

BEFORE THE ENVIRONMENTAL QUALITY COUNCIL
OF THE STATE OF WYOMING

IN THE MATTER OF THE APPEAL)
OF CLABAUGH RANCH, INC.)
FROM WYPDES PERMIT NO.)
WY0049697) Docket No. 08-3802

CLABAUGH RANCH, INC.'S RESPONSE TO LANCE OIL & GAS COMPANY'S
MOTION FOR SUMMARY JUDGMENT

Clabaugh Ranch, Inc.'s right to a hearing

Lance argues in page after page of its memorandum that the EQC has no statutory power to decide protests of permits issued by the DEQ and that Clabaugh Ranch is not entitled to a hearing before the EQC. Lance argues that the only persons entitled to a hearing before the EQC are applicants whose permits have been denied. This argument is so weak that it can be answered in one paragraph.

The EQC has already rejected the argument which Lance is making in its Order Denying Basin Electric Power Cooperative Inc.'s Motion to Dismiss Appeal filed August 21, 2008 in EQC Docket No. 07-2801. Lance should have recognized this order rather than pretending that it did not exist.

Bridger Study

Lance supports its motion with the affidavit of Terry Brown. Mr. Brown bases his conclusions about the salt tolerance of plants in the Wild Horse Creek drainage on a study from the Bridger Plant Materials Center. Brown claims that this study shows that smooth brome grass, which is found throughout the Wild Horse Creek drainage and on the Clabaugh Ranch, has a salt tolerance level of 5000 (5 ds/m); therefore, he argues that

effluent limits designed to yield a soil salinity of 3851 (3.851 ds/m) will not result in a yield loss. (Brown Aff. ¶5.B.) Brown's affidavit should be disregarded because the Bridger Study has been discredited as a basis for setting salinity levels in discharge permits.

The salt tolerance of smooth brome which Brown claims is established by the Bridger Study conflicts with all recognized scientific studies of the salt tolerance of smooth brome. These studies state that smooth brome is moderately sensitive to salinity. Relying on American Society of Civil Engineers, *Agricultural Salinity Assessment and Management*, 1996, the DEQ has said that a soil EC of 1500 (1.5 dS/M) to 3000 (3.0 dS/M) constitutes the range for 100% crop yield for a moderately sensitive crop. (Dep. Ex 3, p. 1, Dep. Ex. 4). Similarly, other scientific studies show that yield loss from smooth brome begins at between 1300-3000 (1.3 - 3.0 ds/m), not 5000 (5/0 dS/M) as Brown Argues. (Ayers and Westcott, *Water Quality for Agriculture*, Dep. Ex. 6; Thomas Dep. pp. 10-20,).

The use of the Bridger Study as a basis for determining salinity tolerance of plants should have been put to rest years ago. EQC Docket No. 05-3803 involved a discharge permit held by Lance's development partner Williams Production RMT Company. Dr. Larry Munn, a soil scientist from the University of Wyoming, testified in that case that he reviewed the Bridger Study and learned that Mr. Majerus, the author of the study, had not actually measured productivity because of unplanned cattle grazing of the test plots, that the study was set up in dryland and saline seep conditions rather than in a situation in which water was applied, and that the study was not designed as a proper quantitative research project. (Munn Dep. pp. 72, 164-168). Dr. Munn talked to the Mr. Majerus, the author of the study. Dr. Munn testified:

Q. So Mr. Majerus even said he wouldn't recommend using his study?

A. Yes, I asked him specifically about it's – you know, I said it was proposed for use for setting regulations, and at that time he told me he did not think that it would be suitable.

(Munn Dep. p. 168)

The DEQ confirmed that this was the case. John Wagner of the DEQ wrote a memo about this study on December 22, 2005. Dr. Ginger Paige, a soil scientist from the University of Wyoming, had objected to the use of this study in determining effluent limits. Mr. Wagner said, "Her first objection is to the use of the "NRCS Bridger Plant Materials Center 1966 Technical Notes No. 26 publication as the primary reference for the soil EC values that will be used to set default EC permit limits. Her concern is that the Bridger document is a limited study that was not peer reviewed and not valid for the purposes proposed. **As a result of her letter, we contacted Mark Majerus, the author of Technical Note 26 who confirmed that he would not recommend our proposed use of the reference document.**" (Emphasis added.) (Dep. Ex. 11).

Jason Thomas of the DEQ was the individual who contacted the author of the Bridger Study. Mr. Thomas was asked about Mr. Wagner's memo and his contact with Majerus:

Q. And is that what he told you, that he would recommend that you not use his study to set EC limits?

A. Yes. In a somewhat indirect way, that's what he conveyed, that **he did not consider it to be reliable for regulatory purposes.**

(Thomas Dep. p. 30). (Emphasis added.)

Obviously when even the author of a study states that it is not reliable for regulatory purposes, it is wholly improper for a so-called expert to base his conclusions about the salt tolerance of smooth brome on such a study and to use that study to conclude that the EC limits of this permit would not cause a decrease in the yield of smooth brome. That is exactly what Brown has done. Just as Lance chose to ignore the EQC's decision that it could hear protests of permits from affected members of the public, Lance's expert chose to ignore the fact that this study has been discredited for regulatory purposes.

Once the Bridger Study is disregarded, the scientific evidence is that smooth brome will begin experiencing a measurable yield loss for smooth brome at between 1300 – 3000 (1.3 - 3.0 ds/m), and this permit is designed to allow result in a soil salinity of 3851 (3.851 ds/m).

Thomas Affidavit

Unsigned Affidavit. Lance states that it is relying on the affidavit of Jason Thomas, but the document attached to the Memorandum in Support of Lance Oil and Gas, Inc.'s Motion for Summary Judgment is an unsigned affidavit. A copy of the Thomas affidavit which was served on Clabaugh Ranch, Inc. is attached to the documents submitted by Clabaugh Ranch in opposition to Lance's motion. Obviously, an unsigned document carries no evidentiary weight.

No Expert Designation for Thomas. In addition, the unsigned Thomas affidavit contains opinions, conclusions and beliefs of Thomas that Lance relies on to support its motion. This presents two major problems for Lance. First, Thomas was not designated by Lance or the DEQ as an expert witness to express these opinions; therefore, he cannot

The DEQ has said, "Whenever the produced water is worse than background, the assumption **must** be made that the lower water quality will have a depressing effect on crop production." (Dep. Ex. 29, p. 14). (Emphasis added.) The DEQ determined that the background SAR of fields in the Wild Horse Creek drainage was 5. It knows that the SAR of the produced water is worse than the background, yet it tries to defend an incorrect formula that allows an SAR of 15.7 in this drainage, which is more than triple the background SAR in the drainage. A decrease in water quality with respect to SAR will cause infiltration problems which necessarily means that there will be "a depressing effect on crop production," in other words, a measurable decrease in forage crop yield and damage to the plant life.

The DEQ's goal was to prevent a decrease in infiltration. That is why the DEQ used the equation in the first place, and that is why the DEQ should just admit that it made a mistake instead of trying to justify its actions by saying that the mistake does not matter.

Groundwater regulations. The DEQ's own ground water regulations show the futility of relying on Mr. Thomas' statement that the DEQ's use of the wrong equation to set the SAR effluent limit is meaningless and that water produced from coalbed methane wells with an SAR as high as 15.7 is suitable for agricultural use. These regulations state that if a rancher's well is producing water with an SAR in excess of 8, it is deemed not suitable for agricultural operations. (Quality Standards for Wyoming Groundwaters Ch. 8, §4(d)(ii) and Table I). However, under the Echeta Road Permit the DEQ allows coalbed methane discharges with an SAR nearly double that amount and claims that water is suitable for agricultural use. This inconsistency alone should show that the DEQ's issuance of this

permit was a clear error. Neither the DEQ nor Lance can answer the question of how can water produced by a rancher from a well completed in a coalbed with an SAR of 8 be unsuitable for agricultural use while water produced by a coalbed methane company from the same coalbed with an SAR of 15.7 be deemed suitable for agricultural use. Perhaps it is a difference in political influence because it certainly is not science.

Mr. Clabaugh's Testimony

Lance states that Mr. Clabaugh "has launched a systematic attack on all WYPDES permits issued upstream on Wild Horse Creek to prevent any discharges into Wild Horse Creek." (Lance Memorandum p.3). While it is true that Mr. Clabaugh objects to coalbed methane operators dumping their effluent onto his ranch, it is not true that he has attacked all permits upstream of Wild Horse Creek. There are dozens of permits which have been issued by the DEQ on the Wild Horse Creek drainage which have never been protested by Mr. Clabaugh. The wildly inaccurate nature of Lance's statement is shown by the fact that the EQC's own docket shows that Clabaugh Ranch never even filed a petition with the EQC when this very permit was originally issued in 2003. When this permit was originally issued, the permit had an EC limit of 2000 and an SAR limit of 6 at an irrigation compliance point, and it required Lance to contain its discharge except in the event of the 25 year/24 hour storm event. Clabaugh Ranch did not protest that permit. Mr. Clabaugh did not even launch a "systematic attack" on the major modification of Lance's Echeta Road Permit in March of 2006 when the DEQ modified the permit to allow a direct discharge into Wild Horse Creek from outfall no. 13 and required that effluent to meet an EC limit of 2000 and an SAR of 6 at an irrigation compliance point and required treatment of the effluent to meet those limits before discharge.

Lance wants to portray Mr. Clabaugh as desiring only to obstruct coalbed methane operations, but even this is contradicted by the record. Mr. Clabaugh has allowed coalbed methane operations on his ranch, but he has prohibited the operator from discharging into the Wild Horse Creek drainage and required the operator to contain produced water in reservoirs or discharge the water into an underground drip system on some uplands approximately 3/4 of a mile from the ranch's bottomlands. (Clabaugh Dep. pp. 25-28, 116).

Flooding of the Clabaugh Ranch

It is true that Mr. Clabaugh does not want any of the coalbed methane companies dumping water onto his ranch. While it is irrelevant to the issues before the EQC, Lance tries to portray Mr. Clabaugh as an unreasonable individual who would not let the coalbed methane companies onto his property to dig a ditch across his ranch to carry their effluent. Mr. Clabaugh explained that he was not allowing that to happen because he saw what happened to the Maycock ranch when a coalbed methane company cut a ditch across his bottom lands. (Clabaugh Dep. p. 71). Indeed in Docket No. 05-3803, this Council saw the photographs of the man-made ditch cut through the bottom lands on the Maycock Ranch along the Barber Creek drainage and heard testimony from Hugh Lowham, a coalbed methane industry consultant, that he had designed this ditch to withstand even 2000 c.f.s. of flow without significant erosion. (Transcript in Docket No. 05-3803, Vol 3, p. 6855). The Council also saw in Docket No. 06-3818 the photographs of the immediate failure of this ditch and the severe erosion which occurred after just one pipeline broke and dumped water into this ditch. (William P. Maycock's Motion for Expedited Hearing Docket No. 06-3818).

Lance also relies on Lowham's work on Wild Horse Creek to support its permit

application. (Dep. Ex. 10, p 02383). After seeing what Lance's development partner did to Mr. Maycock's ranch with the assistance of Lowham, Mr. Clabaugh has every right to refuse a ditch through the ranch.

It is interesting that Lance's attorney relies on an opinion which he wrote while he was Attorney General before he resigned and started representing the coalbed methane operators as a private attorney. Citing his own opinion, Lance's attorney says, "The Wyoming Environmental Quality Act ('WEQA') gives neither the DEQ or the EQC any authority to regulate quantity of discharges as sought by Clabaugh." (Memorandum pp. 3-4): In fact, what his opinion actually said , "The EQA allows regulation of the quantity of water if the quantity has an unacceptable effect on the quality of water . . . If the quantity of water is causing unacceptable water quality or has the potential to cause unacceptable water quality, then the EQA gives the DEQ the authority to regulate water quantity." Opinion No. 2006-001. In fact the DEQ has stated, "However, WQD has, on occasion, set limits on volumes of discharge to intermittent and ephemeral streams when there is concern that the volume of effluent would cause a water quality problem (i.e. overwhelm the channel and cause scouring and/or excessive sedimentation)." (Dep. Ex. 29, p. 16).

Clabaugh Ranch recognizes that the EQC is not the forum in which all of the issues arising from the coalbed methane operators flooding the ranch can be addressed. However, the EQC is charged with assuring that whatever water is discharged does not degrade the water quality so as to impair its use and does not damage plant life, and that is what this hearing is about.

Effect on Clabaugh Ranch

Lance argues that Clabaugh Ranch bottomlands are not protected and that there

is no evidence that Clabaugh Ranch will be adversely affected by Lance's discharges under this permit. This is a recently concocted argument. Apparently Lance forgot that when it filed its application for renewal of this permit, it recognized that Clabaugh Ranch's bottom lands are watered by the ephemeral water source called Wild Horse Creek. Lance's application for renewal was signed T. Reed Scott, Lance's general manager of business services. In response to item #24 in the application, Lance was to provide the names and addresses of "all downstream irrigators between the outfalls and the mainstem." Lance listed, "Irrigator Name Clabaugh Ranch Inc., Kenny Clabaugh." (Dep. Ex. 2).

Lance discharges from outfall no. 13 within 300 feet of the Clabaugh Ranch fence line. Lance has discharged directly into Wild Horse Creek within 300 feet of the Clabaugh fence line nearly every month of the year. Lance's environmental and regulatory supervisor has conceded the obvious that Lance's discharge flows onto the Clabaugh Ranch. Lance has previously averaged a discharge of approximately .73 c.f.s from outfall no. 13 and now averages .44 to .67 c.f.s. of discharge from that outfall. The permit authorizes Lance to discharge 750,936 pounds of dissolved sodium and 5,799,902 pounds of dissolved solids within 300 feet of the Clabaugh fence line every year for 3 years. The Clabaugh Ranch bottomlands which used to be productive hay land can no longer be hayed because the land is saturated with water and salts, Grasses have changed from smooth brome and blue stem to salt tolerant species. (Kalus Dep. pp. 14, 39-40, 44-49, 72, Dep. Ex. 1) .

These discharges flow through and flood the Clabaugh Ranch for miles. The DEQ has stated that the purpose of its Agricultural Use Protection Policy is to develop effluent

limits for EC and SAR on discharges that will reach and potentially affect both artificially irrigated lands and naturally irrigated lands. Naturally irrigated lands include naturally occurring floodplains and bottomlands where there exists a significant amount of enhanced forage production that may be negatively affected by the produced water discharges even though there may not be an irrigation water right or point of diversion. (Dep. Ex. 28, p. 2). The DEQ has said that year round water quality protection is appropriate for naturally irrigated lands and that naturally irrigated lands produce a significant amount of forage for both livestock and wildlife and that the enhanced vegetative productivity found in those naturally irrigated areas may be adversely affected by increases in EC and SAR. (Dep. Ex. 29, pp. 41, 48).

Lance says that Clabaugh Ranch used water from coalbed aquifers for agricultural purposes. It is true that cattle on the ranch have drunk water from tanks supplied by wells completed in coalbed aquifers and that some water being produced from a coalbed aquifer is being injected into an underground drip system in an upland area about 3/4 of a mile from the bottomlands, but that water is not dumped or allowed to be dumped in large quantities on the Clabaugh bottomlands.

Lance claims that there is no evidence that the Clabaugh Ranch will be affected by Lance's discharge under this permit because Mr. Clabaugh could not testify to how much water is being discharged upstream of his ranch or the quantities coming from particular outfalls or "how many dissolved solids were allowed by the permit or the quantity of solids flowing through or being deposited on the ranch" or what the historic EC or SAR was of water in Wild Horse Creek. Because Mr. Clabaugh could not recite the terms of the statutes and regulations which were set out in the Petition to this Council prepared by

Clabaugh Ranch's attorney or state which facts supported some of the allegations in the Petition, Lance claims it is entitled to summary judgment.

Mr. Clabaugh is a rancher, not a soil scientist or an attorney. The issue is what facts are in the record relating to the issues before the Council, not whether Mr. Clabaugh has knowledge of the technical issues involved in this appeal or can recite the contents of DEQ regulations. The facts in the record which support Clabaugh Ranch's motion for summary judgment and defeat Lance's motion are set out in the attached Rule 56.1 statement.

Conclusion

Lance wants the EQC to believe that even though the DEQ set the effluent limits using an incorrect mathematical equation and a scientifically invalid methodology that its effluent limits are still somehow protective of agricultural uses of water that flows in the Wild Horse Creek drainage. Permit limits are to be based on the best available science, not magic and crossed fingers. Clabaugh Ranch, Inc. asks that the Environmental Quality Council deny Lance's motion for summary judgment and revoke the Echeta Road Permit and remand Lance's renewal application to the DEQ for further review in light of the multiple errors made in issuing this permit.

Dated this 29th day of July, 2009.

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Certificate of Service

I certify that on the 29th day of July, 2009, I served a true and correct copy of the foregoing by depositing the same in the U.S. Mail, postage prepaid and addressed to:

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CLABAUGH RANCH, INC. RULE 56.1 STATEMENT

Background

1. Clabaugh Ranch, Inc. is the owner of a ranch located in the Wild Horse Creek drainage below the outfalls permitted under Lance Oil and Gas Company's Permit No. WY0049697 ("Echeta Road Permit.")

2. The Echeta Road Permit authorizes Lance to discharge water directly into Wild Horse Creek from Outfall No. 13. This outfall is approximately 300 feet from the Clabaugh Ranch, Inc. fence line. (Kalus Dep. p. 14, Dep. Ex. 38). The electrical conductivity (EC) effluent limit for discharges from Outfall No. 13 is 2560 micromhos/cm. The sodium adsorption (SAR) effluent limit for discharges from Outfall No. 13 is expressed by the following formula in the permit: $SAR < 7.10 \times EC - 2.48$. This means that if the effluent has an EC of 2560 (2.56 dS/m, then the SAR limit is 15.7. The permit does not limit the quantity of water that Lance can discharge from Outfall No. 13. (Dep. Ex. 1, Permit p. 3)

3. The Echeta Road Permit also authorizes Lance to discharge water directly into twelve reservoirs at Outfalls Nos. 1-12. The EC effluent limit for discharges from these outfalls is 2560 micromhos/cm. There is no SAR effluent limit set for discharges into these reservoirs or discharges from these reservoirs. The permit provides that Lance is required to contain all effluent from Outfalls Nos. 1-12 in the on-channel reservoirs during "dry operating conditions" unless prior written authorization is granted by the DEQ for a reservoir release in association with use of assimilative capacity credits for the Powder River Basin. While the permit states that the authorization release will specify the release

volume, duration and the individual reservoir covered, the permit has no requirement that reservoir releases are subject to any SAR effluent limit and does not state that the authorization release will require the released water to meet any SAR effluent limit. (Dep. Ex. 1, Permit p. 2).

4. There is no limit in the permit on the quantity of water that Lance can discharge from any of its outfalls onto the Clabaugh Ranch. (Kalus Dep. p. 66).

5. Lance discharges water directly from outfall no. 13 into Wild Horse Creek within 300 feet of Clabaugh Ranch's fence line. (Kalus Dep. p. 14, Dep. Ex. 38).

6. Water from Lance's outfalls flows onto the Clabaugh Ranch. (Kalus Dep. p. 39),

7. Lance has discharged directly into Wild Horse Creek within 300 feet of the Clabaugh fence line nearly every month of the year. (Kalus Dep. pp. 44-49, 72)

8. Lance has discharged an average of 11,000 barrels of water per day (42 gallons per barrel x 11,000 barrels = 462,000 gallons per day) directly into Wild Horse Creek within 300 feet of the Clabaugh fence (Kalus Dep. p. 40). This is equivalent to a flow of .73 c.f.s. per day [626,317 gallons per day = 1 c.f.s.].

9. Lance is currently discharging between 200-300 gallons per minute directly into Wild Horse Creek (Kalus Dep p. 39). This discharge is equivalent to a flow of between .44 c.f.s and .67 c.f.s. [448.83 gallons per minute = 1 c.f.s.],

10. The DEQ determined that one (1) c.f.s of effluent discharged into Wild Horse Creek was traveling up to 20 miles, especially in the winter. (Thomas Dep. pp. 96-98)

11. The permit authorizes Lance to discharge 750,936 pounds of dissolved sodium and 5,799,902 pounds of total dissolved solids within 300 feet of the Clabaugh

fence line each and every year for the life of this permit. (Dep. Ex. 1, Permit pp. 3-4)

12. The bottom lands on the Clabaugh Ranch have historically been a source of a hay crop, but they can no longer be hayed because the ground is saturated with water and salt, grasses have changed from smooth brome and blue stem to slew grass and foxtail, and in some areas the grasses have been killed. (Clabaugh Dep. pp 19-20, 53-54, 65).

13. The DEQ used a Tier 2 methodology to set permit the limits for electrical conductivity (EC) and sodium adsorption ratio (SAR) in the Echeta Road Permit. (Ex. 1, p. 1).

SAR effluent limit

14. Sodium Adsorption Ratio (SAR) expresses the ratio of sodium to calcium and magnesium in the water. Without adequate amounts of calcium and magnesium in solution to counteract its effects, sodium will bind onto clay particles and cause the soil to disperse. A permit limit is established for SAR because high SARs induce poor permeability in the soil and cause the soil to seal or crust so that water and air cannot enter the soil profile.

15. The DEQ has said, "When setting limits on SAR, the agency uses the mathematical formula which is the basis of the Hanson chart." (Ex. 29, p. 46).

16. In this permit, the DEQ used the mathematical formula of $SAR < 7.10 \times EC - 2.48$ to establish the SAR effluent limit. This mathematical formula is incorrect, and the DEQ's Agricultural Use Protection Policy recognizes this error and states that the proper formula is: $SAR < (EC \times 6.67) - 3.33$. (Dep. Ex. 17, p. 1; Wagner Dep. pp. 17-18; Thomas Dep. p. 66).

17. As a result of using the incorrect formula, Lance is allowed to discharge effluent with an SAR of up to 15.7 into Wild Horse Creek even though the DEQ has determined that in the irrigated areas downstream of Lance's discharge, the SAR is only 5 and even though Lance submitted data to the DEQ indicating that the SAR of the storm water which would naturally flow in the Wild Horse Creek drainage was only 2.8. (Dep. Ex. 3, p. 1; Dep. Ex. 10, p. 2385).

18. This permit allows Lance to discharge water with an SAR of up to 15.7 even though the DEQ's groundwater regulations provide that water produced from a well with an SAR in excess of 8 is not classified as groundwater suitable for agricultural use (Quality Standards for Wyoming Groundwaters Ch. 8, §4(d)(ii) and Table I).

19. The Echeta Road Permit allows Lance to degrade the existing quality of background water conditions with respect to SAR. Even using the correct equation for the relationship between SAR and EC, this permit would allow the fields in the Wild Horse Creek drainage to be subjected to water with an SAR higher than what is seen in the background water. (Thomas Dep. pp. 66-67)

20. Studies at the U.S. Salinity Laboratory in Riverside, California have demonstrated that it is not a good approach to try to balance high SAR levels with high EC levels from a soil infiltration perspective. This study found that for bare clay soil an increase from SAR 2 to SAR 4 resulted in a significant increase in infiltration time while for loam soil the increase in infiltration time was significant at SAR 6 level. (Dep. Ex. 16).

Improper Use of Tier 2 Methodology

21. The DEQ has said, "Whenever the produced water is worse than background, the assumption must be made that the lower water quality will have a

depressing effect on crop production.” (Ex. 29, p. 14). Lance’s produced water is worse than the background water.

22. The DEQ violated its own Agricultural Use Protection Policy when it used Tier 2 to establish effluent limits on Wild Horse Creek. The Agricultural Use Protection Policy states, “Tier 2 refers to a process whereby the default limits may be refined to equal background water quality conditions and is intended to be used where the background EC and SAR is worse than the effluent quality.” (Dep. Ex. 17, p. 57).

23. Lance has stated that the representative SAR of its effluent is 13.8 (Dep. Ex. 2), and the DEQ determined in 2006 that the soil data it received indicated a mean background SAR of 5 within the downstream irrigated areas on Wild Horse Creek. (Dep. Ex. 3, p. 1).

24. The DEQ applied a Tier 2 methodology to set the effluent limits in the Echeta Road Permit even though the background SAR was better than the effluent quality and even though Tier 2 methodology is to be applied only if the background SAR is worse than the SAR of Lance’s effluent. (Thomas Dep. pp. 77-78).

25. Even though Tier 2 is to be used only where background SAR is worse than effluent quality, Jason Thomas testified, “We don’t need to know background SAR for our purposes.” (Thomas Dep. p. 74).

No SAR Limit on Reservoir Discharges

25. The DEQ has said that naturally irrigated lands produce a significant amount of forage for both livestock and wildlife and that the enhanced vegetative productivity found on such lands may be adversely affected by increases in EC and SAR the same as in artificially irrigated lands and that year round water quality protection is appropriate for

naturally irrigated lands. (Dep. Ex. 29, p. 48).

26. This permit establishes no SAR limit for water discharged from the twelve reservoirs, and the permit has no requirement that reservoir releases will be subject to any SAR effluent limit. (Dep. Ex. 1).

EC Effluent Limit

27. A permit limit is established for EC because EC is a measure of the salinity of water. Salinity becomes a problem when enough salt accumulates in the root zone to negatively affect plant growth. Excess salt hinders plant roots from withdrawing water from the surrounding soil and lowers the amount of water available to the plant regardless of the amount of water in the root zone.

28. Even though Lance asked for an EC effluent limit in its renewed permit of 2350 (2.35 dS/m) [Dep. Ex. 2], the DEQ established an EC permit limit of 2560 (2.56 dS/m) for discharges from outfall no. 13 under the theory that water with this EC would produce soil with an EC of 3851.

29. Lance submitted documents to the DEQ showing that the historical background EC of water in Wild Horse Creek was 1400 (1.4 dS/m). (Dep. Ex. 10, p. 2385; Dep. Ex. 25, p. 2408).

30. There is smooth brome on the Clabaugh Ranch, and smooth brome is one of the dominant important forage crops grown in fields in the Wild Horse Creek drainage. (Clabaugh Dep. pp. 53-54, Ex 32). Smooth brome is a moderately salt sensitive plant species. It is designated as a moderately sensitive plant species in the Salt Tolerance Database of the Agricultural Research Service of the United States Department of Agriculture, which is an accepted reference and whose use was approved on March 28,

2008 by the Water and Waste Advisory Board. (Dep. Ex. 8, Dep Ex. 29, p. 48). Smooth brome is recognized as a moderately sensitive plant species by Ayers & Westcot, *Water Quality for Agriculture*. (Dep. Ex. 6). Smooth brome is also recognized as moderately sensitive to salinity by Hanson, *Agricultural and Salinity Drainage*. (Dep. Ex. 5).

32. According to Hanson, the same authority that the DEQ relies upon to establish the mathematical formula for the relationship between EC and SAR, irrigation water with an EC of 1200 (1.2 dS/m) should "be used only cautiously to irrigate crops moderately sensitive to salinity." (Thomas Dep. p. 21). The Echeta Road Permit allows naturally irrigated lands in the Wild Horse Creek Drainage to be exposed to effluent with EC more than double that amount.

33. Ayers & Westcot state that the soil salinity range within which yield loss begins in plants which are moderately sensitive to salinity is 1300 to 3000 (1.3 dS/m - 3.0 dS/m). (Dep. Ex. 6). The DEQ analysis assumes that the effluent limit of 2560 (2.56 dS/m) will result in a soil salinity of 3851 (3.851 dS/m).

34. Moderately sensitive plant species will have a yield loss of 100% at a soil EC of between 8,000 (8 dS/m) and 16,000 (16 dS/m) and moderately sensitive plant species will begin to experience less than 100% yield between a soil EC of 1300 (1.3 dS/m) and 3000 (3 dS/m). (Dep. Ex. 6).

35. The equation to calculate yield loss per unit increase in salinity is as follows:

Yield Loss per unit increase in salinity = 100 divided by (the soil EC at 0% yield minus the soil EC at 100% yield) (Dep. Ex. 6).

36. If this equation is applied to the upper bound on the basis that a moderately sensitive crop can still produce a 100% yield at a soil EC of 3000 (3.0 dS/m) and that a

100% yield loss for a moderately sensitive crop does not occur until soil EC reaches 16,000 (16 dS/m), then the yield loss per unit increase in salinity is 7.69 [100 divided by (16-3)]. The increase in salinity from 3.0 [the point at which yield loss begins] to 3.851 [the soil salinity allowed by the permit] is .851, Therefore, if yield loss for smooth brome does not start to occur until soil EC reaches 3.0 dS/m, allowing the soil to increase to an 3.851 dS/m will result in a percentage yield loss of 6.54% for smooth brome [.851 x 7.69]. (Dep. Ex. 6).

37. If the equation is applied to the lower bound on the basis that a moderately sensitive crop is able to produce a 100% yield at a soil EC of 1300 (1.3 dS/m) and a 100% yield loss for a moderately sensitive crop does not occur until soil EC reaches 8,000 (8 dS/m), then the yield loss per unit increase in salinity is 14.92 [100 divided by (8-1.3)]. The increase in salinity from 1.3 [the point at which yield loss begins] to 3.851 [the soil salinity allowed by the permit] is 2.551. Therefore, if yield loss for smooth brome starts to occur when the soil EC reaches 1.3 dS/m, then allowing the soil to increase to an 3.851 dS/m will result in a percentage yield loss of approximately 38% [2.551 x 14.92]. (Dep. Ex. 6)

38. According to the American Society of Civil Engineers as interpreted by the DEQ, crops moderately sensitive to salinity will begin experiencing yield loss when the soil salinity is in the EC range of 1500 to 3000 (1.5 dS/m - 3.0 dS/m).

39. The scientific references recognized by the DEQ say that at a soil salinity in excess of 3000, moderately sensitive plant species will experience a measurable yield loss. (Thomas Dep. pp. 10-16). Despite this, the DEQ has set an effluent limit which it projects will result in soil salinity of 3851. According to the references relied on by the DEQ, a soil salinity of 3851 will result in a loss of crop yield for "moderately sensitive" crop species and

the loss could be in the range of 15 to 20%. (Thomas Dep. pp. 18-19). In fact, these same references indicate that even plants which are "moderately tolerant" of salinity, such as crested wheat grass, could start experiencing yield loss when soil salinity reaches an EC of 3851. (Thomas Dep. P. 32-33).

40. The study on salt tolerance of plants from the Bridger Plant Materials Center cannot be relied upon to determine the salt tolerance of plants for purposes of establishing effluent limits because the author of the study has confirmed to the DEQ that the study should not be used for regulatory purposes and because the study did not measure actual productivity because of unplanned cattle grazing of test plots and because the study was not designed as a proper quantitative research project. (Dep. Ex. 11, Thomas Dep. p. 30, Munn Dep. p. 168).

Very High Sodium Hazard and Salinity Hazard

41. This permit allows an SAR of 15.7 at an EC of 2560. According to a chart prepared by the California State Water Resources Control Board, Water Quality Criteria Manual, which Lance provided to the DEQ in support of its renewal application and which has been used by the DEQ in determining effluent limits, water with that EC and SAR would have a C4/S4 classification meaning that such water would have a "very high" sodium hazard and a "very high" salinity hazard. (Ex. 10 pp. 02380-02381) (Thomas Dep. pp. 27-28).

Scientific Invalidity of Tier 2 Methodology

42. The consultants employed by the Environmental Quality Council have determined that (1) the Tier 2 methodology which the DEQ used to set the Echeta Road

effluent limits is “not reasonable nor scientifically valid for determining the EC and SAR of water that can be discharged into ephemeral drainages in Wyoming so that degradation of the receiving water will not be of such an extent to cause a measurable decrease in crop production” and (2) the method the DEQ used for determining EC and SAR for permitting the discharge of produced water “is not reasonable nor sufficiently defined nor scientifically defensible for the conditions in Wyoming.” (Dep. Ex. 14, pp. iii, 21, 22).

43. DEQ entered into a Services Contract with the Environmental Quality Council’s consultants in June of 2009. This contract requires the consultants to provide clarification of their report to the EQC and to discuss in more detail the DEQ program as it pertains to agricultural use protection and to provide advice to the DEQ as to whether and how the findings and recommendations in their report can be used to revise DEQ’s approach to permitting surface discharges of produced water. (Service Contract)

44. John Wagner, the administrator of the Water Quality Division of the DEQ, stated that he “tended to agree” with the consultants’ conclusion that you cannot use soil quality to back-calculate water quality. (Wagner Dep. Pp. 12-13).

45. Tier 2 is designed to back-calculate water quality from soil quality. The policy makes that clear. Under the heading “Tier 2-Background Water Quality” the Agricultural Use Protection Policy states, “(2) Calculated Background: On intermittent and ephemeral stream channels, pre-discharge water quality data is usually scarce or non-existent and very difficult to collect. In these circumstances, background water quality can be estimated by conducting soil surveys on land that has been historically irrigated from the subject stream. In the event that soil studies are used as a means to estimate baseline water quality for a given drainage, the following requirements apply . . .” (Dep Ex. 17, p. 59)

46. The EQC's consultants concluded that "it is not scientifically defensible to use Tier 2." (Dep. Ex. 14, pp. iii, 22). They recommended that Tier 1 can continue to be used. The DEQ has done a Tier 1 analysis on Wild Horse Creek and concluded that under that analysis the EC limit should be 1500, not the 2560 allowed by this permit, and that the maximum allowable SAR would be 8, not 15.7 as allowed by this permit. (Dep. Ex. 3, p. 1).

Averaging

47. In order to derive the EC limit in this permit, the DEQ used the EC readings on soil samples that coalbed methane industry consultant Kevin Harvey took from 12 fields upstream of the Clabaugh Ranch, tossed out a few outliers, totaled the numbers, divided that sum by the number of samples, and concluded that the average EC of the soil in the twelve fields was 4220. (Thomas Dep. p. 54; Dep. Ex. 1, Statement of Basis pp. 3-4). The DEQ then concluded that the "mean soil EC for all fields" likely fell between 3851 and 4589. The DEQ used an EC of the soil of 3851 and divided that number by a 1.5 concentration factor [EC (applied water) = 1.5 x EC (soil)] to derive the EC effluent limit of 2560.

48. The averaging technique allowed the DEQ to set effluent limits which might protect only those fields with average or worse than average salinity. All other fields can now be exposed to water higher in salinity than the historic background flows on those fields. (Thomas Dep. p. 55).

49. The data which the DEQ relied on to establish the EC effluent limits measured the soil EC on the Lower Smith Field at 3000. If 3000 is divided by the 1.5, which

is the concentration factor that the DEQ chose to use in this case, then the allowable EC of the water on the Lower Smith Field, the EC limit would be 2000, not 2560 set by the permit. (Thomas Dep. p. 54). The Echeta Road Permit allows Lance to make any fields with less than average salinity more saline and degrade those fields.

Anti-Backsliding

50. When this permit was originally issued in 2003 it had an EC limit of 2000, an SAR limit of 6, an irrigation compliance point, and a 25 year/24 hour storm event containment requirement. Now the permit has an EC limit of 2560, an SAR limit of up to 15.7 for outfall no. 13, no SAR limit for discharges from outfall nos. 1-12, no SAR limit for discharges from 12 reservoirs, no irrigation compliance point, and allows discharge from 12 reservoirs if (a) natural overtopping occurs or (b) the DEQ authorizes the release. (Kalus Dep. p. 8; Dep. Exs. 1 and 34).

51. When Lance applied for a renewal of this permit, it asked for an EC effluent limit of 2350, and instead the DEQ assigned an effluent limit of 2560 on the basis of additional soil sampling done by Kevin Harvey in 2007 even though Kevin Harvey had advised Lance's consultant that his 2007 soil testing did not result in a significant change in soil chemistry. (Kalus Dep. p. 57; Dep. Ex 44).

Lance's Operations

52. Lance was able to conduct its coalbed methane gas operations under this permit when the effluent limits for EC was 2000 and the SAR limit was 6 and the irrigation compliance point and containment requirements were in effect. (Kalus Dep. p. 9-10).

53. The 100 acre managed irrigation area on the Floyd Ranch where Lance uses some of its effluent is precisely managed to prevent deterioration of soil quality. (Kalus Dep. p. 26). The water Lance discharges onto the Clabaugh Ranch is not precisely managed.

54. Lance has the capacity to contain in its reservoirs the water and use in its irrigation system the water which it is currently discharging from outfall no. 13. (Kalus Dep. P. 40-42). Such containment and use would reduce downstream erosion resulting from Lance's discharge.

55. Lance has the ability to meet the effluent limits which would be set by a Tier 1 methodology (EC effluent limit of 1500 and a maximum SAR limit of 8), and Lance has discharged water into the Wild Horse Creek drainage which would meet those Tier 1 limits. For example, in May and June of 2008, when the EC limit was 2560, Lance was discharging water from outfall no. 13 with an EC of 1480 in May and 1090 in June. (Kalus Dep. p. 54).

Livestock

56. Dr. Raisbeck of the University of Wyoming's Department of Veterinary Sciences and Renewable Resources provided the most up to date summary of the information currently available on the subject of water quality for livestock and recommended a sodium limit of 1,000 mg/l (dissolved) for chronic exposure. (Dep. Ex. 24).

57. The DEQ has said, "A thorough review of the scientific literature conducted by the University of Wyoming concluded that significant changes to Wyoming's water quality criteria for livestock should be made." (Dep Ex. 29, p. 26).

58. The DEQ recommended sodium limits of 1,000 mg/l (dissolved) to protect

livestock water quality. (Dep. Ex. 24)

59. This permit does not set dissolved sodium limits of 1,000 mg/l to protect livestock water quality.

Beneficial Use

59. There is nothing in the permit which requires that the water discharged by Lance actually be put to use in agriculture or wildlife propagation during periods of discharge, and Lance has not documented that the produced water will actually be put to use during periods of discharge. Instead, water discharged by Lance is contributing to flooding on the Clabaugh Ranch and is damaging agricultural use of the land.

Erosion

60. The DEQ has said, "However, WQD has, on occasion, set limits on volumes of discharge to intermittent and ephemeral streams when there is concern that the volume of effluent would cause a water quality problem (i.e. overwhelm the channel and cause scouring and/or excessive sedimentation)." (Dep. Ex. 29, p. 16).

61. The permit does not require Lance to take all reasonable measures to prevent downstream erosion that would be attributable to the discharge of produced water but instead requires only that reservoir and/or discharge water is to be released at a rate which does not cause significant erosion to the channel or receiving lands and that the water be discharged to prevent erosion at the point of discharge. (Dep. Ex. 1, Permit pp. 4-5).

62. Discharges by Lance are contributing to erosion on Clabaugh Ranch. Erosion is occurring on the Clabaugh Ranch within 1/4 mile of Lance's discharge. Head

cuts are forming and channels are being cut in areas where there were no channels before. (Clabaugh Dep. pp. 101-103).

Absent Required Permit Terms

63. The permit does not provide that floating and suspended solids attributable to or influenced by the activities of man shall not be present in quantities which could result in significant aesthetic degradation, significant degradation of habitat for aquatic life, or adversely affect public water supplies, agricultural or industrial water use, plant life or wildlife and instead the permit provides only that there will be no discharge of floating solids other than in trace amounts.

64. The permit does not prohibit deposition of substances in quantities sufficient to adversely affect plant life, but instead the permit prohibits deposition of substances that could result in degradation of habitat for plant life. (Dep. Ex. 1, Permit p. 5)