request into the permit renewal process. 48054 Fact Sheet at 21; 48062 Fact Sheet at 19. The Division also noted that XTO provided additional information regarding the WET request as comments on the draft renewal permits. 48054 Fact Sheet at 21; 48062 Fact Sheet at 19.

Notwithstanding this representation, the Division never states that it approved or denied the request. The Fact Sheet, Appendix C, and Renewal Permits implicitly deny the request, but contain no express statement to that effect. The Division's failure to explicitly approve or deny XTO's request is an abuse of discretion. Also, absent a rationale for the implicit denial of the requested permit modification, the denial is also arbitrary and capricious.

B. <u>The Division Decision Regarding Iron Is Erroneous</u>.

1. Summary of the Division's Decision Regarding Iron.

The Division partially accepted and partially implemented XTO's alternatives analysis ("AA") for iron, which XTO included along with its comments regarding the draft renewal permits. *See* Ex. X-86 (Comment Letter) at Attach. B, pages 105-33. XTO's AA details the benefits of its CBM operations to Las Animas County, both in terms of the water produced and the economic benefits generated. *See id.* at 109-16. The AA also outlines how continued levels of iron discharge are necessary to accommodate CBM development. *See id.* at 116-21. XTO explained that it had two options for complying with the draft permits' limits—treatment or injection—and it detailed the costs of each. *See id.* at 117-21. XTO concluded, "The costs of the two alternatives described above [to the CBM operators in the Basin], (1) MF [microfiltration] treatment and backwash disposal ($83.8 – 91.9M) or (2) disposal of all produced water via subsurface injection ($93M - $184.8M) significantly exceed the costs of the proposal herein,

namely, to maintain surface water discharge of produced water at iron levels not to exceed the current conditions defined as the maximum [total recoverable iron] concentration discharged at each outfall based on DMR data and statistical analyses that removed outliers." *Id.* at 121-22.

The Division rejected the application of the AA to 30-day average limitations, reasoning that they apply to beneficial uses, which cannot be changed by an AA. 48054 App. C at 30; 48062 App. C at 30. The Division determined that it would allow the AA's antidegradation based effluent limitations (ADBELs) of the maximum 2-year rolling average exhibited during the previous permit term at each outfall. 48054 App. C at 31; 48062 App. C at 31. Notwithstanding this determination, the Division did not apply it uniformly to the permits' many outfalls. *See* Section IV.G and Addendum 1. The Division authorized compliance schedules for certain outfalls that demonstrated WQBEL exceedances. *See* 48054 Fact Sheet at 60-70; *see also* 48054 Fact Sheet at 81-82; 48062 Fact Sheet at 55-56.

2. Errors in the Division's Decision Regarding Iron.

The Division's decisions regarding iron were not only erroneous, but arbitrary, capricious, in excess of the Division's authority, and an abuse of discretion for several reasons, discussed below.

a) The Division Erred in Ignoring 5-year Set of Data.

The Division's decision to disregard a set of 5-year historic iron data in calculating the ABDELs is arbitrary and capricious. XTO and the Division both have access to iron data going back 5 years. This 5-year set of data shows a range of iron values that are not captured in the 2-year set selected by the Division. Using the additional 3 years of data, the Division could have formulated limitations that better reflect the conditions of the water. In other words, more data

would have produced more representative limitations. *See* Ex. X-52 at 18 (Determination of the Requirement to Include Water Quality Standards-Based Limits in CDPS Permits Based on Reasonable Potential) ("Larger data sets are more desirable because they are generally less variable and more representative of the discharge than smaller data sets."). Instead, the Division chose to disregard 3 years of valuable data, thereby arriving at limits that do not reflect the historical variability of iron levels in the produced water. This decision, based on two out of five years of data, was in error.

b) The Division Erred in Using the 2-Year Set of Data It Did.

The Division erred in using the previous two years of data to calculate 2-year rolling averages because that data was supposed to be "report only." That is, while XTO was obtaining that data, it was under the impression that the data would not affect its legal rights. Unaware that the data would become the basis of the ABDELs, XTO was without the ability to fully contest irregular data, or to collect duplicate or near-time verification samples where possible exceedances had occurred. The appropriate course of action would have been for the Division to notify XTO two years ago of its decision to utilize 2-year rolling average and to expressly require XTO to collect data for that purpose. The Division's action here amounts to a retroactive application of permit limits and constitutes an abuse of discretion and in excess of the Division's regulatory authority.

c) The Division's Suggested Treatment Plan Is Unreasonably Expensive and Practically Infeasible.

By disregarding the drastic costs of treatment or injection—both to XTO and the surrounding communities—the Division erred in refusing to implement XTO's AA proposal to maintain surface water discharge of produced water at iron levels not to exceed the current

conditions defined as the maximum total recoverable iron ("FeTR") concentration discharged at each outfall based on DMR data and statistical analyses that removed outliers. As explained by XTO, its CBM operations significantly benefit Las Animas county by producing much-needed water and economic benefits such as jobs, tax revenue, and revenue from agriculture and tourism. *See* Ex. X-86 (Comment Letter) at 109-16. Moreover, because XTO would have difficulty complying with the new iron limitations, it would be forced to install treatment at a capital cost to the CBM operators in the Basin of approximately $83.3 million to $91.9 million, plus ongoing annual operating costs of approximately $3.9 million; or to inject the water into underground injection wells, which would cost the operators in the Basin in excess of $100 million in capital costs, plus annual operating costs of $1.8 million per year. *Id.* at 117-21.

The Division erred by not acknowledging these severe costs. *See* 48054 App. C at 30-31; 48062 App. C at 30-31. In particular, the Division advanced no reason for not accepting the conclusion that XTO's proposed limits were less costly than the alternatives. XTO's AA was well researched and well-articulated, and its proposed iron limits should therefore have been accepted. Alternatively, even if the Division did consider but disagreed with XTO's AA, the Division was obligated to explain why.

d) <u>The Division's Proposed Treatment Plan for Iron Would Be Likely to Increase SAR Levels</u>.

Moreover, the Division's proposed treatment for iron—aeration—would be likely to increase SAR levels. Aeration increases the amount of evaporation. Sodium compounds are much more soluble than calcium or magnesium compounds; therefore evaporation effectively raises the SAR by increasing the sodium to calcium and magnesium ratio. In theory, therefore, the SAR would be higher in the aerated waters compared to the unaerated waters due to more

calcium carbonate precipitation. The Division's suggestion of a treatment for iron that would increase another controlled parameter without acknowledging the same is another reason the Division's decision regarding iron is arbitrary and capricious.

e) The Division Ignores the Reality That Background Iron Levels Are Already High.

Due to streambank erosion and other factors, the background levels of iron in the Purgatoire are already high. These levels are high even without the addition of CBM produced water. As a result, even if XTO were able to lower the iron levels in its produced water, such reductions would not make an appreciable difference in the Purgatoire's overall iron levels. The iron limits imposed in the Renewal Permits ignore this reality. Moreover, in some cases, the iron limits in the Renewal Permits are lower than background iron levels, meaning the Renewal Permits do not accommodate the addition of any iron by produced water.

f) The Division Failed to Approve or Deny XTO's Iron Modification Request.

As an initial matter, the Division noted that XTO requested iron modifications in December 2013, and that the Division chose to incorporate its review of the request into the permit renewal process. 48054 Fact Sheet at 19; 48062 Fact Sheet at 16-17.

Notwithstanding this representation, the Division never states that it approved or denied the request. The Fact Sheet, Appendix C, and Renewal Permits implicitly deny the request, but contain no express statement to that effect. The Division's failure to explicitly approve or deny XTO's request is arbitrary and capricious. Also, absent a rationale for the implicit denial of the requested permit modification, the denial is also arbitrary and capricious.

C. The Division's Decision Regarding SAR Is Erroneous.

1. Summary of the Division's Decision Regarding SAR.

The Division concluded that numeric effluent limitations were necessary and appropriate for SAR. 48054 Fact Sheet at 7; 48062 Fact Sheet at 5. The Division found that the narrative standards required two types of protection: (1) no harm to irrigated crops, and (2) no harm to the beneficial use, which for irrigated agriculture is "for crops usually grown in Colorado." 48054 Fact Sheet at 7-8; 48062 Fact Sheet at 6. Examining discharge data from January 1, 2014 to September 20, 2014, the Division concluded that ambient stream data continues to demonstrate a positive relationship between the discharge of CBM water containing high levels of EC and SAR, and a corresponding increase in ambient EC and SAR levels. 48054 Fact Sheet at 10-11; 48062 Fact Sheet at 8-9. Looking at soil sampling results, the Division concluded that SAR values "indicate an increase" over the "normal" SAR value of "about 1." 48054 Fact Sheet at 14; 48062 Fact Sheet at 12. The Division found that the "results of the soil sampling do not inform a change in approach for establishing effluent limits to characterize the initial effluent discharge concentration at this time." 48054 Fact Sheet at 12; 48062 Fact Sheet at 14.

The Division maintained per-outfall flow limits (the maximum effluent discharge flow over a 30 day average) because no outfalls exceeded the flow limit during the previous permit term. 48054 Fact Sheet at 15; 48062 Fact Sheet at 13. The Division rejected XTO's request for a compliance schedule. 48054 Fact Sheet at 17-19; 48062 Fact Sheet at 15-16. The Division found that the necessity test was met for a number of outfalls, but concluded that the appropriate test had not been met because, according to the Division, the effluent limit was less stringent than the previous effluent limit. 48054 Fact Sheet at 19; 48062 Fact Sheet at 16.

2. Errors in the Division's Decision Regarding SAR.

The Division's decisions regarding SAR were not only erroneous, but arbitrary, capricious, in excess of the Division's authority, and an abuse of discretion for several reasons:

a) The Division Fails to Properly Apply Its Own Policy.

The Division failed to properly apply Water Quality Policy 24 ("WQP24"), "Implementing Narrative Standards in Discharge Permits for the Protection of Irrigated Crops." *See* Ex. X-51 (WQP24). The key standard under WQP24 is preventing harm to plants and to beneficial uses, however nowhere does the Division make a finding that SAR levels in XTO's produced water threatens to cause such harm in the Raton Basin. Instead, the Division merely assesses SAR levels in light of statewide studies. *See* 48054 Fact Sheet at 13-14; 48062 Fact Sheet at 11-12. There is no indication that the SAR levels in fields irrigated with Purgatoire River water (itself a mixture of runoff and CBM produced water) are harming crops or crop productivity in the Raton Basin. *See* Ex. X-61 at 10 (Fall 2014 Soil Sampling Results for Irrigated Soils Along the Purgatoire River Upstream from Trinidad Reservoir, Dec. 2014) (concluding that soils in two Basin agriculture fileds have SAR "that will not impair crop growth and development or soil structure"). Such harm is objectively unlikely given the crops are hardy pasture grass and alfalfa. The Division's indiscriminate application of statewide determinations of "normal" SAR values fails to effectuate WQP24's principle that "determination of the suitability of the quality of irrigation water is a complex analysis and dependent upon site-specific interactions of agricultural practices and environmental conditions." *See* X-51 at 2 (WQP24).

b) The Modified LCL Method Creates Significant Uncertainty, Depriving XTO of Due Process.

There are several flaws in the Division's LCL method for measuring SAR compliance, the most critical of them being that it does not provide a reliable standard by which XTO can evaluate and predict compliance. This error is discussed in depth in an attached memorandum by Dr. Konrad W. Quast, PhD, analyzing the LCL method. *See* Ex. X-63 at 1-3(Konrad W. Quast, CDPHE proposed revised SAR NPDES limits approach, June 5, 2015) (the "LCL Memorandum").

Based on field variability, the Division changed the method for determining compliance to the "lower confidence limit (LCL) method." 48054 Fact Sheet at 15; 48062 Fact Sheet at 13. According to the Division, this method was first developed for use in the 303(d) listing methodology. 48054 Fact Sheet at 15; 48062 Fact Sheet at 13; *see also* Ex. X-57 (Appendix. B, Jan. 8, 2015). Under that method, the Division calculated initial effluent discharge concentrations based on data from January 2010 through September 2013. 48054 Fact Sheet at 15; 48062 Fact Sheet at 13. From that set, the Division selected the concentration from the 85th percentile to characterize the data set. 48054 Fact Sheet at 13; 48062 Fact Sheet at 15. The 85th percentile concentration becomes the benchmark for testing future compliance data. 48054 Fact Sheet at 13; 48062 Fact Sheet at 15. Compliance is measured by asking whether the 85th percentile concentration of the new data set is significantly greater than the permit limit. 48054 Fact Sheet at 15; 48062 Fact Sheet at 13. This determination is made using the 99% level of confidence. 48054 Fact Sheet at 15-16; 48062 Fact Sheet at 13-14. The Division claims that the method allows for variability in effluent discharge concentrations and accepts the possibility that the 85th percentile will exceed the permit limit, as long as it is not significantly greater. 48054 Fact Sheet at 15-16; 48062 Fact Sheet at 13-14. The Division assigned a six-month averaging period to the effluent limit in order to facilitate a sample size of at least five samples. 48054 Fact

Sheet at 16; 48062 Fact Sheet at 14. In actuality, however. the LCL method creates significant unpredictability which makes compliance almost impossible.

Dr. Quast illustrates the unpredictability of the LCL method using two different examples. First, Dr. Quast shows how the same range of values used to generate SAR limits can also generate noncompliant results. *See* Ex. X-63 at 1-3 (LCL Memo.). On page 3 of his memorandum, Dr. Quast calculates the SAR limits for 3 outfalls using the Division's January 2010 through September 2013 data set. *Id.* at 3. Using a function that generates random numbers that fall within the reported maximum and minimum values of the January 2010 through September 2013 data set, he then generates two, 6-value sets of model data. *Id.* Comparing these to the calculated SAR limits, one outfall experiences an exceedance under the first 6-value model set, but none under the second set. *Id.* The second outfall experiences an exceedance under both model sets, while the third outfall experiences an exceedance under the second model set, but not under the first. *Id.* In other words, under the LCL method, SAR values falling between the minimum and maximum values of the very data set used to calculate SAR limit can actually result in exceedances of that SAR limit. Hence, as illustrated by Dr. Quast, the LCL method results in random, unpredictable noncompliance.

Another way the LCL method creates uncertainty is that it can result in outfalls going in and out of compliance during a sampling period. *See id.* at 6-7. For example, under the LCL method, the SAR limit for the Lorencito 059 outfall is 57.6. *See id.* After the 5 sampling events during the sampling period, the outfall reports a compliant value of 57.0. *Id.* at 7. With the addition of the 6th sampling event, however, the outfall reports a noncompliant value of 57.8. *Id.* Therefore, under the LCL method, XTO could spend 5 sampling events thinking an outfall will be compliant, only to learn that the outfall is noncompliant when the sampling period ends.

In this way, the LCL method would prevent XTO from taking actions to close or mitigate an outfall predicted to be noncompliant because XTO would not be able to predict noncompliance even after 5 of 6 sampling events. This places XTO at risk of enforcement actions even where it is doing what it is supposed to do – watching to see if an outfall appears noncompliant.

The LCL method therefore violates the fundamental principle of due process that a law "must be sufficiently explicit to inform those who are subject to it what conduct on their part will render them liable to its penalties." *Connally v. General Construction Co.*, 269 U.S. 385, 391 (1926). Moreover, the LCL method contradicts the Division's express reason for using it, which is to create predictability in the face of variable data. 48054 Fact Sheet at 15; 48062 Fact Sheet at 13 ("Noting the field variability described by the permittee, the Division explored options for revising the establishment of effluent limitations and evaluation of compliance for limits for SAR **which, would expressly allow for variability and for slight single value exceedances of the current permit limits** to be considered compliant.") (emphasis added). The Division's LCL method, which contradicts basic due process requirements and the Division's own reasoning, is therefore arbitrary and capricious.

c) <u>The Modified LCL Method Is More Stringent Than the Previous Limits, Making a Compliance Schedule Appropriate</u>.

In addition to creating significant unpredictability, the LCL method is actually more stringent than previous limits, contrary to the Division's representations. *See* 48054 Fact Sheet at 18; 48062 Fact Sheet at 16 ("In this case the effluent limit is less stringent than the previous effluent limit . . . ."); 48054 App. C at 47; 48062 App. C at 47 ("The effluent limits for SAR in this renewal permit and the method to determine compliance with the SAR effluent limit is less

stringent than in the current permit."). This misrepresentation leads to the Division's denying a compliance schedule for SAR where it would otherwise be appropriate.

The effluent limit in the current Permits is the maximum concentration effluent limit. Dr. Quast provides an example showing how the LCL method may actually be more stringent than the maximum approach. *See* Ex. X-63 at 6-7 (LCL Memo.). In an example using the Lorencito 059 outfall (discussed above), the SAR limit would be 57.6 under the LCL method but 59.7 under the maximum approach. *Id.* The LCL method may therefore be more stringent than the previous effluent limitations.

This misrepresentation is critical because the Division denies XTO's request for a compliance schedule on the basis that the LCL method is less stringent. *See* 48054 Fact Sheet at 18-19; 48062 Fact Sheet at 16 ("The determination that a compliance schedule was not appropriate for less stringent effluent limits derived to maintain historic effluent discharge concentration for the April 1, 2014 permit modification, remains appropriate for this renewal."). Because the LCL method is not less stringent, the Division should have granted a compliance schedule.

d) The Division's Calculation of the Benchmark SAR Value of 1.2 is Flawed.

The Division's calculation of 1.2 as the "mean of the range of SAR values" obtained from XTO's soil sampling is arbitrary and capricious. *See* 48054 Fact Sheet at 14; 48062 Fact Sheet at 12. The soil sampling was performed on two different fields within the Purgatoire Watershed: the Vigil field, which predominantly grows pasture grass, and the Roybal field, which predominantly grows alfalfa. In the Vigil field, XTO obtained 5 samples from depths ranging from 0 to 4 feet. These values ranged from 1.2 to 1.5. 48054 Fact Sheet at 14; 48062

Fact Sheet at 12. In the Roybal field, the samples came from depths ranging from 0 to 6 feet. These values ranged from 0.9 to 1.3. 48054 Fact Sheet at 14; 48062 Fact Sheet at 12. In its calculations for obtaining a benchmark SAR value of 1.2, the Division took the mean of the range of SAR values from both fields. 48054 Fact Sheet at 14; 48062 Fact Sheet at 12.

There are two distinct methodological errors in the Division's calculation. First, the Division erred in combining sampling values from two different fields with materially different characteristics. The two fields are owned by separate individuals and have different crops—predominately pasture grass in the Vigil field and predominately alfalfa in the Roybal field. Therefore, these fields may have been subject to different management practices in the past (e.g., irrigation, fertilization, amendments, tilling) and may be managed differently in the future. As past and future management practices may influence soil chemistry, the Division erred in pooling the SAR values from these two separate populations to develop one benchmark SAR value.

Just as the Division erred in combining values obtained from two different fields, it also erred in averaging SAR values obtained from different, incorrect soil depths—from 0 to 4 feet in the Vigil field, and from 0 to 6 feet in the Roybal field. As discussed in Colorado State University Extension Fact Sheet No. 0.504, *Managing Sodic Soils* by J.G. Davis, R.M. Waskom and T.A. Bauder, SAR levels in agricultural soils should be assessed by collecting "*a composite sample of several cores, 6 to 8 inches deep*." *See* Ex. X-64 (Fact Sheet No. 0.504). One reason for this recommended methodology is that anthropogenic sodicity issues are first apparent in the near surface soils, not the deeper soils. *Id.* Therefore, the Division's averaging of SAR values from two different fields at depths ranging from 0 to 6 feet is flawed.

Using the correct methodology—keeping the two fields' data separate and using samples from the correct depth—the correct mean SAR values, based on the 6 to 8 inch composite sample values collected by the Companies from the separate fields in the fall 2014, are, for the Vigil field, 1.5; and for the Roybal field, 0.9. Based on the Division's decision to calculate benchmark values as a two-fold increase in action field values, the correct benchmark SAR value would be 3.0 for the Vigil field, and 1.8 for the Roybal field.

No matter which mean SAR values are used, the Division's conclusion that SAR values "indicate an increase" over "normal" SAR values of "about 1" is unsupportable. *See* 47767 Fact Sheet at 11; 47776 Fact Sheet at 9-10; 48003 Fact Sheet at 10-11. To determine that 1.2 is anything other than "about 1" is inconsistent with the English language. The soil data, if anything, show that SAR values in the area are normal.

e) The Division Failed to Apply the Benchmark SAR Value of 2.4 in the Renewal Permits.

Even if the Division had used the correct methodology for calculating the benchmark SAR values, the Division failed to apply the correct benchmark values in the Renewal Permits. As just discussed, the Division calculated the mean SAR value as 1.2. 48054 Fact Sheet at 14; 48062 Fact Sheet at 12. Calculating benchmark SAR values as a two-fold increase of actual field values, the Division arrived at a benchmark SAR value of 2.4.

The Division did not apply the benchmark SAR value of 2.4 in the Renewal Permits, however. *See* 48054 Renewal Permit at 14; 48062 Renewal Permit at 12. The Division's failure to implement benchmark SAR values in accordance with its reasoning in the Fact Sheets is arbitrary and capricious, and should be reversed.

f) There Is No Active Irrigation Diversion on the Lorencito.

The Division erred by applying SAR limits to outfalls on the Lorencito Canyon because the only irrigation diversion in the canyon—the Chacon Ditch—is not in use, and has not been in use for years. In Table 3 of the Division's WQP24, "Implementing Narrative Standards in Discharge Permits for the Protection of Irrigated Crops," EC and SAR do not apply if there is "No diversion present" at the site, even if there is an agricultural beneficial use assigned to the receiving water body and the actual use is irrigated crops. *See* Ex. X-51 (WQP24) at 11, Table 3.

Regarding the Chacon Ditch on Lorencito Canyon, the Division found:

> An active intake is located approximately ¾ of a mile upstream of the confluence of Lorencito Canyon with the Purgatoire River. The Ciccone [*sic*] Ditch irrigation has not been actively used since 2004 when a flood washed out the structure.

48054 App. C at 57; 48062 App. C at 57.

After finding that there is no active intake in Lorencito Canyon, the Division should have concluded that EC and SAR limitations should not apply to outfalls discharging to the Lorencito Canyon. To conclude otherwise is inconsistent with Table 3 of the WQP24. Accordingly, the Division's decision to maintain EC and SAR limitations on discharges to the Lorencito Canyon, notwithstanding the lack of an active intake there, is arbitrary and capricious.

g) Flow Limits Are Impermissible and Restrict Operational Flexibility.

The Division's decision to impose per-outfall flow limits despite XTO's concerns regarding SAR compliance is arbitrary, capricious, and in excess of the Division's statutory authority. This is because the imposition of flow limitations by outfall makes mitigation more difficult by reducing XTO's operational flexibility, removing its ability to transfer water between

outfalls to meet EC/SAR requirements. The Division's imposition of per-outfall flow limits directly contradicts its statement that XTO retains "non-treatment operational practices" such as "blending produced water" that should allow it to mitigate costs. *See* 48054 App. C at 8; 48062 App. C at 8.

Not only is the per-outfall flow limitation contrary to XTO's and the Division's stated objectives, but it is also lacks legal justification: The Division's regulations allow it to regulate flow for a *permit*, but not on an outfall level. *See* 5 C.C.R. § 1002-61.8(2)(e); *see also* Section IV.E.2, *infra*. The Division's decision to impose flow limits is therefore in excess of its authority, and arbitrary and capricious in that it actually hampers XTO's operational flexibility—directly contrary to the Division's representation that flow limits would increase operational flexibility.

h) The Revised SAR Approach Does Not Account for Laboratory Imprecision.

The revised SAR approach is also inappropriate due to unavoidable variability in laboratory test results. XTO originally proposed an 85th percentile approach incorporating a 20 percent margin of error necessary to account for inherent imprecision in laboratory testing for SAR. XTO did not pull this approach out of thin air, but derived it from established EPA testing methodology. Such methodology accounts for the fact that, under laboratory conditions, the same sample can be analyzed and re-analyzed and the results can vary by as much as 20 percent. *See* Ex. X-78 (Memorandum from K. Quast of Norwest Corp. to Lori Mulsoff, June 17, 2014). From a practical standpoint, variations within this range should have no measurable effect on downstream water used for irrigation, as monitored in the Purgatoire River. *Id.* XTO has already performed studies to identify a method (the ICP-AES method) that has less sodium

interference. *See* Ex. X-73 at 12 (Letter from R. Sandquist to WQCD re XTO SAR Permit Limits, July 24, 2014). The Division's rejection of any margin of error amounts to an unfounded (and indeed in this case laughable) presumption that laboratory data are perfectly accurate.

Instead of acknowledging this reality, the Division encouraged XTO to "find[] a more precise test method or . . . increase[e] sample size." 48054 App. C at 49-50; 48062 App. C at 49-50. No such method exists. Because laboratory data demonstrate unavoidable variability, the Division's selection of the LCL approach, which does not take such variability into account, is arbitrary and capricious.

i) The LCL Approach Is Inapplicable.

It was inappropriate for the Division to incorporate the LCL approach contained in Appendix B. *See* Ex. X-57 (Appendix B, Jan. 8, 2015). Appendix B is intended for the 303D impaired waters analysis; neither its intent nor scope applies to determining discharge limits in permits. *See id.* Additionally, Appendix B is not final, and therefore may change pending the Commission's review. The Division's use of an inapplicable draft document is arbitrary, capricious, and an abuse of discretion.

j) The Division Failed to Approve or Deny XTO's EC/SAR Testing Modification Request.

The Division noted that XTO requested EC/SAR modifications in August 2014, and that the Division chose to incorporate its review of the request into the permit renewal process. 48054 Fact Sheet at 5; 48062 Fact Sheet at 4. The Division also noted that XTO provided additional information regarding the EC/SAR requests as comments on the draft renewal permits. 48054 Fact Sheet at 5; 48062 Fact Sheet at 4.

Notwithstanding this representation, the Division never states that it approved or denied the request. The Fact Sheet, Appendix C, and Renewal Permits implicitly deny the request, but contain no express statement to that effect. The Division's failure to explicitly approve or deny XTO's request is arbitrary and capricious. Also, absent a rationale for the implicit denial of the requested permit modification, the denial is also arbitrary and capricious.

D. The Division's Decision Regarding Other Metals Is Erroneous.

1. Summary of The Division's Decision Regarding Other Metals.

In the Renewal Permits and Fact Sheets, the Division made several decisions regarding the monitoring of metals other than iron (the "Other Metals"). First, the Division imposed new Other Metals limits. *See, e.g.*, 48054 Fact Sheet at 72 (Mo, TR), 74 (Se, TR), 78 (Radium 226+228). The Division also added semiannual monitoring for certain Other Metals. *See, e.g.*, 48054 Fact Sheet at 53 (As, TR and Cd, Dis), 72 (Hg, Tot), 72-73 (Ni, Dis), 73 (Ni, TR), 75 (Zn, TR and B, Tot), 78 (sulfide). Finally, the Division maintained its requirement to monitor certain Other Metals even though the data were too voluminous to run a statistical program. *See, e.g.*, 48054 Fact Sheet at 54 (Cu), 71 (Pb, Dis), 73 (Se, Dis), 75 (B).

2. The Required Testing for Other Metals Is Unreasonably Costly.

The Division's decision to impose new monitoring requirements, maintain monitoring requirements, and impose new limits for the Other Metals creates unreasonable monitoring costs. XTO estimates that to monitor the Other Metals in accordance with the permits would cost the CBM operators in the Basin approximately $1.9 million over the permits' 5-year terms. *See* Ex. X-65 (Other Metals Monitoring Costs). The Division's decision to maintain monitoring costs in cases where the data are already too voluminous to analyze emphasizes the fact that the Other Metals requirements are arbitrary and capricious. Moreover, although the Permits provide some

"off ramps" under which monitoring requirements are eventually phased out, these off ramps are unreasonably far into the future.

The Purpose of the New Other Metals Monitoring Is to Detect Change in Process, but There Has Been No Change in Process.

The monitoring of elements like the Other Metals is common in cases of industrial waste derived from some process, the purpose being to detect change in process. Here, however, not only is the CBM produced water not akin to industrial waste, but there has been no change in process. While the chemical composition of the produced water may vary, the process of extracting CBM methane has remained the same. To even require monitoring of the Other Metals is therefore erroneous.

E. The Division's Decision Regarding Flow Limits Is Erroneous.

1. Summary of the Division's Decision Regarding Flow Limits.

In the Renewal Permits, the Division added flow limits at each outfall, set as the maximum effluent discharge flow (30 day average) reported during the initial effluent discharge period of record (January 1, 2010 through September 30, 2013). 48054 Fact Sheet at 15; 48062 Fact Sheet at 13. According to the Division, "The effluent limitations for flow were added to allow operational flexibility while ensuring that operational and discharge changes do not result in a decrease in water quality." 48054 Fact Sheet at 9; 48062 Fact Sheet at 8. Although flow limits were discussed above, in connection with SAR, they are an independently appealable issue, as they impact a number of other permit parameters.

2. Flow Limits Are Impermissible and Restrict Operational Flexibility.

The Division's decision to impose per-outfall flow limits is arbitrary, capricious, and in excess of the Division's statutory authority. This is because the imposition of flow limitations by

outfall makes mitigation more difficult by reducing XTO's operational flexibility, removing its ability to transfer water between outfalls to meet other permit requirements. The Division's imposition of per-outfall flow limits directly contradicts its statement that XTO retains "non-treatment operational practices" such as "blending produced water" that should allow it to mitigate costs. *See* 48054 App. C at 8; 48062 App. C at 8 This determination is therefore arbitrary and capricious in that it actually hampers XTO's operational flexibility—directly contrary to the Division's representation that flow limits would increase operational flexibility.

Not only is the per-outfall flow limitation contrary to XTO's and the Division's stated objections, but it is also lacks legal justification: The Division's regulations allow it to regulate flow for a permit, but not on an outfall level. The flow limits in the Permits were not developed based on the clear language in the permit regulations. Although the Division relies on Regulation 61.8(2) for the imposition of flow, the regulation only requires flow limits for permits, not each outfall authorized to discharge under the permit. The clear language of 61.8(2) states:

> Effluent limits for **each permit** will, as a minimum, include the following effluent limitations and standards . . .
>
> * * *
>
> (i) All pollutants limited in **permits** shall have limitations, standards or prohibitions expressed in terms of concentration and mass or concentration and flow . . . .

The regulations do not expressly require flow limits at each outfall. *See* 5 C.C.R. § 1002-61.8(2)(e). For more than twelve years of CBM operations in the Raton basin, the discharge permits governing them only applied flow limits for the permit's flows (all outfalls collectively). There have been no amendments to the relevant legal provisions pertaining to flow. The

Division's regulation of flow for each outfall is inconsistent with the law, constitutes a new incorrect interpretation of the law and is arbitrary and capricious.

F. The Division's Economic Reasonableness Evaluation is Erroneous.

1. Summary of the Division's Decision Regarding Economic Reasonableness.

Section 25-8-503(8) of the Colorado Water Quality Control Act require the Division to "determine whether or not any or all of the water quality standard based effluent limitations are reasonably related to the economic, environmental, public health and energy impacts to the public and affected persons, and are in furtherance of the policies set forth in sections 25-8-192 and 25-8-104." *See also* Ex. X-53 (WQP-8, Economic Reasonableness). In its comments, XTO argued that the Division's determination in the draft fact sheets was insufficient, noting that the Division merely cited the fact that "the WQCC, during their proceedings to adopt the Classifications and Variance Standards for Arkansas River Basing [*sic*], Regulation 32, considered economic reasonableness." *See* 48054 App. C at 6; 48062 App. C at 6. XTO pointed out that the very fact it submitted modifications for WET, iron, and EC/SAR was that it could not economically meet the discharge limits. *Id.* The only feasible option (not a preferred option)—underground injection—was not economically reasonable as it would cost the CBM operators in the Basin in excess of $00 million in capital costs, plus annual operating costs of $1.8 million. *Id.* at 6-7.

In its decisions, the Division provided three reasons why its economic reasonableness determination was adequate. First, the Division asserted that its decisions allowed XTO to determine how it would meet the limitations—in other words, XTO was somehow incorrectly choosing an uneconomical solution, according to the Division. The Division states:

> Neither the draft nor the final permit require the permittee to install treatment to meet water quality standards. To the contrary, the draft and final permits allow the permittee operational flexibility to determine how to meet the all effluent limitations. The permittee can, and it's the Division's understanding that the permittee does have a variety of non-treatment operational practices that it uses to meet its permit limitations, including but not limited to underground injection, blending produced water, operating certain wells during certain time periods, and pulling water from different formations within each well.

48054 App. C at 8; 48062 App. C at 8; *see also id.* at 9 ("Accordingly, because the permittee maintains operational flexibility to manage its pollution, and because there are other uses that will be harmed by pollution, the water quality – based effluent limit is reasonably related to the economic, environmental, public health, and energy impact to the public and affected persons . . .").

Second, the Division asserted that the fact the WQCC is required to consider the economic feasibility of treatment techniques necessarily means that economic reasonableness is already baked into the water quality standards, and that if XTO disagreed with the WQCC's determination, it could petition the WQCC. *See* 48054 App. C at 8-9; 48062 App. C at 8-9. In particular, the Division noted that XTO "went through this process for boron before the Commission in 2013" and that it "participated in the most recent hearing on the Arkansas River Basin and could have advocated for different standards for iron, toxicity, and protection of irrigation uses." 48054 App. C at 9; 48062 App. C at 9.

Third, the Division provided a legal interpretation of why its determination was sufficient:

> When sections 25-8-503(4) and 25-8-503(8), C.R.S., are read together, it is clear that the Division does not have flexibility to issue a permit with an effluent limitations that would allow a

> discharge to exceed the pollution permitted by a water quality standard. Where section 25-8-503(4) prohibits a particular action of the Division, section 25-8-503(8) only requires a determination not an action. Therefore, the Division must include effluent limitations in permits that do not exceed the water quality standard.

48054 App. C at 9; 48062 App. C at 9.

2. Errors in the Division's Decision Regarding Economic Reasonableness.

a) The Division's Reliance on Injection Is Severely Misplaced.

Throughout its assessment of economic reasonableness, the Division erroneously claims that XTO's preferred option to control exceedances would be underground injection over treatment. *See, e.g.*, 48054 App. C at 5, 41; 48062 App. C at 5, 41. For example, in Appendix C, the Division states:

> Neither the draft nor the final permit require the permittee to install treatment to meet water quality standards. To the contrary, the draft and final permits allow the permittee operational flexibility to determine how to meet the all effluent limitations. The permittee can, and it's the Division's understanding that the permittee does have a variety of non-treatment operational practices that it uses to meet its permit limitations, including but not limited to underground injection, blending produced water, operating certain wells during certain time periods, and pulling water from different formations within each well.

48054 App. C at 8; 48062 App. C at 8.

The Division's suggestion that XTO is essentially imposing high costs on itself is incorrect for several reasons. First, the Division's decision expressly contemplates XTO having to treat its water; in fact, the Division included 24-month compliance schedules for WET and iron for implementing treatment. Second, XTO might have operational flexibility but for the Division's decision to impose flow requirements, which significantly hinder XTO's ability to

"blend[] produced water," among other things. *See also* 48054 App. C at 9; 48062 App. C at 9 ("Under the final permit the permittee maintains the same operational flexibility to manage its pollution."). Third, XTO has repeatedly informed the Division that injection is its worst-case scenario, in part because of the significant economic effects it would have on the region; to phrase it as a solution that should allow the Division to ignore its decisions' economic effects is nonsensical. Finally, injection is not a cheap or easy option: XTO estimates that capital costs alone would be in excess of $100 million. To portray injection as the solution to both XTO's exceedances and the Division's statutory requirement to make an economic reasonableness determination is patently wrong.

b) The Division's Reliance on the Commission's Hearing Is Erroneous.

Contrary to the Division's bald assertions, the Commission's determination of economic factors does not discharge the Division of its requirement to make its own determination of economic reasonableness. Section 25-8-503(8) of the Colorado Water Quality Control Act requires the Division to make such a determination, not to merely defer to the Commission. Moreover, as a factual matter, XTO only raised the economic reasonableness of boron before the Commission in 2013; the 2013 hearings therefore did not address the vast majority of issues in this appeal, especially WET, iron, and SAR. The very fact that XTO submitted permit modification requests for WET, iron, and SAR subsequent to the 2013 hearings shows that the hearings did not address the economic reasonableness of the requirements regarding those parameters. Finally, one reason XTO did not advocate for different WET, iron, and SAR requirements in 2013 was that it was in contact with the Division regarding these requirements, and had the (mistaken) impression that the Division would work with it through those issues.

G. The Division's Inconsistent Drafting and Failure to Adequately Address Comments As Required by Law.

1. The Renewal Permits, Fact Sheets, and Appendices C Are Inconsistent in Many Regards.

The Renewal Permits, Fact Sheets, and Appendices C are inconsistent in many regards. These inconsistencies are enumerated in an Errata Sheet contained in Addendum 1.

2. The Division Failed to Respond to Comments.

The Division failed to respond to several comments in Pioneer's Comment Letter. These failures are noted in a chart contained in Addendum 2.

H. Permit-Specific Issues for XTO

1. The Division Entirely Failed to Update the 2-year Averages in the 48062 Renewal Permit.

The Division In the 48062 Fact Sheet, the Division stated that it would revise the ADBELs to the highest effluent values, providing a chart with those new values. *See* 48062 Fact Sheet at 41. These values appear nowhere in the 48062 Renewal Permit, however.

V. REQUEST FOR STAY

XTO requests that the Division stay its adoption, implementation, and enforcement of the new permits in their entirety. A stay is appropriate for several reasons. First and foremost, enforcement of the challenged requirements and limitations would cause severe harm to XTO. For example, XTO's testing shows that the WET testing approach and iron and SAR limitations risk XTO's compliance with the permit terms and conditions, opening XTO up to enforcement actions, citizen suits, and the accompanying costs of fines, damages, and attorneys' fees. Such

enforcement actions and citizen suits threaten XTO's hard-earned goodwill and reputations, a harm that cannot be undone. The alternative to noncompliance and irreversible reputational harm is shutting down XTO's CBM outfalls. As the Division knows, this process is exceedingly expensive, and often itself irreversible.

Moreover, requiring XTO to comply with permit terms and conditions later found to be erroneous would adversely affect XTO. The remedial measures needed to comply with the new WET testing approach, and iron and SAR limitations alone would be significant, perhaps impossible. To force XTO to undertake this work before hearing its appeal on the substantive issues herein would deprive XTO of the benefit of the appeal process. Finally, a stay of the new permits in their entirety is is appropriate because of the complexity that would be required if only the challenged terms were stayed. The currently effective terms of the current (administratively-extended) permits provide adequate protection and predictability while this appeal is pending. Good cause therefore exists for a stay pursuant to C.R.S. § 25-8-406 of the entirety of the new permits pending the adjudication of this appeal.

VI. ESTIMATE OF HEARING TIME

XTO estimates that three days will be required to conduct the hearing.

Dated June 12, 2015.

BROWNSTEIN HYATT FARBER SCHRECK, LLP

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ADDENDUM 1

Addendum 1

Permit-Specific Comments and Corrections on Permit Nos. CO-0048054 and CO-0048062

XTO Energy Incorporated

I. Comments and Corrections Related to Permit No. CO-0048054

A. Permit

Throughout Final Permit. Numbered section subheadings have been eliminated from the final permit. For ease of reference, the Division should re-insert numbers to identify subheadings.

Part I.A, pages 8-40. The frequency of monitoring for total recoverable molybdenum (Mo, TR) should be revised to "Semi-Annual" per the discussion in Appendix C, page 73.

Part I.A, page 20. A limit and compliance schedule was imposed for Radium 226+228 for outfall 049A, but the Division has not established that a limit is warranted. This outfall was retested and shown to be below limits. A report-only requirement should be imposed for this outfall.

Part I.A, page 20. A 2-year average of 495 was imposed for iron at outfall 049A in the permit, but the Fact Sheet and Appendix C indicate that there is no 2-year average for this outfall. *See* 48054 Fact Sheet at 59; Appendix C at 39. The Fact Sheet also identifies a maximum average 2 year rolling average for this outfall of 1208.5. Fact Sheet at 57. A report-only requirement may be imposed instead of a 2-year average limit for this outfall.

Part I.A, page 33. The Fact Sheet states that a compliance schedule was adopted for iron at outfall 037A, but this is not reflected in the permit. *See* 48054 Fact Sheet at 60-61. A compliance schedule should be added for this parameter at outfall 037A.

Part I.A, page 35. The Fact Sheet states that a compliance schedule was adopted for iron at outfalls 074A and 093A, but this is not reflected in the permit. *See* 48054 Fact Sheet at 61. A compliance schedule should be added for this parameter at these outfalls.

Part I.A, page 36. The Fact Sheet states that a compliance schedule was adopted for iron at outfall 051A, but this is not reflected in the permit. *See* 48054 Fact Sheet at 61. A compliance schedule should be added for this parameter at outfall 051A.

Part I.A, page 37. The Fact Sheet states that a compliance schedule was adopted for iron at outfall 084A, but this is not reflected in the permit. *See* 48054 Fact Sheet at 61. A compliance schedule should be added for this parameter at outfall 084A.

Part I.A, page 41. The final permit does not include Special Monitoring, Reporting and Notification Conditions for in-stream EC and SAR monitoring. The Division should include this information on page 41 of the final permit, similar to the information provided in CO-0048062 at page 36.

Part I.A, page 41. While XTO reserves the right to dispute the limits imposed, the SAR benchmark values for soil salinity monitoring should be 2.4 for SAR, not 1.2, to be consistent with the Fact Sheet and Appendix C.

Part I.B.b, page 44. The Division has changed WET testing result notification deadlines from 21 calendar days to 14 calendar days. The Division has not provided a basis for this change. Notification within 21 calendar days should remain in the final permit.

Part I.B.b, page 45. The permit notes that the permittee "must indicate whether accelerated testing or a Toxicity Identification Evaluation or Toxicity Reduction Evaluation (TIE or TRE) is being performed, ..." but accelerated testing is not defined in the final permit. The Division should include a definition/explanation of "Accelerated Testing" for chronic WET testing, similar to the one provided in CO-0048062 for acute WET testing in Part I.B.3.c.i, page 43.

Part I.C, page 45. The permit should allow for preliminary toxicity identification evaluations (PTIE) similar to the process provided in CO-0048062 for acute WET testing in Part I.B.3.c.ii, page 44.

Part I.C, page 47. While the Division revised the LCL table to reflect the revisions to the LCL method, the text below the LCL table was not revised. It should read, "For example, if the sample size is six, the LCL percentile is 0.265 and the LCL concentration is the 26.5^{th} percentile value of the sample set."

Part I.D, page 50. The permit states that reporting of data gathered in compliance with Part I.A or Part I.B "shall be on a **monthly** [basis] where sampling is monthly and on a **quarterly** basis where sampling is quarterly." (emphasis in original). The permit should be clarified such that quarterly reporting starts on the first of the year, rather than in the middle of the current annual reporting period.

Part I.D, page 50. The last sentence of the "Routine Reporting of Data" section states that Discharge Monitoring Reports "shall be signed by an authorized person as identified in Part I.D.8." This reference should be corrected to read "Part I.D, "Signatory and Certification Requirements."

B. Fact Sheet

Part I.A., page 1. The Fact Sheet states that this is the "First Renewal" of permit CO-0048054, but it is the Second Renewal.

Part II.D., page 5. The Division has not adequately justified the imposition of trivalent chromium (chronic) limits to the segment. The data show that there is not reasonable potential. As such, this limit should be deleted.

Part II.D., page 5. The Division state that it has taken a modified approach for implementation of the "current condition" for SAR. If the Division has taken a modified approach, a compliance schedule should be provided for implementation of this new approach.

Part III, pages 9-10. The Division provides a summary of the outfalls for which discharge data from January 1, 2014 through September 30, 2014 "exhibit exceedances of the maximum concentration effluent limitations." These values are not exceedances; these values were "report only" in the prior permit. The Division should revise this discussion accordingly, making clear that these were not exceedances.

Part III, page 24. The Division states that "some Preliminary Toxicity Investigations (PTI) and Toxicity Identification Evaluations (TIE) were conducted." The Fact Sheet should be revised to clarify that a PTI/TIE was performed for all WET failures.

Part III, page 29. The Division has not adequately explained its conclusion that the discharge "causes, has the reasonable potential to cause, or measurably contributes to an in-stream chronic toxic aquatic life effect and as such effluent limits must be established to control the toxicity." The Division should provide the results of its research that this conclusion is correct.

Part VI.B, pages 46-47. The Division provides a summary of "DMR Violations" in Table VI-3. The Division incorrectly entered the wrong DMR data for the entry for outfall 042-A from the 12/31/2012 DMR regarding pH. This was not a DMR violation. Similarly, the DMR data for the entry on 9/30/2014 for flow was corrected by XTO in a corrected DMR provided to the Division on 2/11/2015. This was also not a DMR violation.

Part VII.A.1.b, page 48. The Division incorrectly states that these "regulations are applicable to the discharge from the XTO Energy: Lorencito WWTF." This permit is not for a WWTF; this error should be corrected.

Part VII.A.3.b, page 49. The Division incorrectly states that these it has "established the use of WET testing as a method for identifying and controlling toxic discharges from wastewater treatment facilities." XTO's operations do not include wastewater treatment facilities; this error should be corrected.

Part VII.B, page 51. The Division identifies limitations for "outfalls discharging to tributaries to Lorencito Canyon (COARLA06a), that reach Lorencito Canyon" but many of the discharges from these outfalls do not actually reach Lorencito Canyon. Specifically, limitations for outfalls 012-A, 016-A, 018-A, 021-A, 028-A, 031-A, 032-A, 034-A, 037-A, 040-A, 042-A, 047-A, 049-A, 057-A, 066-A, 068-A, 069-A, 070-A, 072-A, 073-A, 074-A, 082-A, 084-A, and 093-A should be deleted from the final permit and Fact Sheet. Outfalls 036-A, 088-A, and 091-A are no longer discharging and should also be deleted form the final permit and Fact Sheet.

Part VII.B, page 52, footnote 3 (see also footnotes 1 and 2 in next table). The Division notes that the "Receiving stream does not have this parameter; downstream segment (COARLA04b) more restrictive than COARLA05b, substituted that value." The Division has not justified or explained its action to substitute a more restrictive value from another segment in this case.

Part VII.B, pages 55-56. The Division states that compliance with the 2-year rolling average requirement for dissolved copper "will be based on the 23 months prior to the effective date of the permit . . . ." These statements should be deleted throughout the Fact Sheet. Compliance with the terms of a new permit may not be based on data collected under the prior permit.

Part VII.B, page 57. The Division incorrectly identifies the maximum 2-year rolling average for outfalls 037A and 045A. These values should be 947 (037-A) and 643 (045A) for consistency with the permit.

Part VII.B, page 58. The Division states that compliance with the 2-year rolling average requirement for total recoverable iron at outfall 039-A "will be based on the 23 months prior to the effective date of the permit . . . ." This statements should be deleted. Compliance with the terms of a new permit may not be based on data collected under the prior permit.

Part VII.B, page 59-60. The Division incorrectly identifies a 30-day and 2-year average limits and a compliance schedule and exceedances for iron limits at outfall 036-A, but this outfall is no longer discharging. This discussion should be deleted.

Part VII.B, pages 59-60, 70, 81. The Division incorrectly identifies a 30-day and 2-year average limits and a compliance schedule and exceedances for iron limits at outfall 091-A, this outfall is no longer discharging. This discussion should be deleted.

Part VII.B, page 72. The Division states that compliance with the 2-year rolling average requirement for dissolved lead "**will utilize the effluent data from previous sampling at these outfalls during the previous permit term.** Specifically, compliance with (or to satisfy the reporting requirement for) this 2 year rolling average will be based on the 23 months prior to the effective date of the permit . . . ." (emphasis in original). This statements should be deleted. Compliance with the terms of a new permit may not be based on data collected under the prior permit.

Part VII.B, page 72. The Division states "data was used from the nearby Pioneer Lorencito CBM facility (CO0047776)" in assessing dissolved nickel. The Division has not explained its rationale for using data from another permittee in performing a reasonable potential analysis for this parameter.

Part VII.B, page 74. The Division states that compliance with the 2-year rolling average requirement for dissolved selenium "will be based on the 23 months prior to the effective date of the permit . . . ." These statements should be deleted. Compliance with the terms of a new permit may not be based on data collected under the prior permit.

Part VII.B, page 75. The Division states "data was available from the nearby Pioneer Lorencito CBM facility (CO0047776)" and was used in performing the reasonable potential analysis for total recoverable zinc for this permit. The Division has not explained its rationale for using data from another permittee in performing a reasonable potential analysis for this parameter.

Part VII.B, page 76. The Division states that compliance with the 2-year rolling average requirement for total boron "will be based on the 23 months prior to the effective date of the permit . . . ." This statement should be deleted. Compliance with the terms of a new permit may not be based on data collected under the prior permit.

Part VII.B, page 78. The Division states that the facility has the ability to "redirect well water to different outfalls", however the flow limits included in the final permit are outfall-specific, meaning that the facility cannot, in fact, redirect well water to different outfalls. This statement should be deleted.

Part VII.B, page 78. The Division includes monitoring requirements for sulfide as H2S in the final permit "[s]ince the potential exists for this parameter to be present". The Division has not established that a reasonable potential exists, but rather only "the potential" that the parameter might be present. As such, this monitoring requirement should be deleted.

Part VIII.A, page 80. The Division states that monitoring requirements have been established in accordance with the frequencies and sample types set forth in the Baseline Monitoring Frequency, Sample Type, and Reduced Monitoring Frequency Policy for Industrial and Domestic Wastewater Treatment Facilities. However, XTO's operations do not include a wastewater treatment facility. The Division has not adequately explained the application of this guidance document.

Part VIII.B, page 80. The Division must clarify when discharge monitoring reports must be submitted, in light of the data collected monthly, quarterly, semi-annually, and annually in the final permit.

Part VIII.D, page 82. The Division states that the "effluent limits for WET in the renewal permit are the same as the effluent limits in the current permit, and those limits have not yet gone into effect." However, the IWCs and pass/fail calculations for WET have changed in the final permit. The Division should clarify this statement to reflect that change.

Part VIII.D, page 82. The Division states that the permittee has conducted several PTIs to identify the causes of chronic WET toxicity, "but has not yet identified or implemented strategies to eliminate whole effluent toxicity in the effluent." This statement fails to recognize the work and investigations completed to date, including identification and evaluation of strategies, such as bicarbonate/TDS and injection that XTO has identified. The Division must clarify this statement.

Part VIII.D, page 82. The Division incorrectly states that underground injection is XTO's "preferred option" for treatment. This statement should be deleted.

Part VIII.D, page 83. The Division incorrectly states that XTO was given time during the previous permit term to conduct research into radium 226+228. Research conducted under the prior permit term did not include research into radium 226+228. This statement should be corrected in the fact sheet.

C. Appendix C

Page 39. The Division incorrectly identifies a 30-day and 2-year average limits and a compliance schedule and exceedances for iron limits at outfall 036-A, this outfall is no longer discharging. This discussion should be deleted from Appendix C.

II. Comments and Corrections Related to Permit No. CO 0048062

A. Permit

Part I.A, pages 8-35. The Division incorrectly identifies the 2-year average for each of the total recoverable iron limits listed for this permit in the permitted features tables. The Fact Sheet and Appendix C identify new ADBELs for each of these outfalls. While XTO reserves the right to dispute the limits imposed, the Division should correct the 2-year averages in the permit to reflect the values outlined in the Fact Sheet and Appendix C for consistency. The Fact Sheet identifies the following 2-year averages for total recoverable iron:

Outfall	2-Year Avg.
001A	738
014A	759
032A	445
033A	740
034A	527
080H	756
017A	775
019A	742
023A	767
040G	719
079H	826
040A	946
043G	691
016A	569
015G	647
038G	511
042G	787
039G	658
033G	612
023G	721
037G	891
024G	965

031G	521
060A	923
002G	839
004G	942
049A	791

Part I.A, pages 8-35. The monitoring and reporting requirements for potentially dissolved and total recoverable selenium (Se, PD and Se, TR) should be deleted per the discussion in Appendix C, page 75, finding that there was a determination of no reasonable potential.

Part I.A, page 11. The permitted features table for outfalls 017A, 019A, 023A, 040G, and 079H incorrectly lists chronic WET limits, while the TCF/IWC table on page 42 lists these outfalls as having acute WET limits. The Division should correct the permitted features table to reflect acute WET limits for these outfalls.

Part I.A, page 13. The Division failed to identify the permitted features table on page 13 as belonging to outfall 043G.

Part I.A, page 14. The permitted features table for outfall 021G incorrectly lists chronic WET limits, while the TCF/IWC table on page 42 lists this outfalls as having an acute WET limit. The Division should correct the permitted features table to reflect acute WET limits for this outfall.

Part I.A, page 17. The Division failed to identify the permitted features table on page 17 as belonging to outfall 022A.

Part I.A, page 18. The permitted features table for outfalls 015G, 038G, and 042G incorrectly lists chronic WET limits, while the TCF/IWC table on page 42 lists these outfalls as having acute WET limits. The Division should correct the permitted features table to reflect acute WET limits.

Part I.A, page 19. The permitted features table for outfall 016G incorrectly lists chronic WET limits, while the TCF/IWC table on page 42 lists this outfalls as having an acute WET limit. The Division should correct the permitted features table to reflect acute WET limits for this outfall.

Part I.A, page 21. The Division incorrectly lists the 2-ear average for total recoverable iron as 366. This value should be revised to 495 for consistency with the Fact Sheet. *See* 48062 Fact Sheet at 36.

Part I.A, page 24. The Division failed to identify the permitted features table on page 24 as belonging to outfall 037G

Part I.A, page 24. The permitted features table for outfall 037G incorrectly lists chronic WET limits, while the TCF/IWC table on page 42 lists this outfalls as having an acute WET limit. The Division should correct the permitted features table to reflect acute WET limits for this outfall.

Part I.A, page 26. The permitted features table for outfall 036G incorrectly lists chronic WET limits, while the TCF/IWC table on page 42 lists this outfalls as having an acute WET limit. The Division should correct the permitted features table to reflect acute WET limits for this outfall.

Part I.A, page 28. The permitted features table for outfall 028G incorrectly lists chronic WET limits, while the TCF/IWC table on page 42 lists this outfalls as having an acute WET limit. The Division should correct the permitted features table to reflect acute WET limits for this outfall.

Part I.A, page 31. The permitted features table for outfall 060A incorrectly lists chronic WET limits, while the TCF/IWC table on page 42 lists this outfalls as having an acute WET limit. The Division should correct the permitted features table to reflect acute WET limits for this outfall.

Part I.A, page 32. The permitted features table for outfall 001G incorrectly lists chronic WET limits, while the TCF/IWC table on page 42 lists this outfalls as having an acute WET limit. The Division should correct the permitted features table to reflect acute WET limits for this outfall.

Part I.A, page 36. While XTO reserves the right to dispute the limits imposed, the SAR benchmark values for soil salinity monitoring should be 2.4 for SAR, not 1.2, to be consistent with the Fact Sheet and Appendix C.

Part I.B. The numbering of the individual sections is not accurate and needs to be corrected. *See*, *e.g.*, Terms and Conditions includes "Compliance Schedule" and "Chronic WET Testing" as item "2" in that section.

Part I.B, page 40. The Division identifies IWC and TCF for outfall 079-H in Table A-8, even though outfall 079-H does not appear on the permitted features table. Outfall 079-H should be deleted from Table A-8.

Part I.B.2, pages 40-41. "Accelerated Testing" is defined with respect to acute WET testing. Although accelerated testing is also referenced in relation to chronic WET testing, it is not defined. The Division should provide a definition/explanation for accelerated testing with respect to chronic WET testing.

Part I.B.2.b, page 41. The Division has changed WET testing result notification deadlines from 21 calendar days to 14 calendar days. The Division has not provided a basis for this change. Notification within 21 calendar days should remain in the final permit.

Part I.B.3, page 42. Table A-8 should be renumbered as Table A-9 so it is distinguishable from Table A-8 on page 40.

Part I.B.3.b, page 43. The Division defines a test failure when the LC50 "is less than or equal to 100% effluent." This is incorrect because IWC is not 100% for any outfall in this permit; the IWC varies depending on the outfall. The permit should be revised to read when the LC50 "is less than or equal to the IWC."

Part I.B.3.c.ii, page 44. The Division states that acute WET testing allows for preliminary TIE (PTIE). The Division should provide for PTIE for chronic testing as well.

Part I.C, page 46. While the Division revised the LCL table to reflect the revisions to the LCL method, the text below the LCL table was not revised. It should read, "For example, if the sample size is six, the LCL percentile is 0.265 and the LCL concentration is the 26.5th percentile value of the sample set."

Part I.C, page 49. The permit states that reporting of data gathered in compliance with Part I.A or Part I.B "shall be on a **monthly** basis." (emphasis in original). Many permit limitations are not reported on a monthly basis. The Division must clarify when quarterly, semi-annual, and annual sampling should be report on DMRs.

B. Fact Sheet

Part II.D, page 4. The Division states that it has taken a modified approach for implementation of the "initial effluent discharge concentration" for EC and SAR. If the Division has taken a modified approach, a compliance schedule should be provided for implementation of this new approach. The Division should also clarify what is the "initial effluent discharge concentration."

Part III, page 8. The Division provides a summary of the outfalls for which discharge data from January 1, 2014 through September 30, 2014 "exhibit exceedances of the maximum concentration effluent limitations." These values are not exceedances; these values were "report only" in the prior permit. The Division should revise this discussion accordingly, making clear that these were not exceedances.

Part III, page 22. The Division states that "some Preliminary Toxicity Investigations (PTI) and Toxicity Identification Evaluations (TIE) were conducted." The Fact Sheet should be revised to clarify that a PTI/TIE was performed for all WET failures.

Part III, page 27. The Division has not adequately explained its conclusion that the discharge "causes, has the reasonable potential to cause, or measurably contributes to an in-stream chronic toxic aquatic life effect and as such effluent limits must be established to control the toxicity." The Division should provide the results of its research that this conclusion is correct.

Part VI.B, page 31. The Division provides a summary of "DMR Violations" in Table VI-3. However, the table is incorrect. An accurate list of DMR violations is presented below. The Division should correct Table VI-3 based upon the following information.

Outfall	DMR Date	Parameter	Units	Permit Limitation	DMR Value	Type of Limitation	Over Limit %
002G	03/31/2010	Iron, total recoverable	ug/L	1062.	1095.	30DA	3%
014-A	04/30/2014	Sodium Absorption	Ratio		74.6	30D	15%
014-A	05/31/2014	Sodium Absorption	Ratio		76.8	30DA	17%
014-A	05/31/2014	Conductivity	dS/m		2.40	30DA	1%

016A	09/30/2010	Boron, total [as B]	mg/L	.75	.84	30DA	12%
040A	12/31/2010	Iron, total recoverable	ug/L	1062.	1279.	30DA	20%
049A	05/31/2014	Sodium Absorption Ratio	Ratio	45.7	46.2	30DA	1%
049A	03/31/2010	Iron, total recoverable	ug/L	1062.	1108.	30DA	4%
060A	09/30/2010	Boron, total [as B]	mg/L	.75	.83	30DA	11%

Part VII.A.1.b, page 32. The Division incorrectly states that these "regulations are applicable to the discharge from the XTO Energy: Alamacito WWTF." This permit is not for a WWTF; this error should be corrected.

Part VII.A.3.b, page 32. The Division incorrectly states that these it has "established the use of WET testing as a method for identifying and controlling toxic discharges from wastewater treatment facilities." XTO's operations do not include wastewater treatment facilities; this error should be corrected.

Part VII.B, page 36, footnotes 1 and 2. The Division notes that the "Downstream segment (COARLA05b) more restrictive, substituted that value" and "Downstream segment (COARLA05b) has this parameter, not the immediate receiving stream". The Division has not justified or explained its action to substitute a values from another segments.

Part VII.B, page 37. The Division states "data from the nearby XTO: Lorencito CBM operation (CO0048054) will be used" in assessing dissolved arsenic. The Division has not explained its rationale for using data from another permit in performing a reasonable potential analysis for this parameter.

Part VII.B, page 37. The Division concluded that monitoring for total recoverable arsenic is required during the permit term but provided no basis for this determination.

Part VII.B, page 38. The Division states "data for total cadmium that was collected from the nearby XTO: Lorencito CBM operation (CO0048054) was used." The Division has not explained its rationale for using data from another permit in performing a reasonable potential analysis for this parameter.

Part VII.B, page 40. The Division states that "the 2 year rolling average upon the effective date of the permit should include the effluent from the previous permitting term during the first two years" for dissolved copper. This statements should be deleted. Compliance with the terms of a new permit may not be based on data collected under the prior permit.

Part VII.B, page 40. The paragraph discussing "Cu, TR" references "potentially dissolved copper" in the final sentence. This should be revised to read "total recoverable copper."

Part VII.B, page 41. The Division incorrectly lists outfall 016A instead of 016G as having a chronic WQBEL of 1649 and ADBAC of 495.

Part VII.B, page 42. The Division states that compliance "with the 2 year rolling average will be based on the 23 months prior to the effective date of the permit" for total recoverable iron. This

statements should be deleted. Compliance with the terms of a new permit may not be based on data collected under the prior permit.

Part VII.B, pages 42-43. The Division states that compliance with the 2-year rolling average requirement for dissolved lead "will be based upon the effluent data from previous sampling at this outfall during the previous permit term. Specifically, reporting the 2 year rolling average will be based on the 23 months prior to the effective date of the permit . . . ." This statements should be deleted. Compliance with the terms of a new permit may not be based on data collected under the prior permit.

Part VII.B, page 44. The Division states "data was used from the nearby Pioneer Lorencito CBM facility (CO0047776)" in assessing dissolved nickel. The Division has not explained its rationale for using data from another permittee in performing a reasonable potential analysis for this parameter.

Part VII.B, page 44. The Division states "data was used from the nearby Pioneer Lorencito CBM facility (CO0047776)" in assessing total recoverable nickel. The Division has not explained its rationale for using data from another permittee in performing a reasonable potential analysis for this parameter.

Part VII.B, page 48 (two instances). The Division states that compliance "with the 2 year rolling average will be based on the 23 months prior to the effective date of the permit" for total boron. This statements should be deleted. Compliance with the terms of a new permit may not be based on data collected under the prior permit.

Part VII.B, page 49. The Division incorrectly refers to the "RP analysis for boron" in the section discussing chloride. This error should be corrected.

Part VIII.B, page 55. The Division must clarify when discharge monitoring reports must be submitted, in light of the data collected monthly, quarterly, semi-annually, and annually in the final permit.

Part VIII.D, page 56. The Division states that the "effluent limits for WET in the renewal permit are the same as the effluent limits in the current permit, and those limits have not yet gone into effect." However, the IWCs and pass/fail calculations for WET have changed in the final permit. The Division should clarify this statement to reflect that change.

Part VIII.D, page 56. The Division states that the permittee has conducted several PTIs to identify the causes of chronic WET toxicity, "but has not yet identified or implemented strategies to eliminate whole effluent toxicity in the effluent." This statement fails to recognize the work and investigations completed to date, including identification and evaluation of strategies, such as bicarbonate/TDS and injection that XTO has identified. The Division must clarify this statement.

Part VIII.D, page 57. The Division incorrectly states that underground injection is XTO's "preferred option" for treatment. This statement should be deleted.

II. Comments and Corrections Related to Appendix B (both permits)

The Division did not update the $\hat{p}$ values in Table 2. The values listed still represent the 95th confidence interval; the values should be updated to reflect the 99th confidence interval for consistency with the permits.

ADDENDUM 2

No.	PERMIT COMMENTS NOT ANSWERED	XTO (pg. no)	PIONEER (pg. no.)
1.	**Inaccurate low flow data was used to develop WET limits, resulting in inappropriate limits.** On behalf of the Companies, Tetra Tech conducted continuous (every 15 minutes) and monthly flow monitoring throughout the Purgatoire watershed from April 14, 2010 until December 31, 2014. The Division used the continuous stream flow data collected by Tetra Tech (April 2010 – December 2012) as part of the permit renewal to derive low flows at some locations; however, the data was not appropriately used in all locations. In other cases, the Division has ignored the data submitted by the Companies and instead relied on comments not supported by scientific data. For instance, low flow estimates from the local water commissioner were used instead of continuous stream flow data from Stations PR-37.1 (near Stonewall, CO) and SFPR-0.2 (along South Fork Purgatoire, 0.2 miles upstream from confluence). Available scientific evidence (provided in the Permit Renewal Application) should be used to determine the appropriate 30E3 chronic flows. Based on an evaluation of this data, the WET testing requirements for many outfalls should be change from chronic to acute WET limits and IWC percentages would be reduced. See discussion supra at Section IX (Flow). Given the significant seasonal flow fluctuations due to spring snowmelt, specifically in Lorencito Canyon, seasonal IWCs should be used for the discharges in permit CO-0048054	34	35
2.	**The Draft Permits contain contradictory requirements regarding what constitutes a failed acute WET test.** In Draft Permit No. CO-0048062, it states that: An acute WET test is failed whenever the LC50[11], . . . is found to be less than or equal to 100% effluent. Draft 48062 Permit at 43. Elsewhere in the Draft Permit (and Fact Sheet), a failed acute test is defined as LC50 ≤ IWC% (or conversely the WET limit is LC50 > IWC. See, e.g., Draft 48062 Permit at 43 ("there is a violation of the permit limit (the LC50 endpoint is less than the applicable IWC)"). In this Draft Permit, the definition of a failed test in Part I, section B.4.b, is both inconsistent and inaccurate. Because not all the outfalls have the same IWCs (e.g., Draft 48062 Permit at 42 (Table of IWCs)), those sentences should state that "an acute WET test is failed whenever the LC50, . . . is found to be less than or equal to the applicable IWC." This will make the information in the text consistent with the tables. In addition, in each of the permitted features tables in the Draft Permits, the effluent limitations maximums for WET should be described as	35	---

	LC50 (NOEC or IC25) > IWC, not LC50 (NOEC or IC25) ≥ IWC. Draft 48054 Permit at 8-31; Draft 48062 Permit at 8-35. The Draft Permits are internally inconsistent and inaccurate on this point. Under the terms of the Draft Permits, the only way for a WET test to be considered passing is for the value to be greater than the IWC, not greater than or equal to IWC.		
3.	**Iron limits will be erroneously required for outfalls which discharge to tributaries without iron standards.** Discharges to Segments 5b and 6a have iron limits in the Draft Permit even though there are no iron standards for these segments. WQA at Table A-3b. As such, the applicable permits impose an iron limit based on this standards for discharges to segment 6abecause they assert that the discharges reach the Purgatoire River (Segment 5b). The iron limits were calculated using receiving water low-flow values for the each specific reach of the Purgatoire (all segment 5b), as follows: • South Fork of the Purgatoire – Iron limit 1,308 ug/l based on chronic (30E3) low-flow of 0.5 cfs. • Middle Fork of the Purgatoire – Iron limit of 1,471 ug/l based on chronic (30E3) low-flow of 1.0 cfs. • Mainstem of the Purgatoire – Iron limit of 1,649 ug/l based on chronic (30E3) low-flow of 11 cfs. However, in imposing these limits, footnotes to WQA Tables A-15a thru -15j explain that "Downstream segment (COARLA05b) has this parameter, not the immediate receiving stream." Many of the segment 6a discharges have iron limits based on the discharged effluent eventually reaching a stream segment with iron standards. In some cases, the original discharge may be 5 to 10 miles (estimate) from the stream segment where the standards are being applied. This logic could be used to apply segment standards even farther downstream and lead to questions of how far is too far, and as such are arbitrary.	60	64
4.	**The Division erroneously eliminated elevated total recoverable iron concentrations from the dataset**. In the WQA, the Division erroneously eliminated nine elevated total recoverable iron concentrations from the dataset based on a "statistical outlier analysis." See WQA at 33-36. Given that the Purgatoire watershed is subject to frequent monsoonal flood events, as illustrated in Figure XIII-4 below, as well as high flows associated with the annual spring freshet, eliminating these data were inappropriate. During these high flows, a large amount of sediment is mobilized and transported to the Purgatoire River. Elevated TSS and total recoverable iron ($Fe_{TR)}$ concentrations were observed throughout the watershed based on this localized flood event. Fe_{TR} and TSS data collected at this time are not outliers. In fact, these data are applicable and	61	64

	representative of iron concentrations during spring runoff and during post summer monsoonal storm events, when elevated TSS and iron concentrations are observed (Table XIII-5). Therefore, the elevated iron concentrations and corresponding high TSS are validated by other hydrologic data and field observations. The data demonstrate that high sediment concentrations after storm events correspond to high iron concentrations, regardless of pre-CBM (USGS 1978-1981) or current conditions (2010-2012).		
5.	**It is inconsistent with the Division's DMR guidance to require compliance with a new permit limit using "report only" data from a prior permit term.** The Draft Permit state that compliance with two-year rolling average limits (for any parameters) must be calculated using the prior 23 months of data. *See* , eg. 48054 Fact Sheet at 45 ("[T]he Division will require **reporting** of two year rolling average, based on the 23 months prior to the effective date of the permit, from the effective date of this renewal permit. This means that data collected during the previous permit term will be used along with data under this renewal to calculate and report the 2- year rolling average, for the first two years of the new permit term.") (emphasis in original); 48062 Fact Sheet at 31("Note that reporting the two year rolling average is expected immediately, and will be based upon the effluent data from previous sampling at this outfall during the previous permit term."). In some of the Draft Permits, the Definitions of Terms section provides a different calculation of two year rolling average calculations. See, e.g., Draft 48054 Permit at 40 (two-year rolling average "limits become effective upon the effective date of the permit, but are not reportable on a DMR until two years (typically 24 months) of data have been collected."); Draft 48062 Permit at 48. It is not within the Division's DMR guidance and is arbitrary to falsely penalize a company for report-only data collected during the compliance period. The Division's Discharge Monitoring Report Guidance state that: Collection of the data required to calculate a two-year rolling average shall start immediately upon the effective date of the permit, but the data is not reported on a DMR until two years after the effective date of the permit. WQCD, "Discharge Monitoring Report Guidance" at 17 (Nov. 2014).	66	69

PERMIT #CO0048062

No.	COMMENTS AND RESPONSES	Page no.
1.	**Comment 14:** Part I B.3, page 39-40. As discussed in the Comment Letter, using low-flow data from gaging stations in the South Fork of the Purgatoire River will result in IWC values < 9.1% for outfalls 019A, 022A, 023A, 079H, 080H, and 049A, thereby changing the WET testing protocol from chronic to acute for these outfalls. These outfalls would then need to be added to the Acute WET Testing table on page 42. **Response 14:** This has been addressed in responses to previous comments.	82

Addendum 3: Overview of WET Modification Request

WET testing is intended to measure "the aggregate toxic effect on an effluent measured directly by an aquatic toxicity test." 54 Fed. Reg. 23,868, 23,895 (June 2, 1989). "Aquatic toxicity tests are laboratory experiments that measure the biological effect (e.g., survival, growth, and reproduction) of effluents or receiving waters on aquatic organisms." *See* Ex. X-47 at 39 (EPA Regions 8, 9, and 10 Toxicity Training Tool (Jan. 2010)). There are two types of WET testing: acute and chronic. *See id.* at 39. Acute toxicity tests are used to determine the concentration of effluent or ambient (pre-existing) water that results in mortality within a group of test organisms during a 24-, 48- or 96-hour exposure. *Id.* A chronic toxicity test is a longer-term test in which sublethal effects, such as fertilization, growth or reproduction, are measured in addition to lethality. *Id.* Traditionally, chronic tests are conducted to allow an evaluation of these effects over the test organisms' full life-cycles or significant portions of those test organisms' life cycles (approximately 30 days). *Id.*

XTO filed Permit Modification Forms on December 18, 2013 requesting modification to the Permits to implement "alternative approaches for determining compliance with [WET] chronic testing for outfalls in the Raton Basin." *See* Ex. X-10 (48054 Permit Modification Form, filed Dec. 18, 2013); Ex. X-33 (48062 Permit Modification Form, filed Dec. 18, 2013). This modification request for WET was encouraged by and developed in cooperation with the U.S. Environmental Protection Agency ("EPA"). Along with, and in support of, the Modification Forms, XTO submitted a cover letter from Ronda Sandquist, Esq. explaining the rationale for the request, *see* Exs. X-11 & X-34, proposed WET testing permit limits, *see* Exs. X-13 & X-36, a February 2013 study by Dr. Rami Naddy, PhD, titled *Ecological Evaluation of the Effects from XTO and XTO NPDES Discharges to Aquatic Life in Lorencito and South Fork Purgatoire*

River, *see* Exs. X-14 & X-37 (the "AECOM WET Study"), and an Executive Summary of the AECOM WET Study, *see* Exs. X-12 & X-35 (the "AECOM Executive Summary"). *See also* Exs. X-09 & X-32 (Division-stamped confirmations of receipt of request (Dec. 20, 2013)).

The request noted that "[b]iological monitoring has found that aquatic life communities are only sustained in the Purgatoire River, not the upgradient tributaries," and therefore proposed that "acute WET testing at discharge outfalls in the tributaries will be protective." Exs. X-11 & X-34 at 1(Dec. 16, 2013 Sandquist Letter). Additionally, although "[t]esting at the tributary outfalls and confluences of the Purgatoire River indicates that compliance with acute levels at the outfalls will result in meeting WET chronic objectives for the Purgatoire River," the request proposed that, "[t]o assure that toxicity in the Purgatoire River does not increase, chronic WET tests will be conducted at the confluences of tributaries and the River." *Id.*

The genesis of XTO's proposal was the U.S. Environmental Protection Agency ("EPA"), which first recommended the requested WET approach at a 2012 meeting with representatives from EPA headquarters, EPA research lab, EPA Region 8 and the Division. *See* Ex. X-71 (Joint letter from XTO and Pioneer to EPA, the Division, and U.S. Geological Survey ("USGS"), Feb. 22, 2012). Prior to this meeting, XTO had recommended using an alternative test species for WET testing. However, EPA determined that the appropriate strategy would be to conduct WET testing at the confluences of the tributaries and Purgatoire River, where the aquatic life warranting protection were present. The EPA indicated that Colorado Department of Public Health and the Environment ("CDPHE") has the discretion to set the point of compliance for its aquatic life and toxicity testing policy. A letter from XTO and Pioneer regarding these discussions documents EPA's seminal role in XTO's modification request. *Id*.

Following the February 2012 meeting, XTO authorized toxicologists to expand the scope of their studies and conduct WET tests of water at the confluences. The results of these tests are contained in a comprehensive study by Dr. Rami Naddy. *See generally* Ex. X-14 (AECOM WET Study). Using the approach advocated by XTO and EPA, the tests resulted in findings of no toxicity at different locations in the Lorencito Canyon and South Fork Purgatoire River tributaries to the Purgatoire River. *See id.* at 11-12 (AECOM WET Study).

The executive summary of the AECOM WET Study lays out the framework for the requested approach. *See generally* Ex. X-12 (AECOM Executive Summary). The summary notes that, in many locations, no flow or aquatic life would exist *but for* the outfall's discharge. *See id*. at 2. When measured at the outfall, some of the outfalls could not comply with the required chronic WET testing, which used the species *Ceriodaphnia dubia* ("*C. dubia*"). *Id.* at 1. This nonattainment arose, in part, because of *C. dubia*'s sensitivity to total dissolved solids ("TDS"). *Id.* at 2-3; *see also* Ex. X-14 at 22 (AECOM WET Study).

XTO therefore proposed a revised, two-part WET testing approach. First, XTO proposed acute WET testing at the outfalls using *Daphnia magna*, a species less susceptible to TDS toxicity and more representative of the aquatic species in the areas. *See* Ex. X-11 at 1 (Dec. 16, 2013 Sandquist Letter); Ex. X-12 at 4 (AECOM Executive Summary). Second, to assure that no toxicities other than TDS were affecting aquatic species, there would be chronic WET testing using *C. dubia* at the confluences with the Purgatoire River. *See* Ex. X-11 at 1 (Dec. 16, 2013 Sandquist Letter); Ex. X-12 at 4 (AECOM Executive Summary).

XTO met with the Division on February 25, 2014 and May 27, 2014 to discuss XTO's iron trading proposal. *See* Ex. X-75 at 3 (E-mail from R. Sandquist to P. Pfaltzgraff, WQCD, re:

RE: XTO Energy & Pioneer Natural Resources Meeting with WQCD Permits Section (Feb. 11, 2014)); Ex. X-76 (E-mail from J. Vlier, Tetra Tech, to L. Mulsoff, WQCD, re: Itinerary for Purgatoire Site Visit – May 27, 2014, noon – 4pm (May 21, 2014)) (documenting that members of CDPHE (including Lori Mulsoff, at a minimum) visited the Purgatoire site on May 27, 2014 and discussed the proposed Iron Trading Stream Restoration Project). In Fact Sheets dated July 30, 2014, the Division informed XTO that it would address this request when it issued draft renewal permits, which it expected to occur by August 2014. *See* Ex. X-08 at 4-5 (July 30, 2014 Fact Sheet to Modification #5, 48054 Permit); Ex. X-31 at 5 (July 30, 2014 Fact Sheet to Modification #6, 48062 Permit).

Addendum 4: Overview of Iron Modification Request

On December 18, 2013, XTO submitted a request for a modification of iron limits in both of its Permits. *See* Ex. X-16 (48054 Permit Modification Form, filed Dec. 18, 2013); Ex. X-39 (48062 Permit Modification Form, filed Dec. 18, 2013). XTO proposed that the Division authorize an iron trading program that would reduce the background sources of iron in the Purgatoire River and provide credits to offset XTO's discharges in an amount equal to half the reduction. *See* Ex. X-17 at 1 (Dec. 18, 2013 Sandquist Letter); Ex. X-16 at 2 (48054 Permit Modification Form, filed Dec. 18, 2013); Ex. X-39 at 2 (48062 Permit Modification Form, filed Dec. 18, 2013). XTO proposed that "iron trades be authorized in its Permits as means to comply with the iron effluent limits." Exs. X-17 & X-40 at 1 (Dec. 18, 2013 Sandquist Letter). This iron trading program was inspired by, and intended to meet the objectives of, the Colorado Pollutant Trading Policy. *See* Ex. 49 (Colorado Pollutant Trading Policy, Oct. 2004); *see also* Ex. 50 (EPA Water Quality Trading Policy, Jan. 13, 2003). Along with, and in support of, the Modification Forms, XTO submitted a cover letter from Ronda Sandquist, Esq. explaining the rationale for the request, *see* Exs. X-17 & X-40, proposed iron permit limits, *see* Exs. X-18 & X-41, iron trading compliance schedules, *see* Exs. X-19 & X-42, and a formal proposal and study titled *Iron Trading Program in the Purgatoire Watershed*, *see* Exs. X-20 & X-43 (the "Iron Trading Study"). *See also* Exs. X-15 & X-38 (Division-stamped confirmations of receipt of request (Dec. 20, 2013).

As detailed in a comprehensive report by Tetra Tech submitted in support of the proposal, XTO noted that because streambank erosion is a substantial source of iron in the Purgatoire, implementing streambank stabilization projects "along the Purgatoire River" would reduce iron loading. *See* Ex. X-20 at 7 (Iron Trading Study); *see also* Ex. X-17 at 1 (Dec. 18,

2013 Sandquist Letter). Using the South Fork of the Purgatoire River as a case study, the report addressed iron loading and the benefits of streambank stabilization in the Purgatoire Watershed as a whole. *See generally* Ex. X-20 (Iron Trading Study). The modification request cited additional benefits of the proposed iron trading program, including reducing total suspended sediment and improving the aquatic habitat of the Purgatoire. *See* Ex. X-17 at 1 (Dec. 18, 2013 Sandquist Letter); *see also* Ex. X-20 (Iron Trading Study) at Appendix C (outlining all secondary benefits). XTO explained that attempts to reduce iron from the CBM discharge had proved infeasible, and moreover would not provide these added benefits. *See* Ex. X-17 at 1 (Dec. 18, 2013 Sandquist Letter). For reasons including these, Colorado Parks and Wildlife expressed initial interest in XTO's iron trading proposal. *See* Ex. X-74 (E-mail from D. Prenzlow to S. Montoya and M. Trujillo Re: Stream Restoration Project (South Fork Purgatoire), Mar. 27, 2013).

The trading program proposal addresses the basic elements of state and federal trading program directives. *See* Ex. X-17 at 1 (Dec. 18, 2013 Sandquist Letter). As one element of the plan, XTO proposed to construct the projects "in phases to match the discharge flows from the outfalls." *Id.* Noting that September is the best month for constructing streambank stabilization projects, XTO requested the Division's timely review to enable XTO to begin the projects in September 2014, rather than September 2015. *Id.*

XTO met with the Division on February 25, 2014 and May 27, 2014 to discuss XTO's iron trading proposal. *See* Ex. X-75 at 3 (E-mail from R. Sandquist to P. Pfaltzgraff, WQCD, re: RE: XTO Energy & Pioneer Natural Resources Meeting with WQCD Permits Section (Feb. 11, 2014)); Ex. X-76 (E-mail from J. Vlier, Tetra Tech, to L. Mulsoff, WQCD, re: Itinerary for Purgatoire Site Visit – May 27, 2014, noon – 4pm (May 21, 2014)) (documenting that members

of CDPHE (including Lori Mulsoff, at a minimum) visited the Purgatoire site on May 27, 2014 and discussed the proposed Iron Trading Stream Restoration Project). In Fact Sheets dated July 30, 2014, the Division informed XTO that it would address this request when it issued draft renewal permits, which it expected to occur by August 2014. *See* Ex. X-08 at 4-5 (July 30, 2014 Fact Sheet to Modification #5, 48054 Permit); Ex. X-31 at 5 (July 30, 2014 Fact Sheet to Modification #6, 48062 Permit).

Addendum 5: Overview of EC/SAR Modification Request

Electrical Conductivity ("EC") is a measure of the amount of dissolved solids (salts) in water. As the EC in soil water increases, the sodium can decrease plant growth, making EC an important measure for irrigation water. Similarly, Sodium Absorption Ratio ("SAR") is a measure of the abundance of sodium relative to the abundance of calcium and magnesium. SAR is also an agricultural concern, as the ratio relates to the amount of sodium that is available for absorption by soils, which impacts soil structure and moisture. These parameters are often referenced together as "EC/SAR."

On August 6, 2014, XTO requested EC/SAR compliance schedules for the Permits. *See* Ex. X-21 (48054 Permit Modification Form, filed Aug. 6, 2014); Ex. X-44 (48062 Permit Modification Form, filed Aug. 6, 2014). Revised EC/SAR limits became effective on April 1, 2014 as the result of a February 28, 2014 modification to the Permits. *See* Ex. X-4 (Feb. 28, 2014 Fact Sheet for Modification No. 4, 48054 Permit); Ex. X-30 (Feb. 28, 2014 Fact Sheet for Modification No. 5, 48062 Permit). Along with the Modification Forms, XTO submitted a cover letter from Ronda Sandquist, Esq. explaining the rationale for the request, *see* Exs. X-22 & X-45, and proposed compliance schedules, *see* Exs. X-23 & X-46.

XTO stated that it was experiencing compliance issues with the EC/SAR values that became effective on April 1, 2014 as the result of the February 28, 2014 modification. Ex. X-22 at 1 (Aug. 6, 2014 Sandquist Letter). The February 28, 2014 modification "set the maximum recorded SAR value for each outfall (removing outliers) as the effluent limit to maintain the 'current condition' of the Purgatoire River." Ex. X-07 at 14-15 (Feb. 28, 2014 Fact Sheet, 48054 Permit); Ex. X-30 at 13-14 (Feb. 28, 2014 Fact Sheet, 48062 Permit). For EC, the February 28, 2014 modification set the EC limitation at the maximum recorded value. Ex. X-07 at 15 (Feb.

28, 2014 Fact Sheet, 48054 Permit); Ex. X-30 at 14 (Feb. 28, 2014 Fact Sheet, 48062 Permit). Additionally, the modification established flow limits for each outfall, and increased the frequency of required EC/SAR sampling from quarterly to monthly. Ex. X-07 at 15-16, 17 (Feb. 28, 2014 Fact Sheet, 48054 Permit); Ex. X-30 at 14-15, 16 (Feb. 28, 2014 Fact Sheet, 48062 Permit).

XTO's primary rationale for requesting a compliance schedule was that the new EC/SAR protocol required monthly sampling, yet the limits were derived from quarterly data. Ex. X-22 at 2 (Aug. 6, 2014 Sandquist Letter). XTO suggested that the variability of the underlying data set explained why certain outfalls reported minute exceedances under the new "current condition" limits even though there were no significant changes in field operations. *Id.* This variability was identified not only in the field, but also under laboratory conditions. *Id.* Compounding the need for additional data, XTO noted, was the documented fact that naturally existing geological differences in coal formations create considerable variability in groundwater quality. *Id.* (citing *USGS, Geldon and Abbott*, 1984).

The revised EC/SAR limits resulted in unpredictable, minor exceedances within outfalls. *See* Ex. X-22 at 2 (Aug. 6, 2014 Sandquist Letter). The exceedances are classified as minor because the numeric values were within the laboratory variability for SAR testing.[2] In other words, outfalls that met the limits one day would not on another. Accordingly, XTO asked for additional time to gather data to support revised limits and to assess how to comply with those limits. *See id.*

[2] EPA's approved laboratory procedures for sodium analysis have an inherent 20% variability; SAR calculations may meet the SAR limit but for the 20% error range. *See* Section III(D)(4)(f), below.

XTO proposed a compliance schedule wherein XTO would test EC/SAR for a 24-month period and report the monthly average as "report only." *See id.* After 12 months, XTO would submit its sampling and testing results to the Division. *Id.* At the end of the 24-month period, XTO would report its EC/SAR results to the Division and provide recommended steps for EC/SAR compliance, and a schedule for compliance. *Id.* XTO cited 5 C.C.R. §§ 1002-61.8(3)(b) and 1002-61.8(8)(a)(i) as the regulatory basis for the imposition of a compliance schedule. *Id.* at 1-2.

XTO met with the Division on at least February 25, 2014 to discuss XTO's EC/SAR testing proposal. *See* Ex. X-75 (E-mail from R. Sandquist to P. Pfaltzgraff, WQCD, re: RE: XTO Energy & Pioneer Natural Resources Meeting with WQCD Permits Section (Feb. 11, 2014)).[3]

[3] XTO had also engaged with the Division regarding EC/SAR issues prior to filing the modification request, including on June 25, 2014. *See, e.g.*, Ex. X-77 (E-mail from K. Morgan, WQCD, to R. Sandquist, et al., re: WQCD- XTO 6/25/14 meeting follow-up (June 26, 2014)).