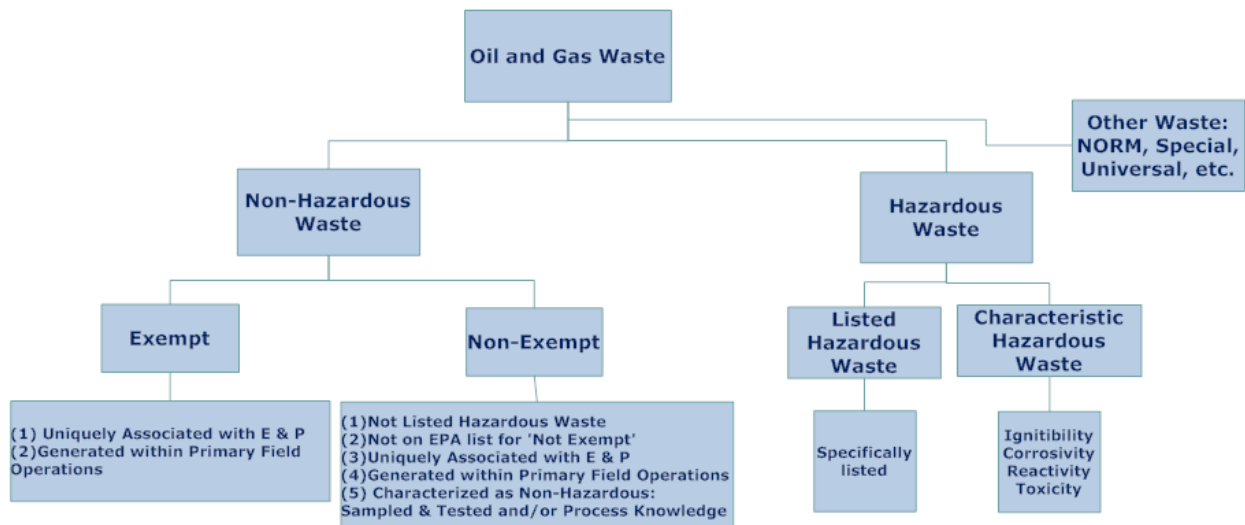


# Categorizing Oil & Gas Waste as Non-Hazardous

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## Oil and Gas Waste Hierarchy



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## A. Summary

The details involved with properly categorizing non-hazardous oilfield wastes can be under-estimated. While the EPA issued a conditional exemption of many oil and gas wastes based on comprehensive analysis of oilfield waste effects on human health and the environment, the list of exempted wastes is not absolute. Operators and disposal companies, in particular, must understand the basis for the exemption so as to apply its criterion correctly. To, wastes may be considered non-hazardous that are not listed by the EPA as exempt. In order to be considered non-hazardous, these wastes must be responsibly evaluated against hazardous waste criterion.

In Texas, the Railroad Commission regulates oil and gas waste, including both hazardous and non-hazardous waste. Oil and gas wastes may be considered non-hazardous either by (a) meeting the EPA's hazardous waste exemption criterion or by (b) comparing the waste stream and its characteristics to EPA's listed and technical criterion for hazardous wastes. To meet the EPA's exemption, the waste must be 'uniquely associated' with exploration, production or development. The waste must also originate within 'primary field operations'. For wastes not meeting the EPA exemption, the waste may be considered non-hazardous if it is not specifically listed by the EPA as a hazardous waste and if, after appropriate sampling and analysis, the waste does not exhibit the hazardous characteristics ignitability, corrosivity, reactivity, and toxicity. Under certain conditions, operators may use 'process knowledge' to establish that a waste stream is not characteristically hazardous.

## B. Oil and Gas Waste

In Texas, oil and gas wastes are broadly defined to include:

- Drilling, operation, and plugging of wells associated with the exploration, development, or production of oil and gas, including oil and gas wells, fluid injection wells used in enhanced recovery projects, and disposal wells;
- Separation and treatment of produced fluids in the field or at natural gas processing plants;
- Storage of crude oil before it enters a refinery;
- Underground storage of hydrocarbons and natural gas;
- Transportation of crude oil or natural gas by pipeline;
- Solution mining of brine; and
- Storage, hauling, disposal, or reclamation of wastes generated by these activities.

'Oil and Gas Waste' includes both hazardous and non-hazardous wastes arising from generally recognized oil and gas operations. These wastes may be in any liquid, semi-liquid or solid form.

See Appendix A for specific definitions of 'oil and gas waste' from various Texas regulations and guidance documents.

## C. Non-Hazardous Oilfield Waste (NOW)

An Oil and gas waste may be categorized as non-hazardous via two avenues - If (1) it meets the EPA hazardous waste exemption criterion or (2) if it is categorized as non-hazardous based on sampling, analytics and/or process knowledge to determine that ignitability, reactivity, corrosivity, and toxicity criterion are not exceeded. Both approaches entail details and misconceptions that challenge accurate categorization of the waste.

### *Note*

Texas rules and regulations do not formally define 'non-hazardous oilfield waste' (NOW). NOW wastes are categorized based on the oil and gas definition and hazardous waste exemptions and/or characterization.

### C.1 EPA Exempt wastes

In the 1980s, the EPA was tasked to determine if the extent of, potential harm from, and present and potential management practices for oilfield wastes warranted separate federal hazardous waste status and regulation. After extensive study, the EPA determined that separate hazardous waste regulation under federal laws was not warranted (See references 10, 11 &12). Their initial regulatory determination and follow-up clarification did not provide that all oil and gas wastes were non-hazardous but that, under certain strict and detailed conditions, some oilfield wastes could be considered non-hazardous.

Initial federal hazardous waste regulations included a temporary exemption for certain oil and gas wastes. EPA expanded the list of exempt wastes and state agencies, such as the Railroad Commission of Texas, followed by adopted similar exemptions in promulgating waste management rules and guidelines. Appendix B includes the TRRC's list of exempt wastes as published in the Waste Minimization in the Oilfield guidance document, Reference 6.

### *Caveat – Lists are Guidelines!*

The RRC and EPA list of exempt waste is not comprehensive. It is a guideline only! Wastes must be (a) unique to E & P operations and (b) used in Primary Field Operations.

While the RRC and EPA list of potentially exempt wastes is a helpful guide, to be considered exempt wastes must be:

- Uniquely Associated with E & P Operations, and
- Derived from Primary Field Operations.

### **C.1.a Uniquely Associated**

To be considered exempt, an oil and gas waste must be uniquely associated with E & P operations. Produced water and drilling fluids, for example, are clearly unique to E & P operations. Wastes may also be common to other industries however, such as paint, cleaning, and lube oil wastes, and are thus not unique to E & P operations and are not exempt. In the broadest sense, 'Uniquely Associated' includes:

- Down-hole operations and wastes; and
- Operations and wastes involved with the removal of impurities.

Operations to locate or remove oil and gas are 'uniquely associated' with E & P. Too, wastes that have been generated by contact with the production stream during the removal of produced water or other contaminants are 'uniquely associated' with E & P.

### **C.1.b Primary Field Operations (PFO)**

To be considered exempt from hazardous waste regulations, oil and gas waste must also be associated with 'primary field operations'. Primary field operations include primary, secondary, and tertiary operations and generally refer to the proximity to the drilling, production, and/or processing site. Transportation and manufacturing activities are not considered primary field operations. Primary field operations are defined differently for oil and gas operations.

#### Oil production PFO

- Activities at or near the wellhead but before the point where oil custody is transferred from and individual field facility or central facility to a carrier; and
- If no custody transfer occurs, the PFO ends at the end point of initial separation.

#### Natural gas production PFO

- Activities at or near the wellhead, production facility, or gas plant but before the point of transfer from an individual field facility, centrally located facility, or gas plant to a carrier for transport to market or before the use of natural gas in a manufacturing process; and
- Gathering lines to a gas plant are considered within the PFO.

#### Clarifying details include:

- The change of custody criterion refers to product, not waste;
- Crude oil stock tanks are considered within the oil production PFO;
- Crude oil processing such as water separation, demulsifying, degassing, and storage at tank batteries associated with a specific well or wells;

- Gas plants are considered within the natural gas PFO because of the need to remove water and other impurities prior to entering the sales line;
- Offsite transport of exempt waste from a primary field site for treatment, reclamation, or disposal does not negate the exemption;
- The use of a cleaning solvent, except in any down-hole operations, will generally negate the exemption;
- Wastes derived from the treatment of an exempt waste, including any recovery of product from an exempt waste (e.g., crude oil reclamation from tank bottoms), generally remain exempt;
- Wastes generated at natural gas compressor stations and facilities along the transportation and distribution network are not exempt;
- Operations beyond the simple removal of impurities, such as cracking, reforming the structures of gas fractions, and addition of odorants or other substances is considered manufacturing and non-exempt;
- Vacuum truck and drum rinsate from trucks and drums transporting or containing exempt waste is exempt, provided that the trucks or drums only contain E&P exempt wastes and that the water or fluid used in the rinsing is not hazardous;
- Oil and gas waste generated by a service company in primary field operations, and that is also uniquely associated with E&P, is an exempt oil and gas waste;
- The removal of elemental sulfur from hydrogen sulfide gas at a gas plant is considered treatment of an exempt waste;
- Wastes uniquely associated with operations to recover natural gas from underground gas storage fields are covered by the exemption.

***Caveat - 'Process Knowledge'***

Process knowledge characterization of waste should be performed by personnel with specific waste stream, operation, and historical analytics knowledge.

## C.2 Non-Exempt Waste

Oil and gas wastes not listed by the EPA as generally exempt may or may not be considered non-hazardous. If the waste is included in EPA's non-exempt list, see Appendix C, the waste does not meet the 'uniquely associated with primary field operations' criterion and may not be categorized as non-hazardous. Other wastes may be considered non-hazardous if (1) it meets the 'uniquely associated with primary field operations' criterion or (2) the waste is characterized as non-hazardous.

An oil and gas waste may be categorized as non-hazardous if it:

- Is not listed by non-exempt (see Appendix C); and
- Is not a Listed Hazardous waste, per Reference 13 and applicable EPA regulations; and
- Is sampled, tested, and does not exceed the ignitibility, corrosivity, reactivity, toxicity hazardous waste criterion of Reference 13 and applicable EPA regulations; or
- By way of process knowledge is characterized as non-hazardous.

## References

- |                                     |   |   |
|-------------------------------------|---|---|
| 1) Railroad Commission of Texas     | Rule §3.8   | Water Protection  |
| 2) Railroad Commission of Texas     | Rule §3.9   | Disposal Wells  |
| 3) Texas Water Code                 | Chapter 26  | Water Quality Control                                   |
| 4) Texas Water Code                 | Chapter 27  | Injection Wells   |
| 5) Texas Natural Resource Code      | Chapter 91  | General Provisions                                      |
| 6) Railroad Commission of Texas     | Waste Minimization in the Oilfield, July 2001   |   |
| 7) Railroad Commission of Texas     | The Interim Guidance for Hazardous Waste (Statewide Rule 98) Manual   |   |
| 8) Railroad Commission of Texas     | Surface Waste Management Manual   |   |
| 9) Railroad Commission of Texas     | Injection/Disposal Well Permit Testing and Monitoring Seminar Manual  |   |
| 10) Environmental Protection Agency | Regulatory Determination for Oil and Gas and Geothermal Exploration, Development and Production Wastes , July 1988                      |   |
| 11) Environmental Protection Agency | Clarification of the Regulatory Determination for Oil and Gas and Geothermal Exploration, Development and Production Wastes, March 1993 |   |
| 12) Environmental Protection Agency | Exemption of Oil and Gas Exploration and Production Wastes from Federal Hazardous Waste Regulations, 2000                               |   |
| 13) Railroad Commission of Texas    | Rule §3.98  | Standards for Management of Hazardous Oil and Gas Waste |

## Appendix A                      Definitions

<b>'Oil and Gas Waste'</b>	
<b>Reference</b>	<b>Definition</b>
<b>RRC Rule §3.9, Disposal Wells</b>	Adopts Texas Water Code, Chapter 27 definition
<b>Texas Water Code, Chapter 27, Injection Wells</b>	<p>Waste arising out of or incidental to:</p> <ul style="list-style-type: none"> <li>• Drilling for or producing of oil, gas, or geothermal resources;</li> <li>• Underground storage of hydrocarbons other than storage in artificial tanks or containers;</li> <li>• Operation of gasoline plants, natural gas processing plants, or pressure maintenance or re-pressurizing plants.</li> </ul> <p>The term includes but is not limited to salt water, brine, sludge, drilling mud, and other liquid or semi-liquid waste material</p>
<b>RRC Rule §3.8, Water Protection</b>	<p>Materials to be disposed of or reclaimed which have been generated in connection with:</p> <ul style="list-style-type: none"> <li>• <u>Activities associated</u> (see follow-up definition) with the exploration, development, and production of oil or gas or geothermal resources;</li> <li>• Solution mining of brine;</li> </ul> <p>The term includes, but is not limited to:</p> <ul style="list-style-type: none"> <li>• Saltwater, other mineralized water, sludge, spent drilling fluids, cuttings, waste oil, spent completion fluids, and other liquid, semi-liquid, or solid waste material;</li> <li>• Waste generated in connection with <u>activities associated</u> with gasoline plants, natural gas or natural gas liquids processing plants, pressure maintenance plants, or re-pressurizing plants unless that waste is a hazardous waste.</li> </ul>
<b>Texas Water Code, Chapter 26, Injection Wells</b>	No definition. Appears subsumed under 'other waste'
<b>Texas Natural Resource Code, Chapter 91, General Provision</b>	<p>Waste that arises out of or incidental to the drilling for or producing of oil or gas, including activities associated with:</p> <ul style="list-style-type: none"> <li>• Drilling of injection water source wells which penetrate the base of usable quality water;</li> <li>• Drilling of cathodic protection holes associated wells and pipelines subject to the jurisdiction of the commission;</li> <li>• Gasoline plants, natural gas or natural gas liquids processing plants, pressure maintenance plants, or re-pressurizing plants;</li> <li>• Underground natural gas storage facility (see 91.173);</li> <li>• Underground hydrocarbon storage facility (see 91.201);</li> <li>• Storage, handling, reclamation, gathering, transportation, or distribution of oil or gas prior to the refining of such oil or prior to the use of such gas in any manufacturing process or as a residential or industrial fuel.</li> </ul> <p>The term includes:</p> <ul style="list-style-type: none"> <li>• Saltwater, brine, sludge, drilling mud, and other liquid, semi-liquid, or solid waste material.</li> </ul>

<b>‘Associated Activities’</b>	
<b>Reference</b>	<b>Definition</b>
<b>RRC Rule §3.8, Water Protection</b>	<p>Activities associated with the exploration, development, and production of oil or gas or geothermal resources--Activities associated with:</p> <ul style="list-style-type: none"> <li>• The drilling of exploratory wells, oil wells, gas wells, or geothermal resource wells;</li> <li>• The production of oil or gas or geothermal resources, including:                             <ul style="list-style-type: none"> <li>• activities associated with the drilling of injection water source wells that penetrate the base of usable quality water;</li> <li>• activities associated with the drilling of cathodic protection holes associated with the cathodic protection of wells and pipelines subject to the jurisdiction of the commission to regulate the production of oil or gas or geothermal resources;</li> <li>• activities associated with gasoline plants, natural gas or natural gas liquids processing plants, pressure maintenance plants, or re-pressurizing plants;</li> <li>• activities associated with any underground natural gas storage facility, provided the terms "natural gas" and "storage facility" shall have the meanings set out in the Texas Natural Resources Code, §91.173;</li> <li>• activities associated with any underground hydrocarbon storage facility, provided the terms "hydrocarbons" and "underground hydrocarbon storage facility" shall have the meanings set out in the Texas Natural Resources Code, §91.201; and</li> <li>• activities associated with the storage, handling, reclamation, gathering, transportation, or distribution of oil or gas prior to the refining of such oil or prior to the use of such gas in any manufacturing process or as a residential or industrial fuel;</li> </ul> </li> <li>• The operation, abandonment, and proper plugging of wells subject to the jurisdiction of the commission to regulate the exploration, development, and production of oil or gas or geothermal resources; and</li> <li>• The discharge, storage, handling, transportation, reclamation, or disposal of waste or any other substance or material associated with any activity listed in subparagraphs (A)-(C) of this paragraph, except for waste generated in connection with activities associated with gasoline plants, natural gas or natural gas liquids processing plants, pressure maintenance plants, or re-pressurizing plants if that waste is a hazardous waste.</li> </ul>

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## Appendix B EPA Exempt Wastes

- Activated charcoal filter media
- Basic sediment and water (BS&W) – see Tank bottoms
- Caustics, if used as drilling fluid additives or for gas treatment
- Condensate
- Cooling tower blowdown
- Debris, crude oil soaked
- Debris, crude oil stained
- Deposits removed from piping and equipment prior to transportation (i.e., pipe scale, hydrocarbon solids, hydrates, and other deposits)
- Drilling cuttings/solids
- Drilling fluids
- Drilling fluids and cuttings from offshore operations disposed of onshore
- Gas dehydration wastes:
  - Glycol-based compounds
  - Glycol filters (see process filters), filter media, and backwash
  - Molecular sieves
- Gas plant sweetening wastes for sulfur removal:
  - Amines (including amine reclaimer bottoms)
  - Amine filters (see process filters), amine filter media and backwash
  - Amine sludge, precipitated
  - Iron sponge (and iron sulfide scale)
  - Hydrogen sulfide scrubber liquid and sludge
- Gases removed from the production stream (i.e., H<sub>2</sub>S, CO<sub>2</sub>, and VOCs)
- Liquid hydrocarbons removed from the production stream but not from oil refining
- Liquid and solid wastes generated by crude oil and tank bottom reclaimers
- Oil, weathered
- Paraffin
- Pigging wastes from producer operated gathering lines
- Pit sludges and contaminated bottoms from storage or disposal of exempt wastes
- Process filters
- Produced sand
- Produced water
- Produced water constituents removed before disposal (injection or other disposal)
- Produced water filters (see Process filters)
- Rigwash
- Slop oil (waste crude oil from primary field operations and production)
- Soils, crude oil-contaminated
- Sulfachek/Chemsweet waste
- Tank bottoms and basic sediment and water (BS&W) from: storage facilities that hold product and exempt waste (including accumulated materials such as hydrocarbons, solids, sand, and emulsion from production separators, fluid treating vessels, and production impoundments)
- VOCs from exempt wastes in reserve pits or impoundments or production equipment
- Well completion, treatment, and stimulation, and packing fluids Workover wastes (i.e., blowdown, swabbing and bailing wastes)

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## Appendix C                      EPA Non- Exempt Wastes

- Batteries: lead acid
- Batteries: nickel-cadmium
- Boiler cleaning wastes
- Boiler refractory bricks
- Caustic or acid cleaners
- Chemicals, surplus
- Chemicals, unusable (including waste acids)
- Compressor oil, filters, and blowdown waste
- Debris, lube oil contaminated
- Drilling fluids, unused
- Drums/containers, containing chemicals
- Drums/containers, containing lubricating oil
- Drums, empty (and drum rinsate)
- Filters, lubrication oil (used)
- Gas plant cooling tower cleaning wastes
- Hydraulic fluids, used
- Incinerator ash
- Laboratory wastes
- Mercury
- Methanol, unused
- Oil, equipment lubricating (used)
- Paint and paint wastes
- Pesticide and herbicide wastes
- Pipe dope, unused
- Radioactive tracer wastes
- Refinery wastes (e.g., unused frac fluids or acids)
- Sandblast media
- Scrap metal
- Soil, chemical-contaminated (including spilled chemicals)
- Soil, lube oil-contaminated
- Soil, mercury-contaminated
- Solvents, spent (including waste solvents)
- Thread protectors, pipe dope contaminated
- Vacuum truck rinsate (from tanks containing nonexempt waste)
- Waste in transportation pipeline related pits
- Well completion, treatment and stimulation fluids, unused

## Oil and Gas Waste Hierarchy

