Introduction and Authority

Oilfield activity in western North Dakota has prompted interest in the potential beneficial use or reuse of oilfield by-products that would otherwise be disposed of as waste. According to the North Dakota Hazardous Waste Management Rules, North Dakota Administrative Code (NDAC) 33.1-24-02-02(5)(a)(2), wastes are exempt from waste management rules and are not considered a waste when they are: *"(2) Used or reused as effective substitutes for commercial products; ..*"

Review and approval of a waste for beneficial use/reuse is managed by the North Dakota Department of Environmental Quality (Department). Review, inspections and other regulatory activities will be administered by the Department's Division of Waste Management and Division of Water Quality. When used in the manner outlined in the guidance, a Department-approved brine source may be used for dust and/or ice control as a substitute for commercial products.

The Department's review of the beneficial use of produced water (also known as oilfield brine) is based on the information presented and the Department's knowledge of the issues at that time. An approval is based on environmental and health issues only and does not constitute an endorsement of the material. The name of the Department and its employees shall not be used in any advertisement or endorsement without the Department's written consent. The Department reserves the right to request additional information and/or modify or rescind an approval for use of the oilfield brine source (produced water) at any time.

All approvals from the Department for the beneficial use of produced water for dust and/or ice control is limited to public roadways only [i. g., Township, County or State Roads]. Produce water use on any other roadway [i. g., lease or access roads] is subject to approval from the North Dakota Industrial Commission – Division of Oil and Gas.

If produced water is used in a manner that does not fall within these guidelines, it may be considered illegal disposal of a waste, and the user may be subject to penalties of up to $25,000 per day pursuant to the requirements in North Dakota Century Code (NDCC) Chapter 23-29 and Chapter 61-28, and NDAC Article 33.1-16, Article 33.1-20, and Article 33.1-24.

Produced water intended for beneficial use must be used within 18 months after Department approval. If not used by 18 months, the produced water must be disposed of at a permitted facility.

Definitions

Owner/End User: The person, government or business that owns or has legal control over roads or parking lots where produced water will be applied for ice or dust control.

Producer: The company which owns the oil well(s) and/or tank batteries from which produced water will be acquired for the purpose of ice or dust control.

Transporter: The person or company transporting produced water from the producer's loading site to the owner/end user storage facility or spreading vehicle.

Produced Water Applicator: The driver and vehicle applying produced water to roads or parking lots for ice or dust control.

Produced Water Source: The well or wells from which the produced water is collected from.

Testing

A produced water source or sources must be tested and approved by the Department prior to applying. If the produced water source includes multiple wells, any change in the wells or average amount received from each well may change the chemical/physical properties of the water used for application and would require a new submittal of analytical results for approval by the Department. All laboratory analyses must be conducted by a laboratory approved by the Department.

Parameter List

Refer to "Appendix A – Parameter List" for a list of laboratory parameters to be analyzed for the selected produced water source 60 days prior to anticipated use.

Frequency of Testing

The produced water source must be tested at least every six months or when changes to the source has occurred. The results must be submitted to the Department for beneficial use approval. Laboratory results must be submitted within 60 days of sampling for approval.

Criteria for Choice of Brine

At the minimum, the selected produced water for application must meet the following:

- Calcium plus magnesium concentration is greater than 10,000 milligrams per liter (mg/L)
- Chloride concentration is greater than 75,000 mg/L
- [1]Concentration of Radium 226 plus 228 must be below 5 pCi/g
- Laboratory results for a new produced water application source may be no more than 60 days old
- No visible sheen may be observed

[1](pCi per liter divided by TDS mg/liter) multiplied by 1000 mg/g = pCi/

Use, Application and Operation Procedures

Solid Waste Transporter Permit

Any person or company transporting produced water for the control of dust and ice or any other waste material must obtain a Solid Waste Transporter Permit issued by the Department. Vendors, generators and contractors using this material shall not deliver or allow transport of this material by any transport company that does not have a valid permit. A permit application may be downloaded at https://deq.nd.gov/Forms/WM/PermitApplicationForTransportingSolidWaste.pdf .

Compliance and Education

Transportation and handling of this waste material must be in accordance with the North Dakota Solid Waste Management Rules and Law, the North Dakota Solid Waste Transporter Permit, this approval and any requirements of the North Dakota Industrial Commission - Department of Mineral Resources - Oil and Gas Division (NDIC). Drivers of transportation vehicles and any contractors, end users and any persons using or handling this material must be instructed in proper handling of the waste material and be provided:

a. A copy of the beneficial use determination;
b. A Safety Data Sheet for this material;
c. Personal protective equipment appropriate for the material; and
d. Adequate information and equipment necessary for proper transportation, handling, storage and use of the material.

All reasonable efforts shall be employed during material transport, handling and use to minimize spillage, leakage, uncontrolled release, or airborne contaminants, including exposure of workers engaged in using the material as well as in the environment.

All transporters and produced water spreaders shall be subject to spot checks by NDIC, the Department and state or local law enforcement officers and the local health unit.

Produced Water Quality

Only produced water from oilfield sources shall be distributed for use as ice or dust control. No drilling fluids, exploration fluids or work-over liquids shall be used in this capacity. Produced water distributed for ice or dust control shall be free of oil and sludge, with no visible sheen and leaving no visible sheen on applied surface.

Responsibility

The produced water producer shall notify the transporter and/or end user of any changes in production sources or procedures that have the potential to change or alter the chemical or physical character of the water.

Once produced water to be used for ice or dust control is transferred to a transporter or end user, proper handling and use of the produced water is the responsibility and liability of the transporter and/or end user. It is the owner's responsibility to: (1) immediately report changes in produced water quality/character to the Department, and (2) to ensure the transport and end users are properly licensed.

The Department will notify the NDIC of wells supplying production water for application to roads for ice and dust control.

Storage

Storage tanks for produced water prior to use should have a clearly legible sign identifying it as produced water. A containment area and/or structure around the tank is recommended to minimize the potential cleanup area if a release was to occur. The container should be completely rinsed before filling with any other liquid after containing produced water to minimize cross-contamination. Any spill which may cause pollution of waters of the state must be reported immediately to the Department. Spill reports are to be filed electronically on the environmental incident reporting weblink.

Spreading Guidelines

Produced water spreaders shall adhere to the following guidelines for the application of produced water for dust/ice control:

a) When spreading produced water for dust/ice control, each vehicle shall display a clearly legible sign identifying it as a produced water applicator (magnetic signs are acceptable).
b) The application of produced water to road surfaces must occur so that impact to the environment is minimized. Produced water may only be applied at a rate and frequency necessary to control dust/ice. The rate and frequency must be controlled to minimize the impact of produced water infiltration to groundwater or producing runoff into roadside ditches, streams, creeks, lakes or other bodies of water.
c) Spreading of produced water shall not create an objectionable odor generated from hydrogen sulfide (NDAC 33.1-15-16-02.1).
d) A log of all spreading activity shall be completed and included for annual submittal to the Department as listed under Reporting and Recordkeeping section of this document.
e) Recommended rates for dust control:
    - Initial application of produced water shall be spread at a rate of one-half (1/2) gallon per square yard, after the road or parking lot has been freshly-graded. In areas where erionite is suspected, a light application of produced or clean water should be laid down prior to grading to minimize dust production.
    - Subsequent applications shall not exceed an application rate of one-third (1/3) gallon per square yard per month, unless weather or traffic conditions require

more frequent applications to suppress the dust or stabilize the road bed. This shall be noted in the application log and annual report to the Department.

- Application rates for race tracks and mining haul roads shall not exceed one (1) gallon per square yard.
- Produced water for dust and ice control shall be applied by use of a spreader bar, with shut-off controls accessible from the cab of the truck and/or other types of spreading equipment approved by the Department.
- Recommended rates for ice control:
- Application rates shall be those used by the North Dakota Department of Transportation (NDDOT).
- Consideration will be given to reducing the amount of produced water applied near any stream creek, lake, wetland or other body of water.
- Consideration will be given to the amount of produced water applied on bridges and culverts over streams, creeks, lakes, wetland or other body of water.

Unused Produced Water Disposal

Produced water that will not be used for Department-approved application is considered special waste and must be disposed of at a permitted facility.

Reporting and Recordkeeping

Electronic Reporting and Submittal

All road or parking lot owners planning to use produced water for ice or dust control shall initially notify the Department by mail or by electronic submission using the form provided in Appendix B – Notification Form.

Any electronic or paper reports and submittals shall be sent to the following address:

North Dakota Department of Environmental Quality
Division of Waste Management
918 E. Divide Ave., 3rd Floor
Bismarck, ND 58501-1947
or
solidwaste@nd.gov

Please submit all electronic forms in a searchable pdf format.

Annual Reports, Submittal Due Dates and Record Retention

An annual report of the ice/dust control programs shall be prepared by the Owner/End User and submitted to the Division of Waste Management. For ice control, the report shall be

submitted by June 1st; and for dust control, the report shall be submitted by January 1st for the previous year's activity. If using produced water for both dust and ice control, both reports shall be submitted each year. Each annual report shall be maintained by the owner for a minimum of three years. An example annual report form for submittal is included in Appendix C – Annual Report Form. **The annual report submittal shall also include a copy of the application log(s) and a legible map marking road surfaces that received an application for the reporting period**.

The annual report shall include an application log of all produced water application activities that occurred over the reporting period. The application log must include all spreading dates, rates, volumes, locations and the produced water source(s). A copy of the application log shall be kept in the spreader truck and company/owner office. The office form shall be updated at least weekly and kept on file for a period of three years. An example application log form is included in Appendix D – operator's Brine Spreading Log.

Annual reports, application logs and maps shall be made available upon request to inspectors from the Department or local health units, state or local law enforcement and/or NDIC.

Additional Department Notification

Significant revisions to the spreading plan or produced water source shall be communicated by letter to the Department before implementing the change. "Significant" shall mean change of produced water supplier(s), produced water character, contact person, contract spreader, or major change in spreading equipment.

Spill Reporting

Should any waste or material containing waste be spilled, released or otherwise discharged, whether prior, during or after application, the material shall be properly managed to minimize impacts to air, water and soil. Any spill, unapproved or accidental discharge of waste must be reported immediately. The owner, operator or person responsible for a spill or discharge must notify the Department as soon as possible (701.328.5150) or the North Dakota Hazardous Materials Emergency Assistance and Spill Reporting number (1.800.472.2121) and provide all relevant information about the spill. Depending on the severity of the spill or accidental discharge, the owner or operator shall:

a. Take immediate remedial measures;
b. Determine the extent of pollution to waters, land or atmosphere of the state;
c. Provide alternate water sources to water users impacted by the spill or accidental discharge;
d. Take any other actions necessary to protect human health and the environment; and
e. Non-emergency releases shall be reported by filling out the online Environmental Incident Report Form: https://deq.nd.gov/eir/NonOilfield/ (releases of produced water from truck transport are not exempt and should be reported using the General Environmental Incident Report Form).

Appendices

Appendix A – Parameter List

Appendix B - Notification Form

Appendix C - Annual Report Form

Appendix D - Operator's Brine Application Log

APPENDIX A

Parameter List

MINIMUM PARAMETER LIST for PRODUCE WATER		
METALS	**GENERAL CHEMISTRY**	**BASIC PARAMETERS**
Aluminum	Alkalinity (Total)	pH
Antimony	Ammonia nitrogen	Specific Conductance
Arsenic	Barium	Oil & Grease
beryllium	Boron	
Cadmium	Bicarbonate (HCO_3)	**RADIONUCLIDES (Naturally Occurring)**
Copper	Carbonate (CO_3)	Radium 226
Chromium	Calcium	Radium 228
Iron	Chloride	
Lead	Fluoride	
Nickel	Hydroxide (OH)	
Selenium	Magnesium	
Silver	Manganese	
Thallium	Nitrate + Nitrite (as N)	
Zinc	Phosphorus	
	Potassium	
	Sodium	
	Sulfate (as SO_4)	
	Total Dissolved Solids	

MAXIMUM/MINIMUM CRITERIA CONCENTRATIONS for PRODUCE WATER			
PARAMETER	**UNITS**	**MAXIMUM**	**MINIMUM**
Hydrocarbons	**Sheen**	**None**	**None**
Calcium + Magnesium	mg/L		10,000
Chloride	mg/L		75,000
Radium 226 + 228	pCi/g of TDS[1]	5.0	

1(pCi per liter divided by TDS mg/liter) multiplied by 1000 mg/g = pCi/g

APPENDIX B

Notification Form

Notification of Oil Field Brine Use for Ice or Dust Control (Produced Water Only)

North Dakota Department of Environmental Quality

Telephone: 701-328-5166 - Fax: 71-328-5200 - email: solidwaste@nd.gov -Website: http//deq.nd.gov/wm

Name of Owner/Organization/Municipality/County	Mailing Address	City	Zip

Contact Person	Telephone	Cell Phone	E-mail Address	Office Location

Understanding and Acceptance of Use Guidelines (yes/no)	

Brine Character Reviewed by ND Department of Health?	Date(s) of Chemical Analysis	Brine Source/Producer
Yes No		

Special Comments on Brine, Brine Source, or Sample?

Brine Source Location (twp, rng, sec, QQQ)	Brine Storage Location (Twp, rng, sec, QQQ)

Geologic Formation(s) of Brine Source	Vehicles Engaged in Spreading the Brine	

Vehicles Clearly Marked (yse/no)		Log Maintained in Each Vehicle and Collected Each Week (yes/no)	

Describe proposed spreading rate (gallons per square yard) and anticipated application frequency
Dust Control: Ice Control:

Owner Certifies that all spreading for ice or dust control will abide by Guidelines provided by North Dakota Department of Health
Signature: _____ Title: _____ Dater of Signature: _____

Notification of Oil Field Brine Use for Ice or Dust Control **(Produced Water Only)**

Name of Owner/Organization/Municipality/County - This is the name of the end user of the brine. Example - XYZ County or AXZ Stock Yard

Mailing Address/City/Zip - The address of the end user.

Contact Person/Telephone/Cell Phone/E-Mail Address - This is the contact information for those in charge of the actual brine spreading. This can be the person at the county or municipality who is directly in charge, or the contact at the company contracted to spread the brine.

Office Location - This will generally be the office of the owner's personnel who will be maintaining the records, unless outsourced. If record keeping and annual synopsis is the responsibility of the spreading company, then that is the office location to be reported.

Brine Character Reviewed by ND Dept. of Health - Has the brine analysis been reviewed by the NDDoH within the last 36 months?

Date(s) of chemical analysis - this is a list of the analysis dates for the brines under consideration.

Brine Source Producer - This is the name of the company owning or operating the oil well or tank battery that the brine is picked up from.

Special Comments on Brine, Brine Source, or Sample - If there are any special considerations or notes regarding one of these subjects, list them here.

Brine Source Location(s) - Please list, by number, the Township, Range, Section and quarter section of the source or sources. The source(s) will generally be a collection tank battery rather than a single oil well, as the owner will want a ready supply of brine. If there is more than one source, such as sources distributed around a large county, then each source location should be identified.

Brine Storage Location - If the brine is being delivered to a central (or several) storage location for subsequent transfer to spreading trucks, list the location in the same manner as for the brine source location, unless there is a more appropriate street address.

Geologic Formation of the Brine Source - This information can be obtained from either the brine producer, or the ND Department of Mineral Resources, Oil and Gas Division.

Vehicles Engaged in Spreading Brine - This is the make and licence number of each truck that will be modified to spread brine.

Owner Certifies… - This is the person owning (or responsible for) the property/road(s) that the brine will be used on.

APPENDIX C

Annual Report Form

PRODUCED WATER APPLICATION ANNUAL REPORT FORM

NORTH DAKOTA DEPARTMENT OF ENVIRONMENTAL QUALITY - DIVISION OF WASTE MANAGEMENT (6/2019)

Telephone: 701-328-5166 · Fax: 701-328-5200 · Email: solidwaste@nd.gov · Website: https://deq.nd.gov/WM/

1. Owner Information

Name:	Email:		Telephone:
Mailing Address:	City:	State:	Zip Code:
Location Address:	Waste Hauler Name (if different from Owner):		Waste Hauler Permit No. :

2. Calendar Period covered by Report- Ice Control (Jun 1-May 31; reports are due on June 1), Dust Control (Jan 1-Dec 31; reports are due Jan 1).

From Month:	To Month:	Year:

3. Annual Quantity of Produced Water Application (Use monthly total logs):

PLEASE INDICATEIFAMOUNT APPLIED IN GALLONS (gal) OR BARRELS (bbl)

Month	
January	
February	
March	
April	
May	
June	
July	
August	
September	
October	
November	
December	
TOTALS:	

4. Explain Any Occurrences of Noncompliance (list any reason for extra applications, spill instances, etc.):

5. Application Map(s) Attached: Yes ☐ or No ☐ Note: Application map(s) must indicate road surfaces that received an application for the reporting period.

6. Application Log(s) Attached: Yes ☐ or No ☐ Note: Application log must include all spreading dates, rates, volumes, locations, and the produced water source(s).

7 . Name, Date, and Signature of Preparer:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Print Name:	Date (month/day/year):	Signature:

Send Completed form to:

ND Dept. of Environmental Quality, Division of Waste Management, 918 E. Divide Ave., 3rd Fl., Bismarck, ND 58501-1947

APPENDIX D

Operator's Brine Application Log

Operator's Brine Spreading Log

North Dakota Department of Environmental Quality

Telephone: 701-328-5166 - Fax: 71-328-5200 - email: solidwaste@nd.gov -Website: http//deq.nd.gov/wm

County/Municipality/Owner	Brine Source	Operational Dates			Operator
			To		

Date	Road Name	Rd Segment - (from - to)	Volume (barrels) / Rate (gal/sq yd)	Dust	Ice