UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8, MONTANA OFFICE
FEDERAL BUILDING, 10 W. 15th STREET, SUITE 3200
HELENA, MONTANA 59626

STATEMENT OF BASIS

PERMITTEE:	Soap Creek Associates, Inc. Crow Reservation
FACILITY:	Soap Creek Oil Field
PERMIT NUMBER:	MT0023183
RESPONSIBLE OFFICIAL:	Willard J. Harnden Soap Creek Associates, Inc. 1365 Forest Park Circle, Suite 203 Lafayette, CO 80026
CONTACT:	John Foster Soap Creek Associates, Inc. P.O. Box 107 St. Xavier, MT 59075
PERMIT TYPE:	Minor Industrial, Indian Country, Renewal
RECEIVING WATER:	Soap Creek
LOCATION:	St. Xavier, Big Horn County, MT NW ¼ of Section 34, Township 06 S, Range 32 E 45° 16' 21" N/107° 46' 41" W

A. Background Information

This facility consists of four oil/water separation units for twenty-six oil production wells in the Tensleep, Amsden and Madison geological formations of the Soap Creek Oil Field. Crude oil and associated production water enters each oil/water separation unit directly from the wells, where the oil and water are separated using cold water knock outs and treatment towers. The oil is then piped to holding tanks while the produced water is run through declivitous aerators (step-like flumes) and placed into a series of three ponds for settling and natural aeration. Treated wastewater is discharged from the third pond into Soap Creek. A flow diagram is included with this statement of basis as Attachment A.

This proposed permit authorizes the discharge of treated production water from Outfall 001, which is just north of the final settling pond of a series of three. The discharge point is located at 45° 16' 21" north latitude and 107° 46' 41" west longitude. The oil production wastewater treatment facility for Soap Creek Associates, Inc. is at the Soap Creek Oil Field

located in the NW¼ of Section 34, Township 6 South, Range 32 East, Montana Principal Meridian, Big Horn County, Montana and is located entirely within the exterior boundaries of the Crow Indian Reservation. This permit is a renewal of NPDES Permit Number MT0023183, which expired on June 30, 2007, and has been administratively extended.

Past Discharge Analytical Data: The discharge data below covers the period from 2002 through 2007.

	Flow, gpm	pH, s.u.	O & G, mg/L	Sulfide, mg/L	TDS, mg/L
Range	109–161	7.1–8.2	1–5	0.04–0.35	1010–1520
Average	130	7.9	1.3	0.10	1447
Permit Limit (30 / 7) a/	------	6.0 – 9.0 b/	10 / 15	0.5 / 0.8	1500 / 2300
# of Permit Exceedences	------	0	0	0	2
The facility passed all Whole Effluent Toxicity (WET) tests of the discharge effluent.					

a. 30 day average and 7 day average permit limits.

b. All pH readings shall be no lower than 6.0 or higher than 9.0 standard pH units.

B. Receiving Waters

The discharge from this facility will enter Soap Creek, a perennial stream, which is a tributary of the Big Horn River. Water discharged to Soap Creek provides wildlife and stock watering opportunities and is also withdrawn for irrigation use farther downstream. As the Crow Nation has not adopted or submitted for EPA approval, Tribal water quality standards for waters within the Crow Reservation, standards are not used in development of water quality based limits and the Tribe has no CWA 401 certification authority. There is limited flow information for Soap Creek. The United States Geological Survey maintained a gauging station on Soap Creek through 1972 and measured flood-flow in 1978 however there is no recent flow information and no water quality information is available for Soap Creek.

Federal effluent limit guidelines have been promulgated for the Oil and Gas Extraction Point Source Category in 40 CFR Part 435, Subpart E as discussed below in the Effluent Limitations section. EPA will utilize the federal effluent limit guidelines, past discharge monitoring data, and extension service livestock water quality guidelines to determine effluent limits for this permit.

The following additional monitoring results were submitted as part of the permit application.

Parameter	Result	Units	Reporting Limit
pH	8.1	s.u.	0.1
Conductivity	1700	µmhos/cm	1
Bicarbonate as HCO_3	288	mg/L	1
Chloride	10	mg/L	1
Sulfate	737	mg/L	1
Fluoride	2.72	mg/L	0.10
Hardness as $CaCO_3$	855	mg/L	10
BOD	11	mg/L	2
COD	26	mg/L	1
Total Organic Carbon	4.0	mg/L	1.0
Calcium	235	mg/L	1
Magnesium	65	mg/L	1
Sodium	46.1	mg/L	0.4
Arsenic	2	µg/L	1
Boron	0.2	µg/L	0.1
Manganese	7	µg/L	1
Zinc	24	µg/L	2
Benzene	1.1	µg/L	0.0050
Toluene	0.44	µg/L	0.010
m+p-Xylene	0.94	µg/L	0.010
Temperature (field)	55	°F	
Flow	124.92	gpm	

Additional substances analyzed for but not detected as part of the permit application monitoring were: total suspended solids; ammonia as nitrogen; nitrite as nitrogen; nitrate as nitrogen; nitrate+nitrite as nitrogen; aluminum; cadmium; chromium; cobalt; copper; lead; mercury; nickel; selenium; vanadium; ethylbenzene; and o-xylene.

C. Effluent Limitations

These permit activities are covered under the effluent guideline for onshore oil and gas operations, subject to the Oil and Gas Extraction Point Source Category (40 CFR Part 435). The Oil and Gas Extraction Point Source Category Subpart C – Onshore Subcategory establishes the effluent limitation for produced water from onshore operations "which are not included within subparts D, E, or F." Subpart E – Agricultural and Wildlife Water Use Subcategory is applicable to onshore facilities west of the 98th meridian for which the produced water has a use in agricultural and wildlife propagation when discharged into navigable waters. (40 CFR 435.50) The effluent guideline (40 CFR 435.51(c)) defines use in agricultural or wildlife propagation to mean "that the produced water is of good enough quality to be used for wildlife or livestock watering or other agricultural uses and that the produced water is actually put to such use during periods of discharge."

The following effluent limitations will be required for this facility for each outfall:

Parameter	Effluent Limitations		Basis
	30 Day Average, mg/L a/	7 Day Average, mg/L a/	
Total Dissolved Solids (TDS)	1500	2300	Previous permit
Sulfide	0.5	0.8	Previous permit
The concentration of oil and grease in any single sample shall not exceed 10 mg/L.			Previous permit
pH shall be between 6.0 and 9.0 standard units at all times.			Previous permit
There shall be no acute toxicity exhibited by the discharge.			Previous permit

a. See Definitions, Part 1.1., for definition of terms.

These limits are based on the previous permit to continue to implement the requirements of the Oil and Gas Extraction Point Source Category Subpart E - Agricultural and Wildlife Water Use Subcategory (40 CFR 435).

There are no limits based on water quality standards proposed for this permit as the Crow Nation has not adopted and EPA has not approved Tribal water quality standards for waters within the Crow Indian Reservation. The permit will contain a reopener provision under which the permit may be reopened and modified as necessary, if Tribal Water Quality Standards are adopted and approved by EPA or if self-monitoring indicates additional effluent limits are needed to maintain use for agricultural and wildlife water use.

D. Self-Monitoring Requirements

The following self-monitoring requirements are included in this permit for each outfall:

Effluent Characteristic	Frequency	Sample Type a/
Total Flow, mgd b/	Monthly	Instantaneous
Total Dissolved Solids, mg/L	Monthly	Grab
pH, standard units	Monthly	Grab c/
Oil and grease, visual d/	Monthly	Observation
Fluoride, mg/L	Monthly	Grab
Sulfides, mg/L	Monthly	Grab
Whole Effluent Toxicity Testing – Acute	Twice Annually e/	Grab

a. See Definitions, Part 1.1., for definition of terms.

b. Flow measurements of effluent volume shall be made in such a manner that the permittee can affirmatively demonstrate that representative values are being obtained. The average flow

rate in million gallons per day (mgd) during the reporting period and the maximum flow rate observed shall be reported.

c. Analyze within 15 minutes. [40 CFR 136.3, Table II]

d. A monthly visual observation is required. If a visible sheen is detected, a grab sample shall be taken and analyzed immediately. The concentration of oil and grease shall not exceed 10 mg/L in any sample.

e. All WET testing shall be conducted between October 1 and March 31. The first WET test shall be conducted between October 1 and December 31 and the second WET test shall be conducted between January 1 and March 31, and there shall be at least 45 days separating the two WET tests. WET tests shall be alternated between the test species of *Ceriodaphnia dubia* and *Pimenphales promelas*. The dilution water for the testing shall be from the receiving water and be collected upstream of the settling ponds. If there is insufficient water flow in Soap Creek to collect dilution water at the time the Permittee selects for the test, the Permittee shall collect the effluent sample as normal and notify their analytical laboratory 24 hours in advance of sample delivery that they will be submitting a WET sample without receiving water for dilution.

The monitoring requirement for fluoride is new in this permit. This monitoring is included because the data submitted with the permit application shows fluoride detected at 2.72 mg/L. Water quality suitable for livestock use is discussed in Montana State University CSREES *Beef Briefs* newsletter of October 23, 2001 and North Dakota State University CSREES *Livestock and Water* bulletin AS-954, July 1999. Both of these documents give 2 mg/L of fluoride as the upper limit for livestock use of the water. The monitoring data will be used to evaluate the acceptability of the discharge for livestock use and possible development of effluent limits for this pollutant.

The following additional self-monitoring requirements are included in this permit at a designated downstream location:

Effluent Characteristic	Frequency	Sample Type a/
Total Dissolved Solids, mg/L	Monthly	Grab
pH, standard units	Monthly	Grab b/
Fluoride, mg/L	Monthly	Grab
Sulfides, mg/L	Monthly	Grab

a. See Definitions, Part 1.1., for definition of terms.

b. Analyze within 15 minutes. [40 CFR 136.3, Table II]

The downstream monitoring requirement is new in this permit. Because of the lack of recent flow information on Soap Creek, this monitoring is included to determine the water quality of Soap Creek after the discharge has been diluted with the ambient creek flow. The

monitoring data will be used to determine if the water quality of Soap Creek remains acceptable for agricultural and wildlife use after receiving the discharge or if effluent limits need to be developed for fluoride at the discharge point.

E. Whole Effluent Toxicity Monitoring

Whole effluent toxicity (WET) testing was required annually in the previous permit. 40 CFR 122.21(j)(5) specifies which treatment works must conduct WET testing. The Director may require other facilities to conduct WET testing based on the following considerations: (1) variability of pollutants; (2) ratio of effluent flow to receiving stream flow; (3) existing controls on point and non point sources; (4) receiving stream characteristics.

As EPA does not have information on ratio of effluent flow to receiving stream flow nor receiving stream characteristics, EPA analyzed ten years of Soap Creek Associates' WET testing data to determine Reasonable Potential Factor (RPF) for effluent toxicity. Reasonable Potential is the likelihood that an effluent will cause or contribute to an excursion above a water quality standard based on a number of factors, including use of data. RPF for acute toxicity based on data is calculated using toxicity units (TU_a) from the historical WET tests and test failure rate as follows:

$$\text{RPF} = \text{geometric mean of } TU_a \times \text{failure rate}$$

Where $TU_a = 100 \div LC_{50}$ of the effluent with an LC_{50} of >100% effluent = $1TU_a$, and the failure rate = tests failed ÷ tests conducted.

For this permit, Soap Creek Associates had 20 WET tests done over a ten year period with tests evenly performed on *Ceriodaphnia dubia* and *Pimenphales promelas*. All test results are given as PASS with an LC_{50} (lethal concentration killing 50% of the test species) of >100% effluent. Therefore the TU_a for each test equals 1 and with all tests listed as PASS the failure rate calculation (failure rate = 0 ÷ 20) produces a result of zero (0). As the TU_a for each test equals 1 calculating a geometric mean for the TU_a values is a simple exercise. Geometric Mean is defined as: the n^{th} root of the product of n numbers. All the TU_a values equal 1 so the product of the TU_a values equals 1 and any root of the number 1 equals 1. So using the RPF equation above:

$$\text{RPF} = \text{geometric mean of } TU_a \times \text{failure rate}$$

$$\text{RPF} = 1 \times 0 = \text{an RPF of } 0$$

Based on data from past WET tests the Soap Creek Associates discharge has zero reasonable potential to cause toxic affects to aquatic organisms in Soap Creek. However EPA has noted a concern in the historical WET testing. The previous permit required annual testing but did not designate time periods during which the testing should be done. The result was all WET tests were conducted May, June or July. Thus while the WET tests showed no toxicity the results are only representative of effluent discharge during the summer months. Therefore EPA is requiring the facility to continue WET testing for two years and increasing the testing to twice

a year with all tests to be conducted between October 1 and March 31 according to the schedule above in Part D, Self-Monitoring, which will be in the permit. After two years of WET testing is conducted, if the test results continue to show no acute toxicity, Soap Creek Associates may request to have the WET testing reduced or discontinued. EPA may approve or deny the request based on the WET testing results and other information available without further public notice or modifying the permit.

F. Reporting Requirements

The facility is required to report effluent monitoring data monthly on a discharge monitoring report. If no discharge occurred during the month, the report is to be marked as "no discharge". The facility is required to report downstream creek monitoring data monthly on a discharge monitoring report. If there is no flow in the stream except discharge effluent flow when the downstream monitoring samples are collected, a note of “no stream flow” is to be made on the discharge monitoring report.

G. Total Maximum Daily Loads

On June 21, 2000 and September 21, 2000, U.S. District Judge Donald W. Molloy issued orders stating that until all necessary total maximum daily loads (TMDLs) under Section 303(d) of the Clean Water Act are established for a particular water quality limited segment, the EPA is prohibited from issuing new permits or from increasing already permitted discharges under the NPDES program. (The orders were issued pursuant to the lawsuit Friends of the Wild Swan, et al., v. U.S. EPA, CV 97-35-M-DWM, District of Montana, Missoula Division.)

EPA finds that the issuance of this permit would not conflict with the order because (1) this is not a permit for a new or increased source and (2) the receiving water is in Indian County. The Crow Nation has not adopted water quality standards EPA has not approved water quality standards for the Crow Reservation so there is no list of impaired water bodies and no 303(d) list to require TMDLs on the Crow Reservation. Furthermore, when EPA approved the State of Montana's 1996 and 1998 lists of impaired streams and lakes which included water bodies within tribal reservation boundaries, EPA specifically stated that the approval did not extend to waters within Indian County.

H. Miscellaneous

The effective date of the permit and the permit expiration date will be determined at the time of issuance. The permit will be issued for a period of approximately five years, but not to exceed five years.

Prepared by David Rise
December 31, 2007
Modified by David Rise
January 29, 2008