AERIAL PHOTOGRAPHY
OF ILLEGALLY STORED OILFIELD WASTES

-- SALTED LANDS COUNCIL --

The Salted Lands Council believes the public deserves to know how oilfield wastes are handled in our state. While we mainly focus on the damage caused by produced water, or "brine," spills, there are many other hazardous materials involved at well sites. In our last document, we provided aerial imagery of well sites with visible salt damage to the soil from brine spills that have not been thoroughly cleaned up, if at all.

We present the following photographs to show a few examples of how potentially hazardous oilfield wastes are currently mishandled in North Dakota, all under the jurisdiction of the Department of Health. The sites photographed raise questions regarding the capacity of the department leadership to enforce rules surrounding proper oilfield waste disposal.

The sites featured in the photographs are not authorized to store hazardous waste, and state law requires that all waste generated from oil exploration and production is to be disposed of immediately at an authorized facility, as required by **Administrative Code rule 43-02-03-19.2.**

ISSUE #1: OILFIELD WASTE AT UNAUTHORIZED SITES

LOCATION: MOHALL

Figure 1 - Murex Petroleum storage site containing oilfield wastes (Mohall). Note the numerous tanks and barrels, which have been found to contain oilfield wastes by Dept. of Health inspectors in the past. Note the close proximity to naturally-occurring fresh water.

Points of Note:

1. Department of Health staff inspected this site on June 9th, 2015.

2. The inspectors found hazardous oilfield wastes improperly stored at this site – which is not an authorized hazardous waste facility.

3. Bill Jansky - Environmental Health and Safety Coordinator for Murex Petroleum - was also present.

FOLLOWING UP ON THE DEPT. OF HEALTH:

The Dept. of Health inspectors reported the following in 2015:

a. The barrels contain "***oil, rags, diapers,*** *and other* ***waste*** *from well sites*."

b. The barrels…"*are collected and contained in a* ***containment basin***."

c. "*The* ***basin walls*** *are approximately* ***3 feet*** *in height*."

d. "*The basin is* ***lined with plastic liner****."*

Note that there is no perimeter berm or diking around this storage site - which is illegally doubling as an oilfield waste storage site. There is nothing preventing contaminated runoff from spreading off-site.

FACT CHECK #1

Department of Health inspector written statement in 2015:

"*The basin walls are approximately 3 feet in height*."

Figure 2 - "Containment Basin" –DoH inspector 2015 photo – Mohall

The barrels in this pit are among those the inspector reported as containing "*oil, rags, diapers, and other waste from well sites*" in June 2015. The inspector referred to this pit as a "*containment basin*," despite its structural deficiencies and lack of impermeable material. We question the basin's ability to contain fluids.

FACT CHECK #2:

Dept. of Health inspector written statement in 2015: "*The basin is lined with plastic liner.*"

Figure 3 - "Containment Basin" – photo by DoH inspector in 2015 – Mohall

A plastic liner is only effective if it is installed and maintained properly. This lining was not installed properly, and thus the inspector's statement, "*The basin is lined with plastic liner***" is misleading.**

The above findings leads us to question,

Are staff at the Dept. of Health even trained on how to inspect oilfield sites?

As shown in the 2016 aerial photograph below (Figure 4), the basin's walls are not 3 ft. around the entirety of this "containment basin." A basin wall or dike is only as effective as the wall's lowest point. There appears to be no wall around portions of this basin.

Figure 4 – Aerial photograph of "Containment Basin"– Mohall, 2016

Note that the basin "walls" do not extend all the way around this unauthorized hazardous waste storage pit. The wall appears to have collapsed in the upper right corner, and there is no wall where the basin connects to the rest of the unlined (waste) storage site.

CHECKING IN ON THE SITE – 1 YEAR LATER:

It has been over a year since the Dept. of Health inspection in which wastes (*"oil, rags, diapers, and other waste from well sites."*) were to be disposed of by Murex Petroleum, as indicated by the inspector's memo:

"When Murex is ready for disposal they will suck out all of the liquid from the basin. The liquid will be taken to Clean Harbors. The barrels will then be mixed on site with fly ash in a roll off and that will also be taken to Clean Harbors. Murex will inform the department when the clean-up is complete."

~Dept. of Health Inspector - June 9th, 2015

Figure 5 – "Containment Basin" – 2016

Basin containing liquid and tanks of oilfield waste more than a year after inspection.

As shown above, there is liquid and barrels in this basin as of July 18, 2016 - more than a year after Murex Petroleum was told to remove liquid from this basin containing and properly dispose of the potentially hazardous oilfield wastes. It appears that not all of the barrels were *"mixed on site with fly ash in a roll off"* and taken to Clean Harbors, as stated in the Department of Health inspector's June 2015 memo. Not only was Murex Petroleum asked to do so, it's the law:

All waste generated from oil exploration and production is to be disposed of <u>immediately</u> at an **<u>authorized facility</u>**, as required by **Administrative Code rule 43-02-03-19.2**.

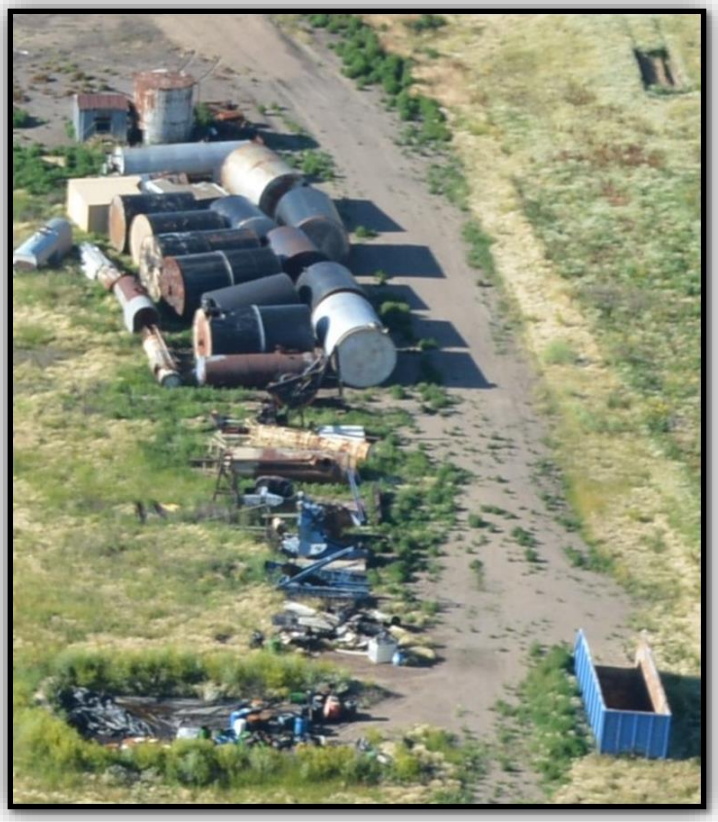
RULE 43-02-03-19.2. DISPOSAL OF WASTE MATERIAL.

> *"**All waste material associated with exploration or production** of oil and gas must be properly disposed of in an **authorized facility** in accord with all applicable local, state, and federal laws and regulations. All waste material recovered from spills, leaks, and other such events shall **immediately be disposed of in an authorized facility**, although the remediation of such material may be allowed onsite if approved by the director."*

Also, storage of wastes can only be stored in earthen pits or receptacles like this one in an **emergency:**

RULE 43-02-03-19.3. EARTHEN PITS AND OPEN RECEPTACLES.

> *"Except as otherwise provided in sections 43-02-03-19.4 and 43-02-03-19.5, **no saltwater, drilling mud, crude oil, waste oil, or other waste** shall be stored in **earthen pits or open receptacles** except in an emergency and upon approval by the director."*



This Murex Petroleum storage yard site is in violation of the above rules since this is n<u>ot an authorized waste disposal facility</u>, and wastes are being stored here in a <u>non-emergency</u>.

SALTED LANDS COUNCIL ASKS:

Is this how the Dept. of Health will allow radioactive waste to be handled?

This Murex Petroleum storage site being used for storing hazardous waste is just one example of negligence by the Department of Health, and their failure to perform their required duties according to the law.

LOCATION #2: NESW SECTION 29 TOWNSHIP 161 RANGE 81

FOLLOWING UP ON THE DEPT. OF HEALTH

The Chief of the Environmental Section of the ND Department of Health visited this well site in 2014. Mr. Glatt said that the department would follow-up by requesting that the North Dakota Industrial Commission (NDIC) require the well operator to clean it up. These photos, taken July 18th 2016, show that this site has still not been cleaned up ***more than a year later***, and remains out of compliance with administrative code rules.

Figure 6 - Well #15106 Site – 2016

This site is out of compliance regarding the following ND Administrative Code rule:

43-02-03-49. OIL PRODUCTION EQUIPMENT, DIKES, AND SEALS.

> *"Surface **oil tanks** and **production equipment** must be **devoid of leaks** and **in good condition** constructed of materials resistant to the effects of produced fluids or chemicals that may be contained therein. **Unused tanks** and production equipment **must be removed** from the site or placed into service, within a reasonable time period, not to exceed **one year."***

VIOLATION #1: TANKS IN POOR CONDITION

The tanks at this site appear to be in poor condition (note the rust) and may not be ***"resistant to the effects of produced fluids or chemicals that may be contained therein"*** *– as required by rule* 43-02-03-49.

VIOLATION #2: UNUSED TANKS AND PRODUCTION EQUIPMENT

As rule 43-02-03-49 **states, *"unused tanks and production equipment"* are not allowed to be stored for more than "one year" – which has passed.**

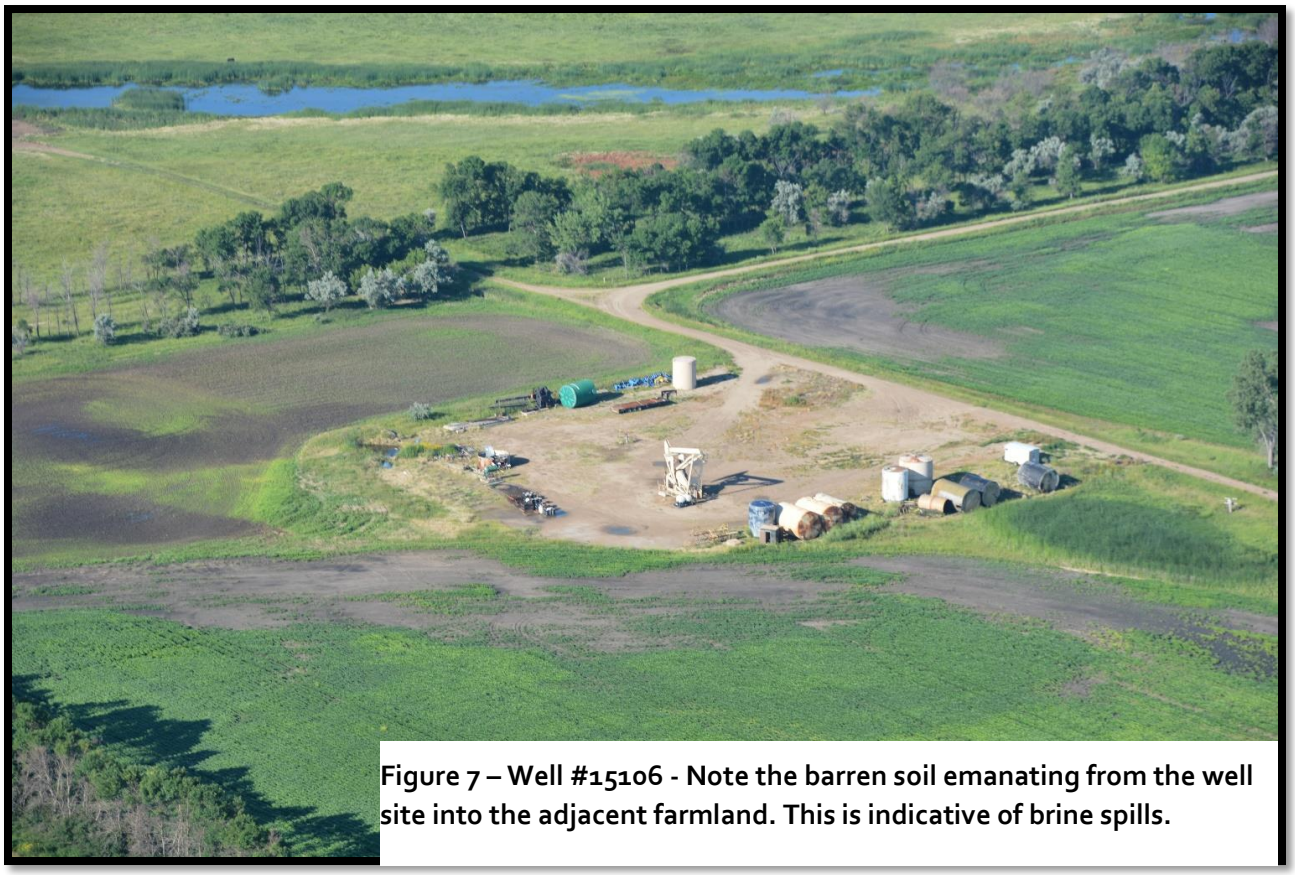


Figure 7 – Well #15106 - Note the barren soil emanating from the well site into the adjacent farmland. This is indicative of brine spills.

If these tanks still contain waste, then this site is in violation of the **ND Administrative Code rule 43-02-03-19.2** instead. As stated previously, this rule requires that **all waste material recovered from spills, leaks, and other such events must immediately be disposed of in an authorized facility.**

The barren soil at the site shown above (Figure 7) is likely a sign of salt from brine spills - such as the reported uncontained brine spill caused by a pipeline leak at this location in 2010. The spill was estimated at **200 barrels** (8,400 gallons).

These are examples of sites where leadership of the Dept. of Health and the North Dakota Industrial Commission are aware of **mismanaged hazardous waste**. This shows their failure to enforce existing rules aimed to protect people, soil, and water from oilfield wastes.

Can we trust the Dept. of Heath to ensure that radioactive waste will be handled properly and disposed of safely?

ISSUE #2: BRINE SPILLS AND ENSURING DISPOSAL OF CONTAMINATED SOIL

In this next section we show how commonly, even very recently, hazardous wastes are spilled and not reported or managed correctly. Using brine spills as an example, we substantiate our concern regarding the Dept. of Health's capacity to supervise radioactive waste disposal properly.

This first well site has been the location of brine spills, *in addition* to poorly managed oilfield waste.

LOCATION #3: NORTHEAST OF MOHALL

Figure 8 – Well #6206 and CBT – Located NE of Mohall

Note the close proximity of this well site and storage yard to a stream, Cut Bank Creek.

It is unknown what the square outlined area was used for.

In 2014, there was a reported brine spill from a pipeline leak at the well site above (Figure 9).

REPORTED SPILL VOLUME: 250 barrels (10,500 gallons)

CAUSE OF THE PIPELINE LEAK: Corrosion

COMPANY: Enduro Operating, LLC.

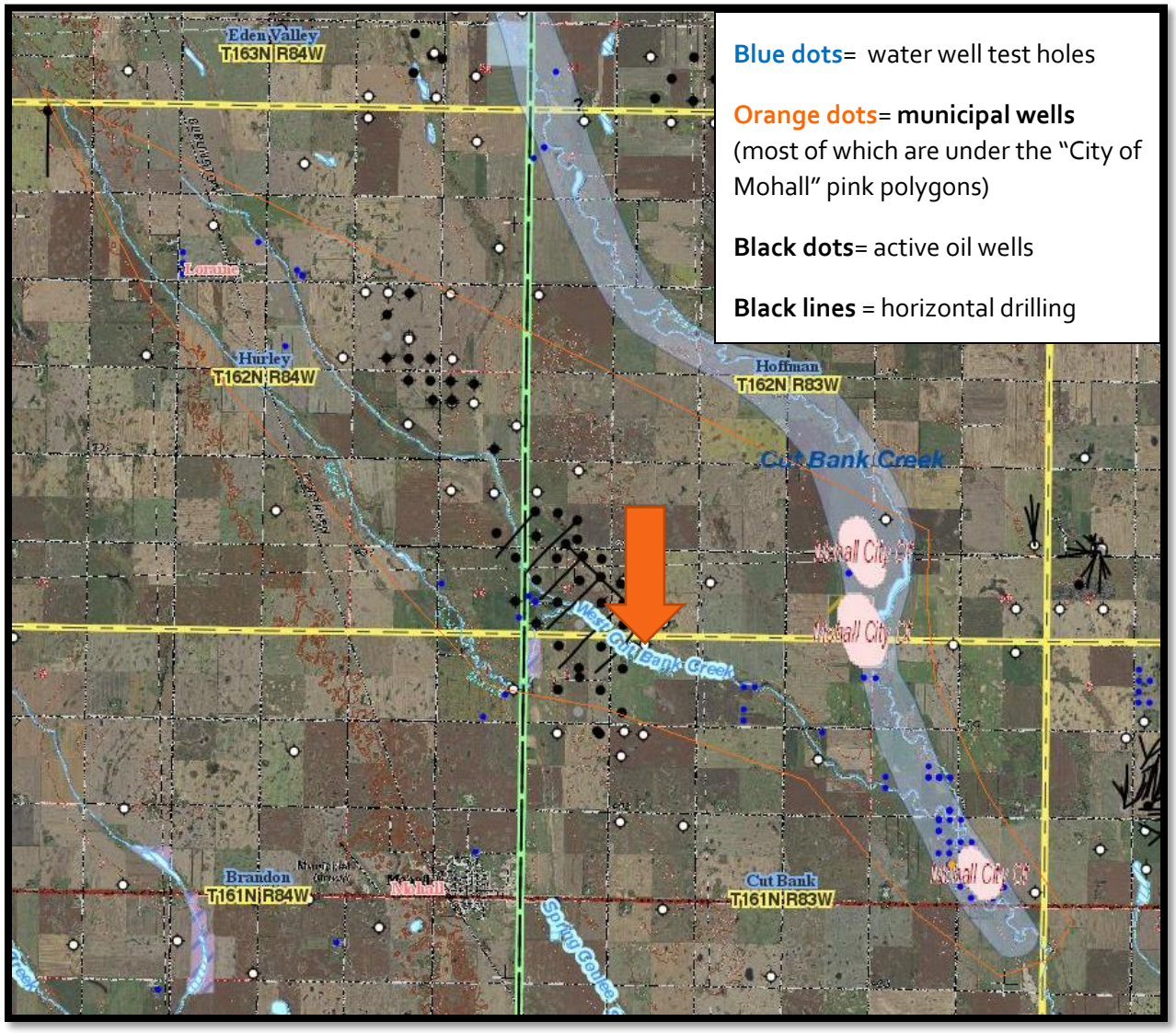
The brine spilled off of the well site and entered into **West Cut Bank Creek** (shown in photograph). This creek flows into the main Cut Bank Creek, which is a tributary of the **Mouse River** (aka Souris River) – which ultimately flows in Lake Winnipeg.

There are 7 municipal water wells located along this creek and within close proximity to its confluence with the main Cut Bank Creek.

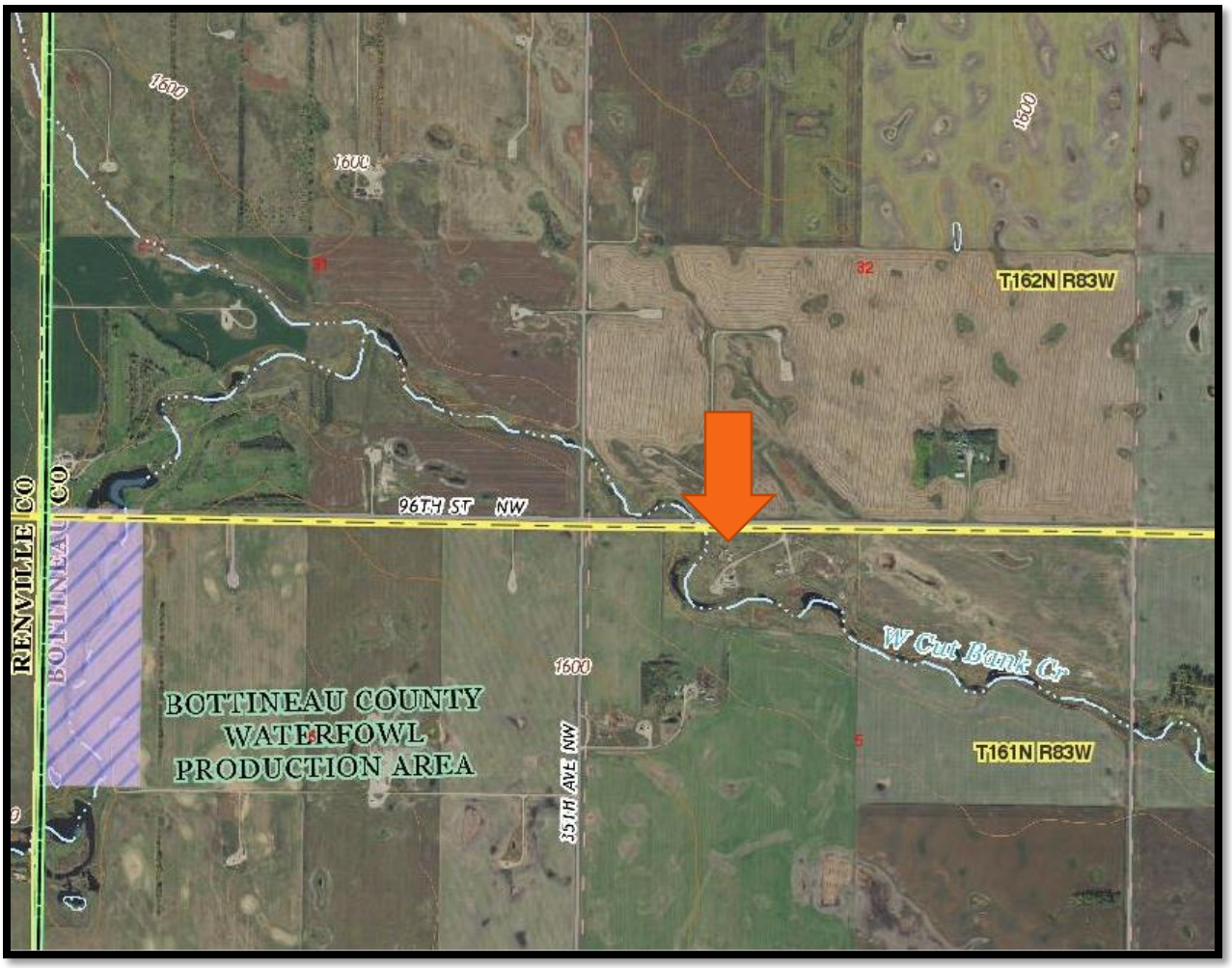
(Shown within orange outlined area on map below)

Figure 9- Oil wells and Water Wells along West Cut Bank Creek and the main Cut Bank Creek

Orange arrow points to well site



Water testing done by the Dept. of Health inspector showed the creek was contaminated with brine, with a salt concentration level **100X higher** than the measured background level– as indicated by conductivity measurements.



Note the well/storage site, visible from satellite, indicated by the orange arrow.

Note the proximity of West Cut Bank Creek.

The above reported spill is a prime example of what can, and does, go wrong when a spill occurs within an **improperly constructed dike**:

The faulty construction allowed the brine to seep under the dike, according to Department of Health inspector's note. The also noted, that the brine traveled ***" 100 ft. along low and riparian land into West Cut Bank Creek."***

THE CUT BANK CREEK SPILL REPORT SUMMARY

A Dept. of Health inspector arrived at the spill site the day after the spill was reported. By that time, berms had been placed in the creek to block contamination from proceeding further down the south fork of the creek and a plug dike was put in across the north fork "beyond where release was believed to have progressed."

The inspector reports measuring the **conductivity** and **chloride** levels of the stream. Conductivity is indicative of the salt in a soil or water sample, and thus is often used for detecting the areal extent of a brine spill. Chloride is a salt ion present in high concentrations in oilfield brine, and is measured by the Dept. of Health because chlorides are more likely to affect ground water.

Based on the inspector's conductivity measurements from an undocumented distance upstream, the creek had a background level of **1.155 mS/cm** and a chloride concentration of **~31-37 mg/L**. The creek branches into a south and north fork near the spill location. The south fork of the creek was sampled, with measurements indicating no impact in comparison the inspector's "background" measurements.

The north fork of the creek had a conductivity measurement of **144.7 mS/cm**, which indicates **brine contamination**, as it is more than **100 X's greater than the background** conductivity level measured in that creel. The chloride level could not even be reported because it was so high it was **out of range** for the test strips used by the Dept. of Health for chloride measurements.

At about 50 feet downstream from the **plug dike** (placed on the north fork of the creek) the conductivity level was about background level at 1.510 mS/cm, but the chloride titration strip measured **>6,903 mg/L** – which is about the highest the chart goes for the strips used, according to the inspector.

Three months after the spill, the inspector's conductivity measurements were "1.075 mS/cm, while water inside the original spill containment berm is **2.5 mS/cm**, and residual water in the trapped north fork beyond the berm is **5.7 mS/cm**" – which is ~**5X background level** for the creek.

LOCATION: SWNE SECTION 6 TOWNSHIP 161 RANGE 83

In 2013, there was a reported brine spill in the neighboring section (Sect. 6) in the **Bottineau County Waterfowl Production Area** (shown below). It was estimated at **54 barrels** – which is **2,268 gallons –** according to the well operator's spill report. Two barrels of oil were also reported spilled.

This spill was not inspected by Dept. of Health staff, nor was the Game and Fish Dept. alerted, despite the spill occurring in a designated nature area.

Despite prompts for the following information, none was supplied:

Inspected: ***Written Report Received:*** ***Clean Up Concluded:***

Risk Evaluation:

Areal Extent:

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Potential Environmental Impacts:

These are not isolated incidents as state government officials would have us believe. Spills are only reported if they are witnessed, or if the fluid – or the damage from it – is discovered and reported.

Spills do go unreported, and we only learn of some of them later. The site below is a RECENT example of that:

EXAMPLE:

On August 19th a brine spill was reported for Well #7748 ("Mouse River Park Souris Upper 31-21") – a well site not far from the previous locations. The brine spill volume was reported at **55 barrels** – which is **2,310 gallons**.

When the Dept. of Health inspector visited the site he discovered an **old, unreported oil spill.**

LOCATION: NENW SECTION 31 TOWNSHIP 162 RANGE 85

Figure 10 – Area Surrounding Well #7748

This old oil spill would likely have never been discovered had the inspector not happened upon it while visiting the brine spill site.

The site was inspected solely because it was reported as a **not contained** spill – meaning the spill leaked "off location" of the well site.

It remains to be seen whether the old oil will be reported as a spill.

CAUSE OF SPILL: Pipeline leak

COMPANY: Enduro Operating, LLC.

Another recent spill in this vicinity involved 30 bbls of oil and 20 bbls of brine:

The spill occurred at the Cramer CTB (central tank battery). The spill report states the wrong county. The spill occurred in Bottineau County, not Renville County as the report states.

LOCATION: SENW SECTION 8 TOWNSHIP 161 RANGE 82

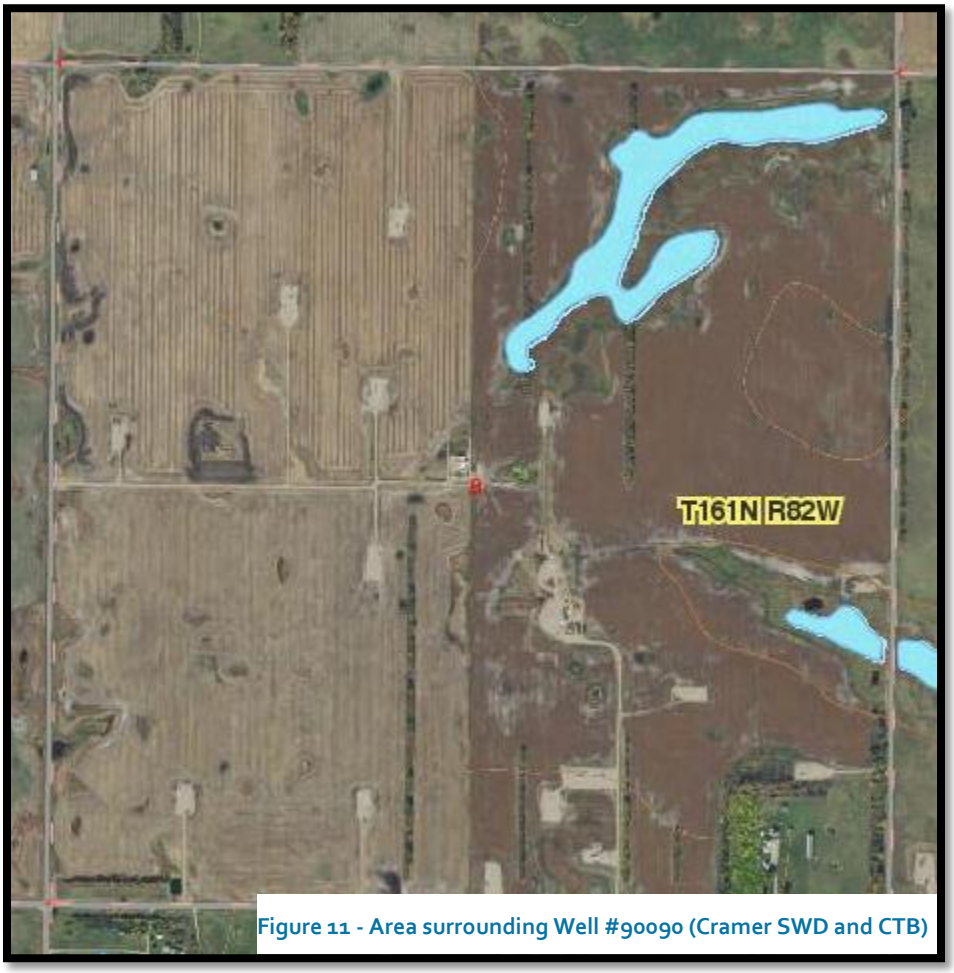

Figure 11 - Area surrounding Well #90090 (Cramer SWD and CTB)

COMPANY: PetroHarvester Operating Company, LLC.

The total spill volume for this August 22nd oil and brine spill was estimated by the well operator at **2,100 gallons.**

This well site has had 6 other reported brine spills since 2004.

No spill volume entered in the appropriate field is a major cause of skewed spill statistics reported by Lynn Helms and the NDIC.

As pointed out in our previous document, some spill reports do not even have a spill volume entered by the well operator. In the case of the site below, it was because the amount spilled and then burned off in the fire was "unknown." While the honesty is appreciated, this spill will be recognized as a "0" barrel spill by the DMR and NDIC, skewing the statistics they report to the public.

LOCATION: SECTION 21 TOWNSHIP 163 RANGE 77

Figure 12 - Surrounding area of Well # 12368 (Haakenstad 11-21)

Earlier this month on August 16th a fire occurred at Well # 12368 (Haaakenstad 11-21), and an "unknown" of oil and brine spilled was burned off in the fire.

As a result of no spill volume entered, this spill will get reported as a "**0" barrel spill** by the DMR and the NDIC, thereby skewing statistics on spills that they report to the public.

Please see our first document for more examples on poor spill reporting.

COMPANY: Citation Oil & Gas Corp.

As the first set of photographs illustrated, the Department of Health knowingly allows hazardous oilfield wastes to be stored at well and storage sites that are not authorized for oilfield waste storage or disposal. These sites are not equipped with properly-installed infrastructure to contain the hazardous materials in the event of a leak or spill. This is against the law as explained previously.

Thus, the Salted Lands Council is concerned that the Dept. of Health will also allow oil companies or radioactive waste haulers to simply move radioactive waste from oil production sites to other sites to be stored indefinitely at sites not authorized to handle radioactive waste. The department's failure to enforce brine spill remediation, as shown at length in our previous document, further substantiates this concern.

The Dept. of Health and NDIC's past and continuing failure to enforce rules regarding oilfield waste disposal informs us that radioactive waste may likewise be knowingly mishandled under the supervision of the Dept. of Health. Although the department recently caught the Alexander landfill with a large amount of radioactive waste, they are not following up on ensuring disposal of oilfield wastes and brine-contaminated soil.

The Salted Lands Council would like to see an audit of the Dept. of Health's records of hazardous and radioactive wastes produced and disposed of in North Dakota.

--SALTED LANDS COUNCIL--