STATE OF COLORADO

Bill Ritter, Jr., Governor
James B. Martin, Executive Director

Dedicated to protecting and improving the health and environment of the people of Colorado

4300 Cherry Creek Dr. S.
Denver, Colorado 80246-1530
Phone (303) 692-2000
TDD Line (303) 691-7700
Located in Glendale, Colorado

Laboratory Services Division
8100 Lowry Blvd.
Denver, Colorado 80230-6928
(303) 692-3090

http://www.cdphe.state.co.us

Colorado Department of Public Health and Environment

For Agency Use Only
Permit Number Assigned

CO-_____

Date Received

____/____/____
Month Day Year

INDUSTRIAL INDIVIDUAL WASTEWATER DISCHARGE PERMIT

Please print or type. Original signatures are required. All items must be completed accurately and in their entirety for the application to be deemed complete. Incomplete applications will not be processed until all information is received which will ultimately delay the issuance of a permit. If more space is required to answer any question, please attach additional sheets to the application form. Applications must be submitted by mail or hand delivered to:

Colorado Department of Public Health and Environment
Water Quality Control Division
4300 Cherry Creek Drive South WQCD-P-B2
Denver, Colorado 80246-1530

PHOTO COPIES, FAXED COPIES, PDF COPIES OR EMAILED COPIES WILL NOT BE ACCEPTED.

This application is for use by all **individual industrial process water dischargers to surface water, ground water or stormwater dischargers**. Discharges to ground water may occur from impoundments that are either non-discharging to surface water or discharging to surface water, land application and septic systems, whose design capacity is greater than 2000 gallons per day. The Division has industry specific permits for construction dewatering, sand and gravel, gasoline clean up sites or other groundwater remediation, hydrostatic testing, subterranean dewatering, water treatment plants, hardrock mining, coal mining, non-contact cooling water, aquatic animal production, produced water from oil and gas facilities, commercial washing of outdoor structures, along with several for stormwater only discharges. If the facility falls under one of these activities, please check the website for the appropriate application (www.coloradowaterpermits.com – click on the industrial link).

PERMIT INFORMATION

Reason for Application: ☐ NEW PERMIT

☑ RENEW PERMIT EXISTING PERMIT # COG840015

This application is not for a certification under a general permit.

Applicant is: ☐ Property Owner ■ Contractor/Operator

A. Contact Information

Permittee (If more than one please add additional pages)

Organization Formal Name: WPX Energy Rocky Mountain LLC

1. **Permittee** the person **authorized to sign and certify** the permit application. This person receives all permit correspondences and is **legally responsible** for compliance with the permit.

Responsible Position (Title): Environmental Manager

Currently Held By (Person): Michael J. Gardner

Telephone No: 970-263-2760

email address Michael.Gardner@wpxenergy.com

Organization: WPX Energy Rocky Mountain LLC

Mailing Address: 1058 County Road 215

City: Parachute State: CO Zip: 81635

This form must be signed by the Permittee to be considered complete.

Per Regulation 61: In all cases the permit application shall be signed as follows:

a) In the case of corporations, by a responsible corporate officer. For the purposes of this section, the responsible corporate officer is responsible for the overall operation of the facility from which the discharge described in the application originates.
b) In the case of a partnership, by a general partner.
c) In the case of a sole proprietorship, by the proprietor.
d) In the case of a municipal, state, or other public facility, by either a principal executive officer or ranking elected official

2. **DMR Cognizant Official (i.e. authorized agent)**—the person or position authorized to **sign and certify** reports required by permits including Discharge Monitoring Reports [DMR's], Annual Reports, Compliance Schedule submittals, and other information requested by the Division. The Division will send pre-printed reports (e.g. DMR's) to this person. If more than one, please add additional pages. ■ Same as 1) Permittee

   Responsible Position (Title): _____

   Currently Held By (Person): _____

   Telephone No: _____

   Email address _____

   Organization: _____

   Mailing Address: _____

   City: _____ State: _____ Zip: _____

   Per Regulation 61: All reports required by permits, and other information requested by the Division shall be signed by the permittee or by a duly authorized representative of that person. A person is a duly authorized representative only if:
   (i) The authorization is made in writing by the permittee;
   (ii) The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a **named individual** or any individual occupying a named position); and
   (iii) The written authorization is submitted to the Division.

3. **Site/Local Contact**—contact for questions regarding the facility & discharges authorized by this permit
   ☐ Same as Permittee—Item 1

   Responsible Position (Title): Operations Engineer

   Currently Held By (Person): Peggy Carter

   Telephone No: 970-263-2750

   Email address Peggy.Carter@wpxenergy.com

   Organization: WPX Energy Rocky Mountain LLC

   Mailing Address: 1058 County Road 215

   City: Parachute State: CO Zip: 81635

4. **Operator in Responsible Charge** ☐ Same as Permittee—Item 1

   Responsible Position (Title): Water Management Supervisor

   Currently Held By (Person): Bradley Kesler

   Telephone No: 970-216-8703

   Email address Brad.Kesler@wpxenergy.com

   Organization: WPX Energy Rocky Mountain LLC

   Mailing Address: 1058 County Road 215

   City: Parachute State: CO Zip: 81635

   Certification Type _____ Certification Number _____

5. Billing Contact (if different than the permittee)

Responsible Position (Title): Water Management Supervisor
Currently Held By (Person): Bradley Kesler
Telephone No: 970-216-8703
Email address Brad.Kesler@wpxenergy.com
Organization: WPX Energy Rocky Mountain LLC
Mailing Address: 1058 County Road 215
City: Parachute State: CO Zip: 81635

6. Other Contact Types (check below) Add pages if necessary:

Responsible Position (Title): _____
Currently Held By (Person): _____
Telephone No: _____
Email address _____
Organization: _____
Mailing Address: _____
City: _____ State: _____ Zip: _____

- ☐ **Pretreatment Coordinator**
- ☐ **Environmental Contact**
- ☐ **Biosolids Responsible Party**
- ☐ **Property Owner**
- ☐ **Inspection Facility Contact**
- ☐ **Consultant**
- ☐ **Compliance Contact**
- ☐ **Stormwater MS4 Responsible Person**
- ☐ **Stormwater Authorized Representative**
- ☐ **Other** _____

B. Permitted Project/Facility Information

1. Project/Facility Name Parachute Treatment Facility

Street Address or cross streets _____

City, State and Zip Code _____ County Garfield

Type of Facility Ownership

☐ City Government ■ Corporation ☐ Private ☐ Municipal or Water District
☐ State Government ☐ Mixed Ownership _____

Legal Description

NWNW Sec 1 T7S R96W

Directions from nearest major cross streets

From intersection of CR215 an I-70 Frontage Road E, travel northeast for 0.4 miles
Turn left at intersection of I-70 Frontage Road E and access road (just after RR Crossing) and travel northeast for 1.2 miles
At Y bear left and travel west 0.5 miles to facility.

B. Permitted Project/Facility Information continued

2. **Facility Latitude/Longitude**—List the latitude and longitude of the excavation(s) resulting in the discharge(s). If the exact excavation location(s) are not known, list the latitude and longitude of the center point of the construction project. **If using the center point, be sure to specify that it is the center point of construction activity.**

001A Latitude 39 . 472975 Longitude -108 . 064998 (e.g., 39.703°, 104.933°')
degrees (to 3 decimal places) degrees (to 3 decimal places)

or

001A Latitude ____ ° ____ ' ____ " Longitude ____ ° ____ ' ____ " (e.g., 39°46'11"N, 104°53'11"W)
degrees minutes seconds degrees minutes seconds

Horizontal Collection Method: ☐ GPS Unspecified ☐ Interpolation Map – Map Scale Number 1:4250

Reference Point: ☐ Project/Facility Entrance ■ Project/Facility Center/Centroid

Horizontal Accuracy Measure (WQCD Requires use of NAD83 Datum for all references) Not applicable
(add additional pages if necessary)

3. **Facility Activity**

Standard Industrial Code (SIC Code) 13899909 | | | |

Facility Industrial/Business Activity

Describe the primary industrial activities which take place on site. Include the type of facility (car lot, gas station parking lot, potato processing plant, etc.) plus a brief description of the nature of the business and the industrial processes used. (The applicant may want to submit a process flow sheet.) If this is a seasonal operation, list the months of operation. Indicate the number of hours per day or weeks of operation:

The planned facility will treat produced water and flow back water from a non-conventional natural gas and natural gas liquids (NGL) production operation. The planned water treatment process is shown on the attached process flow sheet with the purpose of treatment to condition a high percentage of the produced water for surface discharge. The planned process consists of two (2) primary treatment systems, the first is pretreatment of the water for the second system where the water is desalinated and further purified by the use of reverse osmosis technology.

The pretreatment system will consist of electrocoagulation, tube settling clarification, spiral wound ultrafiltration, weak acid cation exchange softening, ultraviolet and charcoal treatment. The desalination system consist of a primary reverse osmosis system, a brine recovery reverse osmosis system, and chemical feed for pH adjustment and remineralization prior to discharge.

Production: List the principal product(s) produced (if any) and maximum production rate:

Treated water, maximum flow rate to be discharged will be 10,000 bbl/day or 291 gpm.

C. Discharge Information

1. **Intermittent Discharges**

A discharge is intermittent unless it occurs without interruption during the operating hours of the facility, except for maintenance, process change or similar shutdown. A discharge is seasonal if it occurs only during certain parts of the year.

Except for storm runoff, are any discharges intermittent or seasonal? ■ YES ☐ NO

Describe the frequency, duration, and flow rate of each discharge occurrence, except for storm runoff, spillage, or leaks:

The planned discharge will be intermittent. The discharge will be on a continuous basis during the operation hours of the facility. The maximum flow rate for discharge will be 10,000 bbl/day or 291 gpm. During periods of time where produced water is being used for completion operations and no excess is available, treatment will be suspended.

2. **Location Map :** A location map designating the facility property, intake points, discharge points, each of its hazardous waste treatment storage or disposal facilities, each well where fluids from the facility are injected underground, those wells, springs, other surface water bodies and drinking water wells listed in public records or otherwise known to the applicant and the receiving waters shall be submitted. The map shall extend one **mile beyond the property boundaries. The map shall be from a 7□ or 15 minute USGS quad sheet, or a map** of comparable scale. A north arrow shall be shown. **The map must be on paper 8.5 x 11 inches.**

3. **Site sketch:** A legible sketch of the facility site shall be submitted and will include buildings, roads, ditches, ponds, streams, drains, sumps, impoundment(s), land application areas, any septic systems and monitoring well locations (indicate if in place or proposed). This sketch may be the same as the one in the surface water discharge permit, if no additional information is needed. **The sketch will be on 8.5 X 11 inch paper.**

4. **Water Balance:** Attach a line drawing showing the water flow through the facility. Indicate sources of intake water, operations contributing wastewater to the effluent, and treatment units labeled to correspond to the more detailed descriptions in item 18. Construct a water balance on the line drawing by showing average flows between intakes, operations, treatment units, and outfalls. If a water balance cannot be determined, provide a pictorial description of the nature and amount of any sources of water and any collection or treatment measures.

D. Site-specific conditions:

a) Does this facility have bulk storage of diesel fuel, gasoline, solvents, fertilizers, or other hazardous materials on site? ☐ NO ■ YES

b) Is this operation located within one mile of a landfill, or any mine or mill tailings? ■ NO ☐ YES

If **YES for either** of these, please show location of landfill, tailings, or possible groundwater contamination on the **Location Map or in the Site Sketch** (See above requirements). Please explain the location, extent of contamination, possible effect on the discharges from this facility. The bulk storage of chemicals associated with the treatment process will be in containment areas that will be physically separated from the process/discharge point and is not expected to have any affect on the discharges from this facility (please see site sketch for proposed location of bulk chemical storage)

- **Chemical treatment:** Will any flocculants (settling agents or chemical additives) be used to treat water prior to discharge? ☐ NO ■ YES

If YES, list here and include the Material Safety Data Sheet (MSDS) with the application.

Chemical Name *	Manufacturer	Purpose	In Which Waste Stream?
30% Sodium Hydroxide	Hill Brothers chemical Co. or equivalent	Ion Exchange Resin Regeneration, Membrane Cleaning, pH Adjustment	Ion exchange waste water
General Purpose Antiscalant Dispersant	Professional Water Technologies or equivalent	Antiscalant, silica dispersant	Reverse osmosis waste water
30% Hydrocloric Acid	Hill Brothers chemical Co. or equivalent	Ion exchange resin regeneration, Membrane Cleaning	Ion exchange waste water
30-35% Calcium chloride liquid	Hill Brothers chemical Co. or equivalent	Sodium absorption ratio (SAR) adjustment	Treated discharge stream
Neutral pH Organic Process Aid	Professional Water Technologies or equivalent	Organic Process aid to guard against fouling	Reverse osmosis waste water
Membrane cleaner	Professional Water Technologies or equivalent	Membrane cleaning	Ion exchange waste water

* If the chemical formula is unknown or confidential, provide the manufacturer's name, contact person, address and phone number or a copy of the manufacturer's brochure, product label information or materials handling data sheet for each product used. Please list the major constituents or active ingredient(s), if known.

- **Used of Manufactured toxics:** The applicant must provide a list of any constituents listed in Appendices A and B which the applicant currently uses or manufactures as an intermediate or final product or by-product. If any constituents are known to be used or manufactured and are not identified in Appendices A and B, list those as well:

Not applicable

- **Flow measurement:** What method of flow measurement will be used for each discharge point (e.g., v notch weir, pump capacity, parshall flume, etc.)? Designate whether currently installed or proposed. Identify the minimum and maximum flow measurement capability.

  WPX proposes to install a magnetic meter to calculate discharge volumes. The meter will be selected to accurately measure volumes up to 10,000bdp +/- 10%.

- **Improvements:** Please provide a description of any abatement requirement, abatement project and projected final compliance dates if subject to any present requirements or compliance schedules for construction, upgrading or operation of waste treatment equipment. Also include here a description of any changes to the facility since the previous permit renewal.

  Not applicable

- **Ground Water Discharge:** Indicate whether this facility has any of the following:
  - Land Application (disposal/treatment) ■ NO ☐ YES
  - Impoundment (pond/lagoon) ☐ NO ■ YES — Impoundments are proposed for the treatment process; however, not for a groundwater discharge. Any impoundments used to store treated water will be either large volume storage tanks or above ground storage containment
  - Septic System for
    - Industrial Waste ■ NO ☐ YES
    - Domestic Waste ■ NO ☐ YES

- **Average flows and treatment:** Please provide a narrative identification of each type of process, operation, or production area which contributes wastewater to the effluent for each outfall including process wastewater, cooling waters, domestic wastewater and stormwater runoff; the average, maximum and design flow which each process contributes; and a description of the treatment the wastewater receives including the ultimate disposal of any solid or fluid wastes other than by discharge. Processes, operations or production areas may be described in general terms. The average flow of point sources composed of stormwater may be estimated. The basis for the rainfall event and the method of estimation must be indicated.

Use additional pages as needed

OUTFALL NUMBER	WASTEWATER SOURCE	TREATMENT USED	AVG FLOW MGD*	DESIGN ** FLOW MGD*	DAILY MAX FLOW MGD*
001	No additional sources besides the treated produced water				

*MGD - Million gallons/day
**If sediment pond, indicate approximate volume of water.

For each outfall to surface water or discharge to ground water, provide latitude/longitude and receiving water

OUTFALL	LATITUDE	LONGITUDE	RECEIVING WATERS* * Give Formation Name for Discharges to Ground Water
001	39.470583	-108.058038	Hayes Gulch

Are the receiving waters, indicated above, a ditch or storm sewer? ■ NO ☐ YES
If YES, submit documentation that the owner of the ditch or storm sewer allows this discharge. No permit will be processed unless documentation of approval is received.

Discharge Quality: Analytical data for the following parameters, unless waived by the Division, shall be submitted from at least one composite sampling of each surface process water discharge point as well as state waters upstream of each discharge. Instream sampling is not required if upstream flow is intermittent or representative instream data exists. See instructions. For **GROUND WATER** analyses see Appendices D and E1-3.

PARAMETER	DETECTION LEVEL	PARAMETER	DETECTION LEVEL
Total Dissolved Solids, mg/l	10	Total Recoverable Manganese, mg/l	0.05
Flow, MGD	NA	Dissolved Manganese, mg/l	0.05
pH, s.u.	NA	Total Mercury, mg/l	0.00025
Oil and Grease, mg/l	5	Total Recoverable Nickel, mg/l	0.05
Dissolved Oxygen, mg/ l	NA	Potentially Dissolved Nickel, mg/l	0.05
Alkalinity, mg/ l	10	Total Recoverable Silver, mg/l	0.0002
Total Suspended Solids, mg/ l	10	Potentially Dissolved Silver, mg/l	0.0002
Hardness, mg/ l as $CaCO_3$	10	Total Recoverable Uranium, mg/l	0.03
Total Ammonia, mg/ l as N	0.05	Total Recoverable Zinc mg/l	0.05
Temperature, °C Winter	NA	Potentially Dissolved Zinc, mg/l	0.05
Temperature, °C Summer	NA	Total Residual Chlorine, mg/l	0.05
Biochemical Oxygen Demand, mg/ l	1	Fecal Coliform, #/100 ml	NA
Chemical Oxygen Demand, mg/ l	30	Nitrate, mg/l as N	0.1
Dissolved Aluminum, mg/ l	0.1	Nitrite, mg/l as N	0.002
Total Arsenic, mg/l	0.05	Sulfide mg/l as H_2S	0.1
Total Recoverable Cadmium, mg/l	0.0004	Boron, mg/l	0.05
Hexavalent Chromium, mg/l	0.025	Chloride, mg/l	5
Trivalent Chromium, mg/l	0.05	Sulfate, mg/l	5
Total Chromium, mg/ l	0.005	Total Cyanide, mg/l	0.01
Total Recoverable Copper, mg/ l	0.005	Total Recoverable Selenium, mg/l	0.002
Potentially Dissolved Copper, mg/l	0.005	Total Cobalt, mg/l	0.006
Total Recoverable Iron, mg/l	0.3	Gross Alpha, piC/l	0.3
Dissolved Iron, mg/l	0.3	Total Radium 226 + 228, pCi/l	8
Total Recoverable Lead, mg/l	0.005	Total Fluoride, mg/l	0.1
Potentially Dissolved Lead, mg/l	0.005	Weak Acid Dissociable Cyanide, mg/l	0.01
Total Phenols, mg/l	0.100	Total Phosphorus, mg/l	0.05
Total Organic Nitrogen, mg/l	1.0		

Dioxin Testing: Each applicant must report qualitative data, generated using a screening procedure not calibrated with analytical standards, for 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) if it:

(a) Uses or manufactures 2,4,5-trichlorophenoxy acetic acid (2,4,5,-T); 2-(2,4,5-trichlorophenoxy) propanoic acid (Silvex, 2,4,5,-TP); 2-(2,4,5-trichlorophenoxy) ethyl, 2,2-dichloropropionate (Erbon); O,O-dimethyl O-(2,4,5-trichlorphenyl) phosphorothioate (Ronnel); 2,4,5-trichlorophenol (TCP); or hexachlorophene (HCP);

or

(b) Knows or has reason to believe that TCDD is or may be present in an effluent.

Whole Effluent Toxicity Testing and Priority Pollutant Scan for Surface Discharge Points

If you have processes in one of the following industries you must also submit the analyses specified below by a "X" in the corresponding box. The parameters for the appropriate GC/MS fraction(s) are shown in Appendix A to this application (see 40 CFR Part 122, Appendix D Table 1 for testing requirements and additional information for these specific industries). The WET testing shall be conducted on 100% effluent and be for both Ceriodaphnia dubia and fathead minnows. This requirement is waived where routine testing is currently required under an existing CDPS permit. The test shall be an acute test unless the ratio of stream low flow to effluent design flow is less than 10:1, respectively, and the receiving stream has a Class 1 or Class 2 Aquatic Life use with all the appropriate aquatic life numeric standards. In the latter case a chronic test is required. The Division reserves the right to request WET testing on industries not listed below or to request additional testing as part of the application review process. If so required, the permit application will not be considered complete until the additional information is submitted.

INDUSTRY CATEGORY	WET TESTING	GC/MS FRACTION			
		VOLATILE	ACID	NEUTRAL	PETICIDE
Adhesives and sealants	X	X	X	X	
Aluminum forming	X	X	X	X	
Auto and other laundries	X	X	X	X	X
Battery manufacturing	X	X		X	
Coil coating	X	X	X	X	
Copper forming	X	X	X	X	
Electric and electronic compounds	X	X	X	X	X
Electroplating	X	X	X	X	
Explosives manufacturing	X		X	X	
Foundries	X	X	X	X	
Gum and wood (all sub parts except D and F)	X	X	X		
Subpart D--tall oil rosin	X	X	X	X	
Subpart F--rosin-based derivatives	X	X	X	X	
Inorganic chemicals manufacturing	X	X	X	X	
Iron and steel manufacturing	X	X	X	X	
Leather tanning and finishing	X	X	X	X	
Mechanical Products manufacturing	X	X	X	X	
Nonferrous metals manufacturing	X	X	X	X	X
Organic chemicals manufacturing	X	X	X	X	X
Paint and ink Formation	X	X	X	X	
Pesticides	X	X	X	X	X
Petroleum refining	X	X			
Pharmaceutical preparations	X	X	X	X	
Photographic equipment and supplies	X	X	X	X	
Plastic and synthetic materials manufacturing	X	X	X	X	X
Plastic processing	X	X			
Porcelain enameling	X				
Printing and publishing	X	X	X	X	X
Pulp and paperboard mills	X				
Rubber processing	X	X	X	X	
Soap and detergent manufacturing	X	X	X	X	
Steam electric power plants	X	X	X	X	
Textile mills (subpart C--Greige Mills are exempt from this table)	X	X	X	X	
Timber products processing	X	X	X	X	X
Landfills	X	X	X	X	X
Oil and gas extraction-- produced water	X	X	X	X	
Sugar processing	X	X	X	X	X
Oil Shale	X	X	X	X	

Additional monitoring:

The applicant must review Appendices A and B and must indicate whether it knows or has reason to believe that any of the pollutants listed are present in its discharge. The Division may waive the reporting requirements for individual point sources if the applicant has demonstrated that such a waiver is appropriate because information adequate to support issuance of a permit can be obtained with less stringent requirements. Each applicant must report quantitative data for each outfall containing process wastewater with the following exceptions:

a.) For every pollutant discharged which is not so limited in an effluent limitations guideline, the applicant must either report quantitative data or briefly describe the reasons the pollutant is expected to be discharged.

b.) For every pollutant expected to be discharged in concentrations of 10 µg/l or greater the applicant must report quantitative data. For acrolein, acrylonitrile, 2,4 dinitrophenol, and 2-methyl-4,6 dinitrophenol, where any of these four pollutants are expected to be discharged in concentrations of 100 µg/l or greater the applicant must report qualitative data. For every pollutant expected to be discharged in concentrations less than 10 µg/l, or in the case of acrolein, acrylonitrile, 2,4 dinitrophenol, and 2-methyl-4,6 dinitrophenol, in concentrations less than 100 µg/l, the applicant must either submit quantitative data or briefly describe the reasons the pollutant is expected to be discharged.

c.) The applicant need not provide quantitative data if the pollutant is present in the discharge solely as the result of its presence in intake water. However, the applicant must report such pollutant as present.

Additional WET Testing: All applicants must identify any biological toxicity tests which have been performed within the last 3 years on any of the discharges or the receiving water in relation to a surface discharge from this facility. If this information is contained in DMRs, this step may be omitted. If there are additional tests that were not included in DMRs, then these tests must be submitted.

Activity duration: When did the activity commence? Activity has not commenced What is the estimated life of the activity from which the discharge(s) identified in item 13 originate? 20 years.

Stormwater Discharges: Please review Appendix C. Does the facility fall under any of the industries listed?

☐ NO ■ YES

If the answer is "yes", please complete the appropriate application for coverage under the applicable stormwater general permit. Applications are available at coloradowaterpermits.com, or by contacting the Stormwater Program at 303-692-3517.

Pollution Prevention Plans: Please describe any pollution prevention or best management plans currently in place which could result in the improvement of water quality. These could include solvent recycling programs, material containment procedures, education, etc.

An SPCC plan and a waste management plan are currently in place at the existing Parachute Water Treatment Facility. In addition, the facility is covered under the Parachute field wise SWMP.

Please include any other information which you feel the Division should be aware of in drafting this permit.

Other Environmental Permits: Does this facility currently have any environmental permits or is it subject to regulation, under any of the following programs? Mark which of the other permits/programs the facility has obtained or is in the process of obtaining or is subject to regulation under.

Under item other mark "yes" if the facility has any of the following permits:

a.) Prevention of Significant Deterioration (PSD) program under the Clean Air Act;
b.) Non-attainment Program under the Clean Air Act; or
c.) National Emission Standards for Hazardous Pollutants (NESHAPS) under the Clean Air Act.
d.) CERCLA

Permit name	Yes	No	Date applied for	Permit no.
Colorado Division of Minerals and Geology Permit	☐	☒		
Underground Injection Control	☒	☐	03/22/2013, 03/22/2013, 09/19/2013, 01/03/2013, 04/24/2013, 04/24/2013, 04/24/2013	COGCC 159295, 159296, 159447, 159418, 159432, 159432, 159432
Dredge or Fill permit, Section 404 – Army Corps of Engineers	☐	☒		
Resource Conservation and Recovery Act (RCRA)	☐	☒		
CDPS Stormater	☒	☐	07/01/2007	COR038541
Colorado State Air Pollution Program	☐	☒	Existing air permit associated with the Parachute WMP will be evaluated to include any additional emissions from proposed RO facility	
Other COGCC Form 28: Centralized E&P Waste Management Facility	☒		11/01/1988	FID 149015

REQUIRED SIGNATURES:

Signature of Applicant: The applicant must be either the owner and/or operator of the construction site. Refer to Part B of the instructions for additional information. The application must be signed by the applicant to be considered complete. In all cases, it shall be signed as follows: (Regulation 61.4 (1ei)

a) In the case of corporations, by the responsible corporate officer is responsible for the overall operation of the facility from which the discharge described in the form originates
b) In the case of a partnership, by a general partner.
c) In the case of a sole proprietorship, by the proprietor.
d) In the case of a municipal, state, or other public facility, by either a principal executive officer, ranking elected official, (a principal executive officer has responsibility for the overall operation of the facility from which the discharge originates).

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment.

Signature of **Owner** (submission must include original signature) Date Signed

Name (printed) Title

Signature of **Applicant** (submission must include original signature) 08-19-14 Date Signed

Michael J. Gardner Environmental Manager

Name (printed) Title

Signature of **Operator** (submission must include original signature) Date Signed

Name (printed) Title

Appendix A - Priority Pollutants

Organic Toxic Pollutants in Each of Three Fractions in Analysis by Gas Chromatography/Mass Spectroscopy(GC/MS).

Volatiles

Acrolein
Acrylonitrile
Benzene
Bromoform
Carbon Tetrachloride
Chlorobenzene
Chlorodibromomethane
Chloroethane
2-Chloroethylvinyl Ether
Chloroform
Dichlorobromomethane
1,1-Dichloroethane
1,2-Dichloroethane
1,1-Dichloroethylene
1,2-Dichloropropane
1,3-Dichloropropylene
Ethylbenzene
Methyl Bromide
Methyl Chloride
Methylene Chloride
1,1,2,2-Tetrachloroethane
Tetrachloroethylene
Toluene
1,2-Trans-dichloroethylene
1,1,1-Trichloroethane
1,1,2-Trichloroethane
Trichloroethylene
Vinyl Chloride

Base/Neutral

Acenaphthene
Acenaphthylene
Anthracene
Benzidine
Benzo(a)anthracene
Benzo(a)pyrene
3,4-Benzofluoranthene
Benzo(ghi)perylene
Benzo(k)fluoranthene
Bis(2-chloroethoxy)methane
Bis(2-chloroethyl) ether
Bis(2-chloroisopropyl) ether
Bis(2-ethylhexyl)phthalate
4-Bromophenyl phenyl ether
Butylbenzyl phthalate
2-Chloronaphthalene
4-Chlorophenyl phenyl ether
Chrysene
Dibenzo (a,h) anthracene
1,2-Dichlorobenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene
3,3-Dichlorobenzidine
Diethyl phthalate
Dimethyl phthalate
Di-n-butyl phthalate
2,4-Dinitrotoluene
2,6-Dinitrotoluene
Di-n-octyl phthalate
1,2-Diphenylhydrazine (as azobenzene)
Fluorene
Fluoranthene
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorcyclopentadiene
Hexachloroethane
Indeno(1,2,3-cd) pyrene
Isophorone
Naphthalene
Nitrobenzene
N-Nitrosodimethylamine
N-Nitrosodi-n-propylamine
N-Nitrosodiphenylamine
Phenanthrene
Pyrene
1,2,4-Trichlorobenzene)

Acid

2-Chlorophenol
2,4-Dichlorophenol
2,4-Dimethylphenol
4,6-Dinitro-o-cresol
2,4-Dinitrophenol
2-Nitrophenol
4-Nitrophenol
P-chloro-m-cresol
Pentachlorophenol
Phenol
2,4,6-Trichlorophenol

Pesticides

Aldrin
Alpha-BHC
Beta-BHC
Gamma-BHC
Delta-BHC
Chlordane
4,4'-DDT
4,4'-DDE
4,4'-DDD
Dieldrin
Alpha-Endosulfan
Beta-Endosulfan
Endosulfan Sulfate
Endrin
Endrin Aldehyde
Heptachlor
Heptachlor Epoxide
PCB-1242
PCB-1254
PCB-1221
PCB-1232
PCB-1248
PCB-1260
PCB-1016
Toxaphene

Metals, Cyanide, and Total Phenols

Total Recoverable Antimony
Total Recoverable Beryllium
Total Recoverable Thallium
Bromide
Color
Sulfite
Surfactants
Total Magnesium
Total Molybdenum
Total Tin
Total Titanium

Appendix B - Toxic Pollutants and Hazardous Substances

Toxic Pollutants

Asbestos

Hazardous Substances

Acetaldehyde
Allyl alcohol
Allyl chloride
Amyl acetate
Aniline
Benzonitrile
Benzyl chloride
Butyl acetate
Butylamine
Captan
Carbaryl
Carbofuran
Carbon disulfide
Chlorphyrifos
Coumaphos
Cresol
Crotonaldehyde
Cyclohexane
2,4-D (2,4-Dichlorophenoxy acetic acid)
Diazinon
Dicamba
Dichlobenil
Dichlone
2,2-Dichloropropionic acid
Dichlorvos
Diethyl amine
Dimethly amine
Dinitrobenzene
Diquat
Disulfoton
Diuron
Epichlorohydrin
Ethion
Ethylene diamine
Ethylene dibromide
Formaldehyde
Furfural
Guthion
Isoprene
Isopropanolamine dodecylbenzenesulfonate
Kelthane
Kepone
Malathion
Mercaptodimethur
Methoxychlor
Methyl mercaptan
Methyl methacrylate
Methyl parathion
Mevinphos
Mexacarbate
Monoethyl amine
Monomethyl amine
Naled
Naphthenic acid
Nitrotoluene
Parathion
Phenolsulfanate
Phosgene
Propargite
Propylene oxide
Pyrethrins
Quinoline
Resorcinol
Strontium
Strychnine
Styrene
2,4,5-T (2,4,5-Trichlorophenoxy acetic acid)

TDE (Tetrachlorodiphenyl ethane)
2,4,5-TP [2-(2,4,5-Trichlorophenoxy) propanoic acid]

Trichlorofan
Triethanolamine dodecylbenzenesulfonate
Triethylamine
Trimethylamine
Uranium
Vanadium
Vinyl acetate
Xylene
Xylenol
Zirconium

APPENDIX C - INDUSTRIES REQUIRED TO OBTAIN STORMWATER DISCHARGE PERMITS

The **Standard Industrial Classification (SIC) Code** or codes for the facility usually determines permit coverage. SIC Codes are assigned according to the primary activities performed by a company. They are often assigned for insurance purposes or when a business registers as a corporation. Industries can also determine their SIC Code by checking with their trade association, Chamber of Commerce, legal counsel, or library for the SIC Manual, or online at www.osha.gov/pls/imis/sic_manual.html.

The industries are listed here by their SIC Code. The manufacturing industries are generally represented by SIC Codes 20-39. (A two digit code, such as 42, means that **all** industries under that heading, from 4200 to 4299, are covered.) Use this table to determine which of the Division's general permits is appropriate for your facility.

SIC Code	Industry Type	Notes	Permit Type
10	Metal mining and milling, metal mining services	(a)	M
12	Coal mining, coal mining services	(a)	C, M
13	Oil and gas extraction, oil and gas services	(b)	A
14	Mining and quarrying of nonmetallic minerals except fuels (e.g., sand and gravel)	(a)	S
NA	Construction	(f)	N
20	Food and kindred products (except)	(g)	A
2011	Meat packing plants	(g)	B
2015	Poultry slaughtering and processing	(g)	B
2077	Animal and marine fats and oils	(g)	B
21	Tobacco products	(g)	A
22	Textile mills	(f) (g)	A
23	Apparel and other finished products made from fabric and similar material	(g)	A
24	Lumber and wood products except furniture (except)	(g)	A
2491	Wood preserving	(f) (g)	B
25	Furniture and fixtures	(g)	A
26	Paper and allied products	(g)	A
27	Printing, publishing, and allied products	(g)	A
28	Chemicals and allied products (except)	(f) (g)	B
283	Drugs	(f)(g)	B
285	Paints and allied products	(g)	B
29	Petroleum refining and related industries (except)	(f)	B
2951	Asphalt batch plants	(c)	A,N,S
30	Rubber and miscellaneous plastics products	(f) (g)	B
31	Leather Products (except)	(g)	A
311	Leather tanning and finishing	(f)	A
32	Stone, clay, glass and concrete products (except)	(g)	A
3241	Cement manufacturing	(f)	B
3273	Ready-mix concrete facilities	(c)	A,N,S
33	Primary metals industries	(f) (g)	B
34	Fabrication of metal products, except machinery and transportation equipment (except)	(g)	A
3441	Fabricated structural metal	(g)	A
35	Industrial and commercial machinery and computer equipment	(g)	A
36	Electronic and other electrical equipment and components, except computer equipment	(g)	A
37	Transportation equipment	(g)	A

APPENDIX C

SIC Code	Industry Type	Permit Notes	Type
38	Measuring, analyzing, and controlling instruments: photographic, medical, and optical goods, watches and clocks	(g)	A
39	Miscellaneous manufacturing industries	(g)	A
40	Railroad transportation	(d) (g)	A
41	Local and suburban transit and interurban highway passenger transportation	(d) (g)	A
42	Motor freight transportation and warehousing (except)	(d) (g)	A
4221	Farm Product warehousing and storage	(g)	A
4222	Refrigerated warehousing and storage	(g)	A
4225	General warehousing and storage	(g)	A
44	Water Transportation	(d) (g)	A
45	Transportation by Air	(d) (e) (g)	A,B
4911	Steam electric power generation (all fuel types)	(f) (g)	B
4952	Wastewater treatment plants with a design flow of 1.0 MGD or more, or required to have an approved pretreatment program under 40 CFR 403	(f) (g)	A
4953	Hazardous waste treatment, storage or disposal facilities; incinerators (including boilers and industrial furnaces) that burn hazardous waste; and active or inactive landfills, land application sites, or open dumps w/industrial waste and w/o stabilized final cover	(f) (g)	B
5015	Motor vehicle parts, used		R
5093	Scrap and waste materials		R
5171	Petroleum bulk stations and terminals	(d) (g)	A

Notes:

(a) For this SIC Code, a stormwater permit is required only if runoff contacts overburden, raw material, intermediate or finished product, or waste products.

(b) For this SIC Code (oil and gas facilities), a stormwater permit is essentially required only the facility has had a discharge of a reportable quantity. See Colorado Discharge Permit System Regulations, Section 61.4(3)(b)(i)(C).

(c) Facilities at sand and gravel operations may be covered under permit S; facilities at construction sites may be covered under permit N; other facilities, including mobile plants, may be covered under permit A.

(d) For this SIC Code, only facilities with vehicle maintenance (including fueling), equipment cleaning, or airport deicing need a stormwater permit.

(e) Airports that use 1000 gallons of deicer(s) or more annually (undiluted), and that have annual fuel sales of one million gal/year or more, are covered under permit B. Airports that do not meet these criteria need permit A.

(f) For most facilities covered by the stormwater regulations, SIC codes are used to indicate the **primary** function of the facility. This footnote denotes industries which, in most cases, are covered under the stormwater regulations regardless of what other activities are conducted at the site (contact Division for details).

(g) For this SIC Code, if **all** industrial activity, materials handling and storage at the facility are protected from precipitation, the facility may qualify for coverage under the No Exposure Exclusion. If that case, stormwater permit coverage would not be required. See http://www.cdphe.state.co.us/wq/PermitsUnit/stormwater/NoExposure.PDF

Permit types:

A: **Light Industry** General Permit (Permit No. COR-010000)
B: **Heavy Industry** General Permit (Permit No. COR-020000)
N: **Construction** General Permit (Permit No. COR-030000) (see Instructions, Item C.4)
M: **Metal Mining** General Permit (Permit No. COR-040000)
C: **Coal Mining** General Permit (Permit No. COG-850000)
S: **Sand and Gravel** General Permit (Permit No. COG-500000)
R: **Recycling Industry** General Permit (Permit No. COR-600000)

Appendix D -- GENERAL REQUIREMENTS FOR DISCHARGES TO GROUND WATER FROM IMPOUNDMENTS, LAND APPLICATION AND SEPTIC SYSTEMS >2000 GPD

(1) FACILITY MAPPING: See Site map information in this application.

(2) FACILITY SKETCH: See Sketch information in this application.

(3) SITE STUDIES/INFORMATION: Provide a copy of any studies, geological reports, consultant reports, water quality analyses pertinent to your facility/site which you feel may help the Division in the development your ground-water permit. Include such reports/studies that address such areas of interest as ground-water quality analyses that establish ambient (existing ground-water quality prior to your ownership of the property), all Material Safety Data Sheets (MSDS) for each chemical used at your facility (an example MSDS is available from the Ground Water Unit), well driller's logs and pumping information of the local aquifer, any computer modelling results that have been performed for the immediate area, U. S. Geological Survey (USGS) reports for the area, etc.

(4) GEOLOGY/HYDROGEOLOGY OF SITE: (a) Describe the local geology of the site. Identify and describe all lithologic units from the ground surface to the first impermeable stratigraphic unit. Provide the estimated thickness of each unit. Include a geologic map or cross sections, if necessary. Maps will be on 8.5 X 11 paper.

(b) Describe the hydrogeology of the site. Describe in detail the relationship of this site to any alluvial or bedrock water bearing formations (unconfined, confined, or perched) and surface water (lakes, ponds, ditches or streams). Identify aquifer name or formation name for each water bearing formation and provide the depth to water (include water elevation) for each. Describe any unusual geologic or hydrologic features that could affect ground water rate of movement or direction of movement (i.e. faults, fractures).

(c) Describe aquifer characteristics (transmissivity or permeability, porosity and storage capacity) of these water bearing formations. State the source(s) of this information.

(d) Provide potentiometric surface (ground water level) map(s) of the water bearing formations. Document information source(s), if obtained from published data. If water levels are contoured from site data, control points must be annotated with water table elevation and time period of measurements indicated in legend. Map must be legible and no larger than 11 X 17 inches paper.

(e) Discuss any hydrogeologic investigations or ground-water modeling conducted at this site.

(5) Water Quality Sampling Requirements The Discharge Regulations have specific requirements [61.4. (7)] for effluent characterization. These requirements are listed below. In addition, the Division is requiring a ground water quality characterization, which is found in paragraph (a), below.

(a) Each applicant must submit (i) a description of the ground water in the sample prior to filtration [i.e. clear, murky, cloudy, etc.] (ii) the below listed analytical data used to document (A) ambient ground water near the impoundment, land application and/or leach field, and (B) the upgradient ground-water quality; (iii) indicate the sample location (well # and depth) and, how sample was obtained; (iv) have the analytical laboratory indicate the method used and the detection limits of the method:

Total Coliforms
Biochemical Oxygen Demand (BOD)
Chemical Oxygen Demand (COD)
Total Organic Carbon (TOC)
Total Suspended Solids (TSS)
Total Ammonia as N
Temperature
pH
Nitrate as N

(CONTINUED ON NEXT PAGE)

CHARACTERIZATION OF GROUND WATER
(Measured as dissolved concentration)

Sodium (Na)	Chloride (Cl)
Calcium (Ca)	Bicarbonate (HCO_3)
Magnesium (Mg)	Sulfate (SO_4)
Potassium (K)	Carbonate (CO_3)
Iron (Fe)	Total Dissolved Solids

(b) Each applicant must sample, analyze and report to the Division any of the below listed pollutants he/she knows or has reason to believe may be present in the ground water below his/her property:

(i) TABLE III OF APPENDIX D, PART 122,TITLE 40 OF THE CODE OF FEDERAL REGULATIONS; OTHER TOXIC POLLUTANTS (METALS AND CYANIDE) AND TOTAL PHENOLS (UNLESS INDICATED OTHERWISE, ANLYZE THE FOLLOWING FOR THE DISSOLVED CONCENTRATION):

ANTIMONY	ARSENIC
BERYLLIUM	CADMIUM
CHROMIUM**	COPPER
LEAD	MERCURY
NICKEL	SELENIUM
SILVER	THALLIUM
ZINC	CYANIDE, WEAK ACID DISSOCIABLE
TOTAL PHENOLS	

** = If the dissolved concentration for chromium exceeds 0.1 mg/l, then an additional analysis for hexavalent chromium shall be performed

(ii) TABLE II OF APPENDIX D, PART 122, TITLE 40 OF THE CODE OF FEDERAL REGULATIONS; ORGANIC TOXIC POLLUTANTS IN EACH OF THE FOUR FRACTIONS IN ANALYSIS BY GAS CHROMATOGRAPHY/MASS SPECTROSCOPY (GC/MS)--CONSIDER ALL POLLUTANTS LISTED FOR EACH FRACTION INDICATED FOR YOUR INDUSTRY, AS INDICATED IN THE CHART ON PAGE 4 OF THIS APPLICATION:

The list of organic toxic pollutants in each of four fractions -"Volatiles, Base/Neutral, Acid and Pesticides" - is found in "Appendix A - Priority Pollutants". Measure the dissolved concentration for each of the parameters listed that you know or believe will be present at your facility.

(iii) TABLE V OF APPENDIX D, PART 122, TITLE 40 OF THE CODE OF FEDERAL REGULATIONS; TOXIC POLLUTANTS AND HAZARDOUS SUBSTANCES.

The list of toxic pollutants and hazardous substances is found in "Appendix B", above. Measure the dissolved concentration for each of the parameters listed that you know or believe will be present at your facility.

(c) Each applicant is required to report that 2,3,7,8 Tetrachlorobenzo-P-Dioxin (TCDD) may be in the ground water based upon whether he/she uses or manufactures one of the below listed compounds or whether he/she knows or has reason to believe that TCDD will or may be present in the soil or ground water.

(i) 2,4,5-trichlorophenoxy acetic acid (2,4,5-T) (CAS #93-76-5);
(ii) 2-(2,4,5-trichlorophenoxy) propanoic acid (Silvex, 2,4,5-TP) (CAS #93-72-1);
(iii) 2-(2,4,5-trichlorophenoxy) ethyl 2,2-dichloropropionate (Erbon) (CAS #136-25-4);
(iv) 0,0-dimethyl 0-(2,4,5-trichlorophenyl) phosphorothioate (Ronnel) (CAS #299-84-3);
(v) 2,4,5-trichlorophenol (TCP) (CAS #95-95-4); or
(vi) Hexachlorophene (HCP) (CAS #70-30-4).

APPENDIX E-1- IMPOUNDMENTS

SPECIFIC REQUIREMENTS FOR IMPOUNDMENTS

COMPLETE THIS PORTION OF THE APPLICATION FOR EACH IMPOUNDMENT AT YOUR FACILITY

1) CHECK ANY OF THE FOLLOWING THAT PERTAIN TO THIS FACILITY:

☐ _____(a)The impoundment(s) at this facility is(are) subject to regulation under the Uranium Mill Tailings Radiation Control Act.

☐ _____(b) The impoundment(s) at this facility is(are) used in the treatment, storage or recharge of raw or potable water.

☐ _____(c)The impoundment(s) at this facility is(are) used only for storm water retention or detention. Provide a copy of the Stormwater permit with this application, if applicable.

☐ _____(d) The impoundment currently has a valid certificate of designation [C.D.] (pursuant to the Solid Waste Disposal and Facilities Act, CRS 1973 30-20-101 et seq. as amended). Provide a copy of the C.D. with this application.

✓ _____(e) This facility has an Underground Injection Control Permit or Authorization by Rule (Safe Drinking Water Act, 42 USC 300f, et seq.). Provide a copy of the permit or authorization by rule.

✓ _____(f) This facility has an impoundment which is subject to the jurisdiction of one of the following State agencies:

_____(i) Minerals and Geology Division (formerly Mined Land Reclamation)

_(ii) State Engineer's Office

_X_(iii) Oil and Gas Conservation Commission

_____(iv) Hazardous Materials and Waste Management Division

If you checked any of the above State agencies, please provide, on a separate sheet of paper, the contact person's name and telephone number and all pertinent identification for your facility, as provided to you by the State agency.

☐ _____ (g) This facility is subject to regulation under the "Confined Animal Feeding Operation Control Regulation", 4.8.0.

IF THE ONLY IMPOUNDMENT(S) AT THIS SITE IS (ARE) ONE (OR MORE) OF THE ABOVE AND LAND APPLICATION AND/OR SEPTIC SYSTEM ARE/IS NOT APPLICABLE, REFER TO "31" IN THIS APPLICATION.

2) Provide detailed plan and side view sketches of impoundment, include liner thickness (if lined) and depth to ground water.

3) Provide technical information on liner type, materials used in construction, thickness and installation.

4) Provide results of "in situ" permeability testing of the clay liner or the expected permeability of a synthetic liner for the bottom and sides of the impoundment.

APPENDIX E-2 - LAND APPLICATION

SPECIFIC REQUIREMENTS FOR LAND APPLICATION

COMPLETE THIS PORTION OF THE APPLICATION ON SEPARATE SHEETS OF PAPER AND ATTACH THEM TO THE APPLICATION AS APPENDIX E-2

(1) Analytical data used to document ambient ground-water quality should be submitted for the following parameters (Unless otherwise indicated, determine the dissolved concentration of each of the following):

Aluminum	Beryllium	Arsenic	Silver
Boron	Cobalt	Barium	Cadmium
Copper	Lithium	Chromium	Cyanide (Weak Acid Dissociable)
Nickel	Vanadium	Fluoride	Lead
		Mercury	Zinc
		Nitrite	Selenium
		Manganese	Color
		Copper	Corrosivity
		Foaming Agents	Odor
		Gross Alpha (excl. Radon/Uranium)	
		Beta and Photon Emitters	

(2) Provide a description of the A and B soil horizons mapped at this site by the U. S. Soil Conservation Service.

(3) Describe the existing vegetative cover at the site. Include plans for any proposed disturbance or planting.

(4) Does this land application plan use the root zone for attenuation of effluent components? If so, explain in detail. Include a report of the vadose zone modelling, if performed.

(5) Provide all information pertaining to precipitation, evapotranspiration, and infiltration for this site (supplemental irrigation, solar and wind evaporation, plant uptake, infiltration tests).

(6) Describe the proposed rate and schedule of application and its expected effects on ground water levels.

(7) The following parameters should be determined from soil samples taken at one foot intervals to a depth of five feet. It is preferred that these soil samples be collected in the spring. These results are to be provided to the Division, when they are available (Parameters are to be measured as Total concentrations (using the AB-DPTA extraction--Contact Jim Self at the CSU Soil Laboratory), as appropriate).

aluminum	copper	nitrate residuals	zinc
iron	nickel	ammonia residuals	
arsenic	lead	phosphorous	
cadmium	mercury	potassium	
chromium	molybdenum	selenium	

(8) Describe the effluent storage capacity during inclement weather and/or frozen ground.

APPENDIX E-3 - SEPTIC SYSTEMS GREATER THAN 2000 GALLONS PER DAY (GPD)

SPECIFIC REQUIREMENTS FOR SEPTIC SYSTEM >2000 GPD

FACILITY WASTESTREAM

DOMESTIC WASTE ☐ **Yes** ☐ **No**

INDUSTRIAL WASTE ☐ **Yes** ☐ **No**

Indicate "Facility Type" and indicate, below, the Design Capacity of the septic system plus whether the facility also has Impoundment(s) or Land Application associated with it.

Suggested "Facility Type"
Industrial/Domestic Wastewater: (a) Business; (b) Ski Area; (c) Campground/R.V. Park; (d) Motel/Hotel/Dude Ranch; (e) Community System; (f) School; (g) Church; (h) Hardrock Mining/Milling / Placer Mining / Coal Mining; (i) Sand and Gravel Production; (j) Construction Dewatering; (k) Ground Water Cleanup of Gasoline/Diesel

FACILITY TYPE _____

SEPTIC SYSTEM DESIGN CAPACITY = _____gpd

Circle the appropriate components of the septic system:

TWO STAGE SYSTEM:

FIRST STAGE	*(a) SEPTIC TANK*	
	(b) AERATION SYSTEM	
SECOND STAGE	*(a) BED*	*(1) PIPE & GRAVEL*
		(2) GRAVELLESS CHAMBERS
	(b) TRENCH	*(3) GRAVELLESS PIPE*

THREE STAGE SYSTEM:

FIRST STAGE	*(a) SEPTIC TANK*	
	(b) AERATION SYSTEM	
SECOND STAGE	*SAND FILTER*	
THIRD STAGE	*(a) BED*	*(1) PIPE & GRAVEL*
		(2) GRAVELLESS CHAMBERS
	(b) TRENCH	*(3) GRAVELLESS PIPE*

IMPOUNDMENT *No* *Yes* *# of Impoundments*_____
LENGTH and WIDTH of each pond at water surface L_1_____*ft* W_1 _____*ft*

DEPTH of each pond D_1 _____*ft; HORIZONTAL SLOPE of sides of pond* ____:____
(Attach extra sheets of paper as required.)

LAND APPLICATION *No* *Yes* *Type*_____

If the response is "Yes" to either the impoundment or land application question, please refer to E-1 OR E-2, RESPECTIVELY.

APPENDIX F

ENVIRONMENTAL PERMIT INFORMATION

TYPES OF PERMITS AVAILABLE FOR FACILITIES:

1. USEPA UNDERGROUND INJECTION CONTROL PERMIT;

2. COLORADO DEPARTMENT OF HEALTH STORMWATER PERMIT;

3. COLORADO DEPARTMENT OF HEALTH AIR POLLUTION EMISSION PERMIT;

4. COLORADO DIVISION OF MINERALS AND GEOLOGY PERMIT;
   (Please include the mined land reclamation board permit anniversary date.)

5. RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
   I. RCRA SUBTITLE C HAZARDOUS WASTE:
      i) PROVIDE YOUR RCRA EPA ID NUMBER;
      ii) PROVIDE YOUR STATE RCRA PERMIT NUMBER;
      iii) DO YOU NOW HAVE OR HAVE YOU IN THE PAST HAD INTERIM STATUS?

   II. RCRA SUBTITLE D SOLID WASTE:
      i) HAS A CERTIFICATE OF DESIGNATION (CD) FOR SOLID WASTE DISPOSAL BEEN ISSUED FOR THIS SITE?
      ii) ARE YOU DISPOSING OF YOUR OWN WASTE ON YOUR OWN PROPERTY?
      iii) DO YOU HAVE AN APPLICATION FOR A CD PENDING?
      iv) IF THIS FACILITY IS A MINING OPERATION, ARE YOU DISPOSING OF MINE WASTE ON YOUR OWN PROPERTY?
      v) HAVE YOU DONE ANY RECYCLING AT THIS SITE?
      vi) IS THERE BENEFICIAL USE OR DISPOSAL OF BIOSOLIDS OR SEPTAGE AT THIS PROPERTY?
      vii) IS YOUR PROPERTY USED AS A TRANSFER STATION?

   III. RCRA SUBTITLE I UNDERGROUND STORAGE TANKS
      i) ARE THERE EITHER ABOVE GROUND OR BELOW GROUND TANKS ON THIS PROPERTY?
      ii) HAS THERE BEEN A RELEASE FROM THE TANK SYSTEM?--IF YES, THEN RESPOND TO "iii)".
      iii) HAS ASSESSMENT WORK BEEN PERFORMED?--IF YES, THEN RESPOND TO "iv)".
      iv) HAS A CORRECTIVE ACTION PLAN BEEN APPROVED OR PERFORMED?

6. URANIUM MILLS TAILINGS REMEDIAL ACTION PROGRAM (UMTRAP):
   IS THERE A REMEDIAL ACTION PLAN PENDING OR IN PLACE AT THIS PROPERTY?
      i) IS THERE A SURFACE DISCHARGE PERMIT?
      ii) IS THERE AN AIR EMISSSIONS PERMIT?

7. COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT (CERCLA):

   IS THIS PROPERTY LISTED AS A SUPER FUND SITE?

APPENDIX G
LOCAL RESOURCES OF INFORMATION

U.S. Geological Survey Library — Telephone: 303/236-1000
Building 20
Denver Federal Center *

U.S. Geological Survey Map Sales — Telephone: 303/236-7476
Building 810
Denver Federal Center *

* Located in Lakewood between Sixth Avenue and Alameda Boulevard, Kipling Street and Union Boulevard

Office of the Colorado State Engineer — Telephone: 303/866-3581
1313 Sherman Street
Room 818
Denver, Colorado

Soil Survey Maps are located at:
Soil Conservation Service — Telephone: 303/236-2897
655 Parfet Street
Room E 200 C
Lakewood, Colorado 80215-5517

US EPA Region VIII — Telephone: 303/293-1430
Mr. Chet Pauls
Underground Injection Control Program
999 18th St.
Suite 500
Denver, Colorado 80202-2466

Air Pollution Control Division — Telephone: 303/692-3100
Hazardous Materials and Waste Management Division — Telephone: 303/692-3300
Radiation Control Division — Telephone: 303/692-3030
Colorado Department of Health and Environment
4300 Cherry Creek Drive South
Denver, Colorado 80222-1530

Laboratory Division at the — Telephone: 303/691-4700
Colorado Department of Health and Environment
4210 East 11th Avenue
Denver, Colorado 80220

APPLICATION GENERAL INFORMATION AND INSTRUCTIONS

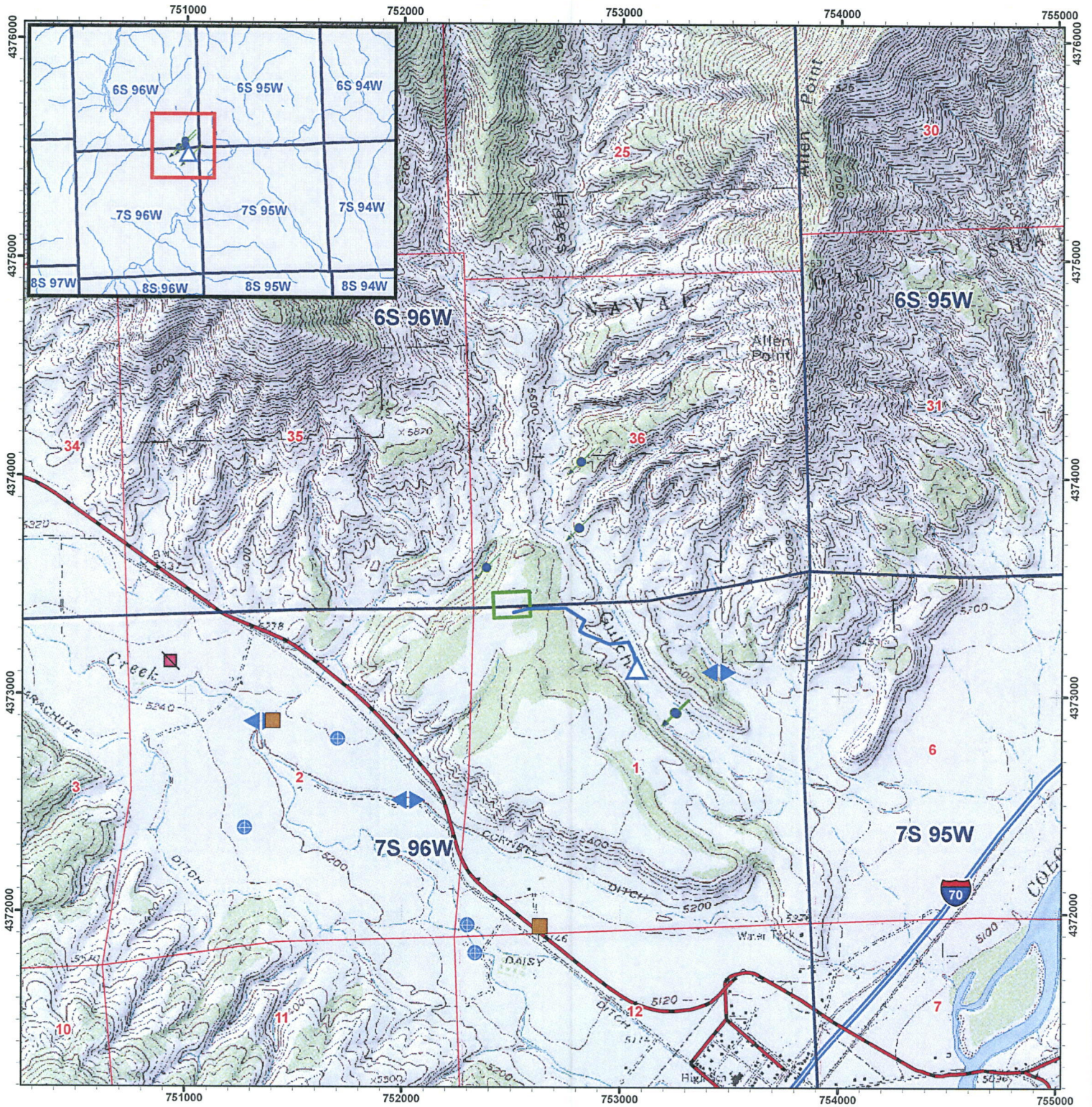
This application is for use by all industrial **process water dischargers to surface water, ground water or stormwater dischargers**. Discharges to ground water may occur from impoundments that are either non-discharging to surface water or discharging to surface water, land application and septic systems, whose design capacity is greater than 2000 gallons per day. The Division has industry specific permits for construction dewatering, gasoline clean up sites, water treatment plants, hardrock mining, coal mining, non-metallic metals mining and placer mining along with several for stormwater only discharges. If the facility falls under one of these activities, please contact the Division for the appropriate application. This form may be reproduced. For information on electronic copies, please contact the Permits and Enforcement Section at 692-3590.

WATER RIGHTS

The State Engineers Office (SEO) has indicated that any discharge that does not return water directly to surface waters (i.e. land application, rapid infiltration basins, etc.) has the potential for material injury to a water right. As a result, the SEO needs to determine that material injury to a water right will not occur from such activities. To make this judgement, the SEO requests that a copy of all documentation demonstrating that the requirements of Colorado water law have been met, be submitted to their office for review. The submittal should be made as soon as possible to the following address:

Colorado Division of Water Resources
1313 Sherman St. Rm 818
Denver, Colorado 80203

Should there be any questions on the issue of water rights, the SEO can be contacted at (303) 866-3581. It is important to understand that any CDPS permit issued by the Division **does not constitute a water right. Issuance of a CDPS permit does not negate the need to also have the necessary water rights in place.** It is also important to understand that even if the activity has an existing CDPS permit, this is no guarantee that the proper water rights are in place.



WPXENERGY

Parachute Treatment Facility General Wastewater Discharge Permit Location Map

December, 2012

Explanation

- Discharge Point - Proposed
- Monitor Well
- Domestic Water Well
- Commercial Water Well
- Ditch Diversion
- Injection Well
- Waterline - Proposed
- Facility Boundary

N

0 0.25 0.5

Miles

1:24,000

InterTech E&E, LLC
bbergstrom@cbmainc.com

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WPXENERGY

Parachute Treatment Facility General Wastewater Discharge Permit Site Sketch

December 2012

Explanation

- Waterline - Proposed
- Facility Boundary

N

0 200 400

Feet

1:4,000

InterTech

InterTech E&E, LLC
bbergstrom@cbmainc.com
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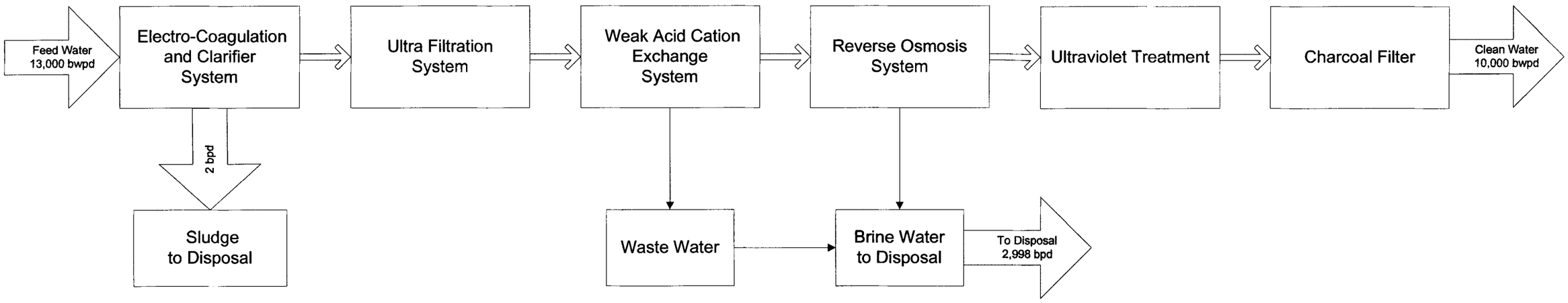

Water Balance			
Water Feed	13,000 bwpd		
Clean Water		10,000	bwpd
Brine Water		2,998	bwpd
Sludge		2	bpd

WPX Energy
Parachute

RO Basic Process Flow and Water Balance

11/4/2012

Material Safety Data Sheet

Revision Issued: 2/23/2012 Supercedes: 11/30/2009 First Issued: 12/12/1986

Section I - Chemical Product And Company Identification

Product Name: Sodium Hydroxide 10-50% Liquid

CAS Number: 1310-73-2 HBCC MSDS No. CC12000

HILL BROTHERS Chemical Co.
1675 NORTH MAIN STREET • ORANGE, CALIFORNIA 92867-3499
(714) 998-8800 • FAX: (714) 998-6310
http://hillbrothers.com

1675 No. Main Street, Orange, California 92867
Telephone No: 714-998-8800 | Outside Calif: 800-821-7234
Chemtrec: 800-424-9300

Section II - Composition/Information On Ingredients

			Exposure Limits (TWAs) in Air		
Chemical Name	CAS Number	%	ACGIH TLV	OSHA PEL	STEL
Sodium Hydroxide	1310-73-2	10-50	2 mg/m³	2 mg/m³	N/A

Section III - Hazard Identification

Routes of Exposure: Sodium hydroxide can affect the body if it is inhaled or if it comes in contact with the eyes or skin. It can also affect the body if it is swallowed.

Summary of Acute Health Hazards

Ingestion: Corrosive! Swallowing sodium hydroxide may cause severe burns of the mouth, throat, esophagus, and stomach. Death may result. Severe scarring of the throat may occur on recovery after swallowing sodium hydroxide. Symptoms may include sneezing, bleeding, vomiting, diarrhea, fall in blood pressure. Damage may appear days after exposure. An increased number of esophageal cancer cases have been reported to occur in individuals who have scarring of the esophagus from swallowing sodium hydroxide.

Inhalation: Severe Irritant. Effects from inhalation of the dusts, mists, or spray will vary from mild irritation to destructive burns depending on the severity of exposure. Symptoms may include sneezing, sore throat or runny nose. Severe pneumonitis may occur.

Skin: Corrosive! Contact of the skin may cause skin irritation and, with greater exposure, severe burns with scarring.

Eyes: Corrosive! Sodium hydroxide is destructive to eye tissues on contact, will cause severe burns that result in damage to the eyes and even blindness. Contact lenses should not be worn when working with this chemical.

Summary of Chronic Health Hazards: The chronic local effect may consist of multiple areas of superficial destruction of the skin or of primary irritant dermatitis. Similarly, inhalation of dust, spray, or mist may result in varying degrees of irritation or damage to the respiratory tract tissues and an increased susceptibility to respiratory illness. Effects may be delayed.

Signs and Symptoms of Exposure: A physician should be contacted if anyone

develops any signs or symptoms and suspects that they are caused by exposure to sodium hydroxide.

Effects of Overexposure: Sodium hydroxide is a strong alkali and is corrosive to any tissue with which it comes in contact.

Medical Conditions Generally Aggravated by Exposure: Sodium hydroxide is a respiratory irritant. Persons with pre-existing skin disorders or eye problems or impaired pulmonary function may be at increased risk from exposure, and should have limited exposure to this material.

Note to Physicians: Perform endoscopy in all cases of suspected sodium hydroxide ingestion. In cases of severe esophageal corrosion, the uses of therapeutic doses of steroids should be considered. General supportive measures with continual monitoring of gas exchange, acid-base balance, electrolytes, and fluid intake are also required.

Section IV - First Aid Measures

Ingestion: Do Not Induce Vomiting. If the person is conscious, give him large quantities of water immediately to dilute the sodium hydroxide. Do not attempt to make the exposed person vomit. DO NOT INDUCE VOMITING! GET MEDICAL ATTENTION IMMEDIATELY.

Inhalation: Move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. If breathing is difficult, give oxygen. Keep the affected person warm and at rest. GET MEDICAL ATTENTION IMMEDIATELY.

Skin: Immediately flush contaminated skin with water. If large areas of the body are contaminated or if clothing is penetrated, immediately use safety shower, removing clothing while under the shower. Flush exposed areas with large amounts of water for at least 15 minutes. GET MEDICAL ATTENTION IMMEDIATELY. Wash clothing before reuse.

Eyes: Immediately flush eyes with a directed stream of water for at least 15 minutes. Forcibly hold eyelids apart to ensure complete irrigation of all eye and lid tissue. Washing eyes within 1 minute is essential to achieve maximum effectiveness. GET MEDICAL ATTENTION IMMEDIATELY. Contact lenses should not be worn when working with this chemical.

Section V - Fire Fighting Measures

Flash Point: Not combustible **Autoignition Temperature:** Not combustible

Lower Explosive Limit: N/A **Upper Explosive Limit:** N/A

Unusual Fire and Explosion Hazards: Not combustible but solid form in contact with moisture or water may generate sufficient heat to ignite combustible materials. Contact with some metals can generate hydrogen gas. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Vapors may be heavier than air.

Extinguishing Media: Foam, carbon dioxide, or dry chemicals may be used where this product is stored. Adding water to caustic solution generates large amounts of heat. Do NOT get water inside containers.

Special Firefighting Procedures: This product is not combustible. Full protective clothing and self-contained breathing apparatus should be worn in areas where product is stored.

Section VI - Accidental Release Measures

Leaks should be stopped. Spills should be contained and cleaned up immediately. Spills should be removed by using a vacuum truck. Neutralize remaining traces of material with any dilute inorganic acid such as hydrochloric, sulfuric, nitric, phosphoric, or acetic acid. The spill area should then be flushed with water, followed by liberal covering of sodium bicarbonate. All clean-up material should be removed and placed in approved containers, labeled and stored in a safe place to await proper treatment or disposal. Spills on areas other than pavement (dirt or sand) may be handled by removing the affected soils and placing in approved containers. Avoid runoff into storm sewers and ditches which lead to waterways. Persons not wearing protective equipment and clothing should be restricted from areas of spills until cleanup has been completed.

Section VII - Handling and Storage

Prevent possible eye and skin contact by wearing protective clothing and equipment. Storage tanks must be vented and diked. Store drums of sodium hydroxide separate from acids, metals and explosives. Provide adequate drainage. When diluting, use agitation and add concentrated sodium hydroxide to water at a controlled rate to control heat of dilution and to avoid splattering. Do not add water to sodium hydroxide. Do not store with aluminum or magnesium. Store above 60°F (16°C) to prevent freezing.

Other Precautions: Sodium hydroxide reacts with reducing sugars such as fructose, lactose, maltose, galactose, levulose, and arabinose to form carbon monoxide. While the potential for worker exposure to carbon monoxide may be small, a potential does exist during cleaning of certain dairy and possibly other industry equipment. Carbon monoxide gas can form upon contact with food and beverage products in enclosed spaces and can cause death. Follow appropriate tank entry procedures.

Special Mixing and Handling Instructions: Considerable heat is generated when water is added to sodium hydroxide; therefore, when making solutions always add the sodium hydroxide to the water with constant stirring. The water should always be lukewarm (80° - 100° F). Never start with hot or cold water. If sodium hydroxide becomes concentrated in one area, or if added too rapidly, or if added to hot or cold water, a rapid temperature increase can result in dangerous boiling and/or spattering or may cause an immediate violent eruption.

Section VIII - Exposure Controls/Personal Protection

Respiratory Protection: Good industrial hygiene practices recommend that engineering controls be used to reduce environmental concentrations to the permissible exposure level. However, there are some exceptions where respirators may be used to control exposure. Respirators may be used when engineering and work practice controls are not technically feasible, when such controls are in the process of being installed, or when they fail and need to be supplemented. If the use of respirators is necessary, the only respirators permitted are those that have been approved by the Mine Safety and Health Administration or by the National Institute for Occupational Safety and Health.

Ventilation: Ventilation is not usually required for sodium hydroxide solutions. Avoid creation of mist or spray. If present wear appropriate safety clothing and provide local exhaust systems. Where carbon monoxide may be generated, special ventilation may be required.

Protective Clothing: Employees should be provided with and required to use impervious clothing, gloves, face shield (eight-inch minimum), and other appropriate protective clothing necessary to prevent any possibility of skin contact with solutions

of sodium hydroxide. Materials suggested for use are natural rubber, butyl rubber, neoprene, or vinyl.

Eye Protection: Employees should be provided with and required to use dust- and splash-proof safety goggles where there is any possibility of sodium hydroxide contacting the eyes. Contact lenses should not be worn when working with this chemical.

Other Protective Clothing or Equipment: Eyewash stations and safety showers must be available in the immediate work area for emergency use.

Work/Hygienic Practices: Avoid contact with the skin and avoid breathing dust or mist. Do not eat, drink, or smoke in work area. Wash hands before eating, drinking, or using toilet facilities. Do NOT place food, coffee or other drinks in the area where dusting or splashing of solutions is possible.

Section IX - Physical and Chemical Properties

Physical State: Liquid **pH:** 14.0

% of Solution	10%	25%	30%	33%	36%	50%
Boiling Point(°F):	217	234	242	245	253	288

Melting Point/Range: -10°C to 12°C **Molecular Weight:** 40.00 (dry basis)

Appearance/Color/Odor: Clear to slightly gray liquid with no odor

Solubility in Water: Complete **Vapor Pressure(mmHg):** 1.5 to 1.6 @ 20°C; 68°F

% of Solution	10%	25%	30%	33%	36%	50%
Specific Gravity(Water=1)@20°C:	1.109	1.252	1.328	1.363	1.397	1.525

% of Solution	10	25	30	33	36	50
% Volatiles	90	75	70	67	64	50

Vapor Density(Air=1): N/A

% of Solution	10%	25%	30%	33%	36%	50%
Freezing Point (°F):	10	-13.9	36	44	58	54

How to detect this compound: Sampling and analyses may be performed by collection of sodium hydroxide in a glass bubbler containing hydrochloric acid, followed by subsequent titration. Also, detector tubes certified by NIOSH under 42 CFR Part 84 or other direct-reading devices calibrated to measure sodium hydroxide may be used.

Section X - Stability and Reactivity

Stability: Stable **Hazardous Polymerization:** Will not occur

Conditions to Avoid: Overheating in storage accelerates corrosion.

Materials to Avoid: Contact with water, acids, flammable liquids, and organic halogen compounds, especially trichloroethylene, may cause fires and explosions. Contact with metals such as aluminum, tin, and zinc and alloys containing these metals cause formation of flammable hydrogen gas. Contact with nitromethane and other similar nitro compounds cause formation of shock-sensitive salts. Contact with water releases heat which can result in boiling and splattering. Sodium hydroxide, even in fairly dilute solution, reacts readily with various sugars to produce carbon

monoxide.

Hazardous Decomposition Products: None

Section XI - Toxicological Information

Sodium hydroxide is a strong alkali; the mist, dust and solutions cause severe injury to the eyes, mucous membranes, and skin. Although inhalation is usually of secondary importance in industrial exposures, the effects from the dust or mist will vary from mild irritation of the nose at 2 mg/m³ to severe pneumonitis, depending on the severity of exposure. The greatest industrial hazard is rapid tissue destruction of eyes or skin upon contact with either the solid or with concentrated solutions. Contact with the eyes causes disintegration and sloughing of conjunctival and corneal epithelium, corneal opacification, marked edema, and ulceration; after 7 to 13 days either gradual recovery begins, or there is progression of ulceration and corneal opacification. Complications of severe eye burns are symblepharon (adhesion of the lid to the eyeball) with overgrowth of the cornea by a vascularized membrane, progressive or recurrent corneal ulceration, and permanent corneal opacification. On the skin, solutions of 25 to 50% cause the sensation of irritation within about 3 minutes; with solutions of 4%, this does not occur until after several hours. If not removed from the skin, severe burns with deep ulceration will occur; exposure to the dust or mist may cause multiple small burns, with temporary loss of hair. Ingestion produces severe pain in the esophagus and stomach, corrosion of the lips, mouth, tongue, and pharynx and the vomiting of large pieces of mucosa; cases of squamous cell carcinoma of the esophagus have occurred with latent periods of 12 to 42 years after ingestion; these cancers may have been sequelae of tissue destruction and possibly scar formation rather than from a direct carcinogenic action of sodium hydroxide itself. Sodium hydroxide: irritation data: skin, rabbit: 500 mg/24H; severe; eye rabbit: 50 ug/24H severe. Investigated as a mutagen.

Section XII - Ecological Information

N/A

Section XIII - Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste facility. Although not a listed RCRA hazardous waste, this material may exhibit one or more characteristics of a hazardous waste and require appropriate analysis to determine specific disposal requirements. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements. Do not flush to sewer.

Section XIV - Transport Information

DOT Proper Shipping Name: Sodium Hydroxide, Solution
DOT Hazard Class/ I.D. No.: 8, UN1824, II

Section XV - Regulatory Information

Reportable Quantity: 1000 Pounds (454 Kilograms)
NIOSH: 10 mg/m³ IDLH
NFPA Rating: Health - 3; Flammability - 0; Instability - 1
0=Insignificant 1=Slight 2=Moderate 3=High 4=Extreme
Carcinogenicity Lists: No **NTP:** No **IARC Monograph:** No **OSHA Regulated:** Yes

Maximum use level for Sodium Hydroxide under NSF/ANSI Standard 60

25% Liquid Caustic Soda	Maximum use	200 mg/L
30% Liquid Caustic Soda	Maximum use	167 mg/L
33% Liquid Caustic Soda	Maximum use	152 mg/L
50% Liquid Caustic Soda	Maximum use	100 mg/L

Section XVI - Other Information

Synonyms/Common Names: Sodium Hydroxide; Soda Lye; Lye; Caustic Soda
Chemical Family/Type: Alkali
Change Since Last Revision: Sections: XV

IMPORTANT! Read this MSDS before use or disposal of this product. Pass along the information to employees and any other persons who could be exposed to the product to be sure that they are aware of the information before use or other exposure. This MSDS has been prepared according to the OSHA Hazard Communication Standard [29 CFR 1910.1200]. The MSDS information is based on sources believed to be reliable. However, since data, safety standards, and government regulations are subject to change and the conditions of handling and use, or misuse are beyond our control, **Hill Brothers Chemical Company** makes no warranty, either expressed or implied, with respect to the completeness or continuing accuracy of the information contained herein and disclaims all liability for reliance thereon. Also, additional information may be necessary or helpful for specific conditions and circumstances of use. It is the user's responsibility to determine the suitability of this product and to evaluate risks prior to use, and then to exercise appropriate precautions for protection of employees and others.

PROFESSIONAL WATER TECHNOLOGIES, Inc.
High-Performance Reverse Osmosis Chemicals

1048 La Mirada Court, Vista, CA 92081
ph: (760)639-4400, (800)914-9072, fax: (760)639-4439
Internet: http://www.PWTInc.com, E-mail: Support@PWTInc.com

MSDS

Material Safety Data Sheet
November 7, 2007

Section 01: Chemical Product Identification

Domestic Trade Name: *SpectraGuard™*
Export Trade Name: *SpectraGuard™*
Chemical Type: *Water Soluble Polymer*

Section 02: Information on Hazardous Ingredients

Non-Hazardous Ingredients

Section 03: Hazards Identification

Health Hazards:

Primary Route of Exposure: Skin contact, eye contact, and inhalation
Inhalation: Exposure to spray may cause irritation to the mucous membranes and respiratory system
Skin Contact: Exposure to skin can cause irritation
Eye contact: Material can cause irritation to eyes
Ingestion: Material is not harmful if accidentally ingested

Medical Conditions Aggravated by Exposure: None known

Section 04: First Aid Measures

First Aid For Ingestion: If swallowed give 2 glasses of water to drink. Seek medical attention immediately. Never give anything by mouth to an unconscious person.
First Aid Inhalation: Remove to Fresh Air. In case of shortness of breath call a physician immediately.
First Aid Eye Contact: Immediately flush eyes with plenty of water for at least 15 minutes. Seek medial attention immediately.
First Aid Skin Contact: Wash exposed area with soap and water immediately. Remove and wash contaminated clothing.

Section 05: Fire Fighting Measures

Autoignition Temp: N/A
Flammable Limits: LEL (Lower Explosive Limits) – Not applicable
Flammable Limits: UEL (Upper Explosive Limits) – Not applicable
Flash Point: Not applicable
Fire Fighting Media: Use media appropriate to primary cause of fire
Special Fire Fighting Procedures: None known
Fire/Explosion Hazards: None known
Special Procedures: Use water spray to cool containers exposed to fire. Minimize exposure. Do not breathe fumes. Contain run-off.

Section 06: Accidental Release Measures

Spill/Leak Clean-Up Procedures: If possible neutralize with alkaline soap.

Land Spill: Wearing recommended protective clothing and equipment, dike spill with soil, sand, or compatible commercial absorbent. Remove remaining liquid with a pump, vacuum truck, or absorb liquid in sand or commercial absorbent. Place waste in approved containers for disposal. Dispose waste according to Federal, State, and local regulations.

Water Spill: Wear protective clothing and equipment. Stop flow. Dike contaminated water and remove for disposal and/or treatment. Notify proper authorities and all downstream users if possible. Dispose of with Solid Waste according to Federal, State, and Local Regulations.

***CAUTION:** Floor will be Slippery

Personal protection:

Wear a NIOSH approved (or equivalent) respirator (with an organic/acid gas cartridge and a dust filter) during spill clean up and deactivation of the material. Protective clothing including chemical splash goggles, Latex, nitrile, or buytl rubber full-length gloves, rubber apron made of nitrile or buytl rubber, and rubber overshoes must be worn during spill clean-ups and deactivation of material. If this material comes into contact with the skin during clean-up operations, immediately remove all contaminated clothing and wash exposed skin areas with soap and water. See section 4, First Aid Measures, for further information.

Section 07: Handling and Storage

Precautionary Measures:

Avoid Breathing Spray. See Section 8, Exposure Control/Personal Protection, prior to handling.

Storage Conditions:

The maximum storage temperature for this material is 55°C/131°F. The minimum storage temperature for this material is 0°C/32°F. Store in a well ventilated area. Do not store this material in containers made of steel.

Section 08: Exposure Control/Personal Protection

Ventilation: Use local exhaust ventilation at the point of dust or mist evolution
Respiratory Protection: Dust masks where spraying cannot be avoided
Eye Protection: Safety glasses, splash goggles, and/or face shields (ANSI Z87.1 or approved equivalent)
Skin Protection: Use latex, neoprene, or rubber gloves, boots, and apron. Remove gloves after use. Wash hands with soap and water.
Personal Hygiene: Observe ordinary measures of personal hygiene

Section 09: Physical and Chemical Properties

Boiling Point: That of Water
Vapor Pressure: That of Water
Vapor Density: That of Water
Water Solubility: Complete
Melting/Freezing Point: 32 °F
Appearance: Clear to light amber
Specific Gravity: 1.0 – 1.2 g/ml
Percentage Volatile: 96% as water
Evaporation Rate: That of Water
pH of Solution: 2 – 4
Odor: Mild

Section 10: Stability and Reactivity

Stability: This material is considered stable under specific conditions of storage, shipment, and/or use. See Section 7, Handling and Storage, for specific conditions.
Hazardous Polymerization: Will not occur
Conditions to Avoid: None Known
Incompatible Materials: Strong Oxidizing or Reducing Agents
Hazardous Decomposition Products: None Known

Section 11: Toxicological Information

Acute Toxicity

Mutagenicity: AMES Salmonella Mutagenicity Testing exhibits no evidence of mutagen presence
Oral Toxicity: Rat LD50>100,000 mg/kg
Dermal Toxicity: Not absorbed topically
Inhalation Toxicity: None known
Skin Irritation: Rabbit; No irritation observed
Sensitizer: No human repeat insult patch test; Not a sensitizer

Section 12: Ecological Information

Environmental Toxicity:

Acute Fish 96 Hr LC50, Flathead minnow: 750 mg/L, NOEC/LOEC 500/1000
Acute Daphnia 48 Hr EC50: 743 mg/L, NOEC/LOEC 500/1000
Acute Purple sea urchin 40min. IC25 mg/L: >10, NOEC/LOEC 10/>10

Section 13: Disposal

Incinerate liquid and contaminated solids in accordance with Federal, State, and local regulations and permits.

Section 14: Transport Information

Domestic Data

Dot Shipping Name: Not Regulated
Dot Hazard Class: Not Regulated
Hazardous Ingredients: None

Export Data

Export Shipping Name: Not Regulate
Export Hazard Class: Not Regulated
Hazardous Ingredients: None
UN Number: None

Section 15: Other Information

HMIS Hazard Codes – Health/Flammability/Reactivity; 0,0,0
NFPA Hazard Codes - Health/Flammability/Reactivity; 0,0,0

For Chemical Emergency
Spill Leak Fire Exposure or Accident
Call CHEMTREC Day or Night

DOMESTIC NORTH AMERICA 800-424-9300
INTERNATIONAL, CALL 703-527-3887 (collect calls accepted)

PROFESSIONAL WATER TECHNOLOGIES™
High-Performance Reverse Osmosis Chemicals

MATERIAL SAFETY DATA SHEET (MSDS)

1. Identification

Product Name: Lavasol™ 3
Synonyms:
CAS Number: NA
Product Use: Reverse Osmosis Membrane Cleaner
Manufacturer/Supplier: Professional Water Technologies
Address: 1048 La Mirada Court, Vista California, 92081, USA

General Information: 760-639-4400
Transportation Emergency Number: CHEMTREC: 800-424-9300 (Domestic North America)
703-527-3887 (International, collect calls accepted)

2. Hazards Identification

GHS Classification:

Health	Environmental	Physical
Health Hazards: Primary Route of Exposure: Skin contact, eye contact, and inhalation Inhalation: Exposure to spray may cause irritation to the mucous membranes and respiratory system Skin Contact: Exposure to skin can cause irritation Eye contact: Material can cause irritation to eyes Ingestion: Material is not harmful if accidentally ingested ***Medical Conditions Aggravated by Exposure:*** None known ***TLV***: Threshold Limit Value - N/A, no danger exists	***Acute Toxicity:*** Oral Toxicity: LD50>4000 mg/kg Dermal Toxicity: LD50>5000 mg/kg in Rabbits Inhalation Toxicity: Exposure to Spray Can Cause Irritation to Mucous Membranes and Respiratory System. Skin Irritation: May Cause Mild Irritation Sensitizer: No Human Repeat Insult Patch Test; Not a Sensitizer DOT Corrosive: Not Applicable	Boiling Point: 100 °C Melting/Freezing Point: Approximately 0 °C Appearance: Clear Liquid Density: Approximately 9 lbs./gallon Specific Gravity: 1.0 – 1.2 g/ml Percentage Volatile: 72% Water - Max Evaporation Rate: Same as Water pH of Solution: 6.5 – 7.0 (5% solution) Odor: Pleasant Vapor Pressure: 17 mm Hg @ 20 degrees C/68 degrees F Water Vapor Density: <1 Water Water Solubility: Complete

GHS Label:

Symbols: None	
Hazard Statements Causes mild skin irritation and eye damage. May cause allergic skin reaction.	Precautionary Statements Do not eat or drink when using this product. Do not breathe mist/vapors. Keep container tightly closed. Wear respiratory protection, protective gloves and eye/face protection. Use in a well-ventilated area. Store container tightly closed in cool/well-ventilated place. Wash thoroughly after handling.

3. Composition / Information on Ingredients

Component	**CAS Number**	**Weight %**
Lavasol™ 3	Non DOT Regulated Ingredients: FDA grade weak organic acids and polyelectrolytes	

(See Section 8 for Exposure Limits)

4. First Aid Measures

Eye: Eye irritation. Flush immediately with large amounts of water for at least 30 minutes. Eyelids should be held away from the eyeball to ensure thorough rinsing. Get immediate medical attention.

Skin: Itching or irritation of the skin. Immediately flush the skin with plenty of water for 15 minutes while removing contaminated clothing and shoes. Wash contaminated clothing before reuse.

Inhalation: For nasal irritation, remove exposed person from source of exposure to fresh air. If not breathing, clear airway and start cardiopulmonary resuscitation (CPR). Get immediate medical attention.

Ingestion: Do Not Induce Vomiting. Give Large Quantities of Water. Never Give Anything by Mouth to an Unconscious Person. Call a Physician Immediately.

5. Fire Fighting Measures

Suitable Extinguishing Media: Use dry chemical, foam, or carbon dioxide to extinguish fire. Water may be ineffective but should be used to cool fire-exposed containers, structures and to protect personnel. Use water to dilute spills and to flush them away from sources of ignition.

Fire Fighting Procedures: Use media appropriate to primary cause of fire. Use water spray to cool containers exposed to fire. Minimize exposure. Do not breathe fumes. Contain run-off.

Unusual Fire and Explosion Hazards: None known

Combustion Products: May present an explosion hazard under dust loading conditions in excess of 25,000 mg/M^3.

Autoignition Temp: N/A
Flammable Limits: LEL N/A

6. Accidental Release Measures
Spill/Leak Clean-Up Procedures: If possible neutralize with alkaline soap.

Land Spill: Wearing recommended protective clothing and equipment, scoop up. Avoid dusting. Place waste in approved containers for disposal. Dispose waste according to Federal, State, and local regulations.

Water Spill: Wear protective clothing and equipment. Stop flow. Dike contaminated water and remove for disposal and/or treatment. Notify proper authorities and all downstream users if possible. Dispose of with Solid Waste according to Federal, State, and Local Regulations.

__CAUTION__: Floor will be Slippery

Refer to Section 15 for spill/release reporting information.

7. Handling and Storage
Handling
Do not get in eyes, on skin or on clothing. Do not breathe vapors or mists. Keep container closed. Use only with adequate ventilation. Use good personal hygiene practices. Wash hands before eating, drinking, smoking. Remove contaminated clothing and clean before re-use.

Storage
The maximum storage temperature for this material is 55°C/131°F. The minimum storage temperature for this material is 0°C/32°F. Store in a well ventilated area. Do not store this material in containers made of steel.

Empty containers may contain toxic, flammable and explosive residue or vapors. Do not cut, grind, drill, or weld on or near containers unless precautions are taken against these hazards.

8. Exposure Controls / Personal Protection

Exposure Limits
Engineering Controls: Local exhaust ventilation may be necessary to control air contaminants to their exposure limits. The use of local ventilation is recommended to control emissions near the source. Provide mechanical ventilation for confined spaces.

Personal Protective Equipment (PPE)
Eye Protection: Safety glasses, splash goggles, and/or face shields (ANSI Z87.1 or approved equivalent). Have eye-wash stations available where eye contact can occur.

Skin Protection: Avoid skin contact. Wear gloves impervious to conditions of use. Additional protection may be necessary to prevent skin contact including use of apron, face shield, boots or full body protection. A safety shower should be located in the work area. Recommended protective materials include: Butyl rubber and for limited contact Teflon.

Respiratory Protection: If exposure limits are exceeded, NIOSH approved respiratory protection should be worn. A NIOSH approved respirator for organic vapors is generally acceptable for concentrations up to 10 times the PEL. For higher concentrations, unknown concentrations and for oxygen deficient atmospheres, use a NIOSH approved air-supplied respirator. Engineering controls are the preferred means for controlling chemical exposures. Respiratory protection may be needed for non-routine or emergency situations. Respiratory protection must be provided in accordance with OSHA 29 CFR 1910.134.

9. Physical and Chemical Properties

Boiling Point: 100 °C
Melting/Freezing Point: Approximately 0 °C
Appearance: Clear Liquid
Density: Approximately 9 lbs./gallon
Specific Gravity: 1.0 – 1.2 g/ml
Percentage Volatile: 72% Water - Max
Evaporation Rate: Same as Water
pH of Solution: 6.5 – 7.0 (5% solution)
Odor: Pleasant
Vapor Pressure: 17 mm Hg @ 20 degrees C/68 degrees F Water
Vapor Density: <1 Water
Water Solubility: Complete

10. Stability and Reactivity

Stability: Stable
Hazardous Polymerization: Will not Occur
Conditions to Avoid: None Known
Incompatible Materials: Strong Oxidizing or Reducing Agents
Hazardous Decomposition Products: None Known

11. Toxicological Information

Signs and Symptoms of Overexposure: Eye and nasal irritation, headache, dizziness, nausea, vomiting, difficulty breathing, weakness, itching or burning of the skin.

Acute Toxicity:
Oral Toxicity: LD50>4000 mg/kg
Dermal Toxicity: LD50>5000 mg/kg in Rabbits
Inhalation Toxicity: Exposure to Spray Can Cause Irritation to Mucous Membranes and Respiratory System.
Skin Irritation: May Cause Mild Irritation
Sensitizer: No Human Repeat Insult Patch Test; Not a Sensitizer
DOT Corrosive: Not Applicable
Primary Route of Exposure: Contact
Medical Conditions Aggravated by Exposure: None known.

12. Ecological Information
No data

13. Disposal Considerations

Incinerate liquid and contaminated solids in accordance with Federal, State, and Local regulations and permits. Refer to state and local requirements for any additional requirements, as these may be different from Federal laws and regulations. Chemical additions, processing or otherwise altering this material may make waste management information presented in the MSDS incomplete, inaccurate or otherwise inappropriate.

14. Transport Information

U.S. Department of Transportation (DOT)
Proper Shipping Name: Lavasol™ 3
Hazard Class: Not regulated
UN/NA Number: None
Packing Group: None
Labels Required: None

International Maritime Organization (IMDG)
Proper Shipping Name: Lavasol™ 3
Hazard Class: Not regulated
UN/NA Number: None
Packing Group: None
Labels Required: None

15. Regulatory Information

U.S. Federal Regulations
Comprehensive Environmental Response and Liability Act of 1980 (CERCLA):
No reportable quantity (RQ) for this material. If appropriate, immediately report to the National Response Center (800/424-8802) as required by U.S. Federal Law. Also contact appropriate state and local regulatory agencies.

Toxic Substances Control Act (TSCA): All components of this product are included on the TSCA inventory.

Clean Water Act (CWA): Lavasol™ 3 is not a hazardous substance under the Clean Water Act. Consult Federal, State and local regulations for specific requirements.

Clean Air Act (CAA): Lavasol™ 3 is not a hazardous substance under the Clean Air Act. Consult Federal, State and local regulations for specific requirements.

Superfund Amendments and Reauthorization Act (SARA) Title III Information:
SARA Section 313 Notification (40CFR 372)

This Product Does Not Contain Toxic Chemicals Subject to the Reporting Requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

All components of this product are in compliance with the inventory listing requirements of the U.S. Toxic Substance Control Act (TSCA) Chemical Substance Inventory.

State Regulations
California: This product contains the following chemicals(s) known to the State of California to cause cancer, birth defects or reproductive harm:

Component	CAS Number	Maximum %
NA	NA	

International Regulations

Canadian Environmental Protection Act: All of the components of this product are included on the Canadian Domestic Substances list (DSL).

Canadian Workplace Hazardous Materials Information System (WHMIS):
None

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

European Inventory of Existing Chemicals (EINECS): All of the components of this product are included on EINECS.

EU Classification:
EU Risk (R) and Safety (S) Phrases:
R37/38: Irritating to respiratory system and skin.
R41: Risk of serious damage to eyes.
R43: May cause sensitization by skin contact.

S53: Avoid exposure - obtain special instructions before use.
S45: In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S9: Keep container in a well-ventilated place.
S36/37: Wear suitable protective clothing and gloves.
S57: Use appropriate container to avoid environmental contamination.

16. Other Information

National Fire Protection Association (NFPA) Ratings: This information is intended solely for the use of individuals trained in the NFPA system.

Health: 1
Flammability: 0
Reactivity: 1

Revision Indicator: New MSDS, May 25, 2012

Disclaimer: This MSDS is provided as an information resource only. This document should not be taken as a warranty for which Professional Water Technologies assumes legal responsibility. The information contained within this MSDS was provided by raw materials and other reliable sources. The buyer assumes all responsibility of using and handling the product in accordance with applicable federal, state, and local regulations.

PROFESSIONAL WATER TECHNOLOGIES™
High-Performance Reverse Osmosis Chemicals

MATERIAL SAFETY DATA SHEET (MSDS)

1. Identification

Product Name: Lavasol™ 1
Synonyms:
CAS Number: NA
Product Use: Reverse Osmosis Membrane Cleaner
Manufacturer/Supplier: Professional Water Technologies
Address: 1048 La Mirada Court, Vista California, 92081, USA

General Information: 760-639-4400
Transportation Emergency Number: CHEMTREC: 800-424-9300 (Domestic North America)
703-527-3887 (International, collect calls accepted)

2. Hazards Identification

GHS Classification:

Health	Environmental	Physical
Health Hazards: Primary Route of Exposure: Skin contact Inhalation: Exposure to Spray Will Cause Irritation to Mucous Membranes and Respiratory System. Skin Contact: Exposure to skin can cause irritation but immediate first aid not likely required Eye contact: Material can cause irritation to eyes Ingestion: Material is not harmful if accidentally ingested ***Medical Conditions Aggravated by Exposure:*** May aggravate existing respiratory and skin ailments. ***TLV***: Threshold Limit Value – Make every effort to limit your exposure through good chemical hygiene practices, workplace engineering controls and use of personal protective equipment	*Acute Toxicity:* Mutagenicity: No Data Oral Toxicity: No Data Skin Irritation: Causes severe irritation Inhalation Toxicity: Exposure to spray causes irritation to mucous membranes and respiratory system Chronic Exposure: No Data Available Eye Contact: May cause slight irritation to eyes Sensitizer: Not a sensitizer	Boiling Point: 100 °C Melting/Freezing Point: Approximately 0 °C Appearance: Clear Liquid Density: Approximately 9 lbs./gallon Specific Gravity: 1.0 – 1.2 g/ml Percentage Volatile: 72-79% Water - Max Evaporation Rate: Same as Water pH of Solution: 3 – 4.5 Odor: Pleasant Vapor Pressure: 17 mm Hg @ 20 degrees C/68 degrees F Water Vapor Density: <1 Water Water Solubility: Complete

GHS Label:

Symbols:

Hazard Statements	Precautionary Statements
Causes mild skin irritation and eye damage. May cause allergic skin reaction.	Do not eat or drink when using this product. Do not breathe mist/vapors. Keep container tightly closed. Wear respiratory protection, protective gloves and eye/face protection. Use in a well-ventilated area. Store container tightly closed in cool/well-ventilated place. Wash thoroughly after handling.

3. Composition / Information on Ingredients

Component	CAS Number
Hydrochloric Acid	# 7647-01-0

4. First Aid Measures

Eye: Eye irritation. Flush immediately with large amounts of water for at least 30 minutes. Eyelids should be held away from the eyeball to ensure thorough rinsing. Get immediate medical attention.

Skin: Itching or irritation of the skin. Immediately flush the skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Use alkaline soap if available. Wash contaminated clothing before reuse.

Inhalation: For nasal irritation, remove exposed person from source of exposure to fresh air.

Ingestion: Do Not Induce Vomiting. Give Large Quantities of Milk and Water. Never Give Anything by Mouth to an Unconscious Person. Call a Physician Immediately.

5. Fire Fighting Measures

Suitable Extinguishing Media: Use dry chemical, foam, or carbon dioxide to extinguish fire. Water may be ineffective but should be used to cool fire-exposed containers, structures and to protect personnel. Use water to dilute spills and to flush them away from sources of ignition.

Fire Fighting Procedures: Use media appropriate to primary cause of fire. Use water spray to cool containers exposed to fire. Minimize exposure. Do not breathe fumes. Contain run-off.
Unusual Fire and Explosion Hazards: None known

Combustion Products: May present an explosion hazard under dust loading conditions in excess of 25,000 mg/M^3.
Autoignition Temp: N/A
Flammable Limits: LEL (Lower Explosive Limits) N/A

6. Accidental Release Measures

Spill/Leak Clean-Up Procedures: If possible neutralize with alkaline soap.

Land Spill: Wearing recommended protective clothing and equipment, dike spill with soil, sand, or compatible commercial absorbent. Remove remaining liquid with a pump, vacuum truck, or absorb liquid in sand or commercial absorbent. Place waste in approved containers for

disposal. Dispose waste according to Federal, State, and local regulations.

Water Spill: Wear protective clothing and equipment. Stop flow. Dike contaminated water and remove for disposal and/or treatment. Notify proper authorities and all downstream users if possible. Dispose of with Solid Waste according to Federal, State, and Local Regulations.

***CAUTION:** Floor will be Slippery

Personal protection:
Protective clothing including chemical splash goggles, Latex, nitrile, or buytl rubber full-length gloves, rubber apron made of nitrile or buytl rubber, and rubber overshoes must be worn during spill clean-ups and deactivation of material. If this material comes into contact with the skin during clean-up operations, immediately remove all contaminated clothing and wash exposed skin areas with soap and water. See section 4, First Aid Measures, for further information.

7. Handling and Storage
Precautionary Measures: Avoid Breathing Spray
Disposal Method: Dispose of with Solid Waste According to Federal, State and Local Regulations
RCRA Class: Not Regulated

Storage Conditions:
The maximum storage temperature for this material is 55°C/131°F. The minimum storage temperature for this material is 0°C/32°F. Store in a well ventilated area. Do not store this material in containers made of steel.

8. Exposure Controls / Personal Protection

Ventilation: Use local exhaust ventilation at the point of dust or mist evolution.

Respiratory Protection: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANZI Z88.2 requirements most be followed when ever workplace conditions warrant a respirator use. Use air purifying respirators within use limitations associated with the equipment or else use supplied air-respirators. If air –purifying respirator use is appropriate, use a respirator with organic/acid gas cartridge and dust/mist prefilters. For emergencies or instances where the exposure levels are not known, use a full- face piece positive-pressure, air supplied respirator. Warning air purifying respirators do not protect workers in oxygen deficient atmospheres.

Eye Protection: Splash goggles and/or face shield (ANSI Z87.1 or approved equivalent).

Skin Protection: Wear impervious protective clothing. Use butyl gloves, boots, and coveralls. Remove gloves after use. Wash hands with soap and water.

Personal Hygiene: Observe ordinary measures of personal hygiene.

9. Physical and Chemical Properties
Boiling Point: 100 °C
Melting/Freezing Point: Approximately 0 °C
Appearance: Clear Liquid
Density: Approximately 9 lbs./gallon
Specific Gravity: 1.0 – 1.2 g/ml
Percentage Volatile: 72-79% Water - Max
Evaporation Rate: Same as Water
pH of Solution: 3 – 4.5

Odor: Pleasant
Vapor Pressure: 17 mm Hg @ 20 degrees C/68 degrees F Water
Vapor Density: <1 Water
Water Solubility: Complete
Autoignition Temp: N/A
Flammable Limits: LEL (Lower Explosive Limits) N/A

10. Stability and Reactivity

Stability: Stable under normal storage conditions. See Section 7, Handling and Storage, for specific conditions.
Hazardous Polymerization: Will not Occur
Conditions to Avoid: None Known
Incompatible Materials: Strong Oxidizing or Reducing Agents
Hazardous Decomposition Products: Not a Fire or Explosions Hazard; However, in a Fire Situation, This Product Will Emit Toxic Gases and Form Acids.

11. Toxicological Information
Signs and Symptoms of Overexposure: Eye and nasal irritation, headache, dizziness, nausea, vomiting, difficulty breathing, weakness, itching or burning of the skin.

12. Ecological Information
Environmental Toxicity:
No Data

13. Disposal Considerations
Dispose of container and unused contents in accordance with Federal, State, and Local requirements.

14. Transport Information
Land Transport - USDOT
Dot Shipping Name: Corrosive liquid, acidic, inorganic, N.O.S.
Dot Hazard Class: 8
Hazardous Ingredients: Hydrochloric Acid
PG III
UN Number: 3264
ERG 154
PWT Product Name: Lavasol™ 1

Sea Transport - IMDG
Export Shipping Name: Corrosive liquid, acidic, inorganic, N.O.S. (Hydrochloric Acid)
Export Hazard Class: 8
Hazardous Ingredients: Hydrochloric Acid
UN Number: 3264
PG III
ERG 154
PWT Product Name: Lavasol™ 1

Air Transport – IATA/ICAO
Export Shipping Name: Corrosive liquid, acidic, inorganic, N.O.S. (Hydrochloric Acid)
Export Hazard Class: 8
Hazardous Ingredients: Hydrochloric Acid
UN Number: 3264
PG III
ERG 154
PWT Product Name: Lavasol™ 1

15. Regulatory Information

U.S. Federal Regulations

Comprehensive Environmental Response and Liability Act of 1980 (CERCLA):
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Toxic Substances Control Act (TSCA): All components of this product are included on the TSCA inventory.

Clean Water Act (CWA): Lavasol™ 1 is not a hazardous substance under the Clean Water Act. Consult Federal, State and local regulations for specific requirements.

Clean Air Act (CAA): Lavasol™ 1 is not a hazardous substance under the Clean Air Act. Consult Federal, State and local regulations for specific requirements.

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SARA Section 313 Notification (40CFR 372)

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State Regulations

California: **This product contains the following chemicals(s) known to the State of California to cause cancer, birth defects or reproductive harm:**

Component	**CAS Number**
Hydrochloric Acid	CAS# 7647-01-0

International Regulations

Canadian Environmental Protection Act: All of the components of this product are included on the Canadian Domestic Substances list (DSL).

Canadian Workplace Hazardous Materials Information System (WHMIS):
None

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

European Inventory of Existing Chemicals (EINECS): All of the components of this product are included on EINECS.

EU Classification:
EU Risk (R) and Safety (S) Phrases:
R37/38: Irritating to respiratory system and skin.
R41: Risk of serious damage to eyes.
R43: May cause sensitization by skin contact.
S53: Avoid exposure - obtain special instructions before use.
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S9: Keep container in a well-ventilated place.
S36/37: Wear suitable protective clothing and gloves.
S57: Use appropriate container to avoid environmental contamination.

16. Other Information

National Fire Protection Association (NFPA) Ratings: This information is intended solely for the use of individuals trained in the NFPA system.

Health: 1
Flammability: 0
Reactivity: 1

Revision Indicator: New MSDS, May 25, 2012

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Material Safety Data Sheet

Revision Issued: 5/21/2009 Supercedes: 10/24/2007 First Issued: 12/01/1986

Section I - Chemical Product And Company Identification

Product Name: Hydrochloric (Muriatic) Acid

Synonyms/Common Names

Muriatic Acid, Hydrogen Chloride Solution, Chlorohydric Acid, HCl

CAS Number: 7647-01-0 HBCC MSDS No. CM15000

HILL BROTHERS Chemical Co.

1675 NORTH MAIN STREET • ORANGE, CALIFORNIA 92867-3499
(714) 998-8800 • FAX: (714) 998-6310
http://hillbrothers.com

1675 No. Main Street, Orange, California 92867
Telephone No: 714-998-8800 | Chemtrec: 800-424-9300

Section II - Composition/Information on Ingredients

		Exposure Limits (TWAs) in Air		
Chemical Name	CAS Number	ACGIH TLV	OSHA PEL	STEL
Hydrochloric Acid (Hydrogen Chloride 31.5%)	7647-01-0	2 ppm	5 ppm	N/A

Section III - Hazard Identification

Routes of Exposure: This product may affect the body either through ingestion, inhalation, or contact with the eyes and/or skin.

Summary of Acute Health Hazards

Ingestion: If ingested, solutions can cause corrosive burns to the mouth, throat, esophagus and stomach. Symptoms may include difficulty in swallowing, intense thirst, nausea, vomiting, diarrhea and in severe cases, collapse and death. Small amounts of acid which enter the lungs during ingestion or aspiration while vomiting can cause serious lung injury and death.

Inhalation: Vapor or mist from concentrated solutions can cause severe nasal irritation, sore throat, choking, coughing and difficulty breathing (50-100 ppm). Prolonged exposures can cause burns and ulcers to the nose and throat. Severe exposures (e.g. 1000-2000 ppm), for even a few minutes, can cause a life-threatening accumulation of fluid in the lungs (pulmonary edema). Symptoms of pulmonary edema such as shortness of breath can be delayed for several hours after the exposure.

Skin: Contact with the skin may cause severe irritation, skin burns and permanent skin damage. Prolonged exposure may result in ulcerating burns which could leave scars. Prolonged and repeated exposure to dilute solutions often causes irritation, redness, pain and drying and cracking of the skin.

Eyes: Contact with the eyes may cause severe irritation, eye burns and permanent eye damage, which may result in permanent blindness. Low concentrations of vapors or mist (10-35 ppm) can be immediately irritating, causing redness.

Summary of Acute Health Hazards: This solution is corrosive, and can burn and damage eyes, skin, mucous membranes, and any other exposed tissue. If inhaled, irritation of the respiratory system may occur, with coughing, and breathing difficulty. Though unlikely to occur during occupational use, ingestion of large quantities may be fatal.
Summary of Chronic Health Hazards: Prolonged and repeated exposure to dilute solutions often causes irritation, redness, pain and drying and cracking of the skin. Repeated exposure to low concentrations of mist can cause brownish discoloration and damage to tooth enamel. Dental erosion becomes more severe with increased exposure. Repeated exposure to low concentrations can cause nose and gum bleeding. Chronic bronchitis and stomach pain (gastritis) have also been reported.
Effects of Overexposure: The most significant routes of occupational overexposure are inhalation and contact with skin and eyes.
Medical Conditions Generally Aggravated by Exposure: Hydrogen chloride (Hydrochloric Acid) is a respiratory irritant. Persons with impaired pulmonary function may be at increased risk from exposure. Periodic surveillance is indicated.
Note to Physicians: This product may cause severe pneumonitis if aspirated. If ingestion has occurred less than 2 hours earlier, carry out careful gastric lavage; use endotracheal cuff if available, to prevent aspiration. Observe patient for respiratory difficulty from aspiration pneumonitis. Give artificial resuscitation and appropriate chemotherapy if respiration is depressed. Following exposure the patient should be kept under medical review for at least 48 hours as delayed pneumonitis may occur. DO NOT attempt to neutralize the acid with weak bases since the reaction will produce heat that may extend the corrosive injury.

Section IV - First Aid Measures

Ingestion: If this product is swallowed, CALL PHYSICIAN OR POISON CONTROL CENTER FOR MOST CURRENT INFORMATION. If professional advice is not available, do not induce vomiting. Victim should rinse mouth with large amounts of water. Victim should drink large amounts of water to dilute the ingested material. If spontaneous vomiting occurs, have victim lean forward with head down to avoid breathing in of vomitus, rinse mouth and administer more water. Never induce vomiting or give water to someone who is unconscious having convulsions, or who cannot swallow. GET IMMEDIATE MEDICAL ATTENTION.
Inhalation: If vapors, mists, or sprays of this product are inhaled, remove victim to fresh air. Give artificial respiration ONLY if breathing has stopped. Do not use mouth-to-mouth method if victim ingested or inhaled the substance: induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Give Cardiopulmonary Resuscitation (CPR) if there is no pulse AND no breathing. Obtain medical attention IMMEDIATELY. Symptoms may appear up to 48 hours after exposure.
Skin: Immediately flush contaminated skin with water for at least 15 minutes and wash with soap and water. If large areas of the body are contaminated or if clothing is penetrated, immediately use safety shower preferably removing clothing while under the shower. Flush exposed areas with large amounts of water for at least 30 minutes. Keep affected area cool. GET PROMPT MEDICAL ATTENTION. Wash clothing before reuse. Destroy contaminated shoes.
Eyes: Immediately flush eyes with a directed stream of water for at least 15 minutes. Forcibly hold eyelids apart to ensure complete irrigation of all eye and lid tissue. Do not use chemical antidotes. Speed is essential. GET IMMEDIATE MEDICAL ATTENTION.

Section V - Fire Fighting Measures

Flash Point: N/A **Autoignition Temperature:** N/A

Lower Explosive Limit: N/A **Upper Explosive Limit:** N/A

Unusual Fire and Explosion Hazards: This product is corrosive, and presents a significant inhalation and contact hazard to fire-fighters. This product will not decompose at temperatures below 1500ºC (2730ºF). Thermal oxidative decomposition produces toxic chlorine fumes and explosive hydrogen gas. Reacts with active metals (potassium, sodium, calcium, powdered aluminum, zinc, magnesium) to produce flammable hydrogen gas which can form explosive mixtures. May also form hydrogen chloride, and acid vapors. Explosive concentrations of hydrogen may accumulate inside metal equipment.

Extinguishing Media: Use water spray, fog, alcohol-resistant foam, dry chemicals, CO2, or other agents as appropriate for surrounding fire. Neutralize with soda ash or slaked lime. Do NOT use straight streams of water. Most foams will react with the material and release corrosive/toxic gases. Do not use carbon dioxide if cyanides are involved in a fire. Water fog is effective for controlling vapors. Controlled water addition is an effective method to reduce vapor pressure and control vapor emissions.

Special Firefighting Procedures: Use self-contained breathing apparatus and full protective equipment. If possible, prevent run-off water from entering storm drains, bodies of water, or other environmentally sensitive areas.

Section VI - Accidental Release Measures

Spill and Leak Response: uncontrolled releases should be responded to by trained personnel using pre-planned procedures. Proper protective equipment should be used. In case of a spill, clear the affected area, protect people and respond with trained personnel. The proper personal protective equipment for incidental releases (e.g.-1 L of the product released in a well-ventilated area) use impermeable gloves, specific for the material handled, goggles, face shield, respirator and appropriate body protection.

In the event of a large release, don proper protective equipment, use impermeable gloves, specific for the material handled, chemically resistant suit and boots, and hard hat. Self-Contained Breathing Apparatus or respirator may be required where engineering controls are not adequate or conditions for potential exposure exist. When respirators are required, Select NIOSH/MSHA approved based on actual or potential airborne concentrations in accordance with latest OSHA and/or ANSI recommendations.

Deny access to the area. Determine isolation distance. Stop leak at source, dike area, pick up with pump as much material as possible, prevent material from entering waterway, prevent contact with other chemicals. Absorb spilled liquid with polypads or other suitable absorbent materials. Neutralize residue with lime or soda ash or other acid-neutralizing agent. Decontaminate the area thoroughly. Test area with litmus paper to confirm neutralization. Place all spill residues in a suitable container. Dispose of in accordance with Federal, State and local hazardous waste disposal regulations (see Section XIII)

Section VII - Handling and Storage

All employees who handle this material should be trained to handle it safely. Avoid breathing mists or sprays generated by this product. Use in a well-ventilated location.

For Non-Bulk Containers - Open containers slowly, on a stable surface. Containers of this product must be properly labeled. Only store in acid-resistant containers. Store containers in a cool, dry location, away from direct sunlight, sources of intense heat, or where freezing is possible. Material should be stored in secondary containers, or in a diked area, as appropriate. Store containers away from incompatible chemicals. Keep container tightly closed when not in use. Wash thoroughly after using this material. Storage areas should be made of fire-resistant materials. If appropriate, post warning signs in storage and use areas. Inspect all incoming containers before storage containers are properly labeled and not damaged.
Empty containers may contain residual liquid. Therefore, empty containers should be handled with care.
Bulk Containers – All tanks and pipelines which contain this material must be labeled. All equipment must be designed for use with this product. Perform routine maintenance on tanks or pipelines which contain this product. Report all leaks immediately to the proper personnel.
Tank Car Shipments – Tank cars carrying this product should be loaded and unloaded in strict accordance with tank-car manufacturer's recommendation and all established on-site safety procedures. Appropriate personal protective must be used (see Section VIII). All loading and unloading equipment must be inspected prior to each use. Loading and unloading operations must be attended, at all times. Tank cars must be level, brakes must be set or wheels must be locked or blocked prior to loading and unloading. Tank car (for loading) or storage tank (for unloading) must be verified to be correct for receiving this product and properly prepared, prior to starting the transfer operations. All equipment must be designed for use with this product. Hoses must be verified to be clean and free of incompatible chemicals, prior to connection to the tank car or vessel. Valves and hoses must be verified to be in the correct positions, before starting transfer operations. A sample (if required) must be taken and verified (if required) prior to starting transfer operations. All lines must be blown-down and purged before disconnecting them from the tank car or vessel.
Protective Practices During Maintenance of Contaminated Equipment – Follow practices indicated in Section VI. Make certain application equipment is locked and tagged-out safely. Always use this product in areas where adequate ventilation is provided. Decontaminate equipment before maintenance begins by a triple-rinse with water followed, if necessary, by using acid neutralizing agent and an additional rinse. Collect all rinsates and dispose of according to applicable Federal, State, or local regulations.

Section VIII - Exposure Controls/Personal Protection

Respiratory Protection: Use approved organic vapor acid-gas respirator for areas where airborne exposure is excessive. For a higher level of protection use positive pressure supplied air respiration protection or self-contained breathing apparatus or if oxygen levels are below 19.5% or are unknown.
Ventilation: Provide good general room ventilation to minimize exposure. Use local exhaust and corrosion-resistant ventilation at points of vapor emission. System should be discharged into absorption media.
Protective Clothing: Wear protective gloves such as rubber or neoprene to minimize skin contact. Use of rubberized coveralls and rubber shoes are suggested. Wash thoroughly after use. In case of emergency, or where there is a possibility of considerable exposure, wear complete acid suit with hood and forced air or self contained breathing apparatus.
Eye Protection: Wear safety glasses with side shields or chemical goggles. Person subject to hydrochloric acid exposure should not wear contact lenses. Face shields are recommended when the operation can generate splashes, sprays or mists.

Other Protective Clothing or Equipment: Eye wash and safety shower should be in close proximity.
Work/Hygienic Practices: All employees who handle this product should wash their hands before eating, drinking, smoking, or using toilet facilities. Do NOT place food, coffee or other drinks in the area where dusting or splashing of solutions is possible.

Section IX - Physical and Chemical Properties

Physical State: Liquid
pH: < 1.0
Melting Point/Range: -74°C; -101°F
Boiling Point/Range: 101-103°C; 214-217°F
Appearance/Color/Odor: Clear, odorless to slightly yellow liquid with a sharp, pungent, irritating odor.
Solubility in Water: Complete
Vapor Pressure (mmHg): 20 @ 20°C
Specific Gravity (Water=1): 1.16
Molecular Weight: 36.46
Vapor Density (Air=1): 1.27
% Volatiles (by volume): 100
Density (lb/gal@15.6°C): 9.67
How to detect this compound: Litmus paper will turn red upon contact with even low concentrations of this solution.

Section X - Stability and Reactivity

Stability: Stable
Hazardous Polymerization: Will not occur
Conditions to Avoid: Heat or fire, runoff to sewer, inhalation of gas, sparks where hydrogen may be present.
Materials to Avoid: Contact with metals and strong oxidizers. Reacts exothermically with alkalis, metal oxides, amines, active metals carbonates, and sulfides. Reacts with oxidizers to give chlorine gas. Reacts with cyanides to give hydrogen cyanide gas. Reacts with sulfides to give hydrogen sulfide gas. Reacts with formaldehyde to give bischloromethyl ether (an OSHA regulated carcinogen). Reacts with amines to form ammonia. Reacts with carbonates to form carbon dioxide. Other materials to avoid are: Bases, acetic anhydride, alkali metals, aluminum, copper, copper alloys, fluorine, iron, sodium hydroxide, steel, sulfites, sulfuric acid, vinyl acetate, zinc, potassium permanganate, cesium acetylene carbide, rubidium acetylene carbide, rubidium carbide, sodium, chlorosulfonic acid, oleum carbonates, perchloric acid, calcium phosphide, metal oxides, acetates, cesium carbide, beta-propiolactone, ethyleneimine, propylene oxide, lithium silicides, alcohols + hydrogen cyanide, 2-aminoethanol, ammonium hydroxide, calcium carbide, 1,1-difluoroethylene, ethylene diamine, magnesium boride, mercuric sulfate, silver perchlorate + carbon tetrachloride, formaldehyde, uranium phosphide.
Hazardous Decomposition Products: Flammable hydrogen gas can be produced by the reaction with most metals. Chlorine will be released by mixing with strong oxidizers. Hydrogen chloride, carbon monoxide, carbon dioxide. When heated to decomposition, emits toxic hydrogen chloride fumes and will react with water or steam to produce heat and toxic and corrosive fumes. Thermal oxidative decomposition produces toxic chlorine fumes and explosive hydrogen gas.

Section XI - Toxicological Information

LD50 (rabbit): 900 mg/kg. @ 100% HCl.
LD50 (rat): 3124 ppm/1 hour @ 100% HCl.
LC50 (inhalation, mouse) = 1108 ppm/1 hr.

Section XII - Ecological Information

Rapidly hydrolyzes when exposed to water. Will exhibit extensive evaporation from soil surfaces. Upon transport through the soil, hydrochloric acid will dissolve some of the soil materials (especially those with carbonate bases) and the acid will neutralize to some degree.
LC50 mosquito fish = 282 mg/l 96 hours
LC50 fathead minnow = 21900 ug/l 96 hours
LC50 trout = 10 mg/l 24 hours
LC50 shrimp = 100 to 330 mg/l 48 hours (salt water)
LC50 gold fish = 178 mg/l 48 hours (salt water)

Section XIII - Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

Section XIV - Transport Information

DOT Proper Shipping Description : UN1789, Hydrochloric Acid, 8, PG II

Section XV - Regulatory Information

Reportable Quantity: (CERCLA) 5000 Pounds (2270 Kilograms) (527.42 Gals)
NFPA Rating: Health - 3; Flammability - 0; Instability - 1
0=Insignificant 1=Slight 2=Moderate 3=High 4=Extreme
Uniform Fire Code Rating: Class 3 Water-Reactive Material
Carcinogenicity Lists: No **NTP:** No **OSHA Regulated:** No
IARC Monograph: Hydrogen Chloride - Group 3 Carcinogen
Hydrogen Chloride:
EPCRA Section 302 (EHS) TPQ: 500 Lbs. | EPCRA Section 304 (EHS) RQ: 5,000 Lbs.
CAA 112(r) TQ: 5,000 Lbs.

Section XVI - Other Information

Synonyms/Common Names: Muriatic Acid
Chemical Family/Type: Inorganic Acid
Sections changed since last revision: II, IV, VIII, IX, X, XIII, XV
IMPORTANT! Read this MSDS before use or disposal of this product. Pass along the information to employees and any other persons who could be exposed to the product to be sure that they are aware of the information before use or other exposure. This MSDS has been prepared according to the OSHA Hazard Communication Standard [29 CFR 1910.1200]. The MSDS information is based on sources believed to be reliable. However, since data, safety standards, and government regulations are subject to change and the conditions of handling and use, or misuse are beyond our control, **Hill Brothers Chemical Company** makes no warranty, either expressed or implied, with respect to the completeness or continuing accuracy of the information contained herein and disclaims all liability for reliance thereon. Also, additional information may be necessary or helpful for specific conditions and circumstances of use. It is the user's responsibility to determine the suitability of this product and to evaluate risks prior to use, and then to exercise appropriate precautions for protection of employees and others.

Material Safety Data Sheet

Revision Issued: 8/09/2010 Supercedes: 5/21/2009 First Issued: 12/01/85

Section I - Chemical Product And Company Identification

Product Name: Calcium Chloride, Liquid

CAS Number: 10043-52-4 HBCC MSDS No. CC06000

HILL BROTHERS Chemical Co.
1675 NORTH MAIN STREET • ORANGE, CALIFORNIA 92867-3499
(714) 998-8800 • FAX: (714) 998-6310
http://hillbrothers.com

1675 No. Main Street, Orange, California 92867
Telephone No: 714-998-8800 | Chemtrec: 800-424-9300

Section II - Composition/Information On Ingredients

		Exposure Limits (TWAs) in Air		
Chemical Name	CAS Number	ACGIH TLV	OSHA PEL	STEL
Calcium Chloride	10043-52-4	N/A	N/A	N/A

Section III - Hazard Identification

Routes of Exposure: Calcium chloride can affect the body if it is ingested or if it comes in contact with the eyes or skin.

Summary of Acute Health Hazards

Ingestion: May irritate gastrointestinal tract and cause nausea and vomiting.

Inhalation: Causes irritation of nose and throat. Additional effects may include shortness of breath.

Skin: Causes mild irritation. May cause more severe response if skin is abraded (scratched or cut). Additional effects may include blisters or sores.

Eyes: Causes irritation and possible transient corneal injury. Tearing may occur.

Summary of Chronic Health Hazards: May cause perforation of the nasal septum and nosebleeds. Contact with heated product can cause thermal burns with resultant corneal injury.

Effects of Overexposure: Possible superficial burns and transient corneal injury.

Medical Conditions Generally Aggravated by Exposure: N/A

Section IV - First Aid Measures

Ingestion: If swallowed will cause nausea and vomiting. If victim is conscious, have victim drink water. If victim is unconscious or having convulsions, do nothing except keep victim warm GET MEDICAL ATTENTION.

Inhalation: Move to fresh air; if breathing is difficult or discomfort persists, GET MEDICAL ATTENTION.

Skin: If necessary, remove contaminated clothing and shoes. Flush affected areas with plenty of water for at least 15 minutes.

Eyes: Promptly flood with water and continue washing for at least 15 minutes. Consult an ophthalmologist.

Notes to Physician: If burn is present, treat as any thermal burn, after decontamination. No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

Section V - Fire Fighting Measures

Flash Point: Not flammable **Autoignition Temperature:** Not flammable

Lower Explosive Limit: N/A **Upper Explosive Limit:** N/A

Unusual Fire and Explosion Hazards: N/A

Extinguishing Media: This product is non-flammable.

Special Firefighting Procedures: Avoid breathing corrosive vapors; keep upwind. Dike area to prevent runoff and contamination of water sources. For firefighters: Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots, and gloves). Avoid contact with this material during fire fighting operations. If contact is likely, change to full chemical resistant fire fighting clothing with self-contained breathing apparatus. If this is not available, wear full chemical resistant clothing with self-contained breathing apparatus and fight fire from a remote location. For protective equipment in post-fire or non-fire clean-up situations, refer to the relevant sections.

Section VI - Accidental Release Measures

Dike the spilled liquid, and either pump back into original container or cover with sand or clay-type substance for absorption. Spilled material may cause a slipping hazard. Isolate area. Keep authorized personnel from entering the area. Use appropriate safety equipment.

Section VII - Handling and Storage

Store at ambient temperature. Protect from atmospheric moisture. Prevent possible eye and skin contact by wearing protective clothing and equipment. Eye wash and safety shower should be provided within the immediate work area for emergency use. Launder contaminated clothing before re-use.

Section VIII - Exposure Controls/Personal Protection

Respiratory Protection: Respiratory protection should be worn when there is a potential to exceed the exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, wear respiratory protection as indicated by your risk assessment process. In misty atmospheres, use an approved particulate respirator.

Ventilation: Use local exhaust in enclosed areas. Natural ventilation for outdoor areas.

Protective Clothing: Employees should be provided with and use impervious clothing, rubber gloves, and rubber boots. Leather work boots and/or leather products will dehydrate with resultant shrinkage and possible destruction.

Eye Protection: Employees should be provided with and required to use splash-proof safety goggles and splash shields where there is any possibility of calcium chloride contacting the eyes.

Other Protective Clothing or Equipment: N/A

Work/Hygienic Practices: Avoid contact with the eyes, skin, and mucous membranes. Wash hands thoroughly with soap and water before eating, drinking, smoking or using toilet facilities. Do NOT place food, coffee or other drinks in the area where dusting or splashing of solutions is possible.

Section IX - Physical and Chemical Properties

Physical State: Liquid

pH: 3.8-9

Melting Point/Range: N/A

Boiling Point/Range: 118°C (244°F) for 38% Solution; 115°C for 34.7% Solution.

Appearance/Color/Odor: Clear to straw colored liquid, odorless

Solubility in Water: 100%

Vapor Pressure(mmHg): 12 @ 25°C

Specific Gravity (Water=1): 1.3 @ 60°F (for 30% Solution); 1.35 @ 60°F (for 34.7% Solution); 1.39 @ 60°F (for 37.5% Solution)

Molecular Weight: 110.99 (for pure $CaCl_2$)

Vapor Density(Air=1): N/A

% Volatiles: 70% for 33 Be; 65.3% for 37.4 Be; 62.5% for 40 Be

How to detect this compound : N/A

Section X - Stability and Reactivity

Stability: Stable **Hazardous Polymerization:** Will not occur

Conditions to Avoid: N/A

Materials to Avoid: Boric acid and calcium oxide are incompatible.

Hazardous Decomposition Products: If liquid completely dries from fire, thermal decomposition products may include toxic and corrosive fumes of chlorine and hydrogen chloride. Product may react with some metals (aluminum, zinc, tin, etc.) to release flammable hydrogen gas.

Section XI - Toxicological Information

Toxicity Data (anhydrous calcium chloride):
TDLO: 112 g/kg, oral, 20 weeks, rat
LDLO: 274 mg/kg, oral, rat
LD50: 1000 mg/kg, oral, rat
LD50: 264 mg/kg, intraperitoneal, rat
Moderately toxic by ingestion, slightly toxic by dermal absorption.

Section XII - Ecological Information

N/A

Section XIII - Disposal Considerations

Dispose of in accordance will local, state and federal regulations.

Section XIV - Transport Information

DOT Proper Shipping Name: N/A
DOT Hazard Class/ I.D. No.: N/A

Section XV - Regulatory Information

Reportable Quantity: N/A
NFPA Rating: Health - 1; Flammability - 0; Instability - 0
0=Insignificant 1=Slight 2=Moderate 3=High 4=Extreme
SARA Title III: Section 311: Acute Hazard
Carcinogenicity Lists: No **NTP:** No **IARC Monograph:** No **OSHA Regulated:** No

Section XVI - Other Information

Synonyms/Common Names: Calcium Chloride-Liquid
Chemical Family/Type: Inorganic Salt
Sections changed since last revision: X

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FORM 28 Rev 6/99

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 (303) 894-2100 Fax. (303) 894-2109

FOR OGCC USE ONLY

2001-0117

Surety ID: _____

CENTRALIZED E&P WASTE MANAGEMENT FACILITY PERMIT

Submit this Form and accompanying documents for each facility per Rule 908 Financial Assurance in the amount of $50,000 is required to operate each facility

OGCC Operator Number: 96850

Name of Operator WILLIAMS PRODUCTION CO.

Address 1515 ARAPAHOE #1000

City DENVER State CO Zip 80202

Contact Name and Telephone:

No _____

Fax _____

Surface Owner (if different than above) _____

Address _____

City _____ State _____ Zip _____ Phone _____

Facility Name PARACHUTE CE&PW FACILITY

Address _____

City _____ State _____ Zip _____

Phone _____ Fax _____

Location (QtrQtr, Sec, Twp, Rng, Mer) SWSW 36-68-96W

Latitude 39.477645

Longitude -108.063297

Complete the Attachment Checklist

	Oper	OGCC
Site description (topo geol hydro)		
Adjacent land use description		
Topographic map		
Site drainage map with structures		
Scaled drawing and survey map		
Facility design & engineering		
Operating plan		
Water analysis report		
Financial assurance		
Closure plan		
Local gov't zoning compliance		
Local gov't permits and notice		

1 Is the site in a sensitive area? ☐ Y ☑ N

2 What are the average annual precipitation and evaporation rates for the site? Precipitation _____ inches/year Evaporation 58 inches/year

3 Has a description of the site's general topography, geology and hydrology been attached? ☑ Y ☐ N

4 Has a description of the adjacent land use been attached? ☑ Y ☐ N

5 Has a 1 24,000 topographic map showing the site location been attached? ☑ Y ☐ N

6 Has a site plan showing drainage patterns, diversion or containment structures, roads, fencing, tanks, pits, buildings and any other pertinent construction details been attached? ☑ Y ☐ N

7 If site is not owned by the operator, is written authorization of the surface owner attached? ☐ Y ☐ N

8 Has a scaled drawing and survey showing the entire section(s) containing the proposed facility been attached? ☐ Y ☐ N

9 What measures have been implemented to limit access to the facility by wildlife, domestic animals or by members of the public? Briefly explain

10 Is there a planned firelane of at least 10 feet in width around the active treatment areas and within the perimeter fence? ☐ Y ☐ N

11 Is there an additional buffer zone of at least 10 feet within the perimeter firelane? ☐ Y ☐ N

12 Have surface water diversion structures been constructed to accommodate a 100-year, 24-hour event? ☐ Y ☐ N

13 Has a waste profile been calculated according to Rule 908 b 6? ☐ Y ☐ N

14 Has facility design and engineering been provided as required by Rule 908 b 7? ☐ Y ☐ N

15 Has an operating plan been completed as required by Rule 908 b 8? ☐ Y ☐ N

16 Has ground water monitoring for the site been provided? ☐ Y ☐ N ***Attach Water Analysis Report, Form 25, for each monitoring well installed ***

17 Has financial assurance been provided as required by Rule 704? ☐ Y ☐ N

18 Has a closure plan been provided? ☐ Y ☐ N

19 Have local government requirements for zoning and construction been complied with? ☐ Y ☐ N

20 Have permits and notifications required by local governments and other agencies been provided? ☐ Y ☐ N

Print Name COGCC STAFF - HISTORICAL

Signed _____ Title _____ Date _____

OGCC Approved HISTORICAL Title _____ Date 11/1/1988

CONDITIONS OF APPROVAL, IF ANY:

Facility Number: 149015

01433073

COGIS - UIC DISPOSAL Information

Related Insp Doc Orders

GM 923-1D INJECTION WELL - #159295 Information

Status: AC

Facility ID:	**159295**	Facility Name/No:	**GM 923-1D INJECTION WELL /**
Facility Status:	**AC**	Status Date:	**10/20/2009**
Operator Name:	**WPX ENERGY ROCKY MOUNTAIN LLC**	Operator Number:	**96850**
County:	**GARFIELD - #045**	Location:	**SWNE 1 7S 96W**
Field:	**GRAND VALLEY**	Lat/Long:	**/**
Facility Type:	**UIC DISPOSAL**	Order #:	
Initial Inj. Date:	**10/20/2009**	Fluid Type:	**PRODUCED WATER**
Inj. Zone Name:	**WILLIAMS FORK**	Inj. Zone Code:	**WMFK**
Avg Porosity:	**11**	Avg Permeablity:	**0**
TDS:	**40571**	Frac Gradient:	**0.758000016212463**

Facility Well(s) Ordered by API
Order by Well Name

API Number:	**05-045-18424**	Well Name:	**Williams # GM 923-1D**
Facility Status:	**IJ**	Wellbore Status:	**XX**
Authorization Date:	**7/31/2013**	No Longer Injector Date:	**N/A**
Max Water Inj Pres:	**1869**	Max Gas Inj Pres:	
Max Inj Volume:	**12980000**	Last MIT:	**9/15/20093/17/2014**

COGIS - UIC DISPOSAL Information

Related Insp Doc Orders

GM 943-1D INJECTION WELL - #159296 Information

Status: AC

Facility ID:	**159296**	Facility Name/No:	**GM 943-1D INJECTION WELL /**
Facility Status:	**AC**	Status Date:	**10/21/2009**
Operator Name:	**WPX ENERGY ROCKY MOUNTAIN LLC**	Operator Number:	**96850**
County:	**GARFIELD - #045**	Location:	**SWNE 1 7S 96W**
Field:	**GRAND VALLEY**	Lat/Long:	**/**
Facility Type:	**UIC DISPOSAL**	Order #:	
Initial Inj. Date:	**10/21/2009**	Fluid Type:	**PRODUCED WATER**
Inj. Zone Name:	**WILLIAMS FORK**	Inj. Zone Code:	**WMFK**
Avg Porosity:	**11**	Avg Permeablity:	**0**
TDS:	**24105**	Frac Gradient:	**0.852999985218048**

Facility Well(s) Ordered by API
Order by Well Name

API Number:	05-045-18426	Well Name:	**Williams # GM 943-1D**
Facility Status:	**IJ**	Wellbore Status:	**IJ**
Authorization Date:	**8/5/2013**	No Longer Injector Date:	**N/A**
Max Water Inj Pres:	**2028**	Max Gas Inj Pres:	
Max Inj Volume:	**18530000**	Last MIT:	**9/15/200910/4/2013**

COGIS - UIC DISPOSAL Information

Related Insp Doc Orders

RWF 911-28D INJECTION WELL - #159447 Information

Status: AC

Facility ID:	159447	Facility Name/No:	RWF 911-28D INJECTION WELL /
Facility Status:	AC	Status Date:	1/24/2014
Operator Name:	WPX ENERGY ROCKY MOUNTAIN LLC	Operator Number:	96850
County:	GARFIELD - #045	Location:	SESW 21 6S 94W
Field:	RULISON	Lat/Long:	/
Facility Type:	UIC DISPOSAL	Order #:	
Initial Inj. Date:	1/24/2014	Fluid Type:	PRODUCED WATER
Inj. Zone Name:	COZZETTE	Inj. Zone Code:	COZZ
Avg Porosity:	0	Avg Permeablity:	0
TDS:	18200	Frac Gradient:	0.685000002384186
Inj. Zone Name:	CORCORAN	Inj. Zone Code:	CRCRN
Avg Porosity:	0	Avg Permeablity:	0
TDS:	15755	Frac Gradient:	0.685000002384186

Facility Well(s) Ordered by API

Order by Well Name

API Number:	05-045-22176	Well Name:	Clough # RWF 911-28D
Facility Status:	WO	Wellbore Status:	WO
Authorization Date:	4/28/2014	No Longer Injector Date:	N/A
Max Water Inj Pres:	4400	Max Gas Inj Pres:	
Max Inj Volume:	48250000	Last MIT:	1/17/20144/16/2014

COGIS - UIC DISPOSAL Information

Related Insp Doc Orders

DOE 2-W-29 - #159418 Information

Status: AC

Facility ID:	**159418**	Facility Name/No:	**DOE 2-W-29 /**
Facility Status:	**AC**	Status Date:	**5/28/2013**
Operator Name:	**WPX ENERGY ROCKY MOUNTAIN LLC**	Operator Number:	**96850**
County:	**GARFIELD - #045**	Location:	**SENE 29 6S 95W**
Field:	**PARACHUTE**	Lat/Long:	**/**
Facility Type:	**UIC DISPOSAL**	Order #:	
Initial Inj. Date:	**5/28/2013**	Fluid Type:	**PRODUCED WATER**
Inj. Zone Name:	**WASATCH**	Inj. Zone Code:	**WSTC**
Avg Porosity:	**14**	Avg Permeablity:	**2**
TDS:	**4118**	Frac Gradient:	**0.685000002384186**

Facility Well(s) Ordered by API

Order by Well Name

API Number:	**05-045-06588**	Well Name:	**DOE # 2-W-29**
Facility Status:	**IJ**	Wellbore Status:	**IJ**
Authorization Date:	**5/28/2013**	No Longer Injector Date:	**N/A**
Max Water Inj Pres:	**576**	Max Gas Inj Pres:	
Max Inj Volume:	**7850000**	Last MIT:	**5/17/2013**

COGIS - UIC DISPOSAL Information

Related Insp Doc Orders

DOE 1-W-27 - #159432 Information — Status: AC

Facility ID:	159432	Facility Name/No:	DOE 1-W-27 /
Facility Status:	AC	Status Date:	11/20/2013
Operator Name:	WPX ENERGY ROCKY MOUNTAIN LLC	Operator Number:	96850
County:	GARFIELD - #045	Location:	SWNW 27 6S 95W
Field:	PARACHUTE	Lat/Long:	/
Facility Type:	UIC DISPOSAL	Order #:	
Initial Inj. Date:	11/20/2013	Fluid Type:	PRODUCED WATER
Inj. Zone Name:	WASATCH	Inj. Zone Code:	WSTC
Avg Porosity:	0	Avg Permeablity:	2
TDS:		Frac Gradient:	0.685000002384186

Facility Well(s) Ordered by API

Order by Well Name

API Number:	05-045-06583	Well Name:	Federal # DOE 1-W-26
Facility Status:	PR	Wellbore Status:	SI
Authorization Date:	6/24/2014	No Longer Injector Date:	N/A
Max Water Inj Pres:	672	Max Gas Inj Pres:	
Max Inj Volume:	7706918	Last MIT:	3/17/20147/15/2014
API Number:	05-045-06584	Well Name:	Federal # DOE 1-W-27
Facility Status:	PR	Wellbore Status:	XX
Authorization Date:	11/20/2013	No Longer Injector Date:	N/A
Max Water Inj Pres:	633	Max Gas Inj Pres:	
Max Inj Volume:	9250000	Last MIT:	11/18/2013
API Number:	05-045-06585	Well Name:	Federal # DOE 2-W-27
Facility Status:	PR	Wellbore Status:	SI
Authorization Date:	6/13/2014	No Longer Injector Date:	N/A
Max Water Inj Pres:	707	Max Gas Inj Pres:	
Max Inj Volume:	6333225	Last MIT:	3/17/2014

WPX Energy Rocky Mountain LLC

Accutest Mountain States			
Lab Sample ID:		D45350-1	D45350-6
Date Sampled:		4/16/2013	4/16/2013
Matrix:		Water	Water
Volatiles	**Units**	**Influent**	**Effluent**
Acrolein	ug/l	ND (25)	ND (5.0)
Acrylonitrile	ug/l	ND (6.5)	ND (1.3)
Benzene	ug/l	290	ND (0.27)
Bromodichloromethane (Cas# 75-27-4)	ug/l	ND (1.9)	ND (0.38)
Bromoform	ug/l	ND (2.7)	ND (0.53)
Carbon tetrachloride	ug/l	ND (1.4)	ND (0.27)
Chlorobenzene	ug/l	ND (1.7)	ND (0.34)
Chloroethane	ug/l	ND (3.1)	ND (0.61)
2-Chloroethyl vinyl ether	ug/l	ND (4.0)	ND (0.80)
Chloroform	ug/l	ND (1.9)	ND (0.38)
Dibromochloromethane	ug/l	ND (2.7)	ND (0.53)
1,1-Dichloroethane	ug/l	ND (1.3)	ND (0.26)
1,2-Dichloroethane	ug/l	6.4 [1]	ND (0.38)
1,1-Dichloroethylene	ug/l	ND (2.3)	ND (0.46)
1,2-Dichloropropane	ug/l	ND (1.9)	ND (0.38)
1,3-Dichloropropene (Cas# 542-75-6)	ug/l	ND (15)	ND (3.0)
Ethylbenzene	ug/l	15.9	ND (0.33)
Methyl bromide	ug/l	ND (12)	ND (2.3)
Methyl chloride	ug/l	ND (2.5)	ND (0.50)
Methylene chloride	ug/l	ND (13)	ND (2.5)
1,1,2,2-Tetrachloroethane	ug/l	ND (1.7)	ND (0.34)
Tetrachloroethylene	ug/l	ND (2.1)	ND (0.42)
Toluene	ug/l	583	ND (1.0)
trans-1,2-Dichloroethylene	ug/l	ND (1.8)	ND (0.36)
1,1,1-Trichloroethane	ug/l	ND (1.4)	ND (0.28)
1,1,2-Trichloroethane	ug/l	ND (1.5)	ND (0.30)
Trichloroethylene	ug/l	ND (2.1)	ND (0.41)
Vinyl chloride	ug/l	ND (1.8)	ND (0.36)
Acid	**Units**	**Influent**	**Effluent**
2-Chlorophenol	ug/l	ND (0.53)	ND (0.53)
2,4-Dichlorophenol	ug/l	ND (0.59)	ND (0.59)
2,4-Dimethylphenol	ug/l	1.8 [1]	ND (0.50)
4,6-Dinitro-o-cresol	ug/l	ND (0.48)	ND (0.48)
2,4-Dinitrophenol	ug/l	ND (3.8)	ND (3.8)
2-Nitrophenol	ug/l	ND (0.48)	ND (0.48)
4-Nitrophenol	ug/l	ND (0.71)	ND (0.71)
4-Chloro-3-methyl phenol (Cas# 59-50-7)	ug/l	ND (0.60)	ND (0.60)
Pentachlorophenol	ug/l	ND (0.71)	ND (0.71)
Phenol	ug/l	3.5 [1]	ND (0.71)
2,4,6-Trichlorophenol	ug/l	ND (0.50)	ND (0.50)
Base/Neutral	**Units**	**Influent**	**Effluent**
Acenaphthene	ug/l	ND (0.49)	ND (0.49)
Acenaphthylene	ug/l	ND (0.48)	ND (0.48)
Anthracene	ug/l	ND (0.48)	ND (0.48)
Benzidine	ug/l	ND (6.7)	ND (6.7)
Benzo(a)anthracene	ug/l	ND (0.48)	ND (0.48)
Benzo(a)pyrene	ug/l	ND (0.48)	ND (0.48)
Benzo(b)fluoranthene (Cas# 205-99-2)	ug/l	ND (0.48)	ND (0.48)
Benzo(g,h,i)perylene	ug/l	ND (0.48)	ND (0.48)

WPX Energy Rocky Mountain LLC

Accutest Mountain States			
Lab Sample ID:		D45350-1	D45350-6
Date Sampled:		4/16/2013	4/16/2013
Matrix:		Water	Water
Volatiles	**Units**	**Influent**	**Effluent**
Benzo(k)fluoranthene	ug/l	ND (0.48)	ND (0.48)
bis(2-Chloroethoxy)methane	ug/l	ND (0.48)	ND (0.48)
bis(2-Chloroethyl)ether	ug/l	ND (0.48)	ND (0.48)
bis(2-Chloroisopropyl)ether	ug/l	ND (0.53)	ND (0.53)
bis(2-Ethylhexyl)phthalate	ug/l	28.1	ND (1.0)
4-Bromophenyl phenyl ether	ug/l	ND (0.48)	ND (0.48)
Butyl benzyl phthalate	ug/l	ND (0.48)	ND (0.48)
2-Chloronaphthalene	ug/l	ND (0.48)	ND (0.48)
4-Chlorophenyl phenyl ether	ug/l	ND (0.48)	ND (0.48)
Chrysene	ug/l	ND (0.48)	ND (0.48)
Dibenzo(a,h)anthracene	ug/l	ND (0.48)	ND (0.48)
m-Dichlorobenzene (Cas# 541-73-1)	ug/l	ND (1.9)	ND (0.37)
o-Dichlorobenzene (Cas# 95-50-1)	ug/l	ND (1.6)	ND (0.32)
p-Dichlorobenzene (Cas# 106-46-7)	ug/l	ND (1.8)	ND (0.35)
3,3'-Dichlorobenzidine	ug/l	ND (0.48)	ND (0.48)
Diethyl phthalate	ug/l	ND (0.48)	ND (0.48)
1,2-Diphenylhydrazine	ug/l	ND (0.48)	ND (0.48)
Dimethyl phthalate	ug/l	ND (0.48)	ND (0.48)
Di-n-butyl phthalate	ug/l	ND (0.66)	ND (0.66)
2,4-Dinitrotoluene	ug/l	ND (0.48)	ND (0.48)
2,6-Dinitrotoluene	ug/l	ND (0.53)	ND (0.53)
Di-n-octyl phthalate	ug/l	ND (0.48)	ND (0.48)
Fluoranthene	ug/l	ND (0.48)	ND (0.48)
Fluorene	ug/l	ND (0.48)	ND (0.48)
Hexachlorobenzene	ug/l	ND (0.48)	ND (0.48)
Hexachlorobutadiene	ug/l	ND (15)	ND (3.0)
Hexachlorocyclopentadiene	ug/l	ND (3.8)	ND (3.8)
Hexachloroethane	ug/l	ND (0.54)	ND (0.54)
Indeno(1,2,3-cd)pyrene	ug/l	ND (0.54)	ND (0.54)
Isophorone	ug/l	ND (0.48)	ND (0.48)
Naphthalene	ug/l	ND (10)	ND (2.0)
Nitrobenzene	ug/l	ND (0.48)	ND (0.48)
N-Nitrosodimethylamine	ug/l	ND (0.48)	ND (0.48)
N-Nitroso-di-n-propylamine	ug/l	ND (0.70)	ND (0.70)
N-Nitrosodiphenylamine	ug/l	ND (0.48)	ND (0.48)
Phenanthrene	ug/l	ND (0.48)	ND (0.48)
Pyrene	ug/l	ND (0.48)	ND (0.48)
1,2,4-Trichlorobenzene	ug/l	ND (3.3)	ND (0.65)
Other	**Units**	**Influent**	**Effluent**
Alkalinity, Carbonate	mg/l	2.0 [2]	2.0 [2]
Aluminum, Dissolved	mg/l	0.0068 [1]	0.0031 [1]
Arsenic, Total	mg/l	0.0041	0.00020 [2]
BOD, 5 Day	mg/l	748	10.6
Boron, Total	mg/l	2.88	0.0968
Cadmium, Total Recoverable	mg/l	0.00080 [1,3]	0.00016 [2]
Calcium	mg/l	248	23.1
Chemical Oxygen Demand	mg/l	2040	738
Chloride	mg/l	9320	69.9
Chromium, Total	mg/l	0.0034 [1]	0.00056 [2]
Chromium, Hexavalent	mg/l	0.0050 [2,4]	0.0050 [2]

WPX Energy Rocky Mountain LLC

Accutest Mountain States			
Lab Sample ID:		D45350-1	D45350-6
Date Sampled:		4/16/2013	4/16/2013
Matrix:		Water	Water
Volatiles	**Units**	**Influent**	**Effluent**
Chromium, Trivalent	mg/l	0.0056 [2,5]	0.0056 [2,5]
Cobalt	mg/l	0.000060 [2]	0.000060 [2]
Copper, Total Recoverable	mg/l	0.154	0.00076 [1]
Copper, Potentially Dissolved	mg/l	0.164	0.00076 [1]
Cyanide, Total	mg/l	0.013 [1,6]	0.0025 [1]
Dissolved Oxygen	mg/l	2.21	2.64
Fecal Coliform	MPN/100ml	< 2	< 2
Fluoride	mg/l	15.1	0.25 [2,4]
Gross Alpha Particles	pCi/L	0.0	2.4
HEM Oil and Grease	mg/l	7.1	2.4 [2]
Hardness, Total as CaCO3	mg/l	738 [7]	58.2 [7]
Hydrogen Sulfide	mg/l	0.40 [1]	0.20 [1]
Iron, Total Recoverable	mg/l	5.6	0.020 [2]
Iron, Dissolved	mg/l	0.145	0.020 [2]
Lead	mg/l	0.00062 [1,3]	0.000058 [1]
Lead, Potentially Dissolved	mg/l	0.00054 [1,3]	0.000028 [2]
Magnesium	mg/l	28.8	0.134 [1]
Manganese, Total Recoverable	mg/l	0.79	0.0023
Manganese, Dissolved	mg/l	0.63	0.0023
Mercury, Total	mg/l	0.000076 [1]	0.0000090 [2]
Nickel, Total Recoverable	mg/l	0.0191	0.00081 [1]
Nickel, Potentially Dissolved	mg/l	0.0205	0.00064 [1]
Nitrogen, Ammonia	mg/l	0.06	0.030 [1]
Nitrogen, Nitrate	mg/l	0.15 [2,4]	0.0060 [2]
Nitrogen, Nitrite	mg/l	1.5 [2]	0.015 [2,4]
Nitrogen, Total Organic	mg/l	29.4 [8]	0.18 [1,8]
pH	su	7.56 [9]	6.91 [9]
Phenols	mg/l	0.22 [1]	0.025 [2]
Phosphorus, Total	mg/l	0.69	0.16
Radium 226	pCi/L	11	0.06
Radium 228	pCi/L	3	1.3
Selenium, Total Recoverable	mg/l	0.0036 [1,3]	0.00058 [2]
Sodium	mg/l	6470	25.8
Solids, Total Dissolved	mg/l	16700	166
Solids, Total Suspended	mg/l	140	2.5 [2]
Silver, Total Recoverable	mg/l	0.00030 [2,3]	0.000060 [2]
Silver, Potentially Dissolved	mg/l	0.00030 [2,3]	0.000060 [2]
Specific Conductivity	umhos/cm	24600	252
SAR		103.6	1.5
Sulfate	mg/l	21.6	10.9
Total Residual Chlorine	mg/l	0.06	0.00
Temperature	Deg F	57.3	65.7
Uranium	mg/l	0.00048 [1,3]	0.0000090 [1]
Weak Acid Dissociable Cyanide	mg/l	0.0042 [1]	0.0030 [2]
Zinc, Total Recoverable	mg/l	0.0178 [1]	0.0091 [1]
Zinc, Potentially Dissolved	mg/l	0.0171 [1]	0.0036 [2]

Footnotes:

[1] Estimated value since result is > MDL but < RL.

[2] Result is < MDL.

Accutest Mountain States			
Lab Sample ID:		D45350-1	D45350-6
Date Sampled:		4/16/2013	4/16/2013
Matrix:		Water	Water
Volatiles	**Units**	**Influent**	**Effluent**

[3] Elevated detection limit due to dilution required for possible matrix interference.

[4] Elevated detection limit due to matrix interference.

[5] Calculated as: (Chromium) - (Chromium, Hexavalent)

[6] Elevated detection limit/MDL due to matrix interference.

[7] Calculated as: (Calcium * 2.497) + (Magnesium * 4.118)

[8] Calculated as: (Nitrogen, Total Kjeldahl) - (Nitrogen, Ammonia)

[9] Analysis performed past the required 15 minutes from collection time/holding time.