

THE STATE



OF WYOMING

NOV 5 - 1976

ED HERSCHLER
GOVERNOR

Department of Environmental Quality

Water Quality Division

HATHAWAY BUILDING

CHEYENNE, WYOMING 82002

TELEPHONE 307 777-7781

November 1, 1976

Mr. Roger Frenette
Enforcement Division
Region VIII
U.S. Environmental Protection Agency
1860 Lincoln Street, Suite 900
Denver, Colorado 80203



Subject: Regulations governing
the discharge of pro-
duced water

Dear Roger:

Enclosed are a Notice of Public Hearing, proposed Regulations Governing the Surface Discharge of Water Associated with the Production of Oil and Gas, and a copy of a memo recently sent to members of our Environmental Quality Council.

I believe the enclosures clearly explain our position on the recently promulgated EPA regulations governing produced water and our proposed regulations on the same subject. I strongly feel that our regulations are better and accurately reflect Wyoming's and Region VIII's past policy on controlling this type of discharge. However, there is considerable concern here that even with adoption of Wyoming's proposed regulations, EPA will interpret its own regulations as being stronger and thus superseding the States'. Specifically, we require "no discharge" only if the discharge does not meet our chemical criteria and is not used beneficially. EPA requires no discharge in all cases except beneficial use. Of course, our regulations are more strict in other areas, most notably on the oil and grease limitation.

Therefore, I hereby request that EPA make a statement at the December 8th public hearing. We would, of course, hope that EPA could give the Environmental Quality Council the indication that if the proposed State regulations were promulgated, the EPA would accept them in place of their own. /←

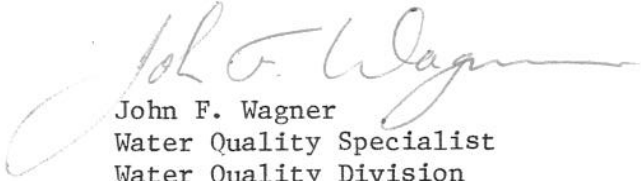
Mr. Roger Frenette
U.S. Environmental Protection Agency

November 1, 1976

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I would very much appreciate it if you would stay in touch with me on this matter and if you have any questions or comments, please contact me immediately.

Sincerely,



John F. Wagner
Water Quality Specialist
Water Quality Division

JFW/bjt

Enclosures

NOTICE OF PUBLIC HEARING

A public hearing for the purpose of receiving comments on Regulations Governing the Surface Discharge of Water Associated with the Production of Oil and Gas, as proposed by the Wyoming Department of Environmental Quality, Water Quality Division, will be held before the Environmental Quality Council on Wednesday, December 8, 1976, at Durham Hall in the Aley Fine Arts Building of Casper College from 10:00 AM to 5:00 PM.

Verbal and written statements will be accepted at the public hearing. Written statements submitted prior to the hearing and requests for copies of the proposed regulations shall be sent to:

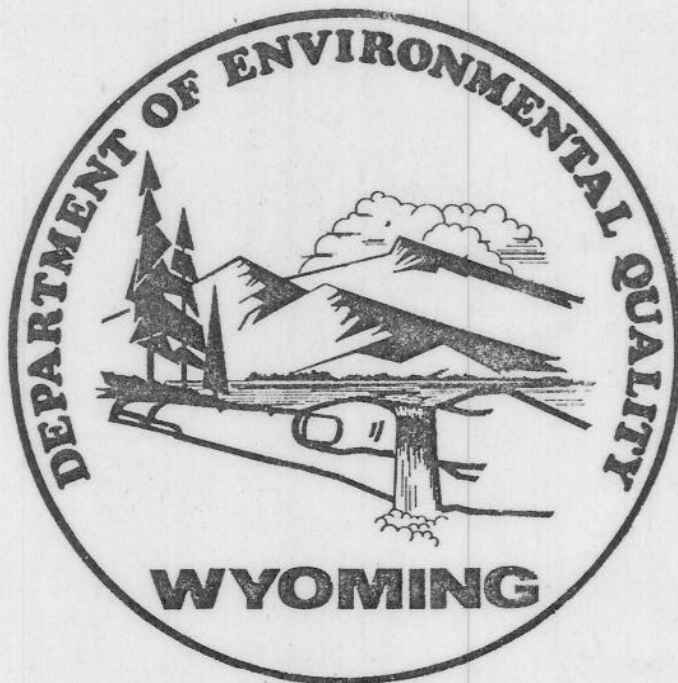
Mr. John F. Wagner
Wyoming Department of Environmental Quality
Water Quality Division
Hathaway Building
Cheyenne, Wyoming 82002

Proposed

WYOMING

WATER QUALITY

Rules & Regulations



WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

CHAPTER VII

1977

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REGULATIONS GOVERNING THE SURFACE DISCHARGE OF WATER ASSOCIATED WITH THE PRODUCTION OF OIL AND GAS

Section 1. Authority. These regulations are promulgated pursuant to Section 35-502 et. seq., Wyoming Statutes 1973, and Section 510 of the Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. et. seq., for the purpose of instituting standards governing the surface discharge of water associated with the production of oil and gas.

Section 2. Definitions. For purposes of these regulations, the following terms shall have the meanings or interpretations set out below and shall be used in conjunction with and supplemental to, those definitions contained in Section 35-502.3, Wyoming Statutes.

- a. Department - The Wyoming Department of Environmental Quality
- b. Grab Sample - A single "dip and take" sample collected at a representative point in the discharge stream
- c. Net Oil and Grease - Shall mean the residue from an oil and grease test conducted in accordance with the liquid-liquid extraction with trichlorotrifluoroethane(freon) test method found in the latest edition of Standard Methods for the Examination of Water and Wastewaters corrected for elemental sulphur. The test for elemental sulphur shall be capable of measurement at a level of 2 milligrams \pm 1.0 milligrams.
- d. Produced Water - Underground water which is brought to the surface through the pumping of oil and/or gas wells and which is usually disposed of by reinjection, discharge to complete containment ponds, or, after treatment for removal of oil, discharge to waters of the State.
- e. Skim Ponds - Earthen ponds usually used in conjunction with heater treaters and/or free water knockout units and/or skim tanks into which produced water is discharged with the purpose of providing gravity separation of oil and water. Usually designed with a "stand pipe" which discharges relatively oil-free water from near the bottom of the pond while the majority of the oil is allowed to float to the top of the pond where it is collected.
- f. Surface Waters of the State - Permanent and intermittent defined drainages and lakes and reservoirs which are not man-made retention ponds used for the treatment of municipal, agricultural, or industrial wastes.

Section 3. Discharge Permits.

- a. The owner or operator of an oil and/or gas production facility which discharges produced water which enters or threatens to enter surface waters of the State must apply for a permit to discharge in accordance with Wyoming Water Quality Rules and Regulations, Chapter 2.
- b. Application for a permit to discharge must be made by the filing with the Department of an application form entitled "National Pollutant Discharge Elimination System, Application for Permit to Discharge Produced Water - Modification Short Form C."

tion is of value to animal life.

- c. Through submission of documentation by the owner or operator of the discharging facility that because of extenuating circumstances (volume of discharge, individual chemical constituents, nature of the area in which the discharge occurs, etc.) an exemption should be granted.
- d. In no case will a modification, as described in Parts (a), (b), or (c) of this Section, be permitted which would result in violation of Wyoming Water Quality Standards.

Section 6. Produced Water Discharges in the Green River Basin. On or before July 1, 1977, all existing produced water discharges to surface waters of the State located in the Green River Basin of Wyoming shall be eliminated. Exemptions to this requirement may be granted under the procedures described in Section 5(a) and 5(b) of these regulations.

Upon the date of adoption of these regulations no new produced water discharges to surface waters of the State located in the Green River Basin of Wyoming will be allowed.

Section 7. Location of Sample Collection Points. All water quality samples collected by the Department and by produced water discharge permit holders shall be taken from the free fall of water from the last treatment unit (pond, tank, etc.) which is located out of the natural drainage. The sample must not be mixed with waters of the receiving stream or with water from another discharge point.

Section 8. Measurement of Flow Volume. Flow volume measurements, as required by produced water discharge permits, must be taken at the outfall of water from the last treatment unit (pond, tank, etc.) which is located out of the natural drainage, and must have an accuracy of ± 10 percent.

Section 9. Testing Procedures. For determination of the parameters involved in these regulations, analysis will be in accord with the latest regulations adopted in accordance with Section 304(g) of the Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. et. seq. For test procedures not listed in these regulations, test procedures outlined in the latest editions of W.Q.O. Methods for Chemical Analysis of Waters and Wastes, or Standard Methods for the Examination of Water and Wastewaters, or A.S.T.M. Standards, Part 23, "Water: Atmospheric Analysis," shall be used.

Samples used for oil and grease analysis shall be collected in one liter, wide mouth glass bottles and shall be acidized with five(5) ml of sulfuric acid (H_2SO_4) at the time of collection.

Where standard methods of testing have not been established, the suitability of testing shall be determined by the Department and the U.S. Environmental Protection Agency.

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Water Quality Division

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CHEYENNE, WYOMING 82002

TELEPHONE 307 777-7781

MEMO

TO: Environmental Quality Council

FROM: John F. Wagner, Environmental Quality Specialist, Water Quality
Division

Date: October 29, 1976

Subject: Proposed Regulations Governing the Surface Discharge of Water
Associated with the Production of Oil and Gas

Enclosed are: A Notice of Public Hearing; Proposed regulations;
and, Attachments A to E.

The purpose of this memo and attachments is to explain the need for,
and rationale behind the proposed regulations. It is expected that these
regulations may be controversial and an understanding of the information
given here will be useful in evaluating the regulations.

A significant portion of the Water Quality Division's effort is allocated to the control of pollution from oil and gas production activities. Oil spills are controlled under Chapter IV of the Water Quality Rules and Regulations, and the discharge of "produced water"(water brought to the surface along with the oil or gas) is controlled under the authority of the discharge permit program. However, to date, the effluent conditions contained in produced water discharge permits have been based only on a position paper entitled Criteria for Produced Water in Wyoming(see exhibit A) which was developed by DEQ, the Wyoming Department of Agriculture, and the Region VIII office of the federal EPA.

As long as the Washington, D.C. headquarters of EPA had not adopted specific regulations for the control of produced water discharges, it was permissible to use the Criteria for Produced Water in Wyoming as the guiding document for setting discharge permit limitations. In fact, this document has been used in Wyoming since the inception of the discharge permit program in late 1972.

However, on October 13, 1976, the headquarters office of EPA published national effluent regulations pertaining to the discharge of produced water(see exhibit B). The Water Quality Division believes that the newly promulgated EPA regulations are not reasonable or workable in Wyoming and feels that the State should adopt its own regulations, which if judged acceptable by EPA, would supercede the Federal regulations.

Major Provisions of the Federal Regulations

1. There shall be "no discharge" of produced waters unless it can be shown that the discharged water is being put to beneficial agricultural use.
2. If beneficial use is shown, the only limitation on the effluent is on the amount of oil and grease, and the allowable limit is set at 45 mg/l.
3. Regulations concerning production facilities in the "stripper" category(producing less than 10 barrels of oil per day) were not specifically spelled out, but it appears that in the future they will be treated as a special case.
4. In no case shall there be a discharge of wastes associated with the drilling of wells such as drilling muds and drill cuttings.

Water Quality Division Position on the Federal Regulations

1. The Division believes that prohibition of discharge, except when beneficial agricultural use is shown, is unreasonable because:
 - a. In Wyoming one of the most important beneficial uses of produced water is for wildlife watering. Under the Federal regulations

this is not recognized and if the State operated under the Federal regulations it is likely that a large number of water sources which are extremely important to wildlife would have to be eliminated. The proposed Wyoming regulations specifically recognize wildlife watering as a beneficial use.

- b. The Division is confident that almost all produced water discharges in the State are used beneficially, either directly or after entering a natural water course. It is unclear under the Federal regulations whether a claim of beneficial use by a water appropriator would be accepted if the only result of the produced water discharge was to augment flow in a natural stream. To address this question the proposed Wyoming regulations would set chemical quality limits on the effluent. If the discharge meets these chemical quality limits, it is assumed, based on scientific evidence and on past experience, that the water is of useable chemical quality and should be allowed to be discharged. There are many documented cases where ranchers have indicated their beneficial use of water with chemical quality in excess of our limits, and in such cases under the provisions of our proposed regulations a variance which would allow continuance of the discharge is granted.
 - c. The EPA also proposes standards for new sources that state essentially the same thing - if beneficial use by agriculture is shown the discharge can continue. It is difficult for the State to understand how anyone will prove beneficial use on a new facility before the discharge has even begun. We feel this section places an unreasonable burden on the oil industry. They need to know fairly early whether or not they are going to be allowed to discharge from a new well. We think our approach is much simpler for new sources - if the water meets the quality requirements it may be discharged, and if it does not meet the quality requirements, it may not be discharged.
2. The Division believes that the EPA effluent limitation on oil and grease of 45 mg/l is much too high and proposes 10 mg/l as a more desirable number.

The 10 mg/l limitation has always been used in Wyoming, even before creation of the DEQ. It is felt that at concentrations above 10 mg/l a "sheen" will begin to appear on the water but that at below 10 mg/l no sheen will appear. However, this rule does not always apply. For example, if the oil is highly emulsified, often no sheen is visible, but the oil and grease content may be well over 10 mg/l. Because the 10 mg/l limitation was based on a subjective (appearance of a sheen) rather than scientific premise, the limitation has received criticism.

Therefore, in order to determine whether a 10 mg/l limitation on oil and grease was justifiable on a practical basis, the Department and the Wyoming Game and Fish Department began an intensive oil treater survey in February 1975. There are currently 380 oil treater facili-

ties operating under permit in Wyoming. For the purpose of the survey, ten of those facilities were chosen for intensive oil and grease monitoring. In selecting the ten facilities the following factors were taken into consideration:

- a. The facilities represented a wide range of treatment technologies;
- b. The facilities represented a wide area of the State;
- c. Facilities with a wide range of ownership were represented (internationals such as Amoco and Union, and small independents such as Webster);
- d. The facilities represented were properly designed and generally well maintained;
- e. The facilities had to be easily accessible to sampling personnel; and
- f. The facilities had to treat a wide range of water volumes.

A listing and description of the facilities chosen for the survey is given in exhibit C. Exhibits D, E, and F give the results of the survey. Of most importance is a comparison of the last two columns of exhibits E and F. Exhibit E indicates that when the chosen facilities were operating abnormally and/or the facilities were not properly maintained, 66% of the samples collected exceeded 10 mg/l. On the other hand, exhibit F shows that under normal operation and maintenance only 5%(a total of 4) of the samples collected exceeded 10 mg/l. The four values exceeding 10 mg/l in exhibit F were: 10.1; 10.4; 13.2; and 25.8. In enforcing any kind of an effluent standard the accuracy of the test procedures as well as what constitutes a "significant" violation must be considered. For oil and grease the Department policy is that a significant violation of the oil and grease standard of 10 mg/l occurs only when a value exceeding 20 mg/l is recorded. Using this criteria, only one value(25.8 mg/l) or 1.3% of the samples collected represented a significant violation during the time the facilities were being operated and maintained normally.

One argument against use of the 10 mg/l limit will be that occasional violations are almost inevitable. The Division recognizes that occasional short term violations due to treater upsets or other equipment malfunctions will occur, however, we believe that this factor has been taken into consideration in our enforcement procedures. While there have been numerous short term violations of the 10 mg/l limit, our enforcement procedure has always been to send out a violation notice simply requiring correction of the situation and notification of the action taken. To date, this procedure has consistently obtained results and a stronger enforcement action is contemplated only in cases where there are consistent repeat offenses.

As the oil companies continue to tighten-up their operation and maintenance procedures, we have found the number of oil and grease violations to be steadily dropping.

In addition, it is widely recognized that the acceptable analytic technique for measurement of oil and grease is not always precise. The reason for this is that in some samples elemental sulfur is extracted along with the oil and grease. The EPA regulations ignore this problem and state that all material extracted shall be considered to be oil and grease. The Division does not agree with this position and feels that the oil industry should be given the opportunity to report actual oil and grease after subtraction of the elemental sulfur content. The Division is confident that analytical procedures capable of determining "net oil and grease" as defined in the proposed regulations are available.

Also, acceptance of the EPA limitation of 45 mg/l of oil and grease would require the Division to modify its in-stream water quality standards. Those standards set an allowable in-stream maximum of 10 mg/l of oil and grease. In many cases the in-stream maximum is also an effluent maximum since there are situations in which the only flow in a stream is produced water. Thus, if we are to accept the EPA regulations a modification of our in-stream standards would be required.

Therefore, it is the position of the Division that it is not unreasonable to require proper design, operation, and maintenance of oil treater facilities, and that if proper design, operation, and maintenance is achieved, the evidence shows that a limitation of 10 mg/l can be achieved consistently.

We believe that produced waters with 45 mg/l of oil and grease as allowable under the Federal regulations would render the produced water unusable for stock and wildlife. Also, since the Division must show a significant violation before it can proceed with enforcement action, the true allowable upper limit for oil and grease would actually be even higher than 45 mg/l.

3. The Division does not agree with EPA that small operators in the "stripper" category should be given special treatment. This type of facility is generally operated by the smaller independent company and is less well maintained and operated than the non-stripper operation. Though the quantity of oil produced is low, very often the quantity of water produced is quite high. Since the pollution potential is directly related to the quantity of water, not oil, the Division feels that all oil treater facilities should be treated the same.
4. The Federal regulations require no discharge of waters associated with the drilling of wells such as drilling muds and drill cuttings. The Division agrees with this provision and our proposed regulations require that such wastes must be completely contained. Then, after

the liquid portion of the waste has evaporated, the ponds must be covered and graded. Problems have occurred in the past when drillers have simply allowed drilling liquids to flow onto the land or into waters of the State. Section 12 of the proposed regulations outlaws this practice.

Provisions of the Proposed Wyoming Regulations
Not Addressed in the Federal Regulations

The proposed Wyoming regulations contain several sections not addressed in the Federal regulations. A listing and brief discussion of these items follows.

1. Produced water discharges in the Green River Basin(Section 6)

Wyoming has reached agreement with all other Colorado River Basin states and the Federal government in which all parties will attempt to eliminate all industrial point sources of "salt pollution". Section 6 confirms this commitment. Essentially all produced water in the Green River Basin is being reinjected or completely confined at this time, and this requirement is not anticipated to be difficult for the oil industry to meet.

2. Clarification of location of sampling points(Sections 7 and 8)

In the past the Division has had some difficulty with permittees collecting discharge samples in the receiving stream or at other inappropriate locations. These sections simply clarify the proper sampling location.

3. Testing procedures(Section 9)

For many parameters the result of an analysis can vary widely depending upon how a sample is collected, in what kind of container it is collected, and if and how the sample is preserved. For example, if an oil and grease sample is collected in a plastic container, much of the oil will adhere to the plastic during the test procedures, resulting in a reading lower than would be expected if the sample was taken in the proper glass container.

4. Location of skim ponds(Section 10)

In the past, problems have occurred when operators have attempted to make treatment ponds simply by damming the natural drainage, thus creating a skim pond. Experience shows that during times of heavy precipitation these dams will often wash out and thus flush all accumulated oil on the ponds downstream. Also, since natural runoff can enter such ponds, discharge samples are diluted and do not give a true reading of the produced water quality.

5. Diffuse discharges(Section 11)

The Division receives occasional complaints from land owners when produced water is allowed to spread in a diffuse manner over their land. Since the chemical content of these waters will often kill vegetation and ruin the land, section 11 simply allows us to require the containment of a discharge to a ditch, pipe, or other conduit.

6. Protection of stock and wildlife(Section 13)

Since flagging and fencing of treatment ponds is not a water quality related item, only a recommendation may be made in these regulations. However, we feel that the problem is real and is sufficiently serious to justify inclusion in the regulations.

CRITERIA FOR PRODUCED WATER IN WYOMING

Developed by: Wyoming Department of Environmental Quality
Wyoming Department of Agriculture
U. S. Environmental Protection Agency

1. All produced water discharges which are documented as being used for irrigation, livestock or wildlife watering shall be allowed to continue to discharge, except in those cases where such discharges cause violation of Water Quality Standards of the State of Wyoming.
2. In those cases where it is not documented that the produced water is being used for irrigation, livestock or wildlife watering, the discharge will be allowed only when it meets the following criteria:

- | | |
|---------------------------|---|
| a. Chlorides | 2,000 mg/l |
| b. Total Dissolved Solids | Below 5,000 mg/l - acceptable
5,000 to 7,500 mg/l - consideration
will be made of beneficial use, individual chemical constituents, and nature of the drainage area
Above 7,500 mg/l - acceptable only
if beneficial use is shown |
| c. Sulfates | 3,000 mg/l |
| d. Oil and Grease | 10 mg/l |
| e. Toxic Substances | Free from toxic substances in concentrations or combinations which are toxic to human, animal, plant or aquatic life |
| f. pH | 6.5 - 8.5 |

In addition to the above, the State reserves the right to impose limitations on other parameters including but not limited to: Temperature; Chemical oxygen demand; and, Sulfides. This shall apply when such limitations are deemed necessary to protect the quality and beneficial uses of the State's waters.

In instances where produced water discharges are causing damage to land and or vegetation due to diffuse flow, the State reserves the right to require that the discharged water be confined to a channel, pipe, or other conduit.

OIL TREATER UNIT SURVEY

Conducted by: Wyoming Department of Environmental Quality
and Wyoming Game and Fish Department

Description of Facilities Surveyed

Company Name	Facility Name	Location	Type of Treatment	Approximate Flow Volume
Amoco	North Fork Field	Approx 4 miles north of Kaycee, Wyoming	Earthen skim ponds	Approx .6 MGD
Amoco	Salt Creek Wemco #7	Salt Creek oil field	Wemco followed by earthen skim ponds	Approx 6.0 MGD
Amoco	Lander Field	Approx 4 miles northeast of Lander, Wyoming	Earthen skim ponds	Approx .5 MGD
Arco	Hamilton Dome	Approx 25 miles north-west of Thermopolis	Earthen skim ponds	Approx 4.0 MGD
Chevron	Queally Dome	Approx 25 miles north-west of Laramie, Wyo.	Sand filter and earthen skim ponds	Approx .1 MGD
Marathon	Oregon Basin Batt. B	Approx 15 miles south of Cody, Wyoming	Concrete separator, Wemco, and earthen skim ponds	Approx .3 MGD
Union Oil Co.	Dallas Dome	Approx 10 miles south-east of Lander, Wyo.	Earthen skim ponds	Approx .8 MGD
Union Oil Co.	Fourte 4 & 5	Approx 10 miles south-east of Lander, Wyo.	Earthen skim ponds	Approx .08 MGD
Union Oil Co.	Derby Dome	Approx 15 miles south-east of Lander, Wyo.	Earthen skim ponds	Approx .13 MGD
Joe Webster	Lake Creek Field	Approx 25 miles east of Thermopolis, Wyoming	Earthen skim ponds	Approx .25 MGD

SUMMARY OF ALL DATA COLLECTED

Unit Name	Total # of Samples Collected	Low mg/l	Average mg/l	High mg/l	# of samples Exceeding 10 mg/l	% of samples Exceeding 10 mg/l
Amoco - North Fork Field	10	1.0	4.6	10.4	1	10%
Amoco - Salt Creek Wemco #7	12	6.8	11.8	22.2	8	67%
Amoco - Lander Field	2	1.8	5.0	8.2	0	0%
Arco - Hamilton Dome	25	1.2	10.8	26.4	10	40%
Chevron - Quealy Dome	12	.2	11.8	83.1	2	15%
Marathon - Oregon Basin	22	1.5	7.3	27.6	4	18%
Union - Dallas Dome	11	1.3	7.8	22.7	1	9%
Union - Fourte 4 & 5	9	1.0	2.0	3.0	0	0%
Union - Derby Dome	10	2.1	8.4	18.3	3	30%
Webster - Lake Creek Field	16	3.8	11.1	25.8	7	44%
TOTAL	129(Total)	.2	(Avg. of all) 8.8	83.1	36(Total)	(Percentage of all samples) 28%

SUMMARY OF DATA COLLECTED WHEN FACILITIES WERE NOT OPERATING NORMALLY
AND/OR SKIM PONDS NOT PROPERLY MAINTAINED

Unit Name	# of samples collected	Low mg/l	Average mg/l	High mg/l	# of samples exceeding 10 mg/l	% of samples exceeding 10 mg/l
Amoco - North Fork Field	(Treater conditions not recorded on 2 samples) 1	10.4	10.4	10.4	1	100%
Amoco - Salt Creek Wemco #7	(Treater conditions not recorded on 3 samples) 5	6.8	13.7	22.2	4	80%
Amoco - Lander Field	0	--	--	--	-	--
Arco - Hamilton Dome	(Treater conditions not recorded on 2 samples) 12	7.1	15.7	26.4	10	83%
Chevron - Quealy Dome	4	1.0	23.3	83.1	1	25%
Marathon - Oregon Basin	(Treater conditions not recorded on 4 samples) 7	2.2	8.1	13.7	2	29%
Union - Dallas Dome	3	7.3	12.7	22.7	1	33%
Union - Fourte 4 & 5	0	--	--	--	-	--
Union - Derby Dome	3	10.6	18.3	18.3	3	100%
Webster - Lake Creek Field	(Treater conditions not recorded on 1 sample) 6	5.6	19.8	19.8	5	83%
TOTAL	41 (Total)	1.0	(Avg. of all) 14.5	83.1	27 (Total)	(Percentage of all samples) 66%

SUMMARY OF DATA COLLECTED WHEN FACILITIES OPERATING NORMALLY
AND SKIM PONDS RECEIVING PROPER MAINTENANCE

Unit Name	# of samples collected	Low mg/l	Average mg/l	High mg/l	# of samples exceeding 10 mg/l	# of samples exceeding 10 mg/l
Amoco - North Fork Field	(Treater conditions not recorded on 2 samples) 7	1.0	3.8	6.4	0	0%
Amoco - Salt Creek Wemco #7	(Treater conditions not recorded on 3 samples) 4	6.8	9.8	13.2	2	50%
Amoco - Lander Field	2	1.8	5.0	8.2	0	0%
Arco - Hamilton Dome	(Treater conditions not recorded on 2 samples) 11	1.2	5.7	9.4	0	0%
Chevron - Quealy Dome	8	.2	6.2	10.4	1	13%
Marathon - Oregon Basin	(Treater conditions not recorded on 4 samples) 11	1.5	5.0	7.5	0	0%
Union - Dallas Dome	8	1.3	6.0	9.6	0	0%
Union - Fourte 4 & 5	9	1.0	2.0	3.0	0	0%
Union - Derby Dome	7	2.1	5.2	9.4	0	0%
Webster - Lake Creek Field	(Treater conditions not recorded on 1 sample) 9	3.8	8.2	25.8	1	11%
TOTAL	76 (Total)	.2	(Avg. of all) 5.5	25.8	4 (Total)	(Percentage of all samples) 5%