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State Corporation Commission
of Kansas

BEFORE THE STATE CORPORATION COMMISSION
OF THE STATE OF KANSAS

In the matter of the failure of Merit Energy Company, LLC (Operator) to comply with K.A.R. 82-3-603 at its WMSU lease in Morton County, Kansas.	)))))	Docket No. 23-CONS-3273-CPEN CONSERVATION DIVISION License No. 32446

PRE-FILED REBUTTAL TESTIMONY OF

KENNY SULLIVAN

ON BEHALF OF COMMISSION STAFF

MARCH 15, 2024

Q. Are you the same Kenny Sullivan who previously filed direct testimony in this docket on January 12, 2024?

A. Yes.

Q. What is the purpose of your rebuttal testimony in this matter?

A. The purpose of my testimony is to address certain issues raised on behalf of Merit Energy Company, LLC (Operator) regarding the spill that occurred on Operator's WMSU lease in Morton County, Kansas. I will first address statements made in the testimony provided by Mr. Anthony Mellini followed by the testimony provided by Mr. Sean Craven.

Q. On page 3, lines 16-21 of his testimony Mr. Mellini states that releases like this are typically managed in-situ. Why was this spill not treated in this manner?

A. All of Operator's major spills on this particular lease have included the physical removal of contaminated soils. Part of that is based on the desire of the landowner to have the contamination removed from the property, and part of it is based on the size of the spill. In-situ treatment in this area is not practicable due to the depths brine can reach due to the loose soil. This impedes the application of gypsum or other alternatives from being an effective treatment solution. This particular area also receives very little precipitation on an annual basis. The average annual rainfall in Morton County according to the Kansas Geological Survey is around 17 inches, which is significantly lower than the national average. The lack of rainfall also prevents the gypsum from working effectively and prevents chlorides and other harmful materials in the soil from being flushed downwards below the root zone.

Q. How large was this spill compared to other spills in District 1?

A. In 2022, Commission records indicate that there were 224 saltwater spills in District 1. The median reported spill volume from these spills was 8 barrels of saltwater. The spill subject to

this docket released a reported amount of 1600 barrels of saltwater, making it the largest reported spill and 200 times larger than the median spill in District 1 for 2022. The magnitude of the spill prevents in-situ treatment from being an effective method of treating the brine-impacted soils in this circumstance.

Q. On page 4, lines 24-25 of his testimony, Mr. Melinni appears to indicate that KDHE and the KCC were just referring Operator back and forth amongst the two agencies without clear options to handle the contaminated soils. Do you believe his statement is accurate?

A. No. KDHE was the appropriate agency to determine whether the contaminated soil could be used for land spreading. However, as I stated in my direct testimony, land spreading is not allowed for brine impacted soils. KDHE or KCC Staff would also need to approve of the current method Operator claims it is using to treat the contaminated soil from this spill. However, neither agency has done so in this instance. K.A.R. 82-3-603(e) gives District Staff the authority to determine what cleanup techniques are appropriate and acceptable. District Staff can also require operators to transfer refuse relating to any remediation or cleanup activity pursuant to K.A.R. 82-3-608. I believe that KCC Staff has given Operator a clear directive on how the contaminated soils need to be handled. Just because it is not the way Operator prefers does not mean it is not an appropriate method of remediation to address the contaminated soil that was a result of an extremely large spill at Operator's WMSU lease.

Q. On page 4, lines 9-10 of his testimony, Mr. Mellini states that this overall remediation approach was employed with Staff approval on several other occasions in the prior three years. Is that statement accurate?

A. Yes, physical removal has been an approved and agreed upon remediation of major spills occurring on the WMSU lease since Operator took over operations. Staff has allowed

Operator to haul contaminated soil from previous spills to its 80-acre property in order to beneficially re-use the impacted soil on a few select instances. However, there was also an agreement to beneficially re-use diluted soil within three months. For example, attached to my testimony as ***Exhibit KS-6*** is a Terracon Remediation Plan for a prior spill on Operator's WMSU lease. Section 2.3 of the remediation plan stated that the soil would be re-used within 3 months of deposition. Any contaminated soils not beneficially re-used within that 3 months should have been taken to a landfill by Operator. However, that does not appear to have occurred. I would also note that the contaminated soils transported from the spill at issue in this docket have not been properly diluted or beneficially re-used despite being on Operator's property for over 3 months. Due to the volume of untreated, contaminated soil already stockpiled on the property, Staff felt it was time to stop adding to the problem and find a more suitable solution for the contaminated soil from this spill.

Q. How much contaminated soil has been stockpiled on Operator's property?

A. Up to this point Operator has failed to properly dilute or beneficially re-use contaminated soil from previous spills which has led to the culmination of approximately 20,000 cubic yards of contaminated soil stockpiled and not being beneficially re-used to this day. This 20,000 number does not include refuse from the most recent spill. For comparison, if all of that contaminated soil were placed goal line to goal line on an American football field, the dirt would reach more than 11 feet high. The amount of contaminated soil transported over to Operator's property is extensive and well beyond the practicability of being used for beneficial purposes. For example, attached to my testimony as ***Exhibit KS-7*** are pictures of contaminated soil that has been stockpiled around Operator's infrastructure on the property. This stockpile is around 10 feet tall on average and approximately a total of 1,815 feet in

combined length. Attached to my testimony as ***Exhibit KS-8*** is a Google Earth image over Operator's property which depicts the location of the stockpiles in relation to the nearby Cimarron National Grassland and an adjacent farmer's property.

Q. On page 5, lines 11-12 of his testimony, Mr. Mellini states that the soil will be flushed through natural precipitation. Is that accurate?

A. No. As I stated earlier in my testimony, this area of Kansas generally receives very little rainfall precipitation. Attached to my testimony as ***Exhibit KS-9*** is an email where Mr. Mellini previously told me that flushing the contaminated soil is not practicable, so I am unsure why he thinks it will be effective now. The treatment cell created by Operator is not an effective method of treating soil. Attached to my testimony as ***Exhibit KS-10*** are photos of this cell. I took these pictures while inspecting the WMSU lease on February 22, 2024. The pictures clearly show that the liner put in place to keep the contaminated soil in the cell is torn to shreds where visible and in complete disarray. I also suspect the liner is in a similar condition at the bottom of the cell. Since the liner is in shreds, there is nothing to prevent chlorides or other harmful materials from continuing to leach outward from where the contaminated soil is concentrated. There is also no containment of any kind in place on the western side of the cell. As seen in ***Exhibit KS-8***, the cell is also very close to the Cimarron National Grassland and an adjacent farmer's property.

Additionally, in order for the chlorides and other harmful chemicals to be properly flushed there needs to be a method to recover the flushed water and remove it to a brine tank or dispose of it in a permitted Class II injection well. This is not the case here, so there is nothing in place to remove and properly dispose of chlorides and other harmful chemicals. Mr. Mellini also mentioned dilution through mixing more contaminated soil with less contaminated soil and

treating the contaminated soil ex-situ with gypsum. Neither of these methods are acceptable forms of dilution for non-reportable spills, and I don't believe they are acceptable methods for the contaminated soils from this specific spill based on my visual observations.

Q. On page 6, lines 10-12 of his testimony, Mr. Mellini expresses confusion as to why Operator should be required to haul the contaminated soil to a landfill. Can you address that confusion?

A. Operator has not demonstrated beneficial re-use for the soil. There is also a long history of taking oil and brine impacted soils to landfills due to spills from oil and gas operations. It is up to the landfill to determine whether or not it takes contaminated soil, and the Seward County landfill has indicated it would take the contaminated soil at issue in this docket. KDHE does allow for landfills to take that type of soil through a "Special Waste Authorization". There have been other spills in the past in which operators were required to transport contaminated soils from a spill to a landfill capable of accepting such soils. Additionally, landfills are better equipped and suited to handle "special waste", such as brine impacted soils. First, landfills are zoned, permitted, and regulated. Second, prior to construction of a landfill pit, a hydrogeological study is conducted and monitoring wells are installed. Third, samples are collected periodically from the monitoring wells and inspections are regularly performed by KDHE staff. Operator's 80-acre parcel of land meets none of those requirements, yet they are attempting to treat their piece of property like a special waste landfill. Further, Operator has placed contaminated soil in the immediate vicinity of the Cimarron National Grassland and private land owners. While chlorides in the impacted soil have been the main area of focus here because it is the most damaging to the soil/vegetation, there are also other harmful

materials that are generally found in produced fluids such as radioactive isotopes, heavy metals, benzene, etc.

Q. Merit estimates that it will costs $650,000 to remove the contaminated soil to the Seward County landfill. Should that be a factor in whether or not contaminated soils are hauled to a landfill?

A. No. Operators are responsible for properly remediating spills regardless of the costs. KCC Staff takes into account no economic considerations when an Operator drills a well or purchases existing wells from another operator, so it seems odd that we would take such a consideration into account for an Operator needing to properly remediate a spill that happened during their operations. That being said, Staff was conscious of the costs and other concerns expressed by Operator and thoroughly considered all requests made by Operator. Ultimately, Operator would not be facing that cost if it implemented upgrades to the infrastructure on the lease sooner rather than letting the spills continue to mount.

Q. Mr. Melinni states that hauling impacted soils to any landfill would be detrimental to the environment and public safety. How do you respond?

A. Operator has the obligation to ensure that the contaminated materials are transported in a safe and reasonable manner. If Operator was truly concerned about a public safety concern, then it could have reached out to us about setting up a schedule to take the contaminated soils to a landfill over a set time period in order to reduce that concern. However, Operator has previously stated that hauling the contaminated soil to a landfill is a non-starter due to the cost. This argument is interesting as Operator claims that it produces 103,000 barrels of oil equivalent per day. Attached to my testimony as ***Exhibit KS-11*** is a copy from Operator's website that confirms this amount of daily production. This number is important for two

reasons. First, that amount represents that Operator is selling roughly $7 million of production per day and over $2 billion per year. Second, Operator is likely using over 350 truckloads per day to haul the oil and produced fluids associated with that production.

As previously described, due to the long droughts the area experiences, high temperatures, and high winds, this soil refuse is likely to cause pollution of the surrounding soils. The treatment cell that Operator constructed and has piled the contaminated soil on is less than 500 feet from the Cimarron National Grassland and approximately 300 feet from a private landowner. These neighboring landowners are expecting the KCC to uphold its regulations and ensure that contaminated soil refuse from spills isn't going to pollute or harm their lands. The KCC's focus is on the contaminated soil at the property, and ensuring the land is not being turned into an unregulated, unmonitored landfill. Operator has not shown that it can adequately dilute or re-use the contaminated soil for beneficial purposes in a manner that is likely not going to cause pollution. Staff has the ability to require operators to transfer contaminated soil when it appears that the soil will likely cause pollution, which is applicable in this instance. Further, as I stated earlier in my testimony, landfills are required to have studies conducted and monitoring in place in order to have a landfill. It would be environmentally irresponsible to leave the contaminated soils on Operator's property.

Q. Do you believe the treatment plan outlined on page 7 of Mr. Mellini's testimony is effective?

A. I don't believe so. It appears that Operator is trying to do the bare minimum in the cheapest way possible. The treatment plan fails to adequately flush or blend the contaminated soil with fresh soil. Operator states that it got some less contaminated soil by over excavating, but there is nothing to indicate that actually was done as Operator did not conduct any confirmation

sampling. The liner beneath the treatment cell is shredded where visible and it is reasonable to believe it is shredded along the bottom as well. There is also nothing in place to capture any chlorides or other chemicals and adequately dispose of them down a Class II disposal well. Additionally, my visual observations and photographs of the treatment cell do not indicate that the contaminated soil is being properly remediated. There also is the issue of Operator not using a majority of the soil already on the property for beneficial re-use and it is clear that Operator's treatment plan will likely not be effective.

Q. Mr. Mellini states that Operator has used the best standard practices in remediating the spill. Do you believe that is accurate?

A. I don't believe that Operator is using best standard practices. I believe that Operator is using different than standard practice and claiming that it is best. There are no best standards for spills of this magnitude that leave this much contaminated soil stockpiled on a property without any treatment or beneficial use. It is not standard for operators to physically remove a large amount of contaminated soil to a property as Operator has done in this case and then do nothing with that impacted soil. Furthermore, it is best standard practice to conduct confirmation sampling. Confirmation sampling has been done on all previous remediation events, but Operator is opposed to that here without providing any sound reasoning for not applying that best standard practice.

Q. Let's move on to Mr. Craven's testimony. On page 3, lines 12-14 of his testimony, Mr. Craven states that Merit has spent $800,000 to replace and update equipment to mitigate against future spills. Should this prevent Operator from being required to properly address the contaminated soils?

A. I commend the Operator for finally taking that action, but it doesn't exempt them from properly remediating spills that occur on their leases during their operations. This water flood in particular was installed in the early 1960s and the infrastructure was showing its age. Operator acquired the lease in 2014, and had its first significant spill on this lease in 2017. However, making the decision to replace the infrastructure after 20+ spills occurred and almost seven years after the first significant spill doesn't relieve Operator of its duty to properly remediate the contaminated soil from the spills that have occurred.

Q. K.A.R. 82-3-603(a) requires operators to act with reasonable diligence to prevent spills and safely confine saltwater, oil and refuse in tanks, pipelines, pits, or dikes. Do you believe Operator has demonstrated such diligence at its WMSU lease?

A. No. I think any operator acting with reasonable diligence would have attempted to address the issues causing the number and large volume of spills in a more timely and proficient manner than what has occurred here.

Q. On Page 6, lines 10-12 of his testimony, Mr. Craven describes beneficial re-use. Is his description accurate?

A. It is generally accurate, but Mr. Craven does not include that the contaminated soil has to be diluted according to KCC dilution requirements, which to my knowledge has never been done. His testimony also fails to include that the landowners have to give permission to beneficially re-use the contaminated soil on their property, and that the soil can only be used on that lease

or unit. The two other landowners of this unit are a farmer and the US Forest Service. The farmer has made it very clear that he does not want contaminated soil on his property, and I don't see the US Forest Service allowing beneficial re-use of contaminated soils that could impact the native grassland that they are trying to preserve.

Q. Does the Commission have guidelines for when beneficial re-use is appropriate?

A. There are guidelines for operators that need to clean-up/remediate non-reportable spills. Attached to my testimony as ***Exhibit KS-12*** is the Clean Up Guidelines for Spill and Escapes Exempted From Notification Requirements webpage which is available on the Commission's website. The guidelines state that contaminated soils physically removed from non-reportable spills can be taken to a landfill authorized by KDHE, used for maintenance of onsite lease roads in accordance with KCC dilution requirements with fresh/clean soil, or used for onsite dikes or berms for containment at tank battery sites in accordance with KCC dilution requirements with fresh/clean soil. Non-reportable spills that are exempted from notification are described under K.A.R. 82-3-603(b)(3) as very minor amounts of saltwater, oil, or refuse that unavoidably or unintentionally leak or drip from pumps, machinery, pipes, valves, fittings, well rods, or tubing during the conduct of normal prudent operations and that are not confined in dikes or pits or within the vicinity of the well. The exception does not apply to ongoing, continual, or repeated leaks or drips, or to leaks or drips that are the result of intentional spillage or abnormal operations, including those due to unrepaired or improperly maintained pumps, machinery, pipes, valves and fittings.

As I stated earlier, the spill at issue was 200 times larger than the median spill in District 1 during 2022. It was clearly a reportable spill and subject to the remediation efforts requiring approval by District 1 Staff. Since the spill at issue was not exempted from K.A.R. 82-3-

603(b), then it fell subject to the cleanup techniques in K.A.R. 82-3-603(e)(1). That regulation states that each operator shall clean up any spill that requires notification under this regulation in accordance with the cleanup method approved by the appropriate District Office. In this case, the only cleanup method approved by the District 1 Office has been to physically remove the contaminated soil and take it to a landfill.

Q. On page 6, lines 19-20, Mr. Craven states that Staff has long approved hauling chloride contaminated dirt to its property. Is this statement true?

A. No, Mr. Craven's testimony distorts previous District-approved remediation efforts. As I stated earlier, there have been spills in the past for which District 1 Staff approved Operator transporting contaminated soil for beneficial re-use within three months. However, it would have been subject to Commission dilution requirements and there would have been a requirement to either use the soil or haul it to a landfill within a specific time period. To my knowledge, Operator has not properly diluted the contaminated soils, used properly diluted soils for beneficial re-use, nor hauled the unused soil as agreed. As I stated earlier in my testimony, the stockpiled, contaminated soil is around 10 feet high on average and 1,815 feet long. Based upon my visual observations and photographs of the contaminated soil, it appears Operator has taken beneficial re-use to mean stockpiling untreated, contaminated soil on its property. Any Staff approval certainly did not intend for the mishandling of contaminated soils Operator has demonstrated at its WMSU unit.

Q. Do you believe Operator has demonstrated that it will beneficially re-use the contaminated soil?

A. No, I do not. From 2017 to 2022 there were a total of 23 spills on this particular unit. Seven of the spills required physical removal of the contaminated soil. The contaminated soil

physically removed as a result of these spills is approximately 20,000 cubic yards. However, as I stated earlier, Operator to my knowledge has not used any of this contaminated soil for beneficial re-use, and has instead stockpiled it on its 80-acre property, mainly around its infrastructure toward the east end of the property. There is also no indication that Operator has appropriately diluted the contaminated soil physically removed from past spills. In his testimony, Mr. Craven states that the contaminated soil has been used for constructing a dike around its infrastructure. However, K.A.R. 82-3-101(a)(25) defines a "Dike" as a permanent structure that is constructed at or above the surface of the earth and totally encloses production facilities or lease equipment and is used to temporarily contain fluids resulting from oil and gas activities and discharged as a result of unforeseen circumstances. The pictures attached to my testimony clearly demonstrate that the soil stockpiled by Operator is not being used for any beneficial purpose because it is not constructed in a manner that would contain fluids as defined by Commission regulation.

Ultimately, in order for the soil refuse to be re-used, there actually has to be a benefit. It is my understanding that an operator is required to get landowner permission before using contaminated soil for re-use at onsite lease roads or dikes. I believe it is unlikely that Operator would be able to do so in this instance beyond its 80-acre property. Additionally, Operator has failed to use the contaminated soil already on its property for any beneficial re-use, and there is no indication that has changed with the current contaminated soils at issue. It is clear that the only benefit here is that Operator would avoid the cost of hauling the contaminated soil to a landfill.

Q. Has Operator addressed the contaminated soil in a method that is appropriate?

A. No. As I have previously stated, Operator has failed to use any contaminated soil for beneficial re-use and has instead opted to place the contaminated soil in large stockpiles around its 80-acre property. Not only has a vast majority of the contaminated soil not been used for beneficial re-use, it has also not been treated per the KCC's dilution requirements. Otherwise, there would likely be twice the amount of soil on Operator's property right now.

Q. On pages 7-10 of his testimony, Mr. Craven addresses the differences between hauling to a landfill, land spreading, and treatment on Operator's property. Would you like to address anything about his testimony?

A. Yes. Staff worked extensively with Operator to try and look at alternative solutions other than landfilling. Based on the amount of contaminated soil already accumulated on Operator's property, Operator's failure to properly dilute that contaminated soil, and Operator's failure to beneficially re-use or haul contaminated soil from past spills, we felt it best for the soil from this spill to be transported to a landfill. I think it is also important to point out the fact that Operator was willing to haul to the Morton and/or Steven County landfills without any qualms of public safety or environmental concerns. The common denominator since this began has been the cost.

Mr. Craven then goes on in his testimony to describe land farming. What stood out to me about this part of his testimony is that he talked to multiple KCC and KDHE Staff members. Every one of them told him that land farming these soils doesn't meet their regulations and neither agency could or would write a permit to land farm the contaminated soil. This also included multiple variations proposed by Operator to land farm the contaminated soils under different names.

Lastly, Mr. Craven discusses treatment on Merit property. I distinctly remember Mr. Craven telling me that Operator's only option for a landfill was the one in Seward County, and he stated that it was a non-starter for Operator due to the cost to haul and dispose. I think Mr. Craven did a good job in describing the conversation and the amount of consideration Staff was giving to their requests, and ultimately provided my email stating why it was denied. I would like to point out again that Operator has already accumulated 20,000 cubic yards of contaminated soil on its property. This contaminated soil wasn't diluted and still has not been used in a beneficial manner, even after commitment from the Operator to beneficially re-use the soil or haul it off within 3 months of the initial agreement we made in 2019.

Q. On page 11, line 18 of his testimony, Mr. Craven stated that the spill was cleaned up according to industry best standard practices. Do you agree?

A. No. The testimony provided on behalf of Operator attempts to state that they are going above and beyond any industry standard. I disagree with that assessment. There are no other operators in my district that have standardized taking the largest spill in an area and moving the contaminated soils to a nearby property and leaving it there.

Q. On page 14, lines 18-20 of his testimony, Mr. Craven states that chlorides would not float upward and "re-contaminate" soils higher in the soil column. Is that true in your experience?

A. It is not. It is not uncommon to see chlorides from past spills re-appearing on the surface long after the spill was supposedly remediated. That is why physical removal is important in this area. Even if the chlorides are at a greater depth they can still be drawn upwards through capillary action as the vegetation above pulls water upwards during time of extreme drought, which is a constant in western Kansas. I have also observed chlorides re-appearing on the

surface due to rainfall after an extended drought. It is why we require operators to add gypsum to the bottom of the excavation after physical removal of the contaminated soil.

Q. On Page 15, lines 2-15 of his testimony, Mr. Craven states that the penalty order is not supported by the facts of the case. Is that true?

A. No. K.A.R. 82-3-603 provides operators 10 days to remediate spills or a later date if granted an extension. Staff attempted to work with Operator and the landowner given the issues with the amount and extensive nature of the spills on the lease. However, Operator failed to come up with any measureable amount of remediation in a timely manner. After multiple extensions, Staff gave Operator a final deadline of March 15, 2023 to remediate the spill. Operator failed to meet that deadline. Even if Operator was correct in its interpretation, it failed to remediate the spill within 10 days after Staff agreed to a removal plan. Furthermore, Operator claims it was waiting on an approved remediation plan, but constructed a treatment cell and hauled the soil and placed it in the treatment cell without any approval or authorization. It seems disingenuous for an operator to claim that it was waiting on an approved method, but did what it wanted to do anyway.

Q. On page 15 lines 16-19, Mr. Craven states that Staff never proposed a cleanup method. Is that Staff's responsibility?

A. It is not Staff's responsibility to propose a cleanup method. It is the responsibility of the operator that caused the spill. It appears that Mr. Craven is trying to paint Staff as being unreasonable in failing to consider Operator's various proposals. However, we were very diligent in carefully reviewing each proposal and checking to see if that proposal would be effective and comply with our regulations, and as Mr. Craven testified we would regularly reach out with clarifying questions and additional thoughts. Staff also proposed the idea of

flushing the soil with fresh water and chemical amendments to try and leach the chlorides out of the soil and recover and dispose of the fluid. However, Mr. Mellini responded by stating, "Low transmissive soils, limited groundwater, and high evapotranspiration rates (due to the semi-arid environment) are not conditions conducive to soil flushing." Ultimately, none of the options provided by Operator met these conditions. That is also why Staff finally directed Operator to take the contaminated soil to a landfill. However, Operator has not done as instructed, and as Operator's counsel agreed it would do.

Q. Has the testimony provided by Anthony Mellini and Mr. Craven changed your recommendation in this docket?

A. No it has not. It is considered to be a best practice to conduct confirmation sampling to ensure a spill has been properly remediated, and it has not occurred in this case. Additionally, it is still my recommendation that Operator be required to transport the contaminated soils removed from the spill to a landfill. Neither KDHE nor KCC Staff has approved of the method that Operator is attempting, which is to turn its property into a landfill. My recommendation would be that Operator needs to take soil samples around the lease road to a depth of 4 feet to ensure that the spill in that area was properly remediated as agreed upon. Additionally, Operator should be required to transport all brine impacted soils physically removed from the spill to the nearest available landfill as agreed upon and as required by District Staff.

Q. Does this conclude your testimony?

A. Yes.

May 7, 2019

Kansas Corporation Commission
Kenny Sullivan, District Geologist
210 E Frontview, Suite A
Dodge City, KS 67801

Telephone: (620) 682-7929
E-mail: k.sullivan@kcc.ks.gov

Re: Remediation Plan
WMSU 2A-02 Saltwater Release
SE/4 Sec. 29, T34S R41W
Morton County, Kansas
Terracon Project No. 01187250

Dear Mr. Sullivan:

Terracon Consultants, Inc. (Terracon) is presenting this Remediation Plan on behalf of Merit Energy Company (Merit) to the Kansas Corporation Commission (KCC) for review and approval. Based on the results of the Limited Site Investigation (LSI) and the extent of impacts, Merit would like to remove the soil with chloride concentrations greater than 500 mg/L and transport it to an 80-acre parcel owned by Merit Energy. The soil will be temporarily staged onsite for reuse at the parcel and on Merit's WMUSU tank battery/facility. This Remediation Plan has been prepared to guide site cleanup activities.

1.0 BACKGROUND

Terracon completed a Limited Site Investigation (LSI) of the site on December 21, 2018 which was transmitted to the Kansas Corporation Commission (KCC) on Merit's behalf. The site is located in the NE 1/4 of the SE 1/4 Section 29, T34S, R41W (Figure 1). Terracon collected soil samples from 18 borings (B-1 through B-18) (see Figures 2A, 2B, and 2C). Soil samples were collected at three intervals below ground surface (bgs): 0 to 2 feet bgs, 2 to 4 feet bgs, and 4 to 6 feet bgs except where auger refusal occurred at about 4 feet bgs in B-7 and B-10. Tables 1 presents the results of laboratory testing for soil samples. Refer to the LSI report for more details on the investigation.

Based on the LSI results, chloride concentrations and extent of impact were delineated for soil and soil removal actions will be implemented. Remediation activities will include soil removal and replacement with gypsum and soil and off-site transport of soil to Merit property for reuse.

2.0 REMEDIATION PLAN

2.1 Soil Removal

Soil removal would be implemented for soils with chloride concentrations greater than 500 mg/L due to potential effects on vegetation. Excavated soils would be hauled off-site for reuse.

Chloride concentrations were mapped at depth intervals of 0 to 2 feet bgs, 2 to 4 feet bgs, and 4 to 6 feet bgs as shown in Figures 2A, 2B, and 2C, respectively. Table 1 presents chloride concentrations with depth. The areas with chloride concentrations greater than 500 mg/L chloride were measured for each interval and the excavation areas were delineated for each depth interval (Figure 3). Terracon will stake the perimeter for three areas to be excavated to defined depth intervals.

The estimated in-place volumes for the depth intervals of 0 to 2 feet bgs, 2 to 4 feet bgs, and 4 to 6 feet bgs are approximately 1,015 cubic yards, 875 cubic yards, and 220 cubic yards, respectively. The total estimated in-place volume of soil impacted with greater than 500 mg/L chloride is approximately 2,110 cubic yards.

Based on the proposed soil removal activities, residual concentration of less than 500 mg/L will remain in place. Post-excavation sampling and analysis is not planned, since Table 1 presents chloride concentrations with depth. Clean soil and/or topsoil will cover this area to promote growth of vegetation.

2.2 Soil Transport to Offsite Location

The excavated soil will be directly loaded into dump trucks for transport to the Merit property located approximately 1 mile south of the release area. The Merit property covers approximately 80 acres of which 3 to 4 acres in the central portion of the site will be used for stockpiling and blending with other site soils. Assuming a 20% volume increase upon excavation, approximately 2,500 – 2,600 cubic yards of soil will be transported.

2.3 Soil Re-Use

The soil will be temporarily stockpiled at Merit's 80-acre parcel and utilized for reuse at the 80-acre parcel and the WMUSU tank battery/facility within 3 months of deposition. Soil reuse will include road or parking lot base material, road maintenance material, and tank berm dike construction material. Dependent on the selected reuse, impacted soil may require blending (i.e., ratio to be determined based on final use) with clean soil for reuse.

2.4 Gypsum Placement

Prior to backfilling the excavation with clean soil, approximately 500 pounds of gypsum will be evenly applied across the bottom of the excavation.

2.5 Clean Soil Replacement

Clean soil and clean topsoil will be used for backfill at the site. The soil and topsoil source will be approved by the property owner or verified clean through confirmation sampling and laboratory analysis before deposition on site. The clean (non-topsoil) material will be placed in 12-inch thick loose lifts and each lift will be compacted by tamping into place using the excavator bucket or by wheel rolling with construction equipment. The clean compacted soil fill (non-topsoil) will be placed up to within approximately 12 inches of the original surface grade.

A minimum of 12 inches of clean topsoil (approximately 510 cubic yards) will be placed in the upper 1 foot of the excavation area and loosely compacted by wheel rolling. A final cover lift of 4 inches of clean topsoil (approximately 261 cubic yards) will be placed across the entire area including the area where chloride concentrations were greater than 100 mg/L. An estimated total of approximately 771 cubic yards of clean topsoil will be required for both the 12-inch and 4-inch layers.

2.6 Vegetative Cover

Merit will seed the area per the property owner's requirements or compensate the property owner for seeding of the area. Vegetative cover should be consistent with future agricultural land use.

3.0 GENERAL COMMENTS

Terracon's services were performed in a manner consistent with generally accepted practices of the profession undertaken in similar studies in the same geographical area during the same time. Terracon makes no warranties, either expressed or implied, regarding findings, or conclusions resulting from these services. Please note that Terracon does not warrant the work of laboratories, regulatory agencies, or other third parties supplying information used in the preparation of this Plan. Our services were performed in accordance with the agreed scope of work.

Findings and conclusions resulting from these services are based upon information derived from the onsite activities and other services performed under this scope of work; such information is subject to change over time. Subsurface conditions may vary from those encountered at specific borings or during other surveys, tests, assessments, investigations, or exploratory services. The data, interpretations, findings, and our conclusions are based solely upon data obtained at the time and within the scope of these services.

Upon receipt of the property owner and KCC's approval of this Plan, Merit will implement remediation at the site.

Should you have any questions or comments regarding this Plan, please contact either of the undersigned at 316-262-0171.

Sincerely,
Terracon

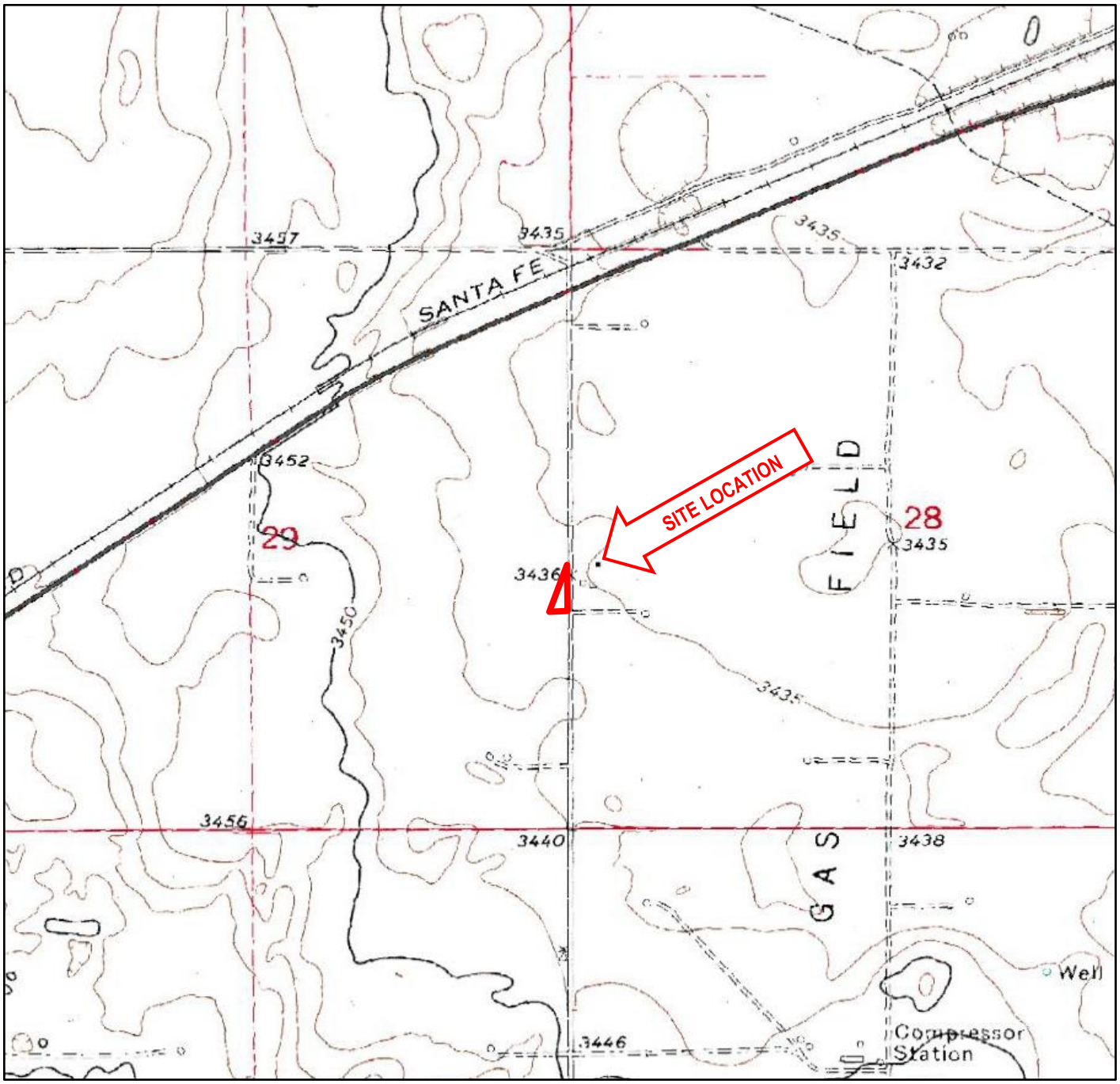
James E. Aamodt, P.E.
Project Engineer

Anthony R. Mellini, Jr., P.G.
Senior Associate

cc: Sean Craven, Merit Energy Company

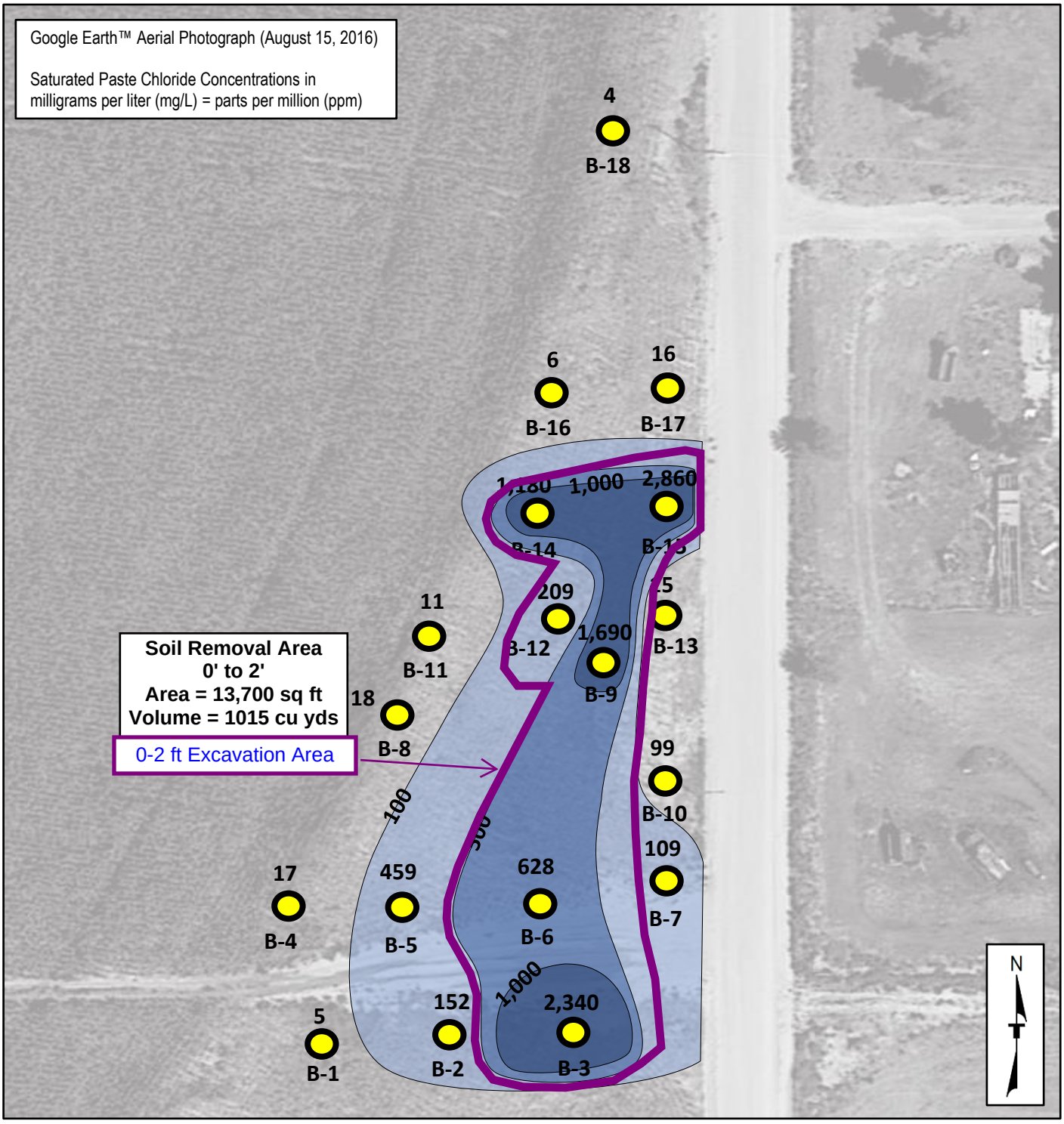
Attachments:

- Figure 1 – Topographic Map
- Figure 2A - Soil Removal Area (0- 2 Ft.)
- Figure 2B – Soil Removal Area (2-4 Ft.)
- Figure 2C – Soil Removal Area (4-6 Ft.)
- Figure 3 – Excavation Areas/Depths
- Table 1 – Electrical Conductivity and Chloride Concentrations

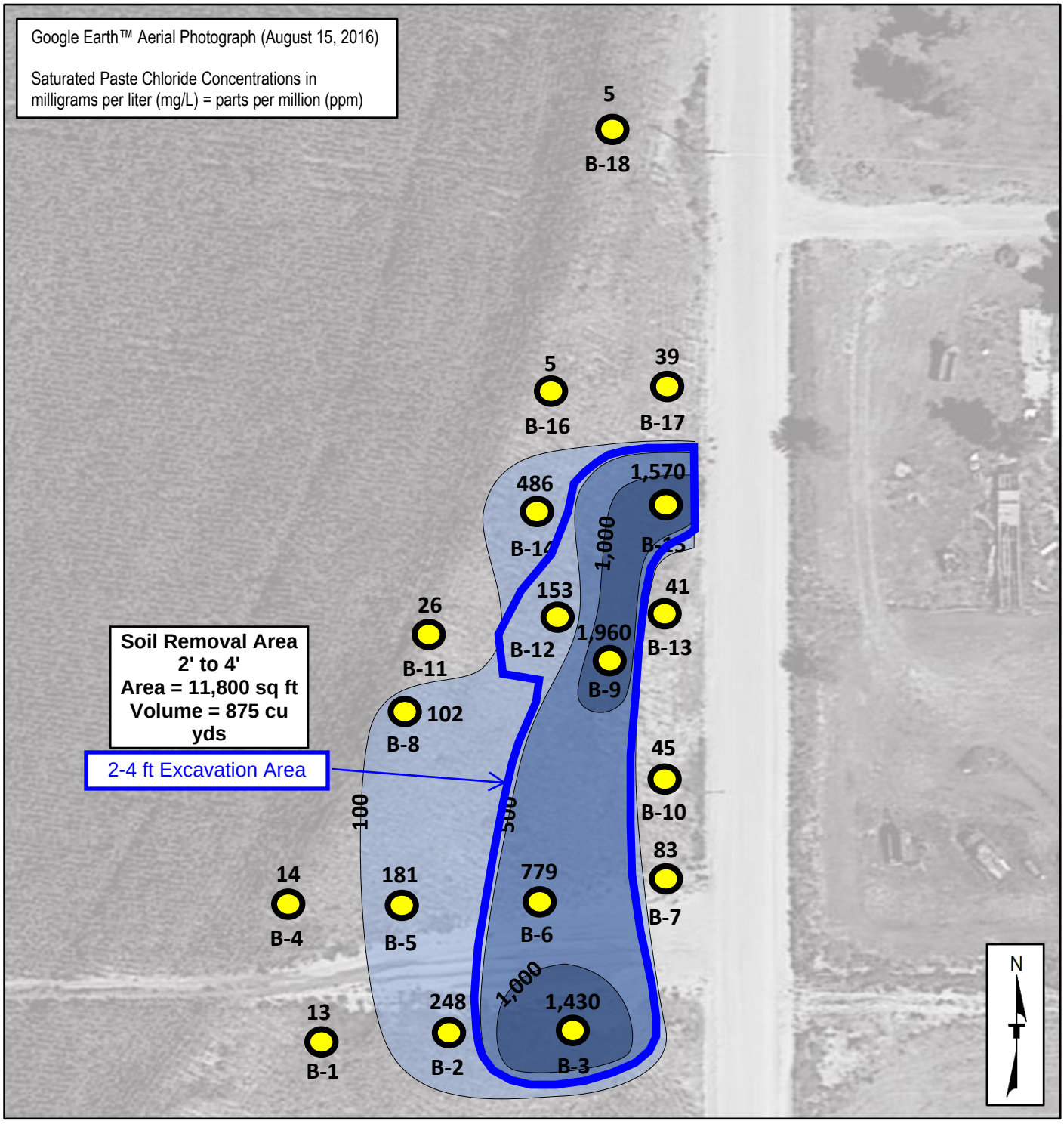


Wilburton, Kansas USGS 7.5 Minute Topographic Map, 1974

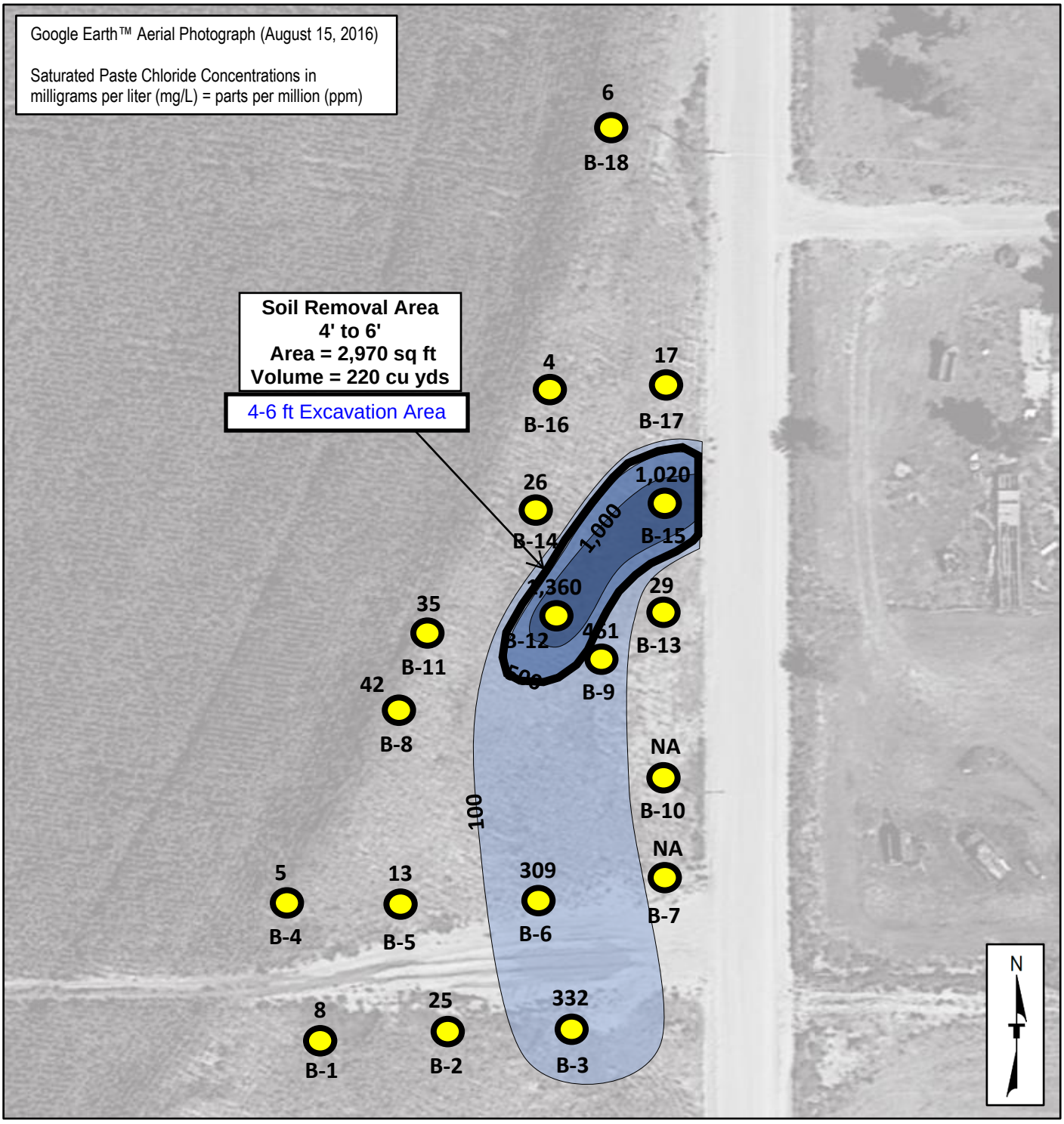
Project Manager: Montgomery **Project Reviewer:** Mellini **Drawn by:** Montgomery **Date:** 12/05/2018 **Project No.:** 01187238	**MAP SCALE** **1,000 FEET**	Terracon 1815 S. Eisenhower St. Wichita, Kansas 316-262-0171	**TOPOGRAHIC MAP** **WMSU 2A-02 SALTWATER RELEASE** Morton County, Kansas	**FIGURE** **1**



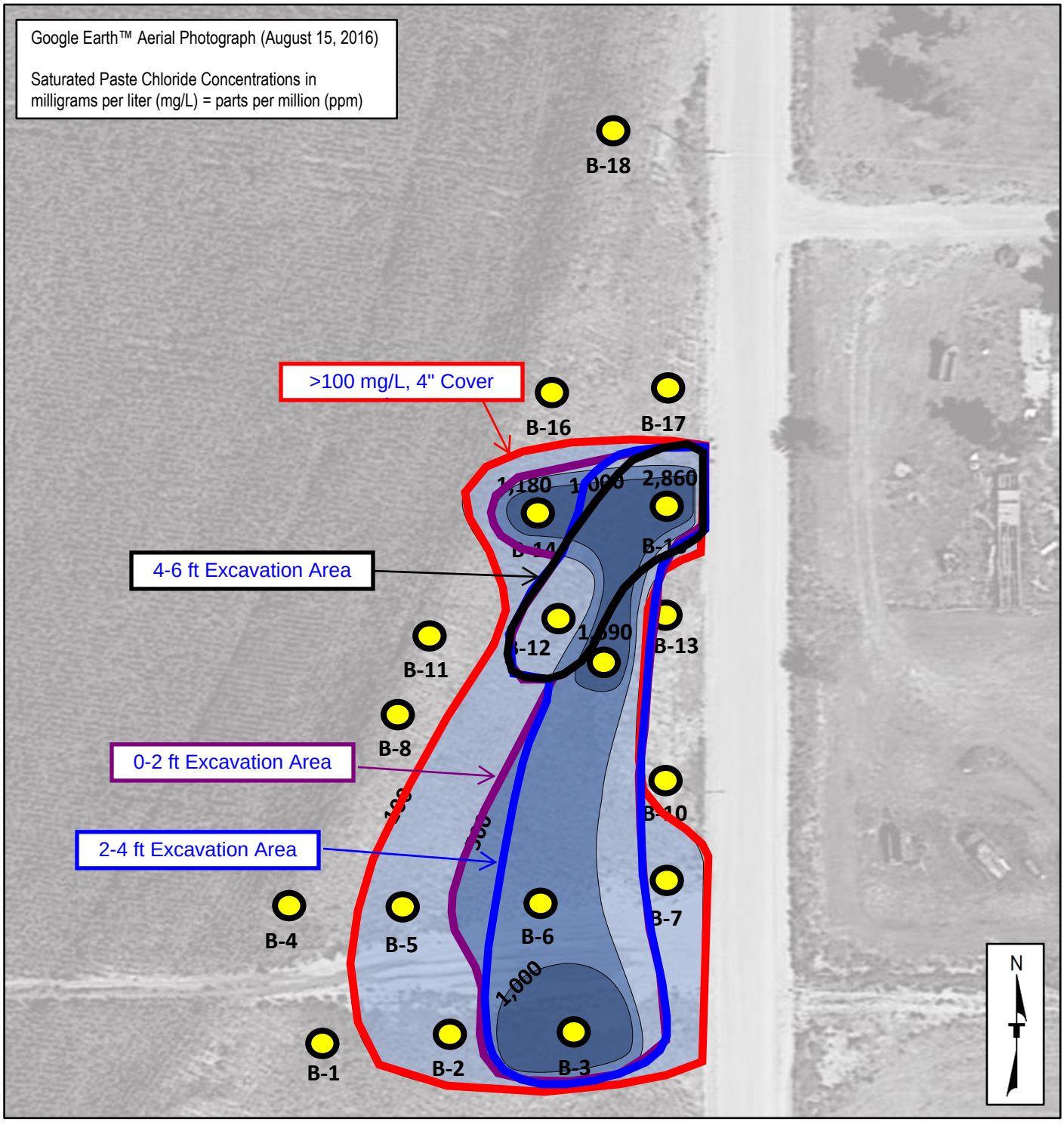
Project Manager: Montgomery **Project Reviewer:** Mellini **Drawn by:** Montgomery **Date:** 12/05/2018 **Project No.:** 01187250	**MAP SCALE** **50 FEET**	Terracon 1815 S. Eisenhower St. Wichita, Kansas 316-262-0171	**Soil Removal Area (0-2 FT.)** **WMSU 2A-02 SALTWATER RELEASE** Morton County, Kansas	**FIGURE** 2A



Project Manager: Montgomery **Project Reviewer:** Mellini **Drawn by:** Montgomery **Date:** 12/05/2018 **Project No.:** 01187250	**MAP SCALE** **50 FEET**	Terracon 1815 S. Eisenhower St. Wichita, Kansas 316-262-0171	**Soil Removal Area (2-4 FT.)** **WMSU 2A-02 SALTWATER RELEASE** Morton County, Kansas	**FIGURE** **2B**



Project Manager: Montgomery **Project Reviewer:** Mellini **Drawn by:** Montgomery **Date:** 12/05/2018 **Project No.:** 01187250	**MAP SCALE** **50 FEET**	Terracon 1815 S. Eisenhower St. Wichita, Kansas 316-262-0171	**Soil Removal Area (4-6 FT.)** **WMSU 2A-02 SALTWATER RELEASE** Morton County, Kansas	**FIGURE** 2C



Project Manager: Montgomery **Project Reviewer:** Mellini **Drawn by:** Montgomery **Date:** 12/05/2018 **Project No.:** 01187250	**MAP SCALE** **50 FEET**	Terracon 1815 S. Eisenhower St. Wichita, Kansas 316-262-0171	**Excavation Areas/Depths** **WMSU 2A-02 SALTWATER RELEASE** Morton County, Kansas	**FIGURE** 3

Table 1 : Electrical Conductivity & Chloride Concentrations

Depth	B-1		B-2		B-3		B-4		B-5		B-6	
	EC	Chloride	EC	Chloride	EC	Chloride	EC	Chloride	EC	Chloride	EC	Chloride
0-2 ft.	0.42	5	2.23	152	7.49	2,340	0.40	17	1.93	459	2.32	628
2-4 ft.	0.46	13	2.25	248	4.74	1,430	0.42	14	0.88	181	1.93	779
4-6 ft.	0.44	8	0.63	25	1.31	332	0.38	5	0.40	13	1.64	309

Depth	B-7		B-8		B-9		B-10		B-11		B-12	
	EC	Chloride	EC	Chloride	EC	Chloride	EC	Chloride	EC	Chloride	EC	Chloride
0-2 ft.	1.00	109	0.54	18	5.73	1,690	0.66	99	0.61	11	1.40	209
2-4 ft.	0.81	83	0.56	102	6.29	1,960	0.40	45	0.63	26	1.29	153
4-6 ft.	---	---	0.41	42	1.57	461	---	---	0.42	35	4.39	1,360

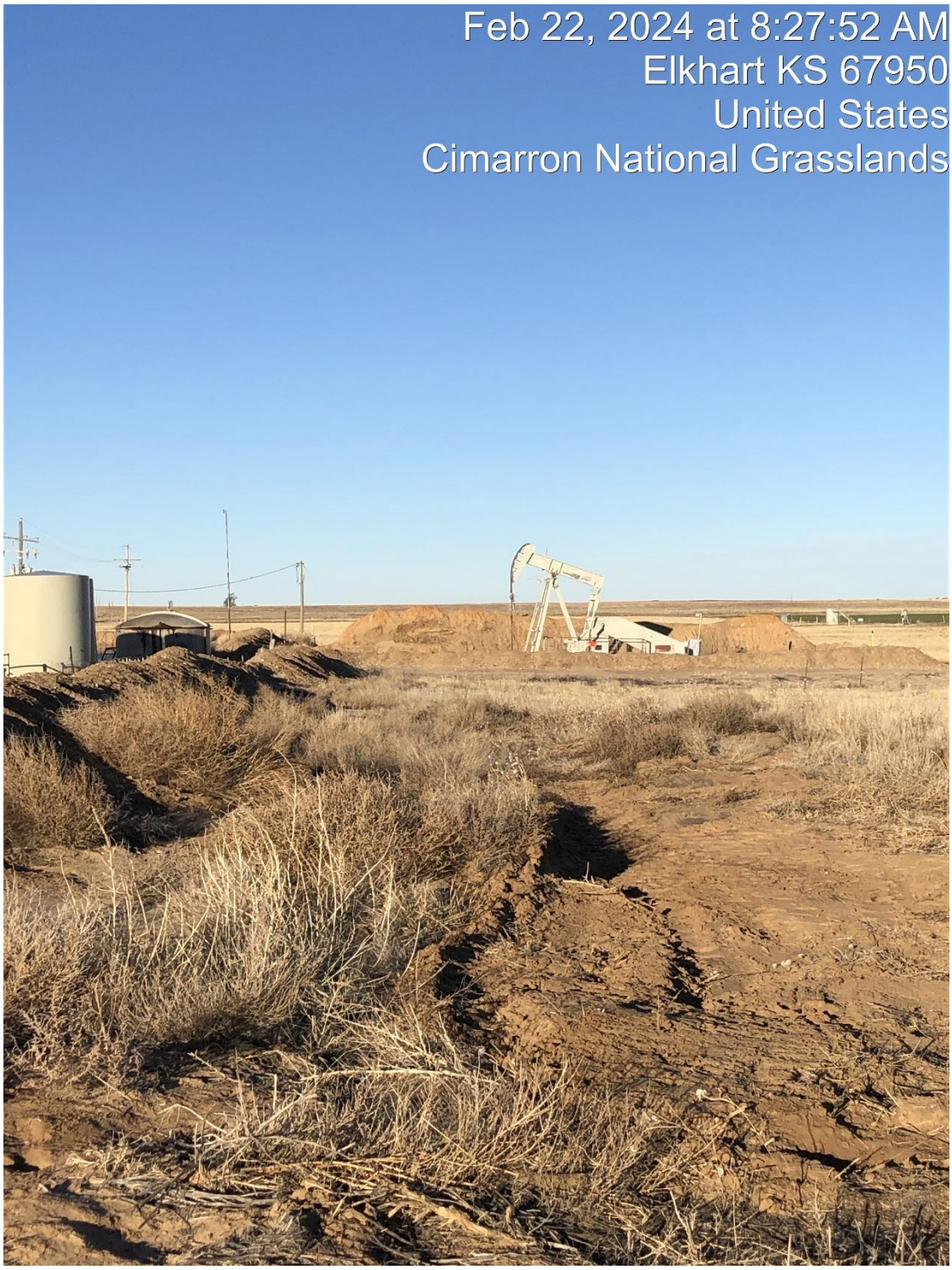
Depth	B-13		B-14		B-15		B-16		B-17		B-18	
	EC	Chloride	EC	Chloride	EC	Chloride	EC	Chloride	EC	Chloride	EC	Chloride
0-2 ft.	0.38	15	4.24	1,180	8.42	2,860	0.18	6	0.65	16	0.33	4
2-4 ft.	0.38	41	1.92	486	5.16	1,570	0.32	5	0.56	39	0.35	5
4-6 ft.	0.31	29	0.53	26	3.15	1,020	0.31	4	0.40	17	0.32	6

EC = Electrical Conductivity
mmho/cm = millimho per centimeter
mg/L = milligrams per liter (parts per million)
Yellow shading indicates "moderate" salt impact (EC 4 to 16 mmho/cm)

2/22/2024 8:26 AM

Merit Energy Company, LLC

Contaminated soil refuse stockpiled on South side of WMSU Central Tank Battery



2/22/2024 8:27 AM

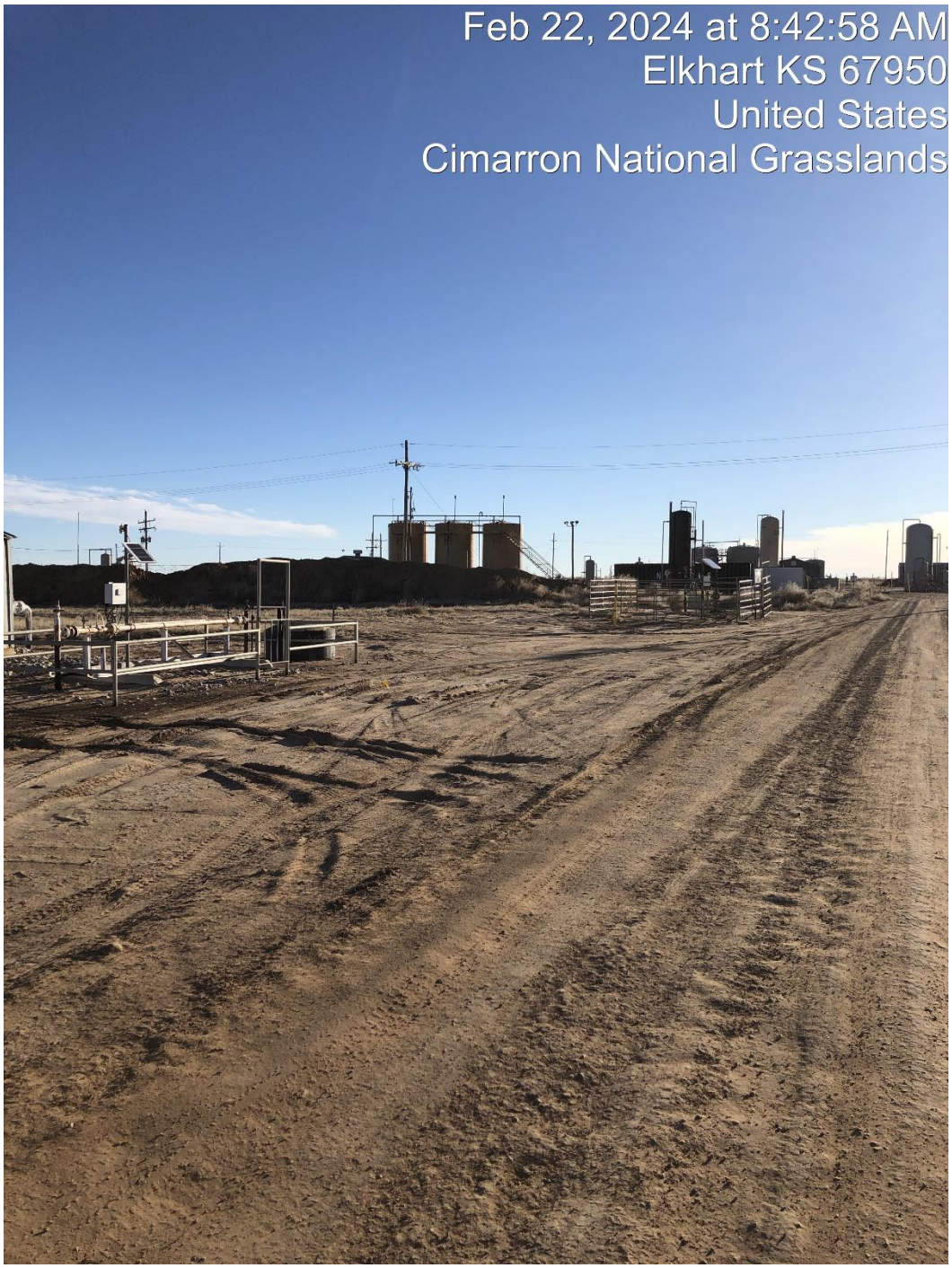
Merit Energy Company, LLC

Contaminated soil refuse stockpiled on North side of WMSU Central Tank Battery

2/22/2024 8:27 AM

Merit Energy Company, LLC

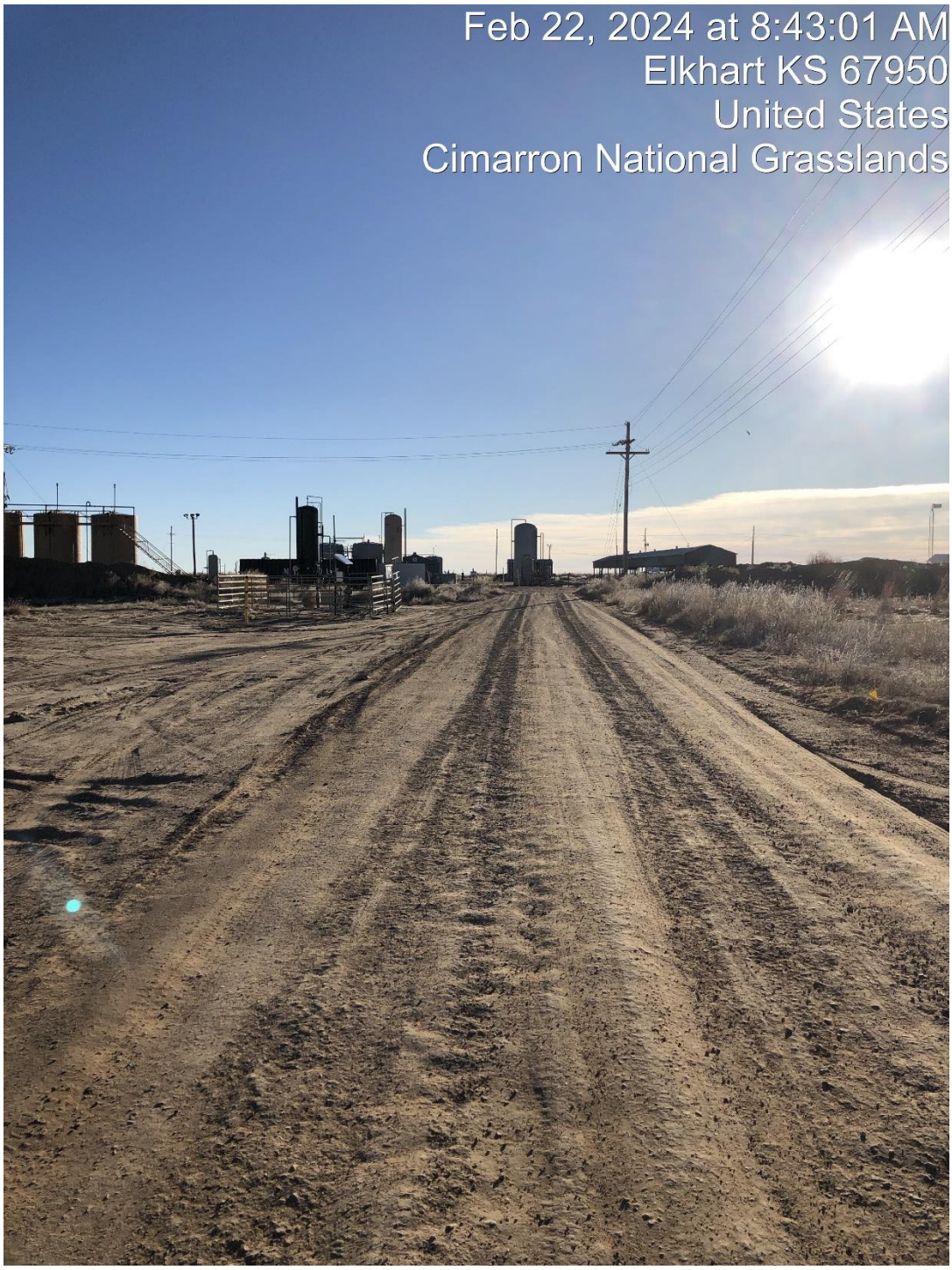
West side of WMSU Central Tank Battery



2/22/2024 8:42 AM

Merit Energy Company, LLC

Contaminated soil refuse stockpiled on West side of WMSU Central Tank Battery



2/22/2024 8:43 AM

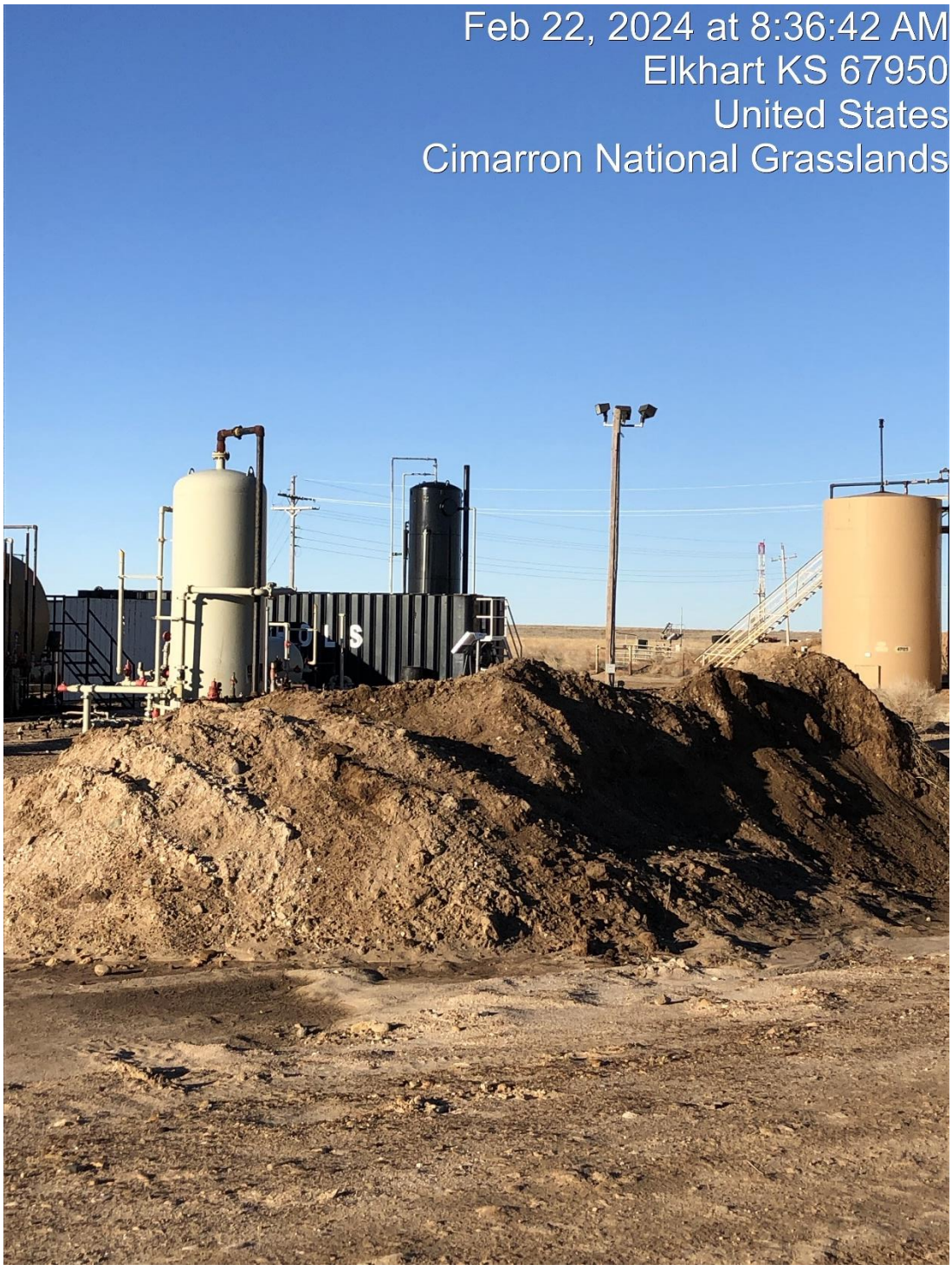
Merit Energy Company, LLC

Contaminated soil refuse stockpiled on West side of WMSU Central Tank Battery

2/22/2024 8:37 AM

Merit Energy Company, LLC

Contaminated soil refuse removed on West side of WMSU Central Tank Battery



2/22/2024 8:36 AM

Merit Energy Company, LLC

Contaminated soil refuse stockpiled within the WMSU Central Tank Battery

2/22/2024 8:35 AM

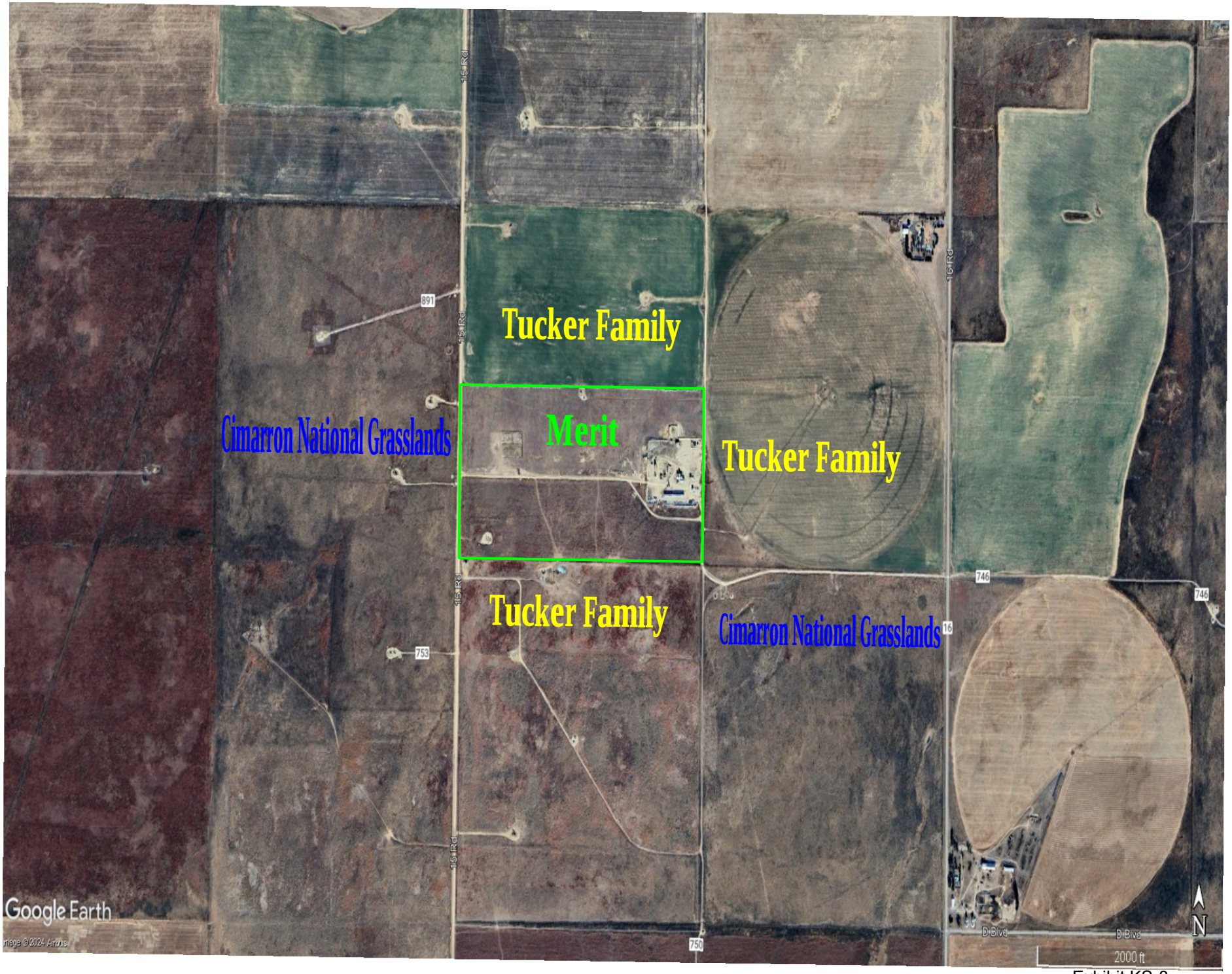
Merit Energy Company, LLC

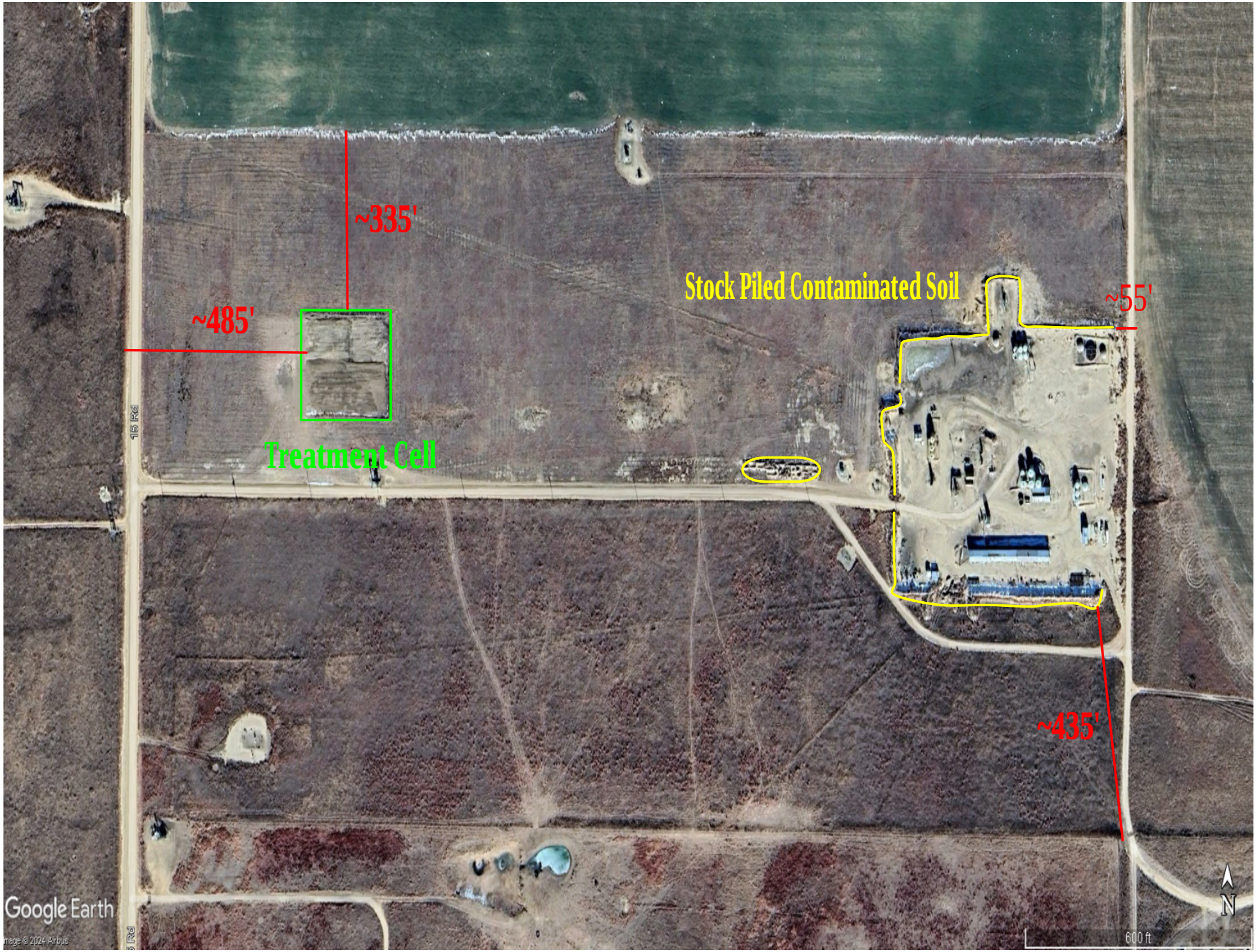
Dirt Dike within the WMSU Central Tank Battery

2/22/2024 8:44 AM

Merit Energy Company, LLC

Contaminated soil refuse stockpiled near West side of WMSU Central Tank Battery


Tucker Family
Cimarron National Grasslands
Merit
Tucker Family
Tucker Family
Cimarron National Grasslands
15 Rd
16 Rd
891
753
746
16
750
Google Earth
2000 ft
N


~335'
~485'
Treatment Cell
Stock Piled Contaminated Soil
~55'
~435'
15 Rd
Google Earth
600 ft
N

Kelcey Marsh [KCC]

From: Kenny Sullivan [KCC]
Sent: Friday, March 8, 2024 9:49 AM
To: Kelcey Marsh [KCC]
Subject: FW: Merit Draft Soil Management Plan

From: Mellini, Tony R. <Tony.Mellini@terracon.com>
Sent: Tuesday, November 8, 2022 8:23 AM
To: Kenny Sullivan <k.sullivan@kcc.ks.gov>
Cc: Sean Craven (Sean.Craven@meritenergy.com) <sean.craven@meritenergy.com>; Gagne, Mike <Mike.Gagne@terracon.com>
Subject: Merit Draft Soil Management Plan

Kenny,

We initially looked at the flushing process, after our discussion at the groundwater conference and came to the conclusion that soil flushing was not the best alternative for the site for multiple reasons.

One reason being that the source soils are primarily silt and clay with some sand. This material has a low transmissivity which makes it extremely difficult to pass water through it, even with tilling operations. Soil flushing will be restricted further after application of water causes the clay particles to expand further impeding water movement through mass. If this was primarily a clean sand without fines, the flushing operation with water could be considered.

In addition, there are also other conditions that preclude soil flushing as a remedy. Groundwater would be the only source in the area for flushing. Large quantities would be required through pumping of wells in an area where groundwater resources are primarily dedicated to agriculture and Jim Tucker's farming operations. Extensive pumping for long durations would result in significant depletion of the groundwater resources. Not sure who has the water rights in the area, but assume Jim Tucker would likely object to depleting the groundwater resource in the area.

Another reason to consider is the site is located in a semi-arid environment which will result in large water loss (>98%) due to evapotranspiration significantly reducing the effectiveness of soil flushing.

Low transmissive soils, limited groundwater, and high evapotranspiration rates are not conditions conducive to soil flushing. We still believe amendments of clean soil and/or gypsum will meet the 1,000 mg/L CL level without flushing.

Let us know if you have any questions or comments.

Thanks

Tony

Tony Mellini, P.G.
Senior Associate

D (316) 448-3680 I M (316) 295-7683
tony.mellini@terracon.com I Terracon.com

Please consider the environment before printing this email

From: Kenny Sullivan <k.sullivan@kcc.ks.gov>
Sent: Monday, November 7, 2022 10:36 AM
To: Mellini, Tony R. <Tony.Mellini@terracon.com>
Cc: Sean Craven (Sean.Craven@meritenergy.com) <sean.craven@meritenergy.com>; Gagne, Mike <Mike.Gagne@terracon.com>
Subject: RE: Merit Draft Soil Management Plan

Tony-

Have you done any figures for how much water it might take to flush the soil?

Thanks,
Kenny

From: Mellini, Tony R. <Tony.Mellini@terracon.com>
Sent: Friday, November 4, 2022 2:55 PM
To: Kenny Sullivan <k.sullivan@kcc.ks.gov>
Cc: Sean Craven (Sean.Craven@meritenergy.com) <sean.craven@meritenergy.com>; Gagne, Mike <Mike.Gagne@terracon.com>
Subject: Merit Draft Soil Management Plan

Kenny,

For your review and approval. Let us know if you have any questions.

Thanks for your assistance on this project.

Tony

Tony Mellini, P.G.
Senior Associate

D (316) 448-3680 I M (316) 295-7683
tony.mellini@terracon.com I Terracon.com

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Terracon provides environmental, facilities, geotechnical, and materials consulting engineering services delivered with responsiveness, resourcefulness, and reliability.

2/22/2024 8:58 AM

Merit Energy Company, LLC

Treatment Cell facing north

2/22/2024 8:51 AM

Merit Energy Company, LLC

West side of Treatment Cell looking south

2/22/2024 8:47 AM

Merit Energy Company, LLC

West side of Treatment Cell facing north

2/22/2024 8:47 AM

Merit Energy Company, LLC

South side of treatment cell

2/22/2024 8:48 AM

Merit Energy Company, LLC

East side of Treatment Cell

2/22/2024 8:50 AM

Merit Energy Company, LLC

Standing inside the Treatment Cell facing north

2/22/2024 8:49 AM

Merit Energy Company, LLC

Standing in Treatment Cell facing north

DEEP EXPERIENCE.
PROVEN SUCCESS.

Photo Credit

Daniel C.

Garden City, KS

World Class Assets.

World Class Team.

For more than 30 years, Merit Energy Company, LLC ("Merit") has remained one of the largest private oil and gas operators in the United States and has served as a direct energy investment for pension plans,

hospitals, endowments, family offices, and foundations.

Our disciplined approach to acquiring, operating, and developing high-quality, mature oil and gas assets has driven our success and is our roadmap for the future. Our strategy has served us well through all price cycles, enabling us to build a company where our employees spend decades, and our Partners continue to invest.

Merit has operated through the highs and lows the oil and gas industry has presented. We have adapted to continuously changing environments and successfully responded when

faced with challenges. Looking ahead we will continue to focus on the details and experiences that define our achievements; the future is promising.

Key Stats as of December, 2022

14,500

Wells Across 6 States

103,000

BOEPD

815

Employees

$4.3B

In Total Assets

Acquisitions

A Disciplined Strategy

Merit's acquisition approach begins with our highly talented, technical, in-house team. Our business development team focuses on high quality, onshore, mature oil and gas assets throughout the United States and thoroughly reviews both on and off market opportunities. Merit's ability to close with cash and take over operations immediately has consistently presented Merit as an attractive buyer, particularly in an environment of less financial certainty.

Our strategy also includes an ongoing divestiture program. Merit typically divests assets for three primary reasons:

strategic opportunities, partnership terminations, or underperforming assets.

Key Stats as of December, 2022

$10B

Acquisitions

$5.5B

Divestitures

135

Total Acquisitions

Clean up Guidelines for Spills and Escapes Exempted From Notification Requirements

*For exemptions to notification, see K.A.R. 82-3-603(b)(3).

Exceptions from notification for certain spills and escapes:

Spills or escapes at exploration and production sites are required to be reported to the Kansas Corporation Commission. However, certain spills and escapes that are specifically outlined in K.A.R. 82-3-603(b)(3) are exempted from notification requirements.

The notification requirement for spills and escapes in paragraph (b)(2) of K.A.R. 82-3-603 shall not apply to very minor amounts of saltwater, oil, or refuse, that unavoidably or unintentionally leak or drip from pumps, machinery, pipes, valves, fittings, or well rods or tubing during the conduct of normal prudent operations and that are not confined in dikes or pits or within the vicinity of the well. However, this exception shall not apply to ongoing, continual, or repeated leaks or drips, or to leaks or drips that are the result of intentional spillage or abnormal operations, including unrepaired or improperly maintained pumps, machinery, pipes, valves, and fittings.

While operators are not required to report certain spills and escapes consisting of very minor amounts of saltwater, oil, or refuse to the KCC, operators are required to clean up these very minor spills or escapes as prescribed in K.A.R. 82-3-603 (e)(2). That regulation states that:

"The operator shall clean up all leaks, drips, and escapes that are excepted from notification under this regulation in accordance with cleanup techniques recognized as appropriate and acceptable by the commission. The cleanup techniques deemed appropriate and acceptable to the commission shall be physical removal, dilution, treatment, and bioremediation."

This regulation further describes the time frame by which the clean up must occur:

"This cleanup shall be accomplished upon completion of the routine operation or condition that caused the leak, drip, or escape or within 24 hours of discovery or knowledge of the leak, drip, or escape, whichever occurs sooner."

Clean up techniques:

The commission recognizes four general clean up techniques that are appropriate and acceptable. They are:

- Physical removal;
- Dilution;

- Treatment; and
- Bioremediation.

Operators should utilize one or more of these techniques to clean up small spills or escapes that are excepted from notice requirements.

Clean up of spills or escapes of crude oil that are excepted from notification requirements:

Physical Removal

Fluids: Pick up all free crude oil and contain in onsite tankage, remove to off site storage, remove to reclamation facilities, or dispose of in permitted Class II injection well.

Solids: Remove all oil impacted soil to one of the following locations.

- A landfill authorized by KDHE;
- Remove for use in maintenance of onsite lease roads in accordance with KCC dilution requirements with fresh/clean soil; or
- Remove for use in maintenance of onsite dikes or berms used as containment at tank battery sites in accordance with KCC dilution requirements with fresh/clean soil.

Dilution

Additions: Add and till fresh/clean soil into crude oil impacted soil until a minimum 50/50 mixture is obtained. If crude oil impacted soils are removed for maintenance of onsite lease roads, dikes, or berms, insure that crude oil impacted soil is adequately bound with fresh soil to minimize any washing of crude oil during rain events.

Bioremediation

Promote natural insitu bioremediation by tilling fertilizer into the crude oil impacted soil. A fertilizer with Ammonia-Nitrogen-Phosphorous ratio of 13-13-13 is recommended. Apply fertilizer at a rate of ½ pound per square yard.

*Commercially available products that promote bioremediation/treatment of crude oil spills such as BioSorb®, Oil Hawg™, Sphag Sorb®, Ken Gro Biosorb, Trivol® 101 and 102® or similar products, may also be utilized. In all cases, follow manufacturers suggested practices for use and application.

Clean up of spills or escapes of saltwater that are excepted from notification requirements:

Physical Removal

Fluids: Remove all free saltwater/brine and contain in a brine tank or dispose of in a permitted Class II injection system.

Solids: Remove all salt impacted soil to one of the following locations:

- A landfill authorized by KDHE;
- Remove for use in maintenance of onsite lease roads in accordance with KCC dilution requirements with fresh/clean soil; or
- Remove for use in maintenance of onsite dikes or berms used as containment at tank battery sites in accordance with KCC dilution requirements with fresh/clean soil.

Dilution

Flushing: Flush saltwater/brine impacted soil in place at site of spill or escape with fresh water. The amount of fresh water used in dilution should be at least 10 times the amount of saltwater/brine spilled. Recover flush water and remove to brine tank or dispose of in a permitted Class II injection system.

Additions: Add and mix fresh/clean soil into saltwate/brine impacted soil. Minimum admixture should be adequate to establish and/or promote re-vegetation. If saltwater/brine impacted soils are removed for maintenance of onsite lease roads, dikes or berms then additions should be adequate to minimize any washing of salts during rain events.

Treatment

Treat the saltwater/brine impacted area with ¾ pound gypsum per one square yard. Till gypsum into the saltwater/brine impacted soil to a depth of six inches or more. *Commercially available products for the treatment of saltwater/brine spills such as Reef Chem SF-40, Vari Chem SP-7008, LCA-II, ET-1 Soil Rejuvenator, or similar products may also be utilized. In all cases, follow manufacturers' suggested practices for use and application.

**Inclusion of commercial product names in this guidance document does not represent an endorsement of the product by the Kansas Corporation Commission.*

View/print a pdf version of this information in tri-fold format

CERTIFICATE OF SERVICE

23-CONS-3273-CPEN

I, the undersigned, certify that a true and correct copy of the attached Prefiled Rebuttal Testimony of Kenny Sullivan has been served to the following by means of electronic service on March 15, 2024.

FRED MACLAREN
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e.maclaren@kcc.ks.gov

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KANSAS CORPORATION COMMISSION
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/s/ Paula J. Murray
Paula J. Murray