



Corporation Commission

# Hydraulic Fracturing

Joint Committee on Energy and Environmental Policy

*Doug Louis, Conservation Division Director*

*September 9, 2011*

# What is Hydraulic Fracturing and How Does It Work?

- Stimulates a well to increase oil or gas production.
- Each fracture job is engineered to be the most effective and stay in the pay zone.
- Procedure done after the well is drilled, before it is put on pump.
- Water and sand, along with other additives, are mixed then pumped below ground to fracture the producing rock matrix. Water and sand make up 98% of the fluid pumped into the formation; other additives, 2%.
- A proppant is introduced, generally fine grained sand. Fractures are then held open by the sand, allowing the natural gas previously trapped to flow to the wellbore and be collected at the surface.
- “Slick water treatment” is introduced to increase viscosity.
- Flowback fluids empty into tanks or pits that are then disposed of properly.

*Kansas was the first in the nation, a well frac in Grant County in 1947 by Stanolind Oil Company.*

# Are Hydraulic Fracture Jobs Performed in Kansas?

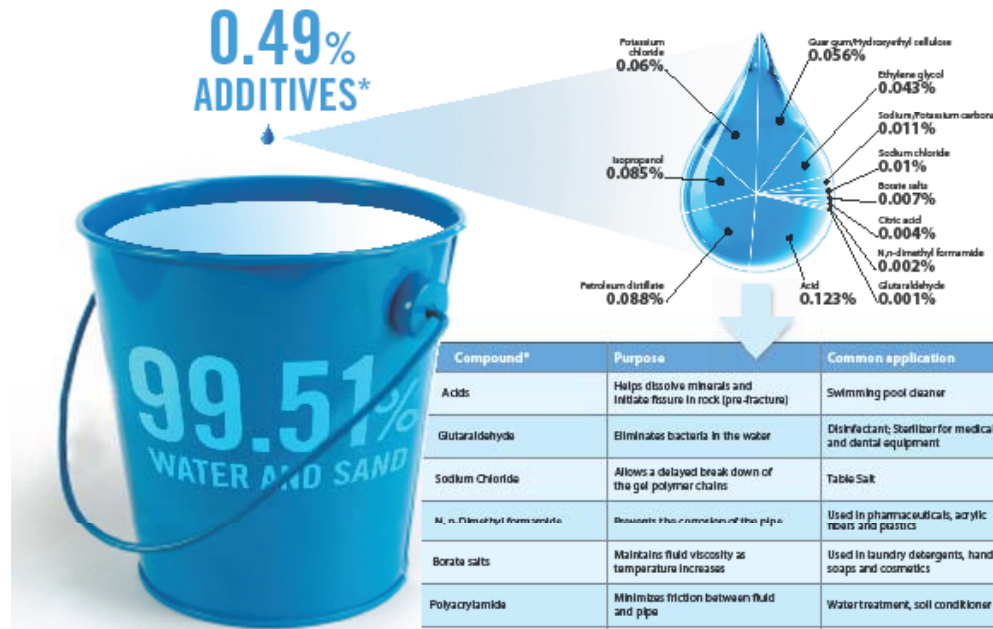
- Conventional Wells
  - Vertical wells in sandstones and carbonates
- Coalbed Methane Wells- Southeast Kansas
- Niobrara Chalk Wells- Northwest Kansas
- Horizontal Wells
- Utilized in saltwater disposal wells for increased disposal
- Increase enhanced oil recovery performance
- Used in gas storage wells to increase deliverability

# Kansas Hydraulic Frac Jobs

( in vertical wells)

KANSAS LOCATION	FORMATION	DEPTH (ft)	TOTAL FLUID VOLUME (bbl)	PRESSURE APPLIED (psi)
Southwest Kansas	Lansing Kansas City, Mississippian, Morrow Sand	2500-6900	500-20000	1000-1500
Northwest Kansas	Niobrara,	1350-1500	2700-3600	900
	Marmaton,	3700-3900	2700-3600	2500-3500
	Tarkio	2200-2500	2700-3600/4000-5000	2700-3600
Southwest Kansas	Cherokee sands, Mississippi, Simpson, Hutton	300-3000	200	300-1000
Southwest Kansas	Cherokee coals	600-1200	350-400 (per stage/coal formation)	600-1500

# A FLUID SITUATION: TYPICAL SOLUTION\* USED IN HYDRAULIC FRACTURING



On average, **99.5%** of fracturing fluids are comprised of freshwater and compounds are injected into deep shale gas formations and are typically confined by many thousands of feet or rock layers.

Source: DOE, GWPC Modern Gas Shale Development in the United States: A Primer (2009)

\*The specific compounds used in a given fracturing operation will vary depending on source water quality and site, and specific characteristics of the target formation. The compounds listed above are representative of the major material components used in the hydraulic fracturing of natural gas shales. Compositions are approximations.

**Hydraulic Fracturing Fluid Product Component Information Disclosure**

Fracture Date	2011-07-14
State:	Kansas
County:	Haskell
API Number:	15-055-21906
Operator Name:	EXXONMOBIL CORPORATION
Well Name and Number:	Jennie Barker 3-23
Longitude:	-101.047328
Latitude:	37.46366
Long/Lat Projection:	NAD27
Production Type:	Gas
True Vertical Depth (TVD):	2,670
Total Water Volume (gal)*:	110,759

**Hydraulic Fracturing Fluid Composition:**

Trade Name	Supplier	Purpose	Ingredients	Chemical Abstract Service Number (CAS #)	Maximum Ingredient Concentration in Additive (% by mass)**	Maximum Ingredient Concentration in HF Fluid (% by mass)**	Comments
Brine Water	Operator				100.00%	91.49283%	Density = 8.330
SAND - PREMIUM WHITE	Halliburton	Proppant	Crystalline silica, quartz	14808-80-7	100.00%	8.29031%	
FR-86	Halliburton	Friction Reducer	Hydrotreated light petroleum distillate	64742-47-8	30.00%	0.02496%	
LoSurf-300D	Halliburton	Surfactant	1,2,4 Trimethylbenzene	95-83-6	1.00%	0.00075%	
			Ethanol	64-17-5	60.00%	0.04480%	
			Heavy aromatic petroleum naphtha	64742-94-5	30.00%	0.02240%	
			Naphthalene	91-20-3	5.00%	0.00373%	
BE-7™	Halliburton	Biocide	Poly(oxy-1,2-ethanediy),alpha-(4-nonylphenyl)-omega-hydroxy-, branched	127087-87-0	5.00%	0.00373%	
			Sodium hydroxide	1310-73-2	2.00%	0.00099%	
OptiKleen-WF™	Halliburton	Concentrate	Sodium hypochlorite	7881-52-9	30.00%	0.01487%	
			Sodium perborate tetrahydrate	10488-00-7	100.00%	0.00942%	

\* Total Water Volume sources may include fresh water, produced water, and/or recycled water

\*\* Information is based on the maximum potential for concentration and thus the total may be over 100%

All component information listed was obtained from the supplier's Material Safety Data Sheets (MSDS). As such, the Operator is not responsible for inaccurate and/or incomplete information. Any questions regarding the content of the MSDS should be directed to the supplier who provided it. The Occupational Safety and Health Administration's (OSHA) regulations govern the criteria for the disclosure of this information. Please note that Federal Law protects "proprietary", "trade secret", and "confidential business information" and the criteria for how this information is reported on an MSDS is subject to 29 CFR 1910.1200(i) and Appendix D.

**Hydraulic Fracturing Fluid Product Component Information Disclosure**

Fracture Date:	6/15/2011
State:	Kansas
County:	Finney
API Number:	15-055-22101
Operator Name:	OXY
Well Name and Number:	Strackeljohn #A-1
Longitude:	-100.8959
Latitude:	37.76917
Long/Lat Projection:	NAD27
Production Type:	Oil
True Vertical Depth (TVD):	5,020
Total Water Volume (gal)*:	11,550

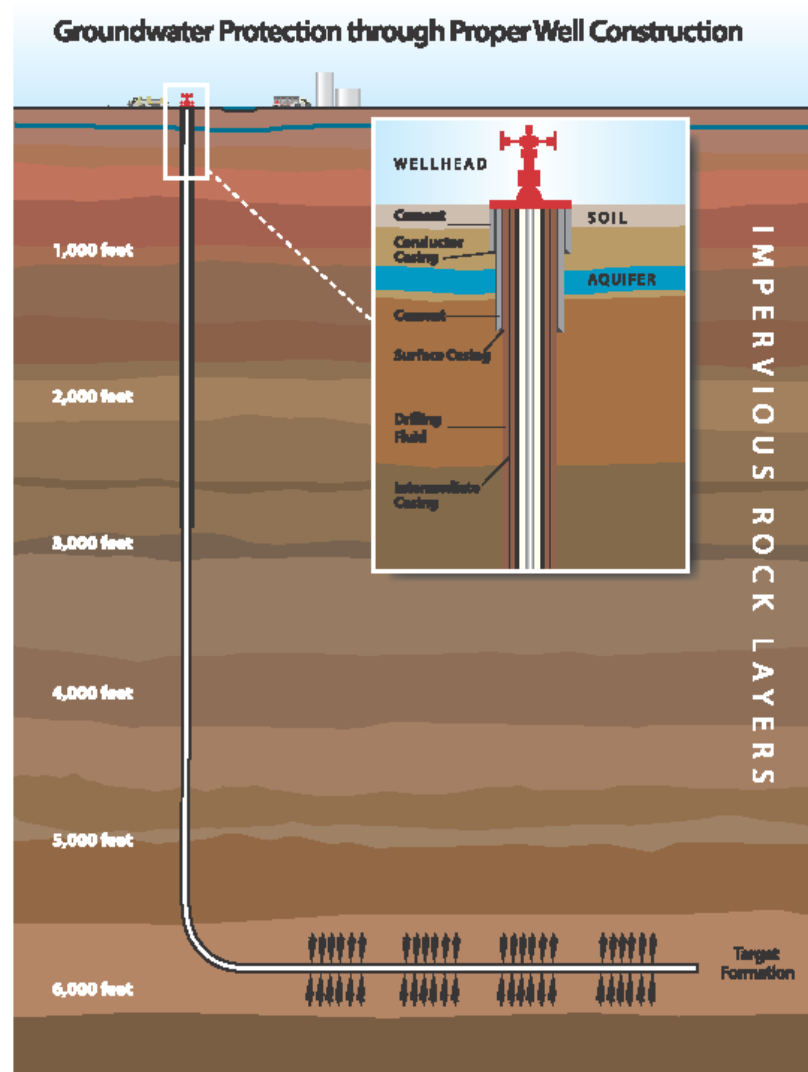
**Hydraulic Fracturing Fluid Composition:**

Trade Name	Supplier	Purpose	Ingredients	Chemical Abstract Service Number (CAS #)	Maximum Ingredient Concentration in Additive (% by mass)**	Maximum Ingredient Concentration in HF Fluid (% by mass)**	Comments
XLW-22C	BHI	Crosslinker	Trisopropanolamine	122-20-3	7.00%	0.00336%	
			Ammonium Hydroxide	1336-21-6	5.00%	0.00242%	
			Zirconium Sodium Hydroxy Lactate Complex	113184-20-6	60.00%	0.02901%	
Frac Sand (All Meshes) [CWT]	BHI	Proppant	Crystalline Silica (Quartz)	14808-60-7	100.00%	33.93292%	
Water	Operator	Carrier	Water	7732-18-5	100.00%	65.03460%	
Enzyme G-VII	BHI	Breaker	Hemicellulase Enzyme Concentrate	9025-56-3	0.02%	0.00001%	
			Water	7732-18-5	99.98%	0.02536%	
FAW-4	BHI	Foamer	Ethylene Glycol Monobutyl Ether	111-76-2	10.00%	0.02199%	
			Isopropanol	67-63-0	20.00%	0.04397%	
GBW-5	BHI	Breaker	Ammonium Persulfate	7727-54-0	100.00%	0.01014%	
GW-38LF	BHI	Gellant	Petroleum Distillates Blend	CBI	70.00%	0.49915%	
			Guar Gum, Substituted	68130-15-4	40.00%	0.28523%	
High Perm CRB-LT	BHI	Breaker	Ammonium Persulfate	7727-54-0	100.00%	0.00676%	
			Crystalline Silica	7631-86-9	10.00%	0.00068%	
Inflo 250W	BHI	Surfactant	Surfactants	CBI	80.00%	0.06424%	
			2-Butoxyethanol	111-78-2	20.00%	0.01606%	
			Methanol	67-56-1	30.00%	0.02409%	

\* Total Water Volume sources may include fresh water, produced water, and/or recycled water  
 \*\* Information is based on the maximum potential for concentration and thus the total may be over 100%

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# Hydraulic Fracture job in a Horizontal Well



Source: ALL Consulting, LLC



**Hydraulic Fracturing Fluid Product Component Information Disclosure**

Fracture Date:	06/11/2011
State:	Oklahoma
County:	Harper
API Number:	35-059-22566
Operator Name:	Apache Corp
Well Name and Number:	Bentley 6-32H
Longitude:	-99.81328
Latitude:	36.76791
Long/Lat Projection:	NAD27
Production Type:	Gas
True Vertical Depth (TVD):	6,424
Total Water Volume (gal)**:	1,737,708

**Hydraulic Fracturing Fluid Composition:**

Trade Name	Supplier	Purpose	Ingredients	Chemical Abstract Service Number (CAS #)	Maximum Ingredient Concentration in Additive (% by mass)**	Maximum Ingredient Concentration in HF Fluid (% by mass)**	Comments
Water	Operator	Carrier	Water	7732-18-5	100.00%	87.65730%	0
HCl 10.1 - 15%	BHI	Acidizing	Hydrochloric Acid	7647-01-0	15.00%	0.48524%	0
0	0	0	Water	7732-18-5	85.00%	2.74971%	0
Alpha 125	BHI	Biocide	Glutaraldehyde	111-30-8	30.00%	0.00816%	0
GBW-5	BHI	Breaker	Ammonium Persulfate	7727-54-0	100.00%	0.00372%	0
High Perm CRB	BHI	Breaker	Ammonium Persulfate	7727-54-0	100.00%	0.00978%	0
0	0	0	Crystalline Silica Quartz	14808-60-7	15.00%	0.00147%	0
BF-9L	BHI	Buffer	Potassium Hydroxide	1310-58-3	15.00%	0.01870%	0
ClayCare	BHI	Clay Control	Choline Chloride	67-48-1	75.00%	0.06905%	0
0	0	0	Non-Hazardous Ingredient	N.A.	100.00%	0.09207%	0
0	0	0	Water	7732-18-5	30.00%	0.02762%	0
CI-27	BHI	Corrosion Inhibitor	Alkenes* C>10 Alpha-	64743-02-8	5.00%	0.00020%	0
0	0	0	Ethoxylated Alcohols* C14-15	68951-67-7	30.00%	0.00121%	0
0	0	0	Methanol	67-56-1	60.00%	0.00243%	0
0	0	0	Propargyl Alcohol	107-19-7	10.00%	0.00040%	0
0	0	0	Tall Oil Acid	61790-12-3	30.00%	0.00121%	0
0	0	0	Thiurea Polymer	68527-49-1	30.00%	0.00121%	0
XLW-4	BHI	Crosslinker	Sodium Borate Decahydrate	1303-96-4	30.00%	0.03155%	0
FRW-20	BHI	Fricition Reducer	Hydrotreated Light Distillate	64742-47-8	30.00%	0.00339%	0
GW-4LF	BHI	Gelling Agent	Guar Gum	9000-30-0	40.00%	0.32279%	0
0	0	0	Petroleum Distillate Blend	CB1	70.00%	0.56487%	0
0	0	0	Sodium Acetate	127-09-3	5.00%	0.04035%	0
AG-12	BHI	Gelling Agent	Acrylic Polymers	26006-22-4	60.00%	0.00347%	0
0	0	0	Distillates, Petroleum, Hydrotreated Middle	64742-47-8	30.00%	0.00173%	0
0	0	0	Nonylphenol Ethoxylate	64742-46-7	5.00%	0.00029%	0
Ferrotrol 300L	BHI	Iron Control	Citric Acid	77-92-9	70.00%	0.00360%	0
NE-900, tote	BHI	Non-emulsifier	Methanol	67-56-1	30.00%	0.00673%	0
0	0	0	Nonyl Phenyl Polyethylene Glycol Ether	9016-45-9	10.00%	0.00224%	0
Sand, White, 20/40	BHI	Proppant	Crystalline Silica (Quartz)	14808-60-7	100.00%	7.75727%	0
GasFlo G, 330 gal tote	BHI	Surfactant	Methanol	67-56-1	30.00%	0.02479%	0
0	0	0	Surfactants	N.A.	60.00%	0.04958%	0

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**Hydraulic Fracturing Fluid Product Component Information Disclosure**

Fracture Date:	6/29/2011
State:	OKLAHOMA
County:	WOODS
API Number:	3515123495
Operator Name:	CHESAPEAKE
Well Name and Number:	EDWARD 10-28-14 1H
Longitude:	-98.68628
Latitude:	36.91375
Long/Lat Projection:	NAD27
Production Type:	OIL
True Vertical Depth (TVD):	5,282
Total Water Volume (gal)*:	2,115,666

**Hydraulic Fracturing Fluid Composition:**

Trade Name	Supplier	Purpose	Ingredients	Chemical Abstract Service Number (CAS #)	Maximum Ingredient Concentration in Additive (% by Mass)**	Maximum Ingredient Concentration in HF Fluid (% by Mass)**	Comments
Fresh Water		Carrier/Base Fluid				89.73661%	
Sand (Proppant)		Proppant				8.34184%	
15% HCl Acid	BASIC ENERGY SERVICES	Acid	Water Hydrochloric Acid	007732-18-5 007647-01-0	85.00% 15.00%	1.36280% 0.24049%	
I-6L	BASIC ENERGY SERVICES	Iron Control Agent	Acetic acid Methanol (Methyl Alcohol)	000064-19-7 000067-56-1	85.00% 5.00%	0.00803% 0.00047%	
CIA- LT166	BASIC ENERGY SERVICES	Corrosion Inhibitor	Methanol (Methyl Alcohol) Propargyl Alcohol (2-Propynol)	000067-56-1 000107-19-7	50.00% 4.00%	0.00123% 0.00010%	
XC105/XC408	BAKER HUGHES	Anti-Bacterial Agent	Glutarsaldehyde (Pentanedial) Isopropanol (Isopropyl Alcohol, Propan-2-ol) Quaternary Ammonium Compound Quaternary Ammonium Compound Quaternary Ammonium Compound	000111-30-8 000067-63-0 000139-07-1 000139-08-2 000122-18-9	45.00% 7.50% 7.50% 2.50% 1.25%	0.00927% 0.00054% 0.00054% 0.00018% 0.00009%	
CC - 11 KCl	BASIC ENERGY SERVICES	Clay Stabilizer	Methanol (Methyl Alcohol)	000067-56-1	100.00%	0.09290%	
S-10	BASIC ENERGY SERVICES	Surfactant	2-Butoxyethanol (Ethylene Glycol Monobutyl Ether) Methanol (Methyl Alcohol)	000111-76-2 000067-56-1	100.00% 100.00%	0.04406% 0.04406%	
FR-947	BASIC ENERGY SERVICES	Friction Reducer	Petroleum Distillate Hydrotreated Light	064742-47-8	30.00%	0.04145%	
WGA-1E SLR	BASIC ENERGY SERVICES	Gelling Agent	Petroleum Distillate Hydrotreated Light	064742-47-8	70.00%	0.01545%	
NE - 140	BASIC ENERGY SERVICES	Non-Emulsifier	Methanol (Methyl Alcohol)	000067-56-1	30.00%	0.00042%	
Breaker -10L	BASIC ENERGY SERVICES	Breaker	No Hazardous Components	NONE		0.00000%	

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**Hydraulic Fracturing Fluid Product Component Information Disclosure**

Fracture Date:	5/31/2011
State:	OKLAHOMA
County:	WOODS
API Number:	3515123492
Operator Name:	CHESAPEAKE
Well Name and Number:	LEOLA MEYER 8-28-13 1H
Longitude:	-98.627571
Latitude:	36.913982
Long/Lat Projection:	NAD27
Production Type:	OIL
True Vertical Depth (TVD):	5,106
Total Water Volume (gal)*:	2,449,608

**Hydraulic Fracturing Fluid Composition:**

Trade Name	Supplier	Purpose	Ingredients	Chemical Abstract Service Number (CAS #)	Maximum Ingredient Concentration in Additive (% by Mass)**	Maximum Ingredient Concentration in HF Fluid (% by Mass)**	Comments
Fresh Water		Carrier/Base Fluid				86.92509%	
Sand (Proppant)		Proppant				11.05827%	
15% HCl Acid	BASIC ENERGY SERVICES	Acid	Water Hydrochloric Acid	007732-18-5 007647-01-0	85.00% 15.00%	1.46590% 0.25869%	
I-6L	BASIC ENERGY SERVICES	Iron Control Agent	Acetic acid Methanol (Methyl Alcohol)	000064-19-7 000067-56-1	85.00% 5.00%	0.00719% 0.00042%	
GA- LT 100	BASIC ENERGY SERVICES	Corrosion Inhibitor	Methanol (Methyl Alcohol) Propargyl Alcohol (2-Propynol)	000067-56-1 000107-19-7	50.00% 4.00%	0.00133% 0.00011%	
X-CIDE 750	BAKER HUGHES	Anti-Bacterial Agent	Tetrakis Hydroxymethyl Phosphonium Sulfate	055566-30-8	60.00%	0.00481%	
CC - 11 KCl	BASIC ENERGY SERVICES	Clay Stabilizer	Methanol (Methyl Alcohol)	000067-56-1	100.00%	0.09250%	
S-10	BASIC ENERGY SERVICES	Surfactant	2-Butoxyethanol (Ethylene Glycol Monobutyl Ether) Methanol (Methyl Alcohol)	000111-76-2 000067-56-1	100.00% 100.00%	0.04521% 0.04521%	
FR-947	BASIC ENERGY SERVICES	Friction Reducer	Petroleum Distillate Hydrotreated Light	064742-47-8	30.00%	0.03610%	
WGA-1E SLR	BASIC ENERGY SERVICES	Gelling Agent	Petroleum Distillate Hydrotreated Light	064742-47-8	70.00%	0.00912%	
NE - 140	BASIC ENERGY SERVICES	Non-Emulsifier	Methanol (Methyl Alcohol)	000067-56-1	30.00%	0.00045%	
Breaker -10L	BASIC ENERGY SERVICES	Breaker	No Hazardous Components	NONE		0.00000%	

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## MATERIAL SAFETY DATA SHEET

Revision #: 01

## Section 1 - Product Identification &amp; Use

Product Name: **Muriatic Acid 10.4%**  
 WH-MSC Classification: **Class E, Corrosive Liquids**  
 TDG Classification: **Hydrochloric Acid Solutions**  
 UN 1789, Class 8, II  
 Supplier: **Advance Chemicals Ltd.**  
 2023 Kingsway Avenue  
 Port Coquitlam, B.C. V3C 1S8  
 Phone: (504) 945-9565  
 Fax: (604) 945-9517  
 Emergency phone: **CANUTEC 24 hrs. (613) 996-6666**

## Section 2 - Hazardous Ingredients

Hazardous Components	%(w/w)	C.A.S. No.	LD <sub>50</sub> & LC <sub>50</sub>
Hydrochloric Acid	7-13	7647-01-0	oral, rabbit 900mg/kg

## Section 3 - Physical Data

Physical state: liquid	Boiling point: 80-82°C
Liquid density: 1.10g/ml	Freezing point: no data
pH: 3% solution 0.2@ 20°C	Solubility in water: 100%
Vapour pressure: 25mmHg @ 20°C	Evaporation rate: no data

Odour & Appearance: Clear, colourless liquid solution. There is an obvious sharp acidic odour above the open liquid.

## Section 4 - Fire or Explosion Hazard

**Flammability:** The product is not considered to be flammable.  
**Extinguishing media:** Use an extinguishing media for surrounding the fire, or all purpose foam by manufacturer's recommended techniques for large fires. Use water to cool fire exposed containers to prevent vapour build-up and rupture. Water may also be used to flush spills away from dangerous exposures.  
**Hazardous Combustion Products:** Wear self-contained breathing apparatus. Product reacts with most metals to produce hydrogen gas, which may accumulate to produce explosive and/or flammable mixtures with air.

## Section 5 - Reactivity Data

**Stability:** Stable.  
**Incompatible substances:** Metals, caustics, sulphides, cyanides, fluorides, carbonates, silicates and strong oxidizing agents.  
**Polymerization:** Will not occur.  
**Conditions to Avoid:** Contact with metals produces hydrogen gas, which can form flammable or explosive mixtures in air. Will generate heat when mixed with alkalis. Reaction with sulphides, phosphides, cyanides, acetylides, fluorides, silicides, and carbides, releases flammable and/or poisonous gases. May spatter upon contact with water.  
**Hazardous Combustion Products:** Wear self-contained breathing apparatus. This product is not considered flammable, but heat may cause decomposition resulting in the production of hydrogen gas, which can form flammable or explosive mixtures.

## Section 6 - Toxicological Properties

**Acute Toxicity:** No data found.  
**Skin contact:** Burning, inflammation, blisters.  
**Eye contact:** Burning, watering.  
**Inhalation:** Irritation of mucous membranes, watering of eyes, difficulty breathing, coughing, nausea.  
**Ingestion:** Pain in swallowing, intense thirst, abdominal pain, nausea, may be fatal if swallowed.

## Section 7 - Preventative Measures

**Personal Protective Equipment:** Avoid contact with skin and eyes. Wear chemical protective gloves, goggles and face shield, rubber apron and boots. Eye wash fountains and safety shower facilities should be provided nearby for emergency use.  
**Respiratory protection:** For acid vapours and mist, use an NIOSH/MSHA approved air purifying, dust, mist and particulate respirator.  
**Ventilation Requirements:** This product should be used in a well-ventilated area at all times. If the hydrochloric acid solution is to be heated or a mist will be generated during product application, then local exhaust ventilation will be necessary.  
**Action to take for spills & leaks:** Wear chemical protective clothing, rubber gloves and suitable respiratory protection. Small spills should be wiped up with absorbent material and disposed of in government approved waste containers. The spilled product can be neutralized with soda ash or baking soda and wet down with a little water to form a slurry. The spill area may then be flushed with large

quantities of water. Larger spills should be contained by diking with sand, soil or other absorbent, non-combustible material, then transferred into approved waste containers for proper disposal. Keep product out of sewers, storm drains, surface run-off water and soil. Restrict access to non-protected personnel. Comply with all government regulations on spill reporting, handling and disposal of waste.  
**Disposal methods:** Dispose of contaminated product and materials used in cleaning up spills or leaks in a manner approved for this material. Consult appropriate federal, provincial and local regulatory agencies to ascertain proper disposal procedures.

**Note:** Empty containers can have residues, gases and mists, and are subject to proper waste disposal as mentioned above.

**Storage & Handling Precautions:** Warning, harmful or fatal if swallowed. Causes eye, skin and respiratory irritation. Avoid contact with eyes and repeated contact with skin and clothing. Do not ingest. Keep away from sources of heat and open flame. Keep container tightly closed when not in use. Store upright in a cool, dry, well-ventilated place away from incompatible materials. Do not use pressure to empty container. Wash thoroughly after handling. Use with adequate ventilation. Tanks must be grounded and ventilated. Ensure proper electrical grounding procedures are in place during product transfer.

**Repair and Maintenance Precautions:** Do not cut, grind, weld or drill in, on or near this container.

## Section 8 - First Aid Measures

**If inhaled:** Remove victim to fresh air. Give artificial respiration if not breathing. Get immediate emergency medical attention.

**In case of eye contact:** Immediately flush eyes with clean water for at least twenty (20) minutes, lifting the upper and lower eyelids occasionally. Get immediate emergency medical attention. Do not transport victim until the recommended flushing period has been completed, unless eye flushing can be continued during transport to the nearest emergency medical treatment facility.

**In case of skin contact:** Immediately flush skin with plenty of clean running water for at least fifteen (15) minutes. Remove contaminated clothing and shoes. If irritation persists after washing, get immediate medical attention. Wash clothes before re-use.

**In case of ingestion or swallowing:** If victim is conscious and not convulsing, give one or two glasses of water to dilute material. Immediately contact the local poison control centre. Vomiting should only be induced under the direction of a physician or poison control centre. If spontaneous vomiting occurs, have victim lean forward with head down to avoid breathing in the vomitus. Rinse mouth and administer more water. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS VICTIM. GET IMMEDIATE EMERGENCY MEDICAL ATTENTION.

## Section 9 - Preparation Information

Advance Chemicals Limited expressly disclaims all expressed or implied warranties of merchantability and fitness for a particular purpose with respect to the product provided. The information contained herein is offered only as a guide to the handling of this specific product, and has been prepared in good faith by technically knowledgeable personnel. This M.S.D.S. is not intended to be all-inclusive, and the manner and conditions of use may involve other and additional considerations.

Prepared: 17 January 2007  
 Revised: 09 February 2007

## OSHA/EPA Occupational Chemical Database

### Chemical Identification

**Chemical Name:** HYDROGEN CHLORIDE

**CAS #:** 7647-01-0

**UN No:** 1789

**Formula:** ClH

**Synonyms:** Anhydrous hydrogen chloride; Aqueous hydrogen chloride (i.e., Hydrochloric acid, Muriatic acid)

### Physical Properties

**Physical Description:** Colorless to slightly yellow gas with a pungent, irritating odor. [Note: Shipped as a liquefied compressed gas.]

<b>BP:</b> -121°F	<b>MW:</b> 36.5	<b>LEL:</b> NA	<b>NFPA Fire Rating:</b> 0
<b>FRZ/MLT:</b> FRZ: -174°F	<b>VP:</b> 40.5 atm	<b>UEL:</b> NA	<b>NFPA Health Rating:</b> 3
<b>FP:</b> NA	<b>VD:</b> 1.27		<b>NFPA Reactivity Rating:</b> 0
<b>Sp. GR:</b> NA	<b>IP:</b> 12.74 eV		<b>NFPA Sp. Inst.:</b> NA

### Exposure Limits

OSHA	NIOSH	Related Information
PEL-TWA ppm: NA	REL-TWA ppm: NA	<b>AIHA Emergency Response Planning Guidelines - ERPG-1/ERPG-2/ERPG-3:</b> 3 ppm/20 ppm/150 ppm
PEL-TWA mg/m3: NA	REL-TWA mg/m3: NA	
PEL-STEL ppm: NA	REL-STEL ppm: NA	
PEL-STEL mg/m3: NA	REL-STEL mg/m3: NA	
PEL-C ppm: 5	REL-C ppm: 5	<b>Carcinogen Classifications:</b> IARC-3, TLV-A4
PEL-C mg/m3: 7	REL-C mg/m3: 7	
<b>Skin Notation:</b> No	<b>Skin Notation:</b> No	
<b>Notes:</b> NA	<b>Notes:</b> NA	
	<b>IDLH ppm:</b> 50	
	<b>IDLH mg/m3:</b> NA	
	<b>IDLH Notes:</b> NA	

## OSHA/EPA Occupational Chemical Database (continued)

NIOSH Pocket Guide to Chemical Hazards (Current through June 2006)			
<b>Hydrogen chloride</b>		CAS: 7647-01-0	
Formula: HCl		RTECS: MW4025000	
Synonyms & Trade Names: Anhydrous hydrogen chloride; Aqueous hydrogen chloride (i.e., Hydrochloric acid, Muriatic acid)		DOT ID & Guide: 1050 125 (anhydrous) 1789 157 (solution)	
<b>Exposure Limits</b>			
NIOSH REL: C 5 ppm (7 mg/m <sup>3</sup> )		OSHA PEL: C 5 ppm (7 mg/m <sup>3</sup> )	
IDLH: 50 ppm		Conversion: 1 ppm = 1.49 mg/m <sup>3</sup>	
<b>Physical Description</b>			
Colorless to slightly yellow gas with a pungent, irritating odor. [Note: Shipped as a liquefied compressed gas.]			
MW: 36.5	BP: -121F	FRZ: -174F	Sol(86F): 67%
VP: 40.5 atm	IP: 12.74 eV	RGasD: 1.27	NA
F.L.P: NA	UEL: NA	LEL: NA	NA
Nonflammable Gas ( <a href="#">See flammable and combustible liquid classes</a> )			
<b>Incompatibilities &amp; Reactivities</b>			
Hydroxides, amines, alkalis, copper, brass, zinc [Note: Hydrochloric acid is highly corrosive to mos			
<b>Measurement Methods</b>			
NIOSH 7903; OSHA ID174SG			
<b>Personal Protection &amp; Sanitation</b>		<b>First Aid</b>	
Skin: Prevent skin contact (solution)/Frostbite Eyes: Prevent eye contact/Frostbite Wash skin:		Eye: Irr immed (solution)/Frostbite Skin: Water flush immed (solution)/Frostbite Breath: Resp ( <a href="#">See procedures</a> )	
<b>NIOSH Respirator Recommendations</b>			
NIOSH/OSHA 50 ppm: CCRS*/GMFS/PAPRS*/SA*/SCBAF : SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFAG/SCBAE ( <a href="#">See symbols and codes</a> )			
<b>Exposure Routes</b>			
Inh Ing (solution) Con			
<b>Symptoms</b>			
Irrit nose, throat, larynx; cough, choking; derm; solution: eye, skin burns; liquid: frostbite; in a ( <a href="#">See abbreviations</a> )			
<b>Target Organs</b>			
Eyes, skin, resp sys ( <a href="#">See abbreviations</a> )			

### OSHA/EPA Occupational Chemical Database (continued)

#### DOT Emergency Response Guidebook (ERG 2004)

**Guide Number: 157**  
**157 SUBSTANCES - TOXIC and/or CORROSIVE (Non-Combustible / Water-Sensitive)**  
**POTENTIAL HAZ**  
**NA**

#### ERG 2004 Isolation and Protective Distances

	SMALL SPILLS (From a small package or small leak from a large pkg.)	LARGE SPILLS (From a large package or from many small packages)
	First ISOLATE in all Downwind Directions	Then PROTECT persons Downwind during- DAY NIGHT
		First ISOLATE in all Directions during- DAY
		Then PROTECT persons during- DAY
	NIGHT	

NA NA

#### ERG 2004 Toxic-by-Inhalation (TIH) Gas(es) Produced When Spilled in Water

TIH: NA

#### Additional Emergency Response Information (CAMEO Data)

**Non-fire Spill Response:** Neutralizing Agents for Acids and Caustics: Flush with water; apply powdered limestone, slaked lime, soda ash, or sodium bicarbonate. (USCG, 1999)

**Firefighting:**

**Reactivity:** CHEMICAL PROFILE: Calcium phosphide and hydrochloric acid undergo a very energetic reaction, Mellor

**First Aid:** INHALATION: remove person to fresh air; keep him warm and quiet and get medical attention immediately; start artificial respiration if breathing stops. INGESTION: have person drink water or milk; do NOT induce vomiting. EYES: immediately flush with plenty of water for at least 15 min. and get medical attention; continue flushing for another 15 min. if physician does not arrive promptly. SKIN: immediately flush skin while removing contaminated clothing; get medical attention promptly; use soap and wash area for at least 15 min. (USCG, 1999)

# Who Regulates Hydraulic Fracturing in Kansas and How?

By regulating the oil and gas exploration industry since the 1930's the KCC has developed sound regulations to protect surface water, groundwater and correlative rights. The 85 full-time employees (geologists, engineers, technical staff, attorneys and field inspectors) who work in the Conservation Division enforce these regulations by witnessing, inspecting and permitting drilling, well-completion and production throughout the state.

- Surface pipe regulations
- Production casing regulations
- Well-cementing requirements
- Intent-to-drill process
- Well spacing requirements
- Pit permitting process
- Well completion reporting requirements
- Permit injection wells used for disposal of flowback water



# What is Happening on the National Level?

- The U.S. Environmental Protection Agency (EPA) is beginning an expansive new three-year study, including water quantity and water handling, issues which conflict with State's jurisdiction. The conflict was recognized in Kansas House Resolution on Hydraulic Fracturing. The EPA's published timeline states it will issue interim results by the end of 2012 with a final report to follow in 2014
- The Interstate Oil & Gas Compact Commission (IOGCC) and the Ground Water Protection Council (GWPC) voiced opposition to the EPA study saying a comprehensive study was done in 2004. The study concluded injection of hydraulic fracturing fluids poses little or no threat to underground sources of drinking water. The two groups argue the states are doing an adequate job as there have been no recorded cases of contamination from fracing.
- IOGCC and GWPC have developed a chemical reporting web portal called frac focus.

# What Are Other States Doing?

- Wyoming and Arkansas passed regulations which require the reporting of the chemical components.
- Oklahoma re-arranged its regulations to form a separate hydraulic fracturing section.
- Texas legislature passed a law which requires operators to use the “frac focus” website for disclosure.
- Alabama, Oklahoma, Wyoming and Louisiana legislatures have passed hydraulic fracturing resolutions, generally stating hydraulic fracturing is beneficial.

# **KCC-Conservation Division**

<http://kcc.ks.gov>

*Doug Louis, Director*

**316-337-6200**

**d.louis@kcc.ks.gov**