

Waste Profile – Produced Water

WPX ENERGY – Colorado, Wyoming, and North Dakota Operations

LOC ID#: 446561
 Document #: 2225865
 Date: 12/23/2013



Uses/Description: Water trapped in underground formations that is brought to the surface along with the produced gas. It may include water from the reservoir, water injected into the formation, and any chemicals added during the production and treatment processes.

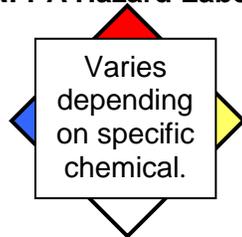
Key Properties:

<i>Physical State</i>		Solid
	✓	Liquid
		Gas

<i>Hazard</i>		Toxic
		Corrosive
		Reactive
		Ignitable
	✓	Case by case basis*

*Dependent on waste characterization

NFPA Hazard Label:



Severity (0 = no hazard, 4 = severe hazard) of:

- Flammability (RED);
- Health Risks (BLUE); and
- Reactivity (YELLOW).

Special Hazard Information (WHITE):

W = Water Reactive
 Oxy = Oxidizing Agent

EHS Considerations:

	Biohazard		Dangerous When Wet
	Poisonous		Explosive
	Carcinogen		Flammable
✓	Stow Away from Foodstuffs		Spontaneously Combustible
	Irritant or Harmful		Organic Peroxide
	Inhalation Hazard		Oxidizing Chemical
✓	Environmental Hazard	✓	Radioactive
	Priority pollutant		Nonflammable Gas
	Marine Pollutant		Other:
✓	Case by case basis – dependent on waste characterization.		

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Waste Classification: *(Red = licensed waste hauler and disposal facility are required. Green = local disposal is OK.)*

	Universal Waste (40 CFR Part 273)
	RCRA Hazardous Waste
✓	Non-hazardous
✓	Non-Exempt E&P Waste
✓	Tribal – Industrial Waste
	Tribal – Special Waste

Process Generating Waste:

(Check all that apply)

✓	Drilling and Completions
	Gathering and Compression
	Centralized Battery
✓	Processing
	Construction
	Other

Location Generated: Tanks and pits field-wide

Onsite Management: Three major categories: water minimization, recycle/reuse and/or treatment/disposal.

Disposal: Evaporation ponds; injection into permitted Class II well; permitted commercial facilities; roadspreading; discharge; reuse and recycle

Waste Minimization Opportunities:

SR = Source Reduction; R = Recycling

SR: Assess the feasibility of treating the producing formation with polymers that decrease the permeability of the formation for water, while the permeability of hydrocarbons remains unchanged.

SR: Investigate feasibility of dually completing gas/water producing zone and injection (Class II) disposal zone (water phase separates and is not produced at surface).

SR: Carefully planned well completions.

SR: Reperforate well to reduce water production.

SR: Drill wells to minimize water production (e.g., horizontal wells when feasible).

SR: Optimize production rate to minimize the influx of water (e.g., coning).

R: Create a system that distributes produced water to various waterfloods in area.

Results: reduction in volume of produced water requiring disposal and reduction of the amount of make up water purchased. Also, the need for water storage tanks for suction at water injection stations is eliminated by pumping directly from the water separation tanks to provide pressured water to the high pressure injection pumps. This reduces cost associated with operating charge pumps at the water station.

R: Use produced water for hydrotesting of pipelines, equipment and tanks.

R: Desalinate for use in other E&P operations if water supply is scarce and the process is cost effective.

Water Minimization: mechanical blocking devices, water shut-off chemicals, downhole separation (DOWS, DGENS, downhole water sink)

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Recycle/Reuse: underground injection for future water use, injection for hydrological purposes (subsidence control, stream flow augmentation), agricultural use (irrigation, livestock watering, wildlife watering, managed wetlands), industrial use (dust control, use in drilling fluids or hydraulic fracturing fluids), cooling water makeup

Recordkeeping: Maintain, **for no less than five (5) years**, copies signed by the generator, transporter, and receiving facility of each invoice, bill or ticket and other necessary documents showing:

- Date of transport;
- Identity of waste generator;
- Identity of waste transporter;
- Location of waste pickup site;
- Type and volume of waste; and
- Name and location of treatment or disposal site.

Per COGCC Rule 907 b (2) Waste Generator Requirements

Transport Requirements: See Attachment A and K. Case by case basis, dependent on waste characterization. All wastes should be transported by appropriately licensed haulers. Potential Hazardous Waste Manifest based on NORM results.

Disposal/Recycling Facilities: See Attachment I and K, and/or contact WPX Energy EH&S Staff

Special Instructions: Use appropriate PPE. Avoid eye and skin contact.



SAFETY DATA SHEET

1. Identification

Product identifier Produced Water

Other means of identification

SDS number 0003

Recommended use Waste

Recommended restrictions None known.

Manufacturer/Importer/Supplier/Distributor information

Company name WPX Energy Inc.
Address P.O. Box 3102
Tulsa, OK 74101 US
US
Telephone 855-979-2012
E-mail Not available.

Emergency phone number 3E Hotline 855-393-9881

2. Hazard(s) identification

Physical hazards Not classified.

Health hazards Not classified.

OSHA defined hazards Not classified.

Label elements

Hazard symbol None.

Signal word None.

Hazard statement The mixture does not meet the criteria for classification.

Precautionary statement

Prevention Wear eye/face protection. Wash hands thoroughly after handling.

Response If eye irritation persists: Get medical advice/attention.

Storage Store away from incompatible materials.

Disposal Dispose of waste and residues in accordance with local authority requirements.

Hazard(s) not otherwise classified (HNOC) None known.

3. Composition/information on ingredients

Mixtures

Chemical name	CAS number	%
Water	7732-18-5	> 80
Various minerals	N/A	1 - 20
Petroleum	8002-05-9	< 1

May contain small amounts of condensate or crude oil as a contaminate.

Composition comments All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First-aid measures

Inhalation Call a physician if symptoms develop or persist. If symptomatic, move to fresh air.

Skin contact Get medical attention if irritation develops and persists. Wash affected area with mild soap and water. Remove contaminated clothing and shoes.

Eye contact	Get medical attention if irritation develops and persists. Any material that contacts the eye should be washed out immediately with water. If easy to do, remove contact lenses.
Ingestion	First aid is normally not required. However, if greater than 1/2 liter (pint) ingested, seek medical attention.
Most important symptoms/effects, acute and delayed	Direct contact with eyes may cause temporary irritation.
General information	If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance.

5. Fire-fighting measures

Suitable extinguishing media	Extinguish with foam, carbon dioxide, dry powder or water fog.
Unsuitable extinguishing media	Do not use water jet as an extinguisher, as this will spread the fire.
Specific hazards arising from the chemical	None known.
Special protective equipment and precautions for firefighters	Firefighters should wear full protective clothing including self contained breathing apparatus.
Fire fighting equipment/instructions	Move containers from fire area if you can do it without risk. Cool containers with flooding quantities of water until well after fire is out. Use water spray to cool unopened containers.
Specific methods	Use water spray to cool unopened containers.
General fire hazards	No unusual fire or explosion hazards noted.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Wear appropriate protective equipment and clothing during clean-up. See Section 8 of the SDS for Personal Protective Equipment. For personal protection, see section 8 of the SDS.
Methods and materials for containment and cleaning up	<p>Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. Absorb in vermiculite, dry sand or earth and place into containers. Prevent entry into waterways, sewer, basements or confined areas. Following product recovery, flush area with water.</p> <p>Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.</p> <p>Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.</p> <p>Land Spills: Prevent further leakage or spillage if safe to do so. Contain spilled liquid with sand or earth to prevent further contamination of soil and surface water. Water Spills: Prevent further leakage or spillage if safe to do so. Allow to evaporate from surface or utilize absorbent material to remove oil and natural gas liquid from the surface of the water. Recover by pumping (use an explosion-proof motor or hand pump) or by sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal. Where feasible and appropriate, remove contaminated soil or flush with fresh water. On water spills utilize absorbent material to remove oil and natural gas liquid from the surface of the water.</p>
Environmental precautions	Prevent further leakage or spillage if safe to do so. Do not allow to enter drains, sewers or watercourses. Environmental manager must be informed of all major spillages.

7. Handling and storage

Precautions for safe handling	Avoid prolonged exposure. No special precautions are necessary beyond normal good hygiene practices. See Section 8 of the SDS for additional personal protection advice when handling this product.
Conditions for safe storage, including any incompatibilities	Store in a closed container away from incompatible materials. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value
Petroleum (CAS 8002-05-9)	PEL	2000 mg/m ³ 500 ppm

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
Petroleum (CAS 8002-05-9)	Ceiling	1800 mg/m ³
	TWA	350 mg/m ³
Biological limit values	No biological exposure limits noted for the ingredient(s).	
Exposure guidelines	Occupational Exposure Limits are not relevant to the current physical form of the product.	
Appropriate engineering controls	Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.	
Individual protection measures, such as personal protective equipment		
Eye/face protection	Wear safety glasses with side shields (or goggles). Risk of contact: Wear approved chemical safety goggles.	
Skin protection		
Hand protection	Not normally needed. Wear appropriate chemical resistant gloves. Suitable gloves can be recommended by the glove supplier.	
Other	Wear normal work clothes and safety shoes. Routinely wash work clothing and protective equipment to remove contaminants.	
Respiratory protection	In case of insufficient ventilation, wear suitable respiratory equipment. Respirator type: Air-purifying respirator with an appropriate, government approved (where applicable), air-purifying filter, cartridge or canister. Contact health and safety professional or manufacturer for specific information.	
Thermal hazards	Wear appropriate thermal protective clothing, when necessary.	
General hygiene considerations	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned.	

9. Physical and chemical properties

Appearance

Physical state	Liquid.
Form	Liquid.
Color	Clear or opaque.
Odor	Slight hydrocarbon.
Odor threshold	Not applicable.
pH	4.9 - 8.5
Melting point/freezing point	Not applicable.
Initial boiling point and boiling range	212 °F (100 °C)
Flash point	Not applicable.
Evaporation rate	Not applicable.
Flammability (solid, gas)	Not applicable.

Upper/lower flammability or explosive limits

Flammability limit - lower (%)	Not applicable.
Flammability limit - upper (%)	Not applicable.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.

Vapor pressure	0.11 mmHg @ 140°F(60°C)
Vapor density	Not available.
Relative density	> 1 @ 39.2°F(4°C)
Solubility(ies)	
Solubility (water)	Soluble

Partition coefficient (n-octanol/water)	Not applicable.
Auto-ignition temperature	Not applicable.
Decomposition temperature	Not applicable.
Viscosity	Not applicable.
Other information	
Bulk density	8.34 - 9.18 lb/gal

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Stable under the prescribed storage conditions.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	None known. Contact with incompatible materials.
Incompatible materials	Strong oxidizing agents.
Hazardous decomposition products	Carbon oxides. Metallic oxides.

11. Toxicological information

Information on likely routes of exposure

Inhalation	Prolonged inhalation may be harmful.
Skin contact	No adverse effects due to skin contact are expected.
Eye contact	Direct contact with eyes may cause temporary irritation.
Ingestion	Expected to be a low ingestion hazard.

Symptoms related to the physical, chemical and toxicological characteristics Direct contact with eyes may cause temporary irritation.

Information on toxicological effects

Acute toxicity

Components	Species	Test Results
Petroleum (CAS 8002-05-9)		
Acute		
<i>Dermal</i>		
LD50	Rabbit	> 2000 mg/kg
<i>Oral</i>		
LD50	Rat	> 5000 mg/kg

Skin corrosion/irritation Not available.

Serious eye damage/eye irritation Causes serious eye irritation.

Respiratory or skin sensitization

Respiratory sensitization	Not a respiratory sensitizer.
Skin sensitization	None known.

Germ cell mutagenicity No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

Carcinogenicity This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

IARC Monographs. Overall Evaluation of Carcinogenicity

Petroleum (CAS 8002-05-9) 3 Not classifiable as to carcinogenicity to humans.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

Reproductive toxicity Contains no ingredient listed as toxic to reproduction.

Specific target organ toxicity - single exposure Not classified.

Specific target organ toxicity - repeated exposure	Not classified.
Aspiration hazard	Not an aspiration hazard.
Chronic effects	Prolonged inhalation may be harmful. No additional adverse health effects noted.
Further information	This product has no known adverse effect on human health.

12. Ecological information

Ecotoxicity	The product components are not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.
Persistence and degradability	None known.
Bioaccumulative potential	No data available.
Mobility in soil	Expected to be mobile in soil.
Other adverse effects	No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations

Disposal instructions	Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Dispose in accordance with applicable federal, state, and local regulations.
Local disposal regulations	Dispose in accordance with all applicable regulations.
Hazardous waste code	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.
Waste from residues / unused products	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
Contaminated packaging	Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT	Not regulated as dangerous goods.
IATA	Not regulated as dangerous goods.
IMDG	Not regulated as dangerous goods.
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not applicable.

15. Regulatory information

US federal regulations	This product is not known to be a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200. All components are on the U.S. EPA TSCA Inventory List.
TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)	Not regulated.
OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)	Not listed.
CERCLA Hazardous Substance List (40 CFR 302.4)	Not listed.
Superfund Amendments and Reauthorization Act of 1986 (SARA)	
Hazard categories	Immediate Hazard - Yes Delayed Hazard - No Fire Hazard - No Pressure Hazard - No Reactivity Hazard - No
SARA 302 Extremely hazardous substance	Not listed.

SARA 311/312 Hazardous chemical No

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
Petroleum	8002-05-9	< 1

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Petroleum (CAS 8002-05-9)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

US state regulations This product does not contain a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.

US. Massachusetts RTK - Substance List

Petroleum (CAS 8002-05-9)

US. New Jersey Worker and Community Right-to-Know Act

Petroleum (CAS 8002-05-9)

US. Pennsylvania Worker and Community Right-to-Know Law

Petroleum (CAS 8002-05-9)

US. Rhode Island RTK

Not regulated.

US. California Proposition 65

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date	01-May-2015
Revision date	-
Version #	01
Further information	Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe
HMIS® ratings	Health: 1 Flammability: 1 Physical hazard: 0

NFPA ratings



References

ACGIH
ACGIH Documentation of the Threshold Limit Values and Biological Exposure Indices
EPA: AQUIRE database
HSDB® - Hazardous Substances Data Bank
IARC Monographs. Overall Evaluation of Carcinogenicity
National Toxicology Program (NTP) Report on Carcinogens
NLM: Hazardous Substances Data Base
US. IARC Monographs on Occupational Exposures to Chemical Agents

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