Oil and Gas Research Program

North Dakota

Industrial Commission

Application

Project Title: Balancing the Success of the North Dakota Oil Industry with its Responsibility to Reclaim and Restore Lands and Water.

Applicant: Salt Contaminated Land and Water Council

Principal Investigators: Kerry Sublette, Bert Fisher, Ken Carlson and Cody Hatzenbuhler

Date of Application:

Amount of Request: $5,236,000

Total Amount of Proposed Project:

Duration of Project: 5-10 years

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ABSTRACT

Objective:

Quantifying Salt-contaminated Soils from Oil and Gas Production in Western North Dakota, Documenting Effects on Surface Water Quality, Demonstrating Sustainable Remediation and Restoration of Salt-contaminated Soils, and Stakeholder Technology.

Expected Results:

1. North Dakota will be able to sort salt contaminated lands from severely impacted to moderately to slightly to no lasting impact.
2. North Dakota will know with greater certainty what will be the cost with time and money to reclaim salted lands.
3. North Dakota farmers and local contractors will understand their role in cost effective reclamation.

Duration: 5-10 years

Total Project Cost: $5,236,000

Participants:

a. landowners,
b. regulators,
c. environmental contractors,
d. oil and gas industry,
e. bankers,
f. educators,
g. fish and wildlife personnel, and all other stewardship minded persons with sharing interest in the preservation of soil, water, wildlife and natural resources of the State of North Dakota.

OBJECTIVES AND PHASES OF THE PROJECT

Part I: Counting the Acres

1) Quantify surface damages from oil and gas production in 16 North Dakota counties. Focus on spills, pits, and leachate from the same by resorting to measurements based on aerial photo rubric and sorting by Applied Ecological Services.

2) Ground truthing of a statistically significant fraction of identified sites to verify salt damage.

Part II: Determining the Impacts to Waters of North Dakota

3) Map the watersheds in the areas of interest and classify the watersheds on the basis of density of spills and pits, production wells, and saltwater disposal facilities in the individual watersheds.

4) Based on a range of impacts of produced water in separate oil and gas production zones calculate the effects of these industrial activities on stream and pond water quality in the individual watersheds.

5) Select three sites in watersheds where impacts to surface waters are identified as uniquely instructive to employ geophysical/aerial and soil coring to document pathways from salt spills or leaching from antiquated equipment and consequent contamination to waters of the State of North Dakota.

Part III: Remediation Demonstration Projects

6) Select two sites as peculiar threats to surface to waters of North Dakota and on them conduct six step remediation with the goals of protecting waters of North Dakota and restoring the surface estate to original condition;

7) Afford stakeholder opportunity to participate at every stage of engineering and performance of the five to 10-year reclamation process; and

8) During the undertaking of reclamation, allow onsite observation of each undertaking and provide full documentation and transfer technology to stakeholders during and after each phase of the project.

Methodology: See above objectives part I-III.

The Salted Lands Council's purpose is to first find the acres. One of our science team, Bert Fisher, provides these illustrations about use of modern technology to track saltwater releases to the surface estate following it laterally and vertically. For now, it is not necessary to master the critical numbers at various concentrations to expand a kill zone. Kill zone depends upon what portion of the spill is captured and when. After initial capture efforts have ended, the extent of the kill zone depends upon whether there is water available for dilution; how soon the dilution occurs; and whether there is natural drainage available or, in its absence, a system to collect and pump downhole brine into saltwater disposal wells.

In north central North Dakota, especially Renville, Bottineau, and Ward Counties, drainage patterns are not well established and to the extent, they are, drainage is slow and shallow ponding occurs. Depending upon location of downfall, snow melt and wind brine plumes may be blown "uphill".

Throughout the illustrations by Bert Fisher and Marvin Nelson, resistivity profiles are scored by numbers which indicate change in conductivity of the soil. The higher the Sodium Chloride concentration, the higher the likelihood of damage to the soil, change of its structure, death of microorganisms and increase of likelihood of creation of hard clay pan. Loss of plant cover, natural or inhibition of cash crops reduces transpiration of water. The combination of these prevents root penetration for even the most salt tolerant crops such as malting barley. The consequence is no grass for beef, no wheat for bread, no barely for beer.

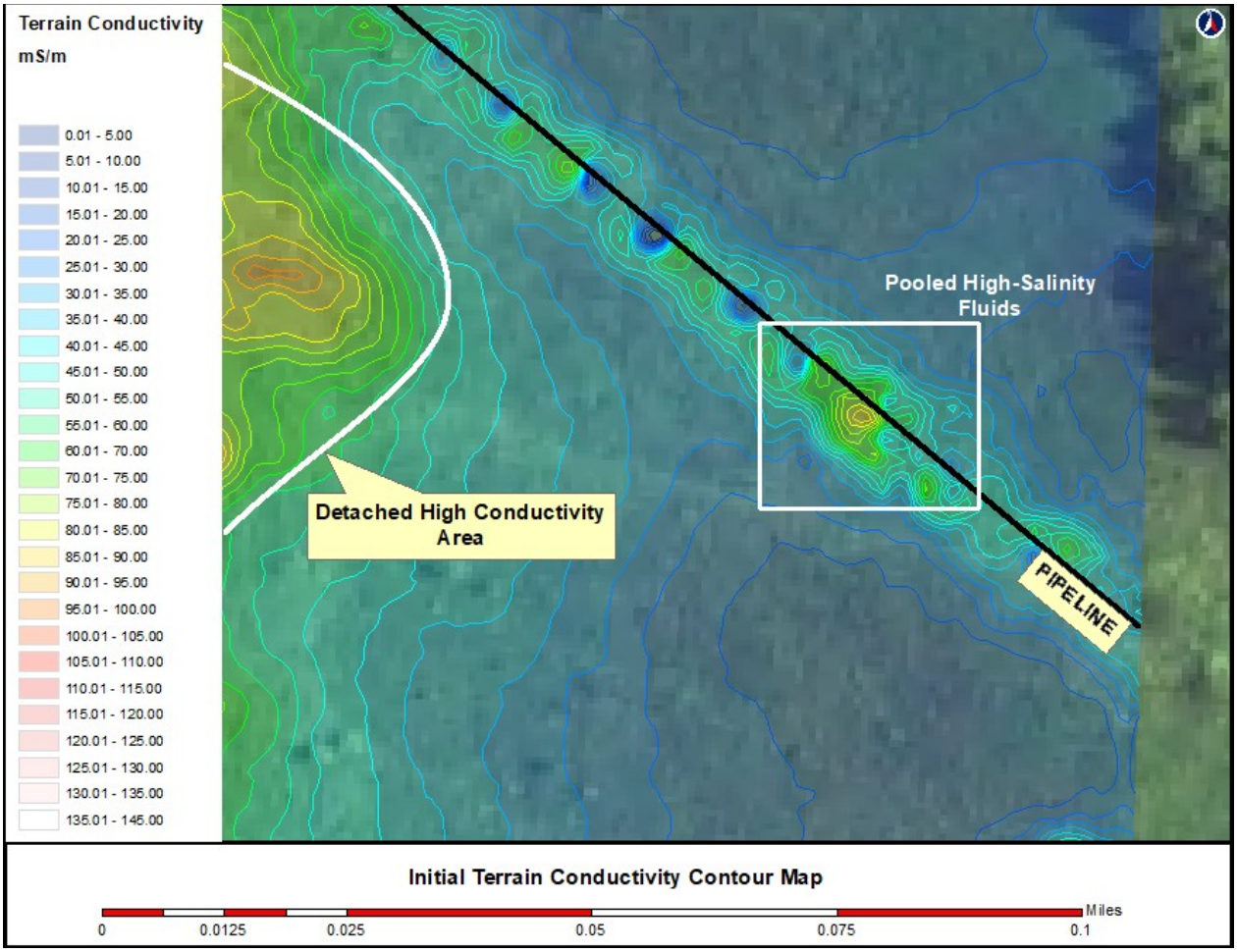
There are a variety of devices which are capable of calculating the lateral extent of oil field brine spills or long-term leaching from pipelines. When underlying soil characteristics are known the Electro Conductivity measurements may be highly suggestive of a vertical component in the soil damage investigation. Soil testing is the gold standard.

EM-31 TERRAIN CONDUCTIVITY SURVEY

In early 2019, Lithochimeia was retained to investigate high salinity liquids that had pooled on the surface of a private landowner's property in Hughes County, Oklahoma. Lithochimeia was tasked to characterize the extent of contamination and identify the source.

Client interviews revealed that a large diameter, high pressure flow line had been recently installed which carried oilfield brine water to a disposal well.

An EM-31 Terrain Conductivity Survey was planned and executed over the impacted area as well as the surrounding surface. Electromagnetic (EM) Surveys use the principle of electromagnetic induction to measure the conductivity of the subsurface based on soil properties and chemistry of pore fluids. EM Surveys do not require ground contact and therefore allow rapid data acquisition. Data can be processed and viewed in near real time.



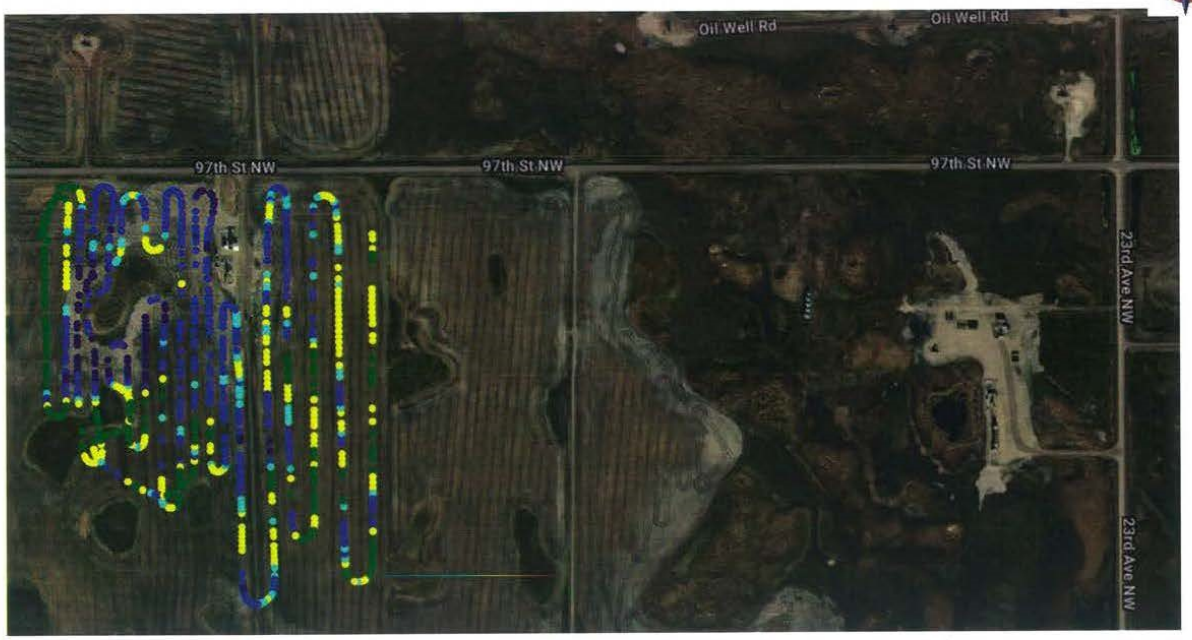
Results of the EM Survey clearly imaged the straight, linear conductivity signature of the underground flowline, and the area of high conductivity at the location of the pooled high-salinity liquids.

Also revealed was a detached area of high conductivity to the west of the original point of interest.

Marvin Nelson, one of the Salt Contaminated Land board members has assessed off-site leaching in the area of our preeminent concern. He used a Profiler EMP-400.

0 350 700
feet

140.001 - 246.957
75.001 - 140.000
60.001 - 75.000
40.001 - 60.000
23.119 - 40.000



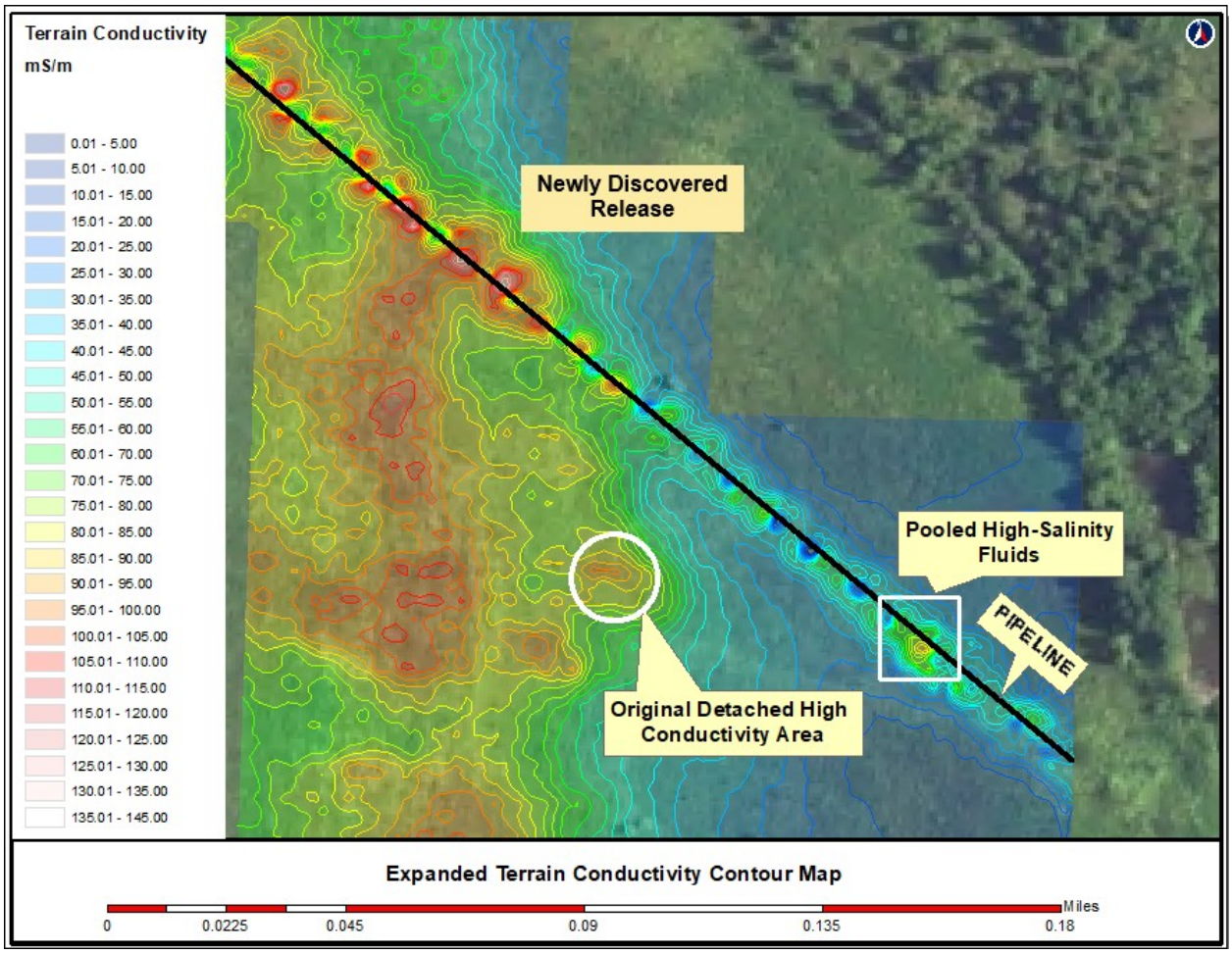
June 1, 2020

0 0.13 0.25
miles

140.001 - 271.783
75.001 - 140.000
60.001 - 75.000
40.001 - 60.000
10.980 - 40.000

EM-31 TERRAIN CONDUCTIVITY SURVEY

Researcher Bert Fisher did a second EM-31 Survey. The task requires great diligence to discover the extent of the leachate. Fisher expanded his survey area to determine the extent and nature of the detached spill area which was discovered in the initial readings from the original survey.



The expanded EM-31 Survey revealed a large plume of highly conductive material in the subsurface further along the pipeline to the northwest. The data indicated a breach of the flowline that had been undetected until the EM-31 Survey was implemented.

Relying exclusively on soil sampling and visual observation would likely have missed the previously unknown plume of high salinity fluids. The high data density and efficiency of the EM-31 Terrain Conductivity Survey allowed for a larger area to be characterized in a cost-conscious approach.

Detection of this previously unknown release and full characterization of the conductive area prevented increased injury to the landowner, as well as reduced the future liability for the flowline operator.

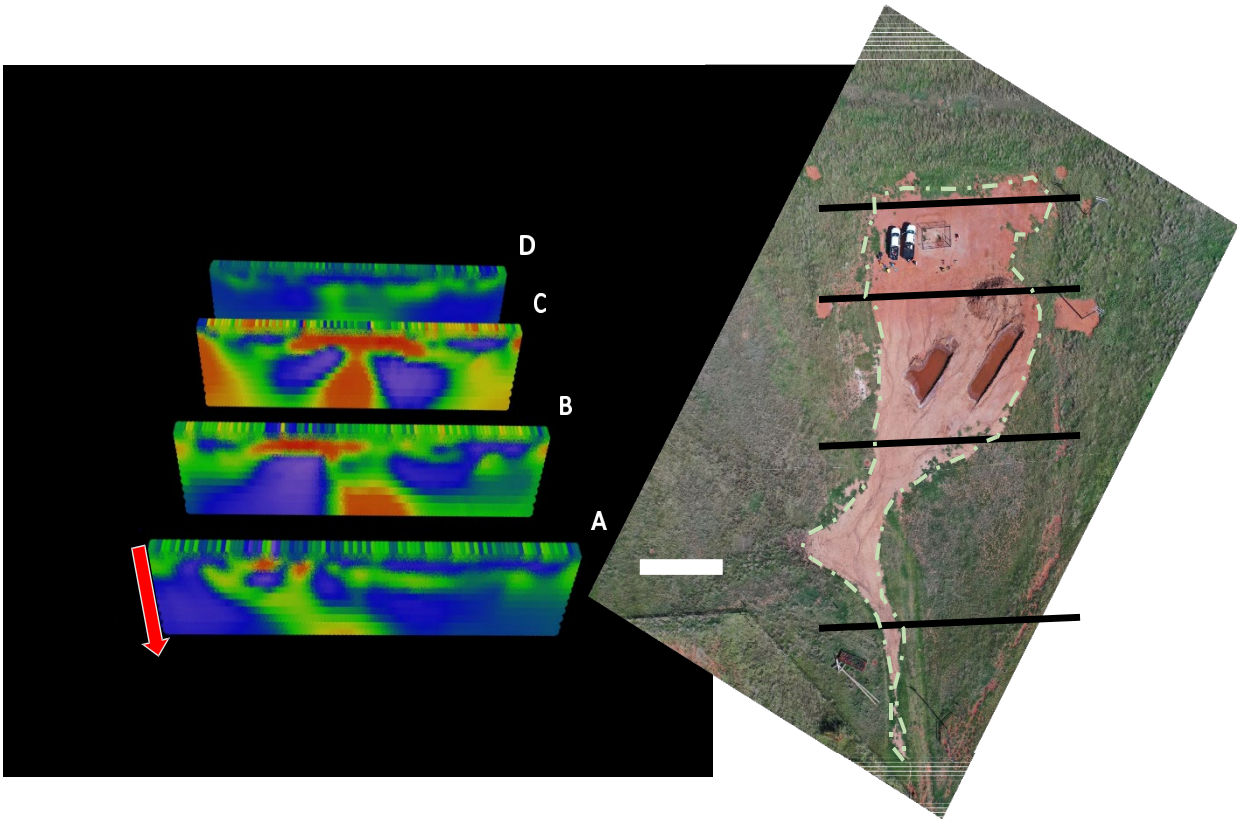
The Good News for Finding the Salt

Significant investment for the remedial intervention was saved through the guidance that the EM-31 Survey provided.

The same researcher provides a 2020 illustration of the vertical component of saltwater leaching.

It is possible to calculate the quantity of salt spilled from a well or a set of wells by reference to Oil and Gas Department Records. It is also possible to make a calculation of the portion of saltwater contained when soil conditions inhibit diffusion.

The illustration below does not display a calculation of either the quantity of saltwater nor does it calculate the capacity of the formation to hold brine. Calculations of that sort probably exist for the Charbonneau Creek Spill because its plume of death imperiled Federal Waters flowing into that creek towards the Yellowstone River. That movement of brine triggered EPA jurisdiction. The multimillion-dollar cost of protecting the Yellowstone River has been addressed in written reports contained in the North Dakota Geological Survey's Periodical occasionally been considered by Cody VanderBusch of the Department of Mineral Resources.



Anticipated Results:

Demonstrating reclamation to original condition as explained by Karlene Fine, North Dakota Industrial Commission Secretary, in her December 31, 2013 response to the Bottineau County Commission:

> Statutes and rules currently exist that require impaired lands to be reclaimed to their original conditions and are based on sound scientific principles and engineering best practices. Plans for reclamation are and continue to be most effectively evaluated on a case-by-case basis.

Facilities:

Land and surface owners willing to participate in the lengthy reclamation process designed by the science team Kerry Sublette, Bert Fisher, Ken Carlson, and Cody Hatzenbuhler.

Resources:

Intellectual Resources, Scientific Insight and Life Experiences:

The human capital has been accumulated by Kerry Sublette, Bert Fisher, Ken Carlson, and Cody Hatzenbuhler align with the day by day collected wisdom and on the ground insights of landowners who have, for decades, contended with non-enforcement of North Dakota's environmental statutes and rules.

Legal Resources under the Police Power and Public Trust Doctrine:

Salted Lands Council offers the State of North Dakota its own Legal Resources which are collected in the life experiences of a team of consulting attorneys who study law review articles, case law and give special attention to the North Dakota Constitution Article 1 Section 16.

With respect to Police Power the duty of the state is to protect the health of citizens, soil, and water. The state does not have unfettered discretion to elect not to enforce laws and rules requiring reclamation. One of the constraints on the state choices not to enforce laws and rules is found in the North Dakota Constitution.

The Salted Lands Council contends that the State of North Dakota has **Inversely Condemned** surface owner's property by permitting economically unproductive wells to continue to exist under the pretentious and false title "held by production". The state has illegally vested discretion in the Director of the Mineral Division authority to issue multiple, even decades of annual one-year excuses from the obligation to plug and reclaim hundreds of well sites. The consequence has been to illegally take the surface estate acres that are suffering leachate of salt, persistence of roads and the loading of the land with detritus of the oil industry. This is the most important lesson to be taught by this grant application.

The consequence of the State of North Dakota implicates the state in a multimillion, if not a billion plus dollar liability. The North Dakota Constitution and cases sited there under are clear. The decisions of agency heads not to enforce but rather spare oil companies from police power enforcement of statutes and rules which require reclamation, trigger liability for an improper exercise of Eminent Domain.

North Dakota Environmental Laws and rules in their current and prior form add precision Public Trust Duties of North Dakota Elected and Appointed Officials. These Officials are Trust Officers. The Beneficiaries of the Public Trust are citizens, living and breathing citizens not corporate persons. Beneficiaries have standing to sue on any matter related to Trust Property. Not only the sovereign lands of the state, but also waters of the state. Salted Lands contends that citizens may hale State Officials into court and inquire on what basis have they failed to reclaim land and water.

The Police and Public Trust duties related to oil wells are found in state statutes as well as the following partial list of rules sited in the North Dakota Administrative Code:

43-02-03-19 – Site Construction
43-02-03-19.3 – Earthen Pits and Open Receptacles
43-02-03-28 – Safety Regulation
43-02-03-30.1 – Leak and Spill Cleanup
43-02-03-29 – Well and Lease Equipment (pipelines)
43-02-03-30 – Notification of fires, leaks, spills or blowouts

Physical Resources: Sovereign Lands, lands of surface owners and waters of the State of North Dakota.

Financial Resources: The contributions of time and money that have sustained the Salted Lands Council together with future money to be given in support of the effort to bring accountability to the relationship between industry and government.

Techniques to Be Used, Their Availability and Capability:

a. Deep tillage to open the soil, increase permeability and allow fresh water to dilute saltwater for eventual removal by tilling and down hole disposal;
b. Use of amendments to maintain permeability, counteract sodicity, and restore soil structure and fertility;
c. Fresh water to contact salt and convey the salt to collection sites;
d. Drainage to collect and dispose of salt leachate in saltwater disposal wells;
e. Periodic monitoring to document the progress of remediation; and
f. Revegetation.

Environmental and Economic Impacts while Project is Underway:

1. It has taken decades to adversely affect the productivity of 15,443,840 acres in 16 of North Dakota's counties which have produced oil from conventional oil wells. The lands that undergo

reclamation will be spared tillage activities conducted on adjoining unaffected acres. That means lands undergoing reclamation will not endure overpass of tillage equipment and will be spared the annual applications of fertilizer and herbicides.

2. Long absent Native Plants will be reestablished for a term of 1 to 10 years and during that interval protected from grazing as well as overpassing tillage activities conducted on adjoining unaffected acres. Saltwater will be diluted and removed. Excessive water will be conveyed into the atmosphere by reestablished plants or conveyed into the depth of the earth to the extent that it is safe and appropriate.
3. Wildlife will eventually find the restored acres and make use of them.

4. Hunter access will be determined by the surface owner.

5. Local contractors who had previously served the oil industry and management of antiquated equipment will be invited to perform the functions identified hereabove under the heading **Techniques to Be Used**.

6. Land which has been unproductive for years will now support landowner, local agribusiness and be fit to carry its share of the county and school district tax burdens.

Ultimate Technological and Economic Impacts:

See above under headings **Techniques to Be Used** and **Environmental and Economic Impacts.**

Why the Project is Needed:

Since 1932 the American Petroleum Institute's Committee on Waste Disposal speaking through D.L. Martin has warned API members of the peril presented by oil field waste. No recognition of the peril appears in the mind of the North Dakota State Geologist, at least not to this author's notice, until 1968.

For purposes of this grant application Applied Ecological Services calculation is that 16 oil producing counties in North Dakota have suffered the loss of 15 million plus acres taken out of production.

Without a single additional brine spill, the inevitable result will be an increasing year by year total of acres damaged because of a phenomenon known as leaching.

The brine movement phenomenon was described by Edward Murphy (Murphy, Edward, et al. "Leachate Generated by an Oil-and-Gas Brine Pond Site in North Dakota." *Ground Water* – January-February 1988 Vol. 26, No. 1. Pages 31-38.). His abstract is worth your time.

> Two unlined ponds were used for holding and evaporation of brines produced with oil and gas at a well site in north-central North Dakota. The brine-evaporation ponds were in use from 1959 up to the late 1970s when they were backfilled and leveled. Continued salt-water migration at this site since closure has decreased

crop yields in surrounding fields and has killed trees in a shelterbelt within an area of approximately 10 acres.

An apparent resistivity survey delineated a 360,000- ft area of extremely low resistivity. Isoconcentration maps indicate that a highly saline leachate plume extends laterally in a 500-foot radius around the ponds and vertically to a depth of 70 feet below the surface.

Ground-water recharge at this site is low because of the semiarid climate and the low hydraulic conductivity of the near-surface sediments and, as a result, very little flushing of the brine from the sediment beneath the ponds has occurred. Pore water within the unsaturated zone beneath the reclaimed ponds contains essentially the same ionic concentrations as that of brine Impounded in these pits 10 to 25 years ago.

Based upon the results of this research, we estimate that brine leachate will continue to migrate at slow rates from this site for tens and possibly hundreds of years if no action is taken. The construction of a mound over the site and/or an infiltration gallery around the perimeter would minimize the spread of brine and make it possible to return this land to production in the foreseeable future.

Litigation is the last stage of an oil field's life. That is the unfortunate reality because of the intimacy of the regulators with the industry. Across the entire globe the most significant cause of environmental damage is Brine Movement, or in Geologist Murphy's word "**Leachate**".

That phenomenon was the principal cause of damage to soil in the leading case in the United States. It was tried in Louisiana. The title of the case is, William G. Corbello, et al. v. Iowa Production, Shell Oil Company, Shell Western E & P, Inc., et al No: 01-567. The trial counsel, J Michael Veron, has provided this summary of the oil industry's insight about the damaging effects of brine. His memo on the Corbello case victory is in part based upon a 1932 American Petroleum Institute advisory on the matter of "*appropriate disposal of wastes*". The memo has been shortened by Fintan L. Dooley.

DISPOSAL OF PRODUCTION DIVISION WASTES
by V.L. MARTIN
The Prairie Oil & Gas Company,
Independence, Kansas

For presentation on April 12, 1932 at the

Chapter Meeting of Division of Production of the American Petroleum Institute
Pampa, Texas,

1. The paper has legally been regarded as admissible evidence showing basis for awarding damages against the industry even though, in 1932, it was funded by the API Committee on Waste Disposal as a recommendation.

2. Serious consequences always attend waste disposal.

3. There are four groups of production wastes: (1) Waste Oil; (2) Saline Waters; (3) Drilling Mud; and (4) Gases and Vapors.

4. Predicts most aggravating will not receive attention until those most affected by waste oil and saline waters force the solution. Noted: Wastewater ought to someday become a revenue producing product (See Bill Bontrager's case from Colorado.) (Page 1 & 2)

5. It is only a question of time until the industry can no longer escape its moral responsibility. All must incorporate waste management costs into the oil and gas production process. After all we are all part of the affected public. (Page 2)

6. According to Martin in the early days of the oil industry, the Field Man was in charge of problem and disposed of it at minimum cost dumping it during high water intervals when detrimental consequences were not obvious.

7. See various tables on salt concentrations and diagrams of oil/water separators.

8. In 1932, Principal Investigator for the API, V.L. Martin, believed returning brines to subsurface formations was prohibitively expensive.

   NOW, HOWEVER, IN NORTH DAKOTA ALL RECOGNIZE THAT USE OF SALTWATER DISPOSAL WELLS AS THE GOLD STANDARD.

9. On Page 6, Martin noted that, depending upon character of clay, some ions such as sodium and potassium render clay relatively impervious to infiltration of water but calcium and magnesium have the opposite effect.

10. Page 7 Martin wrote:

    > "We are only 'kidding' ourselves when we think we can dispose of salt water by solar evaporation from earthen ponds…what we have attributed to evaporation was due to seepage…eventually such seepage might either follow a impervious stratum to the surface where it may effect vegetation or may find its way to fresh water sources, either surface or sub surface and in such quantities as to be objectionable. The theory that seepage tends to filter out the objectionable salt has been thoroughly disproven." (Schmidt and Divine in Bureau of Mine Bulletins, R.I. 2945.)

11. Page 8 end of second paragraph,

    > "Therefore, we cannot expect to successfully impound salt water without seepage and that disposal by seepage is not as practical as methods which will confine the water to definite and known channels."

    MARTIN REITERATED HIS RECOMMENDATION, DISPOSAL AT TIMES OF HIGH WATER WHEN DILUTION WAS THE SOLUTION.

12. CONCLUSION INFLUENCED BY VERON:

    When the Industry came to North Dakota in the 50s for 20 years it had already known that evaporation pits leaked and would leach poisonous brine into state waters and onto farm and ranch lands.

More on North Dakota geologist Ed Murphy's soil science insight from his 1968 paper **Leachate**. His Figure 7 illustrates his visualization of the phenomenon. He shows lateral and vertical movement of brines which Murphy declared had been first observed in the early 30s. Curiously Murphy did not reference the soil killing effects of leaching which was subject of a special contamination study. The Chapter Meeting of Division of Production of the American Petroleum Institute by the American Petroleum Institute in 1935 was kept secret until Veron's Case unearthed it. The Oil Industry knew unlined pits would fail to contain brine as soon as Amerada Petroleum produced Clarence Iverson #1, April 4, 1951 its first well in North Dakota in the 50s.

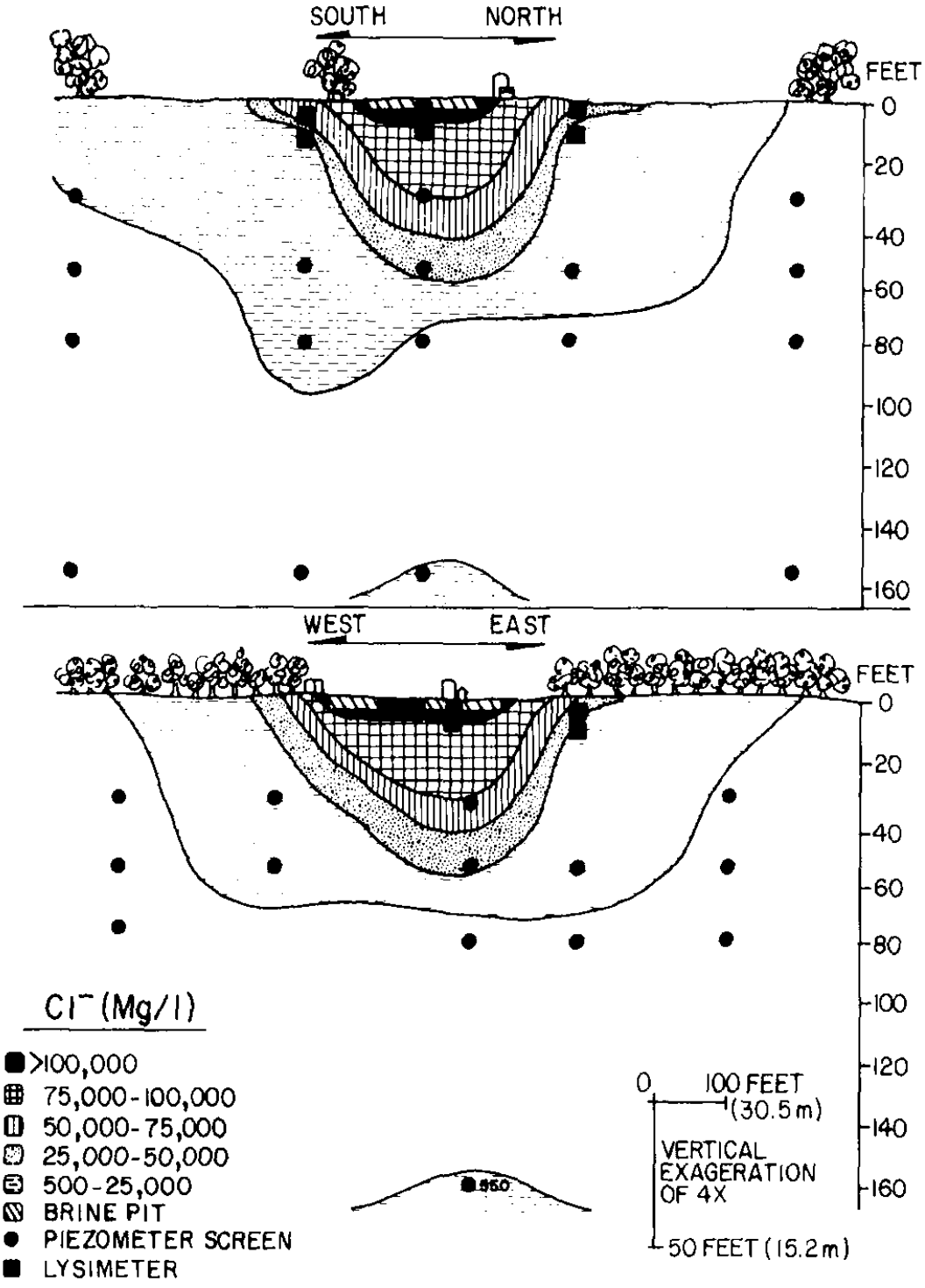


Fig. 7. Profiles of chloride concentrations at the study site.

In 2020 soil scientist typically utilize Electro Conductivity devices that display concentration of sodium chloride laterally and vertically.

STANDARDS OF SUCCESS

Standards of Success should include: The measurable deliverables of the project that will determine

1. *Whether it is a success;*

   The key determinant will be whether we bring dead soil back to life. The most salt tolerant plants are cattails and kosha weed. Neither plants are desirable. Original Native Plants were salt tolerant grasses valuable for wildlife of all sorts. During the course of the reclamation process, maintenance of reestablished microorganisms and Native Plants will be monitored and when the lands are able to be released from the "Intensive Care Ward," the landowner will be free to resume cash cropping. Some of the lands may be fit only for grazing.

2. *The method to be utilized in measuring success;*

   See again Techniques to Be Used, Their Availability and Capability a-f page 11. During the multiyear reclamation process, soil tests will be conducted at appropriate sites which will be maintained and used through the whole cycle. According to the scientific processes used by cropping experts, selected plots harvesting will occur with measurements of forage and species produced. These records will be kept and published to stakeholders.

3. *The value to North Dakota;*

   No better statement of the value to North Dakota to be obtained by honest reclamation can be made than the following addressed to the Industrial Commissioners on November 7, 2013:

   > *The Bottineau County Commission is writing this letter to show our support for responsible oil development and express our appreciation of the prosperity and economic benefits the oil development brings to our county and citizens.*
   >
   > *The Commissioners believe however, that positive actions must be taken to reclaim current sites and prevent future damage from oil field saltwater spills. These spills are happening at an alarming rate and are causing devastating damage to our prime farm and ranch land.*
   >
   > *We are asking the Industrial Commission to assist our County with the positive actions to reclaim and protect our land, tax base, and the future of agricultural production and producers in Bottineau County.*
   >
   > *We request that the Commission:*
   >
   > *1. Require regulatory enforcement that holds violators fully accountable with real consequences for damaging the land that will sustain our rural prosperity for generations to come.*

2. Use available resources to do an accounting of acres affected by oil field spills and Inadequate reclamation of well sites.
3. Develop a plan to reclaim land to pre-exploration conditions so the land regains full productivity.

We look forward to working with your Commission and hearing from you soon.
Respect fully submitted,
/s/ Jeff Beyer
Bottineau County Commissioner Chairman

4. *An explanation of what parts of the public and private sector will likely make use of the project's results, and when and in what way;*

The following stakeholders will be invited to witness the reclamation process, ask questions and read the reports periodically produced.

a. landowners,
b. regulators,
c. environmental contractors,
d. oil and gas industry,
e. bankers,
f. educators,
g. fish and wildlife personnel, and all other stewardship minded persons with sharing interest in the preservation of soil, water, wildlife and natural resources of the State of North Dakota.

5. *The potential that commercial use will be made of the project's results;*

Lands taken out of production for decades during oil production and thereafter during decades of Temporary Well Abandonment will be returned to productive uses such as grazing and crop production.

6. *How the project will enhance the education, research, development and marketing of North Dakota's oil and natural gas resources;*

Surface owner protection statutes have revised the rule that the Mineral Estate is dominant over the Surface Estate. A successful development of oil and natural gas resources must recalibrate mineral development schemes.

North Dakotans expect corporate entities involved in the oil industry to clean up their messes. The determination of the people of North Dakota to revise the ancient rule that favored the development of minerals at any cost is reflected in the environmental statutes and rules which although enacted have not been enforced.

The statutes and rules referenced hereabove must be considered along with the 2013 Surface Owner Protection Act Chapter 38-18 manifest an intent to limit the dominance of the mineral

estate. The constitutionality of that state has been upheld and observed in Deadwood Canyon Ranch, v. Fidelity Exploration Prod, 4:10-CV-081. The Federal Jury convened in the William Guy Courthouse granted and Magistrate Judge Charles Miller Jr. sustained the award of millions of dollars to surface owners whose lands were devoted to recreation, not agriculture.

There is no doubt that reclamation will be costly and that the prospects for resumed production of oil from conventionally produced wells especially those in counties which do not have good prospects for fracking at any level will be inhibited. That is an appropriate outcome if stewardship and sustained use is our goal.

7. *How it will preserve existing jobs and create new ones;*

The practice of the science team is to utilize local contractors and farmers to execute the reclamation plans. It has taken decades to damage the 15 plus million acres in the 16 oil producing counties. It will take decades to reclaim the land and the expertise developed is needed throughout North America and the rest of the world because since Edwin Drake produced the first oil well in 1859 in Pennsylvania the oil industry relied upon corporate immunity to evade cleanup costs. As Professor William "Bill" Bontrager, J.D. Consultant on Law, Justice & Reconciliation has said

1. The legal fiction of Corporate Immunity has resulted in the damage or destruction of thousands of acres of productive lands in North Dakota because as oil industry profits diminish oil fields are sold to resource poor corporations which eventually are dissolved or placed in bankruptcy.

2. Although laws are passed, and Police Powers are vested in North Dakota agencies enforcement fails. Enforcement responsibilities are fractured and assigned to Health Department, the Oil and Gas Division, the Public Service Commission, the Water Commission and the Game and Fish Department. In reality the state is plagued by lack of enforcement. In legal textbooks, the phenomenon is called The Rule of Capture. Political contributions and lobbying restrain enforcement of environmental laws. Environmental enforcement officers are captured.

3. Cultural viewpoints of stewardship are of interest. In the Judeo-Christian, Muslim world, and in Native American Cultures as well as in the realms of the Great Khans of Asia, corporate immunity did not exist. Individuals who destroyed the environment were culpable. Whether they were forced to clean-up their mess depended upon the balance of power that existed when the messes were created. Whether lack of Corporate Immunity inhibited destruction of natural resources and wildlife is doubtful. In the Western World the change from no corporate existence to the creation of fictitious legal persons occurred because of the rise of the Merchant Societies in the 10 and 11 centuries AD. The Merchants Societies demanded immunity protection of individual entrepreneurs the Ecclesiastical as well as the Civil Courts. If individual wealth of merchants was not off limits to the reach of these courts then merchants would not conduct trade in those cities and jurisdictions.

8. *How it will otherwise satisfy the purposes established in the mission of the Program;*

   The oil industry declares itself committed to stewardship. The work we propose assists the oil industry in achieving its goals to be responsible corporate citizens.

9. *How it will be reporting on the success of the project.*

   Technology transfer will be accomplished by: field demonstrations of all site characterization activities such as:

   a. visual inspections (vegetation, erosion, salt crusts, etc.)
   b. geophysical surveys (EM vs. resistivity)
   c. soil sampling (surface sampling, coring, compositing vs grab samples)
   d. field analysis (EC, chlorides)
   e. submitting lab samples (salinity, sodicity)

BACKGROUND/QUALIFICIATIONS

Please provide a summary of prior work related to the project conducted by the applicant and other participants as well as by other organizations. This should also include summary of the experience and qualifications pertinent to the project of the applicant, principal investigator, and other participants in the project.

Kerry Sublette, Ph. D.

Professor of Chemical Engin. & Geosciences, University of Tulsa

From not only a cost perspective, but also from a soil science and biological perspective, dig-and-haul, even when done correctly, results in a loss of the local topsoil environment and creates an ecological island.

Dig-and-haul is often used as a quick fix. The preferable approach to restoring soil health is based on 30 years of site-specific planning and diligent multiyear execution of *in-situ* reclamation. Many brine spills can be treated using an *in-situ* approach which depends on fresh water to mobilize salts, calcium to restore a proper cation balance in the soil, and drainage to remove salty leachate to saltwater disposal wells or simply dilution into accommodatingly large waterbodies. Send it to Canada?

Dr. Kerry L. Sublette served as the Professor of Chemical Engineering and Geosciences and Sarkeys Professor of Environmental Engineering at The University of Tulsa. He has over 30 years of experience in a wide variety of bioengineering and soil remediation problems, including biodegradation of hydrocarbons, chlorinated hydrocarbons and fuel oxygenates in soil and groundwater, environmental forensic analysis using molecular biological tools, and remediation of brine-impacted soil. Dr. Sublette has 13 patents and 117 publications in bioprocessing, bioremediation, brine spill remediation, and restoration of soil ecosystems. He chairs the annual International Petroleum Environmental Conference.

During my lifetime I have directed brine spill remediation projects volunteer for The Nature Conservancy on the Tallgrass Prairie Preserve in Oklahoma. Over my lifetime in remediation around the world I have seen both successful and unsuccessful endeavors. Many failures started as manageable sites miscarried because of haste which resulted in creating greater difficulty and more costly completed project. I serve as an expert in litigation both the defending corporate entrepreneur and also assisting in the fixing of responsibility upon responsible parties. Uniquely North Dakota has access to a critical component in reclamation, gypsum. The young man is Austin Bitz owner of Hangman Drywall and Dakota Gypsum. His gypsum is more appropriate than industrial gypsum from power plants because it is more soluble. In summary, reclamation is not rocket science. It requires a plan and time with an appropriate selection of soil additives to restore and sustain soil organisms, maintain adequate drainage.

Most relevant for you, Ken and I worked with the Energy and Environmental Resource Center (EERC) at UND at Grand Forks analyzing contaminated soils of Bottineau County. Our proposal for comparative remediation of several sites was approved but not completed because of diversion of funds by EERC for other activities.

Remediation and restoration of these sites is not rocket science, it requires open soils, water, calcium, drainage, and time to flush, collect, and dispose of salt.

The good news is that the despite what you might hear, salted lands can be restored and it's not rocket science. It just takes know how and sufficient funding and enough pressure on the industry to do the right thing.

J. Berton Fisher

Specializations
Environmental Geosciences
Hydrogeology, Geochemistry (crude oil, hydrocarbon products, industrial chemicals, water, rocks, soils)

Education

Ph.D. Earth Sciences, Case Western Reserve University, 1979
M.S. Earth Sciences, Case Western Reserve University, 1976
B.S. Geology & Geophysics, Yale University, 1973

Certifications

Certified Professional Geologist American Institute of Professional Geologists, Certificate No.10078
Registered Professional Geoscientist, State of Texas, Registration No. 0201

Employment History

2017 to Present Principal, IMMIX, LLC, Tulsa, OK
2004 to Present President, Lithochimeia, LLC, Tulsa, OK
2000 to 2004 Principal, Exponent Environmental Group, Tulsa, OK
1995 to 2000 Geologist/Geochemist, Gardere & Wynne, L.L.P., Tulsa, OK
1994 to 1995 Staff Research Scientist, Technology Application and Development, Environmental Technology, Amoco Shared Services, Tulsa, OK
1990 to 1994 Staff Research Scientist, Environmental Research Group, Amoco Production Company, Tulsa, OK (acting supervisor of group 4/94 to 8/94)
1981 to 1990 Staff Research Scientist, Lithochemistry/Petrology Research Group, Amoco Production Company, Tulsa, OK

Kenneth E. Carlson

Kenneth's interest is designing and executing successful remediation. He does so as the Principal Soil Scientist of a Colorado entity called Habitat Management, Inc.

He is prepared to teach the stakeholders just what is successful reclamation and how do we best achieve it. He will participate in design features of reclamation that make stepped progress towards the end goals set forth in North Dakota statues and rules. Land use of the restored property will balance the interests of the surface owner many of whom are older and at the end of their career or tenant farmer heirs. The competing considerations in regulatory compliance include, land use, site stabilization, vegetation permanence and sustainability, and finally meeting revegetation success standards.

As a wildlife biologist his insight is critical in defining pre-disturbance conditions. His expertise is critical to define site limitations some of which are natural and some of which are the consequence of industrial refuse loading. It is necessary that each site have its own reclamation plan which can be appropriately designed in response to site limitations. The successfully implemented plan will have taken it to consideration soils, vegetation communities, wildlife habitat, hydrology, and eventual land use.

Carlson recognizes that good starts and reclamation are often abandoned by desires of responsible parties to avoid the real cost of reclamation and landowner desires to resume cash cropping or grazing for that reason post revegetation management is instrumental in attaining reclamation success. Management includes erosion control and weed control. Careful monitoring of rainfall and supplementation by irrigation water will assure long term maintenance of the vegetation reestablished.

Cody Hatzenbuhler

Cody's passion is soil health. As a Reclamation Agronomist ***Walking the Line*** between the Oil Industry and Surface Owners.

Cody grew up on a ranch in northern Morton County. He graduated from Dickinson State University Ag Program. He served as a County Agent for two decades. He is owner of Pan Ag. He designed and managed a 10-year reclamation plan; managed year one of a 10-year reclamation endeavor in Bottineau County. The 40-acre endeavor stirred great interest of local farmers who participated in site preparation and deep tillage. Multiple slides showing his endeavors are available. Invitations will promptly be made on your request at Dropbox. That 10-year restoration plan in Bottineau County was suspended by reason of COVID-19 and the oil price collapse. He counsels farmers on improving the productivity of their soils.

MANAGEMENT

*A description of **how** the applicant will manage and oversee the project to ensure it is being carried out on schedule and in a manner that best ensures its objectives will be met, **and a description of the evaluation points to be used** during the course of the project.*

How the applicant will manage the project. It is a seven stage project:

1) quantify surface damages from oil and gas production in western North Dakota (in the area of interest determined by the Salted Lands Council) resulting from surface releases of produced water and salt migration from production pits based on aerial photos;

2) ground truth a statistically significant fraction of identified sites to verify salt damage;

3) map the watersheds in the area of interest and classify the watersheds on the basis of density of spills and pits, production wells, and saltwater disposal facilities in the watersheds;

4) determine, based on a range of impact and oil and gas production activity densities, the effects of these impacts on stream and pond water quality (relevant to saltwater impacts) in the watersheds;

5) conduct coring on three sites within watersheds where impact to surface waters are identified using geophysical methods to document pathways from damaged sites to surface waters to fully document damage to waters of North Dakota from saltwater impacts from oil and gas production;

6) conduct remediation on two carefully selected sites which exemplify threats to surface waters of North Dakota with the goals of demonstrating the feasibility protecting the waters of North Dakota and the importance of restoring the beneficial use of the surface; and

7) provide full documentation and technology transfer to all stakeholders at each phase of the project.

Timelines and checkpoints:

The Salted Lands proposal is as follows:

Part I: “Counting the Acres”

Task 1: Quantify surface damages from oil and gas production in western North Dakota (in the area of interested determined by the Salted Lands Council) resulting from spills of produced water and salt migration from production pits based on high resolution aerial photos. Areas devoid of vegetation in the vicinity of existing or past oil and gas production

sites will be identified as potential saltwater impacts from an ArcGIS analysis. Areas that appear to have significantly different vegetation cover than surrounding areas in the vicinity of existing or past oil and gas production facilities will also be flagged as potential saltwater damage. Saltwater impacts will be classified as spill sites or production pits based on image pixel characteristics.

Project duration: 6-8 weeks

Estimated cost: $32,000

Task 2: Ground truth a statistically significant fraction of identified sites to verify salt damage. Sites identified from ArcGIS analysis of aerial imagery as potential spills and production pits will be verified as saltwater damage by field site investigation consisting of field measurements of surface soil EC and identification of salt-tolerant plants. It is not economically feasible to ground truth all sites and not all sites will be accessible. However, a sufficient number of bare and partially or fully vegetated sites identified in Task 1 will be randomly selected to be ground truthed (multi-depth EM and resistivity surveys and visual observations) to determine a statistically valid probability of determining saltwater surface impacts from aerial photos.

Project duration: 4 weeks

Estimated cost (based on 20-40 sites): $60,000

Part II: Determining the Impacts to Waters of North Dakota

Task 3. Map the watershed boundaries and surface water flow paths in the area of interest and classify the watersheds on the basis of density of spills and pits, production wells, and saltwater disposal facilities in the watersheds. Mapping will integrate data from multiple sources. Health Department and Mineral Division records, landowner reports, satellite imagery, fixed wing mounted and drone photography. These data sources will enable sorting of contamination following the lead of Applied Ecological Services in their project entitled Proposal for demonstrating a pilot approach to identify and quantify the acreage of land that is contaminated with oil field produced water (brine). The innovative map makers were the Project Manager Fugui Wang and owner of AES, Steven Apfelbaum serving as Project Director. The sorting using an algorithm developed by Wang and Apfelbaum is thought to be more than 50% reliable. It serves as a calculation that shifts the

burden to the responsible parties or initiates the counting process later to be confirmed by ground truthing. Landowners and other stakeholders are invited to utilize an app called Quickcapture which enables uploading of photographs and narratives into a database. The collected data accurately locates spills and connects narratives of knowledgeable witness to enable the researcher to begin to describe the dimensions and consequences of the spill.

Project duration is focused on carefully chosen sites where an abundance of reliable data is known to exist: 3 weeks

Estimated cost: $25,000

Task 4: Based on a range of impact or production activity densities, determine the effects of the impacts identified in Task 3 on stream and pond water quality (relevant to saltwater impacts) in the watersheds. This task includes an investigation of surface water quality in streams and ponds within affected watersheds by field analysis of water samples for EC and laboratory analysis of water samples for parameters relevant to salt water impacts including: EC, TSS, pH, Na^{+}, Ca^{+2}, Mg^{+2}, Cl^{-}, HCO_3^{-}, SO_4^{-2}, and SAR. Watershed boundaries will be established using StreamStats supported by analysis of 7.5-minute topographic maps. A sufficient number of densities of surface damages, oil and gas production facilities and produced water disposal facilities will be investigated to determine whether a statistically valid correlation exists between these densities and water quality parameters in the watersheds.

Project duration: 8-10 weeks

Estimated cost: $216,000

Task 5: For three sites within watersheds where impact to surface waters are identified use geophysical methods and soil coring to document pathways from damaged sites to surface waters to fully document damage to waters of North Dakota from saltwater impacts from oil and gas production. Based on the results of Task 4, three saltwater-damaged sites in proximity to identified impacts to surface waters will be more fully investigated using geophysical techniques (EM and resistivity surveys) verified by soil coring and analysis of soil cores by depth to more fully document these impacts as the cause of observed impacts to surface waters.

Project duration: 8-10 weeks

Estimated cost: $160,000

Part III: Remediation demonstration projects

Task 6: For two surface spill sites (> 2 acres) determined to be a treat to waters of North Dakota remediation will be conducted as demonstration projects with the goals of eliminating the threat to waters of North Dakota and restoring the original beneficial us of the surface. Current best practice will be used at the two sites including:

a. opening the soil to increase permeability and contact between fresh water and salt;

b. use of amendments to maintain permeability, counteract sodicity, and restore soil structure and fertility;

c. fresh water (natural rainfall or supplemental irrigation) to contact salt and convey the salt to collection sites;

d. drainage to collect and dispose of salt leachate;

e. periodic monitoring to document the progress of remediation; and

f. revegetation with a variety of site-adapted vegetation.

Remediation of the two demonstration sites will differ only in the source of fresh water. At one site natural rainfall will be utilized. At the second site irrigation water will be used. Local contractors and sources of amendments will be used to the greatest extent possible.

Project duration: 1-3 years (with irrigation water) or 3-8 years (with natural rainfall)

Estimated cost: $2-4 million

Part IV: Technology transfer

All technology transfer efforts associated with Part IV will, wherever possible, be conducted simultaneously with the tasks outlined above for Parts I-III. The objectives will be to educate all stakeholders on all aspects of complete characterization and remediation of salt impacted sites in North Dakota. Stakeholders will include:

a. landowners,
b. regulators,
c. environmental contractors,
d. oil and gas industry,
e. bankers,
f. educators,
g. fish and wildlife personnel, and

h. all with interest in the preservation of soil and water resources in North Dakota.

These technology transfer objectives will be met through the following activities:

field demonstrations of all site characterization activities such as

a. visual inspections (vegetation, erosion, salt crusts, etc.)
b. geophysical surveys (EM vs. resistivity)
c. soil sampling (surface sampling, coring, compositing vs grab samples)
d. field analysis (EC, chlorides)
e. submitting lab samples (salinity, sodicity)

field demonstration of remediation and restoration of salt-impacted soils

f. amendments and their applications
g. opening the soil
h. drainage (natural drainage vs tile drainage systems)
i. handling and disposal of leachate
j. monitoring
k. revegetation
l. measuring success and long-term sustainability with annual vegetation surveys to document vegetation cover, production, and diversity and compare to adjacent non-impacted sites on similar soils, topography and aspect.
m. stakeholder workshops
n. all field demonstrations will be fully documented (video, photos, data) and used for stakeholder workshops throughout oil and gas producing areas of North Dakota to convey sustainable methods for site characterization and remediation to all stakeholders.
o. Workshops will utilize nationally and internationally recognized experts in the field

Project duration: 3-5 years

Estimated cost: $250,000

TIMETABLE

Please provide a project schedule setting forth the starting and completion dates, dates for completing major project activities, and proposed dates upon which the interim reports will be submitted.

See above timelines recited relevant to Parts I – IV with more precise descriptions Phase by Phase.

BUDGET

*Please use the table below to provide an **itemized list** of the project's capital costs; direct operating costs, including salaries; and indirect costs; and an explanation of which of these costs will be supported by the grant and in what amount. The budget should identify all other committed and prospective funding sources and the amount of funding from each source, differentiating between cash, indirect costs, and in-kind services. Justification must be provided for operating costs not directly associated to the costs of the project. Higher priority will be given to those projects that have matching private industry investment equal to at least 50% or more of total cost. (Note ineligible activities or uses are listed under OGRP 2.02) **Please feel free to add columns and rows as needed.***

Part I: Counting the Acres – 6 – 8 weeks to flag areas of potential saltwater impacts

Task 1: Quantifying acres of surface damage from spills, pits, and migration. $32,000

Task 2: Ground truthing – 4 weeks 20-40 sites $60,000

Part II: Determining the Impacts to Waters of North Dakota

Task 3: Mapping watersheds of interest noting density of spills, pits, and wells and saltwater disposal facilities and watersheds $25,000

Task 4: Surface water quality study – 8-10 weeks focused on Electro Conductivity (EC), Total Suspended Solids (TSS), pH, Na^{+}, Ca^{+2}, Mg^{+2}, Cl^{-}, HCO_3^{-}, SO_4^{-2}, and Sodium Absorption Ratio (SAR). $216,000

Task 5: Geophysical study of EC (EM?) and resistivity surveys 8 – 10 weeks via soil coring and in-depth analysis of contaminated lands to describe impact on surface waters. $160,000

Part III: Remediation Demonstration Projects

Task 6: Multiple steps undertaken by local farmers and contractors under direction of science team and focused upon two surfaced spill sites greater than two acres in size.

a. Deep tillage to open the soil, increase permeability and allow fresh water to dilute saltwater for eventual removal by tiling and down hole disposal;

b. use of amendments to maintain permeability, counteract sodicity, and restore soil structure and fertility;

c. fresh water to contact salt and convey the salt to collection sites;

d. drainage to collect and dispose of salt leachate;

e. periodic monitoring to document the progress of remediation; and

f. revegetation.

Duration of activity on first site 1 – 3 years utilizing irrigation.

Duration on second site 3 - 8 years relying on normal rainfall.

These two sites will be chosen because brine produced on them threatens the waters of the State of North Dakota. As referenced in NDCC 61-01 and relevant subparts which establish the Public Trust Doctrine United Plainsmen v. N.D. State Water Conservation Commission, 247 N.W.2d 457 (N.D. 1976) the waters of the State of North Dakota are beneficially owned by the citizens of the State of North Dakota who have standing to sue public officials for failure to enforce environmental laws and statutes against oil entrepreneurs. Utilize best practices to accomplish reclamation to the greatest extent possible by state-of-the-art engineering and scientific practices.

Comparing the two techniques, one with irrigation one without.	$4,000,000

Part IV: Public Education and Technology transfer to be conducted over 5 years	
	$250,000
Total Project Cost	**$5,236,000**

Project Associated Expense	NDIC's Share	Applicant's Share (Cash)	Applicant's Share (In-Kind)	Other Project Sponsor's Share
A six column breakdown of comparable Reclamation Project Expenses is briefly explained in the letter of application addressed to Karlene Fine. As an exemplar attached hereto is a two page display of costs and shares of the same entitled Bottineau's Big Four Salted Township's Budge 2020 thru 2023. The left hand column discloses 46 different cost items.	In the view of the Salted Contaminated Land Council in the more egregious incidents of failed enforcement the NDIC is responsible for the entire cost of reclamation. The Council now explains an important view of the law. The Oil and Gas Division and Health Department are the repositories of data related to production of salt water and saltwater spill incidents. Likewise, these agencies have records of oil and gas production and know the identities of developers and subsequent owners. The state can subrogate and recoup its costs of reclamation from developers and subsequent owners.	Contributions from townships, waterboards, county commissions, environmental groups, wildlife groups and prospective plaintiffs	Land values 10 years of suspended production of cash grains and suspension of grazing during reclamation process plus suspension of cash grain and grazing during the interval of temporary abandonment of unproductive wells. The length of time in temporary abandoned status whether brief or decades long will be established by referenced to NDIC records.	The Salted Lands Council expects that the novelty of holding the State of North Dakota accountable will prompt other sponsors help fund this project.

Please use the space below to justify project associated expenses and discuss if less funding is available that that requested, whether the project's objectives will be unattainable or delayed.

CONFIDENTIAL INFORMATION

Any information in the application that is entitled to confidentiality and which the applicant wants to be kept confidential should, if possible, be placed in an appendix to allow for administrative ease in protecting the information from public disclosure while allowing public access to the rest of the application. Such information must be clearly labeled as confidential and the applicant must explain why the information is entitled to confidentiality as described in North Dakota Century Code 54-17.6. Oil and gas well data that is a result of financial support of the Council shall be governed by North Dakota Century Code 38-08-04(6). ***If there is no confidential information, please note that below.***

There will be no confidential information used or developed. The Salt Contaminated Land and Water Council's corporate purpose is to educate stewardship minded people and assist the oil industry in achieving their stated goals.

PATENTS/RIGHTS TO TECHNICAL DATA

Any patents or rights that the applicant wishes to reserve must be identified in the application. ***If this does not apply to your proposal, please note that below.***

It is expected no patentable rights will derive from these endeavors. The Salt Contaminated Land and Water Council's corporate purpose is to educate stewardship minded people and assist the oil industry in achieving their stated goals.

STATUS OF ONGOING PROJECTS (IF ANY)

If the applicant is a recipient of previous funding from the Commission, a statement must be provided regarding the current status of the project.

Cody Hatzenbuhler was involved in grants received from the Commission. Those grants have been completed. Kerry Sublette and Ken Carlson have been involved in a project to characterize salt contaminated land in Bottineau County. That project was completed under the auspices of EERC of Grand Forks, North Dakota.

SALTED LANDS COUNCIL

June 1, 2020

Karlene Fine, Executive Director
North Dakota Industrial Commission
State Capitol – 14th Floor
600 East Boulevard Ave Dept 405
Bismarck, ND 58505-0840

Re: Oil and Gas Research Council Grant Application

Dear Ms. Fine,

Here is the Salt Contaminate Land Council's first application. It will not be our last. Our endeavors are an investigation of a multifactor problem with known and unknown variables. The variables involve soil science hydrology which will dramatically effect project and time costs to successfully achieve reclamation. The calculus involves differential equations.

In calculus scientists and mathematicians search for known quantities and familiar scientific processes to address unknown and constantly changing variables. Differential equations involve a hierarchy of approaches.
In the reclamation endeavor we are dealing with constantly varying conditions which dramatically change dollar and time cost outcomes. The objective however was quite simply stated by yourself:

> Statutes and rules currently exist that require impaired lands to be reclaimed to their original conditions and are based on sound scientific principles and engineering best practices. Plans for reclamation are and continue to be most effectively evaluated on a case-by-case basis.
> A quote from your letter of December 31, 2013 to the Bottineau County Commissioners.

Our council's Tax Liability Statement will be provided by our council's attorney and CPA Isaac Zimmerman. Letters of support will follow. Our appendices will be the power point developed for the Outdoor Heritage Fund. You will find enclosed two hard copies. We are pleased to submit an application to the Oil and Gas Research Fund to demonstrate the importance and cost of finding, counting and reclaiming salt contaminated lands. The project will aid landowners, township board members, county commissioners in 16 oil producing counties in North Dakota. The project will educate stakeholders including stewardship minded individuals, non-profit entities, and oil industry entrepreneurs about the affordability of reclamation.

Too frequently and too often the occurrence of salt spills for the discovery of salt plumes from legacy pits is an embarrassment which prompts what is known as *dig-and-haul.* Our team of four scientists has experience as designers and general contractors on restoration projects all across North America.

The Salt Contaminated Land and Water Council contends that its membership and directors, especially its landowners have made "in-kind" contributions of time and real property despoiled sufficient to constitute matching of the $5,236,000.

Our project is likely to have a timeline longer than the Oil and Gas Research Council has seen before. As Kerry Sublette, our senior scientist has declared, "Haste in the preparation of the reclamation plan and haste in the decision to reuse land undergoing reclamation, consistently causes reclamation failure. If ever an appropriate reclamation is undertaken after untimely attempts to resume grazing or farming, reclamation costs will increase, and the outcome will be less favorable."

Sincerely,

Donny Nelson
President and Founder
donelson@restel.com

Fintan L. Dooley
Coordinator
findooley@gmail.com

Zimmerman Law

289 Main Ave.
PO Box 50
Napoleon, ND 58561
Phone: 701.754.2570
Fax: 701.754.2450

Kirkwood Tower
919 South 7th St. Ste. 607
Bismarck, ND 58504
Phone: 701.224.1519
Fax: 701.224.1769

June 1, 2020

Salt Contaminated Land and Water Council, Inc.
Board of Directors

Re: Certification of Good Standing

Greetings:

I serve as general counsel and accountant to Salt Contaminated Land and Water Council, Inc.

This letter is to confirm that Salt Contaminated Land and Water Council, Inc. is in good standing with the North Dakota Secretary of State as of the date of this letter.

I also certify that all required tax returns have been timely filed and there are not any known intsances of non-compliance with any federal or state taxing authorities.

Sincerely yours,

Isaac Zimmerman
Attorney at Law
Certified Public Accountant

IZ/

2654 - Bottineau's Big Four Salted Townships

Budget 2020 thru 2023

PROJECT EXPENSE	OHF REQUEST	MATCH SHARE (CASH)	MATCH SHARE (IN-KIND)	Other Project Sponsor/Share	TOTAL EACH PROJECT EXPENSE
2 Monitoring Wells Per Site (100 wells (AES team)	$ 750,000.00	$ 750,000.00			$ 1,500,000.00
Chemical Amendments	$ 75,000.00	$ 75,000.00			$ 150,000.00
Collapsed tanks and Old Iron Debris	$ 750,000.00	$ 750,000.00			$ 1,500,000.00
Contractor All-Maps (AES team)	$ 50,000.00	$ 50,000.00			$ 100,000.00
Contractor Soil Assessment (AES team)	$ 75,000.00	$ 75,000.00			$ 150,000.00
Cover Crop Seed	$ 25,000.00	$ 25,000.00			$ 50,000.00
Disposal Well Access and Payment Per Barrel Down Well $2/barrel	$ 113,700.00	$ 113,700.00			$ 227,400.00
Donation - (maybe)			$ 25,000.00		$ 25,000.00
Drain Tile	$ 500,000.00	$ 500,000.00			$ 1,000,000.00
Education (Outreach, AES contribution)	$ 100,000.00				$ 100,000.00
Engineering Planning of 50 Site Project	$ 75,000.00	$ 75,000.00			$ 150,000.00
Equipment Rental/Ripper	$ 10,000.00	$ 10,000.00			$ 20,000.00
Excess Salt Disposal to Approved Landfill	$ 75,000.00	$ 75,000.00			$ 150,000.00
Gypsum Amendments	$ 262,500.00	$ 262,500.00			$ 525,000.00
Irrigation / Pivots	$ 2,500,000.00	$ 2,500,000.00			$ 5,000,000.00
Irrigation / Pipelines / Pivots	$ 400,000.00	$ 400,000.00			$ 800,000.00
Irrigation / Pipelines / From River	$ 600,000.00	$ 600,000.00			$ 1,200,000.00
Land Easements and surveying	$ 2,304,000.00	$ 2,304,000.00			$ 4,608,000.00
Landowner Rental	$ 10,800,000.00				$ 10,800,000.00
Learendite Amendments	$ 50,000.00	$ 50,000.00			$ 100,000.00
Legal Permits				$ 40,000.00	$ 40,000.00
Mapping Four Townships (AES)			$ 40,000.00		$ 40,000.00
Machine Rentals / Bobcat / Ect	$ 60,000.00	$ 60,000.00			$ 120,000.00
Native Seed (AES) (Heavy Impact 30%)	$ 1,000,000.00	$ 1,000,000.00			$ 2,000,000.00
Native Seed (AES) Moderate Impact 30%)	$ 3,750,000.00	$ 3,750,000.00			$ 7,500,000.00
Native Seed (AES) Light Impact 40%)	$ 1,900,000.00	$ 1,900,000.00			$ 3,800,000.00
Principal Scientists Sublette & Fisher				$ 210,000.00	$ 210,000.00
Principal ecologists, ecotoxicologists, scientists (AES team)	$ 175,000.00	$ 175,000.00			$ 350,000.00
Ecological Planning, finalize remote sensing and salt impact land mapping and on ground calibration (AES Team)	$ 125,000.00	$ 125,000.00			$ 250,000.00
Principal Agronomist/Manager Hatzenbuhler				$ 350,000.00	$ 350,000.00
Principal Agronomist/II/ Brad H				$ 280,000.00	$ 280,000.00

Repurpose an active oil well for disposal	$ 375,000.00	$ 375,000.00			$ 750,000.00
Salt Water Pipeline with Input site by site 12" dia by 8' deep	$ 570,240.00	$ 570,240.00			$ 1,140,480.00
Salt Water Pipeline with Input site by site 8" dia by 8' deep	$ 506,880.00	$ 506,880.00			$ 1,013,760.00
Salted Land - Accounting				$ 100,000.00	$ 100,000.00
Salted Land - Secretary				$ 150,000.00	$ 150,000.00
Salted Land Coordinator				$ 300,000.00	$ 300,000.00
Supplies	$ 20,000.00				$ 20,000.00
Travel				$ 100,000.00	$ 100,000.00
Volunteer (Salted Land Board member)			$ 30,000.00		$ 30,000.00
Subtotal	$ 27,997,320.00	$ 17,077,320.00	$ 95,000.00	$ 1,530,000.00	$ 46,699,640.00
Contingency (10% of subtotal)	$ 2,799,732.00	$ 1,707,732.00	$ 9,500.00	$ 153,000.00	$ 4,669,964.00
GRAND TOTAL	$ 30,797,052.00	$ 18,785,052.00	$ 104,500.00	$ 1,683,000.00	$ 51,369,604.00
	OHF REQUEST	MATCH SHARE (CASH)	MATCH SHARE (INKIND)	Other Project Sponsor/Share	TOTAL EACH PROJECT EXPENSE

$ 12,842,401.00
25% matching needed

Match shares

Nees to = Zero

November 7, 2013

NOV 2

Industrial Commission of ND
Jack Dalrymple, Chairman
Wayne Stenehjem, Attorney General
Doug Goehring, Agriculture Commissioner
State Capitol
14th Floor, Dept 405
600 E Boulevard Ave
Bismarck ND 58505-0840

The Bottineau County Commission is writing this letter to show our support for responsible oil development and express our appreciation of the prosperity and economic benefits the oil development brings to our county and citizens.

The Commissioners believe however, that positive actions must be taken to reclaim current sites and prevent future damage from oil field saltwater spills. These spills are happening at an alarming rate and are causing devastating damage to our prime farm and ranch land.

We are asking the Industrial Commission to assist our County with the positive actions to reclaim and protect our land, tax base, and the future of agricultural production and producers in Bottineau County.

We request that the Commission:

1. Require regulatory enforcement that holds violators fully accountable with real consequences for damaging the land that will sustain our rural prosperity for generations to come.
2. Use available resources to do an accounting of acres affected by oil field spills and inadequate reclamation of well sites.
3. Develop a plan to reclaim land to pre-exploration conditions so the land regains full productivity.

We look forward to working with your Commission and hearing from you soon.

Respectfully submitted,

Jeff Beyer,
Bottineau County Commissioner Chairman

COUNTY OFFICERS

County Auditor	Lisa Herbel
County Treasurer/MVD	Ann Monson
County Recorder	Helen Christenson
County Sheriff	Steve Watson
State's Attorney	A. Swain Benson
Clerk of Courts	Rhonda Langehaug
Tax Director/Zoning Adm.	Lisa Peterson
Social Services	Kelly Jensen
9-1-1 Coordinator	Terry Volk
Disaster Emergency	Richard Hummel
Veteran's Service Officer	Dwight Nahinurk
Road Supervisor	Ritchie Gimbel
Official Newspaper	Courant

BOTTINEAU COUNTY
NORTH DAKOTA

314 West Fifth Street
Bottineau, North Dakota 58318
Fax (701) 228-5181

COUNTY COMMISSIONERS

1ST District	LeRoy Rude Bottineau, ND 58318
2nd District	Jeff Beyer Bottineau, ND 58318
3rd District	Daniel Marquardt Bottineau, ND 58318
4th District	Lance Kjelshus Souris, ND 58783
5th District	Todd Streich Maxbass, ND 58760

December 5, 2013

Industrial Commission of ND
Jack Dalrymple, Chairman
Wayne Stenehjem, Attorney General
Doug Goehring, Agriculture Commissioner
State Capitol
14th Floor, Dept 405
600 E Boulevard Ave.
Bismarck, ND 58505-0840

The Bottineau County commission has established a committee to write a letter to your commission with concerns about salt water and oil spills within our County. A letter was sent to your commission on the 7th of November, listing the concerns that the County Commission has over this issue. Our committee was wondering if anything has or will be done about these concerns and if the County will receive any type of response from your Commission.

At the November Bottineau County Commission meeting members of the NW Landowners Association attended and brought these concerns to the County Commission and requested a letter of support. Also, at the meeting was a representative from the Farm Credit Bureau who was asked about obtaining a loan on any land with salt water damage. He said it would be hard to obtain a loan on that land, if not impossible.

Because of all the damage that is done by salt water spills, our committee feels that it is up to all of us to do whatever we can to protect the lands of North Dakota from the severe damage that salt water causes. We are in no way against oil production within the of State North Dakota, but would like to see stiffer enforcement of regulations that relate to oil production to help protect and preserve the lands of our fine State of North Dakota.

Looking forward again to your response

Best regards

COUNTY OFFICERS

County Auditor	Lisa Herbel
County Treasurer/MVD	Ann Monson
County Recorder	Helen Christenson
County Sheriff	Steve Watson
State's Attorney	A. Swain Benson
Clerk of Courts	Rhonda Langehaug
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9-1-1 Coordinator	Terry Volk
Disaster Emergency	Richard Hummel
Veteran's Service Officer	Dwight Nahinurk
Road Supervisor	Ritchie Gimbel
Official Newspaper	Courant

BOTTINEAU COUNTY
NORTH DAKOTA

314 West Fifth Street
Bottineau, North Dakota 58318
Fax (701) 228-5181

COUNTY COMMISSIONERS

1ST District	LeRoy Rude Bottineau, ND 58318
2nd District	Jeff Beyer Bottineau, ND 58318
3rd District	Daniel Marquardt Bottineau, ND 58318
4th District	Lance Kjelshus Souris, ND 58783
5th District	Todd Streich Maxbass, ND 58760

Bottineau County Commission Co-Chair
Lance Hjelshus

Northwest Landowners Association
Larry Peterson

Bottineau County Commission
LeRoy Rude

Northwest Landowners Association
~~Pete Artz~~

Bottineau County Emergency Manager
Rick Hummel

INDUSTRIAL COMMISSION OF NORTH DAKOTA

Jack Dalrymple
Governor

Wayne Stenehjem
Attorney General

Doug Goehring
Agriculture Commissioner

December 31, 2013

The Honorable Jeff Beyer, Chairman
The Honorable LeRoy Rude
The Honorable Daniel Marquardt
The Honorable Lance Kjelshus
The Honorable Todd Streich
Bottineau County Commissioners and
Larry Peterson
Pete Artz
Northwest Landowners Association and
Mr. Rick Hummel
Bottineau County Emergency Manager
314 West Fifth Street
Bottineau, North Dakota 58318

Dear Sirs:

This is in response to your recent letters regarding salt water and oil spills in Bottineau County. I am responding on behalf of the Industrial Commission.

The North Dakota Industrial Commission and the Oil and Gas Division are committed to the responsible stewardship of our State's mineral, land and water resources.

The statutory mission of the Oil and Gas Division is to encourage and promote the development, production and utilization of oil and gas in the State in such a manner as will prevent waste, maximize economic recovery, and fully protect the correlative rights of all owners to the end that landowners, the royalty owners, the producers and the general public realize possible good from these vital natural resources.

In keeping with that mission we recognize the potential for the detrimental effects that accidental spills and leaks can have on the State's precious land and water resources.

North Dakota has some of the most stringent spill reporting and reclamation requirements in the nation, which are evaluated and implemented on a case-by-case basis. Statutory changes were made during the 2011 and 2013 legislative sessions which resulted in the implementation of significant changes to the Industrial Commission's oil and gas rules and regulations. As you may know the 2013 proposed rules and regulations were just recently approved by the Industrial Commission and are now in the final stages of review under the Administrative Practices Act. It is the Commission's hope that these changes will become effective on April 1, 2014.

Karlene K. Fine, Executive Director and Secretary
State Capitol, 14th Floor - 600 E Boulevard Ave Dept 405 - Bismarck, ND 58505-0840

The 2011 revisions included changes to the North Dakota Administrative Code Sections:

43-02-03-19 – Site Construction
43-02-03-19.3 – Earthen Pits and Open Receptacles
43-02-03-28 – Safety Regulation
43-02-03-30.1 – Leak and Spill Cleanup

The 2013 proposed changes also impact a number of North Dakota Administrative Code Sections. Of particular interest are:

43-02-03-29 - Well and Lease Equipment (pipelines)
43-02-03-30 - Notification of fires, leaks, spills or blowouts

As you can see these revisions deal with the topics you are concerned about—spills, pipeline safety, reclamation, etc.

We continue to use our resources to respond to these situations, most effectively, on a case-by-case basis, recognizing that every case is unique, with different geographic, geologic and land-use considerations.

Statutes and rules currently exist that require impaired lands to be reclaimed to their original conditions and are based on sound scientific principles and engineering best practices. Plans for reclamation are and continue to be most effectively evaluated on a case-by-case basis.

Sincerely,

Karlene Fine
Executive Director and Secretary
North Dakota Industrial Commission