Fact Sheet

Date: July 1998
NPDES Permit Number: AK-004038-0

The U.S. Environmental Protection Agency (EPA) Plans To Reissue A Wastewater Discharge Permit To:

Usibelli Coal Mine, Inc.
P.O. Box 1000
Healy, Alaska 99743
ph. 907-683-2226

EPA Proposes NPDES Permit Reissuance.

EPA proposes to reissue a *National Pollutant Discharge Elimination System* (NPDES) Permit to Usibelli Coal Mine, Inc. in Healy, Alaska. The proposed permit sets conditions on the discharge of pollutants from the wastewater treatment impoundments to Sanderson Creek, Hoseanna (Lignite) Creek, and the West Tipple Gravel Ponds.

This Fact Sheet includes:

- information on public comment, public hearing, and appeal procedures
- a description of the facility, its history and current discharge and treatment system
- a description of proposed effluent limitations and monitoring requirements, and other conditions
- a map and description of the discharges

EPA invites comments on the proposed permit.

EPA will consider all substantive comments before issuing a final permit. Those wishing to comment on the proposed permit may do so in writing by the expiration date of the Public Notice. After the Public Notice expires, and all comments have been considered, EPA's regional Office of Water Director will make a final decision regarding permit reissuance.

If no substantive comments are received, the tentative conditions in the proposed permit will become final, and the permit will become effective upon issuance. If comments are received, the permit will become effective 30 days after the issuance date, unless a request for an evidentiary hearing is submitted within 30 days.

Documents are available for review.

The proposed NPDES permit and related documents can be reviewed at EPA's Regional Office in Seattle between 8:30 a.m. and 4:00 p.m., Monday through Friday. This material is also available for inspection and copying at the following places in Alaska:

USEPA Alaska Operations Office
Federal Building, Room 537
222 West 7th Avenue
Anchorage, Alaska 99513-7588
Telephone: (800) 781-0983
(Within Alaska)

USEPA Alaska Operations Office
410 Willoughby Avenue, Suite 100
Juneau, Alaska 99801
Telephone: (907) 586-7619

United States Environmental Protection Agency
Region 10
1200 Sixth Avenue, OW-130
Seattle, Washington 98101
(206) 553-1214 or
1-800-424-4372
(Within Alaska, Idaho, Oregon and Washington)

ADEC Watershed Development Program
Air and Water Quality Division
610 University Avenue
Fairbanks, AK 99709
Telephone: (907) 451-2141

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I. APPLICANT

NPDES Permit No.: AK-004038-0

Usibelli Coal Mine, Inc

Mailing Address:
P.O. Box 1000
Healy, Alaska 99743

Facility Location:
Poker-Gold Run Pass-Two Bull Ridge Coal Mines

Facility contact: Alan Renshaw, Regulatory Manager

II. FACILITY ACTIVITY

Usibelli Coal Mine, Inc. operates year round, and is located within the Alaska Range near the town of Healy. The mine was founded in 1943 by Emil Usibelli, and it has a work force of approximately 120 employees. Domestically, the coal produced at Usibelli Coal Mine, Inc. is used to power six cogeneration plants in the interior of Alaska, supplying electricity and steam to approximately 75,000 customers. Internationally, the mine ships coal to the Republic of Korea from the Seward Port.

Usibelli Coal Mine, Inc. surface mines for coal recovery through the use of dragline and truckshovel methods. Over 1.6 million tons of coal per year are produced from three mining areas: Gold Run Pass, Poker Flats and Two Bull Ridge (upcoming). The Gold Run Pass mining area is in the final stages of producing coal and the revegetation process is well underway. The Poker Flats mining area produces the majority of the 1.6 million tons of coal per year, and it is currently being revegetated as individual cuts are completed. The Two Bull Ridge mining area will produce coal starting in 1999.

III. RECEIVING WATER

Mostly stormwater and occasional mine drainage from these areas are routed through settling ponds. Discharges from the settling ponds occur in Sanderson Creek, Hoseanna Creek, (both in the Hoseanna Creek watershed on the east side of the Nenana River) and the West Tipple gravel ponds (west side of the Nenana River). Treatment from the mining areas is accomplished by channeling runoff and mine drainage (if any) first to presettling basins, then to primary and secondary settling ponds. The ponds are designed with the capacity to treat runoff resulting from a ten-year twenty-four hour storm event. The maps in the Appendix F of the permit show the location of the discharges and receiving water quality monitoring sites. There is no discharge in the winter months.

As are most waters of the State, Sanderson Creek, Hoseanna Creek, and the West Tipple gravel ponds are all classified in the Alaska Water Quality Standard Regulations (18 AAC 70) for use as water supply, water recreation, and growth and propagation of fish, shellfish, other aquatic life, and wildlife. This means the permit must be designed to provide for compliance with the strictest water quality standard by comparison of the uses. The AWQS that could be affected by the discharge are pH,

turbidity, sediment, and inorganic substances such as iron and manganese. However, because the discharges from the ponds normally exhibit a pH greater than 6.0, the effluent guidelines do not require a manganese limitation in the permit.

The drainage from Hoseanna Creek based on USGS data indicates a 7Q10 flow (lowest average daily flow during any consecutive seven days in any ten-year period) as follows:

April - June	4.2 cubic feet per second
July - August	11.0 cubic feet per second
September - November	8.5 cubic feet per second

Due to the wide variation of receiving water and effluent flow rates, in addition to routine weekly sampling of the technology-based effluent limits, the permit is designed to gather data across seasonal variations over its five-year term.

IV. FACILITY BACKGROUND

History

After an inspection in 1983 by EPA, it was determined that mine drainage was being discharged into waters of the U.S. via settling ponds, and thus an NPDES permit would be required. It was issued on August 12, 1985. In March 1986, the EPA received a request from Usibelli Coal Mine, Inc. for a modification to the permit, based on plans for reconstruction and new construction, which added sedimentation ponds and the use of flocculants to the treatment system. The permit was modified in April 1987. An application for reissuance was received on February 1, 1990. Since then, more planned changes have dictated submittal of a new application. This was received in November, 1997. It included upcoming discharges from addition of the Two Bull Ridge mining area and the discharges into the gravel pits on the west side of the Nenana River from the coal storage and loading area (referred to as the West Tipple).

Discharge Points

The November 1997 NPDES permit application listed ten discrete point sources discharging into five water bodies: Sanderson Creek, Hoseanna Creek, Nenana River, Poker Creek, and West Tipple. All the discharges require monitoring for a full suite of parameters, mostly metals. In addition, bioassays are now a standard for whole effluent toxicity monitoring. Since two of the discharges rarely discharge, the company decided to eliminate their discharge points from the facility. A letter to amend the permit application describes the elimination of the outfall into the Nenana River (below the maintenance shop) and the outfall into Poker Creek.

V. EFFLUENT LIMITATIONS

Basis

"Permit writers must consider the impact of every proposed surface water discharge on the quality of the receiving water. Water quality goals for a water body are defined by State water quality standards. A permit writer may find, by analyzing the effect of a discharge on the receiving water, that technology-based permit limits are not sufficiently stringent to meet these water quality standards. In such cases, the Clean Water Act and EPA regulations require development of more stringent, water quality-based effluent limits designed to ensure that water quality standards are met." (1996, U.S. EPA NPDES Permit Writer's Manual, p87.)

The effluent limits in this permit are *technology-based* for new sources (where construction commenced after May 4, 1984). One data set existed for development of *water quality-based* limits for metals. Due to the high level of uncertainty in interpretation or extrapolation to water quality concerns from a single data point, it was decided to discontinue the water quality-based limit analysis. Instead, the parameters of concern will be monitored throughout the life of this permit. If during the course of examination, a water quality concern arises, the permit may be modified. More likely, the data will be used in preparation of the next permit for determination of additional limits.

Furthermore, it is well-known that metals are often associated with suspended solids which are limited by this permit. Over a period of the preceding five years, a review of the Discharge Monitoring Reports revealed only one instance of non-compliance with the permit limit for TSS (See Appendix D).

The Trend in Water Quality Protection:
An Integrated Approach to Implementing Water Quality Standards

In water quality-based effluent analysis, controlling highly toxic pollutants is a primary concern. The EPA Technical Support Document (TSD) for Water Quality-based Toxics Control (EPA/505/2-90-001, March 1991) explains the permitting approach to the control of toxic substances. In the EPA's surface toxics control regulation (54 FR 23868, June 2, 1989) requirements to use the "integrated" approach for controlling these substances was specified. "The 'integrated' approach consists of whole effluent, chemical-specific, and biological approaches as a means of protecting aquatic life and human health." (EPA, 1991)

Chemical Specific: The chemical specific substances limited in this permit are based on analyses which resulted in the promulgation of effluent limitations for the Coal Mining industrial category (47 FR 45382, October 13, 1983).

Whole Effluent Toxicity (WET): This protects the receiving water quality from the aggregate toxic effect of a mixture of pollutants in the effluent. The WET tests are bioassays which measure the degree of response of exposed aquatic organisms to the effluent. Bioassays allow the permit writer to be protective of the narrative "no toxics in toxic amounts" criterion that is applicable to all water of the United States.

Biological Criteria: The biological criteria or biological assessment approach is the third approach to water quality-based toxics control. The "biocriteria" are numerical values or narrative statements describing reference biological communities inhabiting waters of a given designated aquatic life use. "When incorporated into State water quality standards, biological criteria an aquatic life use designations serve as direct, legal endpoints for determining aquatic life use attainment." (1996, U.S. EPA NPDES Permit Writer's Manual, p98.) However, the State of Alaska is still a number of years away from establishing biological criteria. More likely to come first will be sediment criteria. (1998, pers. comm. with Robert Dolan, ADEC, Anchorage.)

Seasonal Effluent Limits

EPA acknowledges that total suspended solids cannot be consistently controlled during precipitation events. Alternative effluent limitation for periods of precipitation are provided by the coal mining point source effluent guidelines, and are incorporated into this permit. A precipitation event is defined as follows:

1. Measurable rainfall during a 24-hour period;
2. The time period of snowmelt (occurring at any time there is snow on the ground within the watershed and the temperature is above 0°C).

Effluent limitations dependent on a rainfall event of 2 inches within a 24-hour period are designated in accordance with the guidelines. The 2 inches of rainfall specification was obtained as the value of the 10-year 24-hour storm event for the approximated location the mine area near Healy, Alaska.

VI. MONITORING REQUIREMENTS

Effluent Monitoring

The Clean Water Act requires that monitoring be included in permits to determine compliance with effluent limitations. Monitoring may also be required to gather data for future effluent limitations or to monitor effluent impacts on receiving water quality. This permit introduces additional monitoring than in the previous permit in order to evaluate the need for water quality-based permit limits. This will be accomplished through the receiving water and effluent sampling program which calls for two sets of samples each year, at varying seasons, in order to yield statistically relevant data. The Permittee is responsible for conducting the monitoring and for reporting results to EPA.

In general, the Clean Water Act requires that the effluent limit for a particular pollutant be the more stringent of either the *technology-based* or *water quality-based* limit. To determine if there is "reasonable potential" to cause or contribute to an exceedence of water quality criteria for a given pollutant, EPA compares applicable water quality criteria to the maximum expected receiving water concentration for a particular pollutant. If the expected receiving water concentration exceeds the criteria, there is "reasonable potential" and a limit must be included in the permit. EPA uses the recommendations in Chapter 3 of the Technical Support Document for Water Quality-based Toxics Control (TSD, EPA 1991) to conduct this "reasonable potential" analysis.

The TSD establishes a statistical procedure for determining the maximum expected receiving water concentration. The maximum expected receiving water concentration is calculated based on *dilution* (if available), the maximum reported *effluent concentration*, the *background pollutant concentration* (if available), and a *multiplier to account for uncertainty*. The multiplier is used to statistically generate a maximum expected effluent concentration from the maximum reported concentration. The multiplier decreases as the number of data points increases and variability of the data decreases. Variability is measured by the coefficient of variation of the data. When there are not enough data (the total number of observations, $n < 10$) to reliably determine a coefficient of variation (CV), the TSD recommends using 0.6 as a default value. Therefore, say a CV = 0.6 and there is only one data point, then the reasonable potential multiplier would equal 6.2 for a 99% Confidence Level and 95% Probability basis, as compared to 1.7 for a data set of 10 samples.

Water Quality Monitoring Program Requirements

In order to obtain statistically relevant data, it was decided to require a minimum of 10 water quality data sets for each of the eight discharges over the life of the permit (See Appendix G). This will be accomplished by twice yearly sampling events with varying seasons. This seasonal shifting of sampling time is important since the effluent is largely derived from stormwater flow through the mining area.

Whole Effluent Toxicity Testing Requirements

At the time of permit development there were no known fish inhabiting Hoseanna Creek. However, since all the receiving waters in this watershed are classified for all uses by the State Water Quality Standards and since there is little knowledge about the toxicity, which would likely result from metals in the effluent, or from some unknown toxic substance, a minimum bioassay program has been chosen. It will require annual bioassays on the last (and largest) outfall into Hoseanna Creek, and the West Tipple North Ditch outfall into the gravel pond, where there is more a likelihood of inhabitation by fish and diverse aquatic life than other locations near outfall points. A conservative TU_c of 2 was chosen since there is no authorized State mixing zone associated with this permit. In preliminary water quality-based limit analyses, flows and mixing zone estimations were performed, along with a determination of the related point of complete mixing on Hoseanna Creek. This was estimated to be 3,049 feet downstream of the last discharge on Hoseanna Creek during the highest flow condition of April - June. Given a 30% confidence in the model, the sampling point will be at Bridge 1 which is 4,000 feet downstream of the last discharge on the creek and a much safer location from which to collect samples. See Appendix E for a graph of the sum of all the effluents into Hoseanna Creek versus the creek flow.

Best Management Practices Plan

It is national policy that, whenever feasible, pollution should be prevented or reduced at the source, that pollution which cannot be prevented should be recycled in an environmentally save manner, and that disposal or release into the environment should be employed only as a last resort and should be conducted in an environmentally safe manner (Pollution Prevention Act of 1990, 42 U.S.C. 13101).

Pursuant to Section 402(a)(1) of the Clean Water Act, development and implementation of Best Management Practices (BMP) Plans may be included as a condition in NPDES permits. Section 402(a)(1) authorized EPA to include miscellaneous requirements in permits on a case-by-case basis which are

deemed necessary to carry out the provision of the Act. BMPs, in addition to numerical effluent limitations, are required to control or abate the discharge of pollutants in accordance with 40 CFR § 122.44(k). The BMP Plan requirement has also been incorporated into this permit in accordance with EPA's Guidance Manual for Developing Best Management Practices (October, 1993).

The proposed permit requires the development and implementation of a BMP Plan which prevents or minimizes the generation of pollutants, their release, and/or potential release from the facility to the waters of the United States. The requirements of the general plan are outlined in the proposed permit.

Implementation is required no later than 120 days of the effective date of the permit. In addition to developing and implementing the BMP Plan, the operator is also required to record periodic inspections and, if no incidents of noncompliance occur, to so certify in accordance with permit stipulations.

Quality Assurance Project Plan

Under 40 CFR § 122.44(e), the permittee must properly operate and maintain all facilities which it uses to achieve compliance with the conditions of the permit. This regulation also requires the permittee to ensure adequate laboratory controls and appropriate quality assurance procedures.

The draft permit requires the permittee to submit, for review and approval by EPA and for review by ADEC, a Quality Assurance Project Plan (QAPP) to EPA within 90 days of the effective date of the permit. The plan is intended to address sampling techniques, sample preservation and shipment procedure, instrument calibration and preventive maintenance procedures and personnel qualifications and training.

VII. OTHER PERMIT CONDITIONS

Endangered Species Act

The Endangered Species Act requires federal agencies to consult with the National Marine Fisheries Service and the U.S. Fish and Wildlife Service if their actions could beneficially or adversely affect any threatened or endangered species. EPA sent letters to the U.S. Fish and Wildlife Service and the National Marine Fisheries Service on May 21, 1998, requesting a species list for the area of the facility.

State Certification

Section 401 of the Clean Water Act requires EPA to seek *state certification* before issuing a final permit. During certification, the state may require more stringent permit conditions to ensure that the permit complies with water quality standards. During certification, the state also may or may not authorize the *mixing zone* used to calculate the effluent limitations in the proposed permit. If the state does not certify the mixing zone, EPA will recalculate the permit limitations based on meeting water quality standards at the point of discharge (rather than in-stream at the edge of the "mixing zone"). If the state certifies a larger or smaller mixing zone than that used in the draft permit, the effluent limitations in the final permit will be recalculated to reflect this change. This permit requires compliance with AWQS at the end of the pipe.

Permit Expiration

This permit will expire five years from the effective date of the permit, but may be administratively extended if the conditions of 40 CFR §122.6(a) are met.

APPENDIX A -- LIST OF ACRONYMS

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
AWQS	Alaska Water Quality Standard
BMP	Best Management Practices
CFR	Code of Federal Regulations
cfs	Cubic feet per second
DMR	Discharge Monitoring Report
EPA	Environmental Protection Agency
FR	Federal Regulation
gpm	gallons per minute
NPDES	National Pollutant Discharge Elimination System
TSD	Technical Support Document for Water Quality-based Toxics Control
TSS	Total Suspended Solids
USC	United States Code
USGS	United States Geological Survey

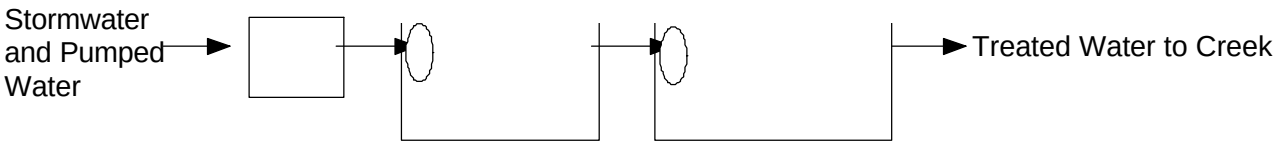
APPENDIX B -- REFERENCES

40 CFR 434, Subpart B -- Coal Preparation Plants and Coal Preparation Plant Associated Areas.

EPA, NPDES Permit Writer's Manual. Office of Water, Office of Wastewater Management, Permits Division. Washington, DC. 20460; EPA-833-B-96-003, December 1996, 220pp.

EPA, Technical Support Document for Water Quality-based Toxics Control. Office of Water Enforcement and Permits, Office of Water Regulations and Standards. Washington, DC, 20460; EPA/505/2-90-001, March 1991, 145pp.

APPENDIX C -- USIBELLI COAL MINE, INC. WATER TREATMENT FLOW SCHEMATIC



Notes:
Ponds are designed to treat runoff from a ten-year, twenty-four hour storm event.
Pumped Water is water that has collected in the mining pit.
Polymer logs are used as a flocculent.

WASTEWATER SOURCES AND TREATMENT PLAN Excerpt from the Permit Application

A system of collection and diversion channels will be used to collect runoff from disturbed area. This runoff will be conveyed to sediment ponds prior to discharge into receiving waters. The drainage channels were designed using a SEDCAD+ computer model for a 10-year, 24-hour storm event. Channel gradient and geometry have been selected to minimize contribution of additional sediment load to the receiving waters. The sets of ponds are also designed with an emergency spillway to safely pass discharge from the 25-year, 24-hour storm event while maintaining one foot of freeboard.

The ponds have been designed with an operational level conservatively at the invert of the outlet pipe. This assumes the worst case scenerio when the incoming water would have the least detention time. As long as the water levels in the ponds are maintained at or below this level, the pond system will treat the peak discharge from a 10-year, 24-hour storm event without discharging through the emergency spillway.

APPENDIX D -- DISCHARGE MONITORING REPORT 5 -YEAR SUMMARY

DMR Review Jan. 1992 - Dec. 1997 (from PCS - Permit Compliance Tracking System) Maximum levels (and min. for pH) and Date of Report						
Outfall	**pH**	**TSS,** (limited only for outfall A)	**Settleable Solids,** (limited only for outfall B)	**Iron** (limited only for outfall A)	**Flow, max.**	**Rainfall, max.**
A= no rain, B= rain, 2 or less inches C= rain, more than 2 inches	6.0 - 9.0	35 daily avg. 70 daily max. mg/L	0.5 ml/L	3.5 daily avg. 7.0 daily max. mg/L	Mgd	inches
001A	6.12 (6/30/93)	33 (6/30/94)	0	0.87 (6/30/96)	0.428 (6/30/97)	0
	9.31 (6/30/94)	33 (6/30/94)		4 (5/31/93)		
001B	6.10 (4/30/93)	468 (5/31/94)	<0.5 (5/31/95), (6/30/96)	2.43 (6/30/94)	0.346 (5/31/94)	4.0 (6/30/95)
	9.06 (6/30/97)	NA		NA		
002A	6.35 (8/31/93)	43 (9/30/94)	0	0.6 (8/31/93), (6/30/94)	0.121 (7/31/97)	0
	7.98 (7/31/97)	69 (9/30/94)		0.7 (8/31/92)		
002B	6.23 (4/30/93)	698 (5/31/95)	<0.5 (5/31/95)	2.1 (4/30/93), (5/31/93)	0.426 (8/31/96)	1.4 (6/30/94)
	8.85 (8/31/96)	NA		NA		
003A	no discharge	no discharge	no discharge	no discharge	no discharge	no discharge
003B	6.33 (5/31/93)	not in PCS	0.5 (5/31/92)	2.1 (4/30/93), (5/31/93)	not in PCS	1.75 (6/30/95)
	8.20 (10/31/94)	NA		NA		
004A	7.23 (9/30/93)	14 (9/30/93)	0	0.4 (9/30/93)	0.009 (9/30/93), (7/31/94)	0
	7.88 (7/31/94)	14 (9/30/93), (7/31/94)		0.4 (9/30/93)		
004B	6.43 (4/30/93)	6800 (7/31/97)	0.4 (5/31/92), (6/30/94), (7/31/97)	2.66 (8/31/96)	0.333 (8/31/96)	0.77 (8/31/96)
	8.54 (7/31/95)	NA		NA		

APPENDIX E -- HISTORICAL POND EFFLUENT V. HOSEANNA CREEK DISCHARGE

Insert LOTUS 1-2-3 PEVS.WK4

APPENDIX F -- ALASKA STATE WATER QUALITY STANDARDS
For Selected Parameters, ug/L* (Current on June 30, 1998)

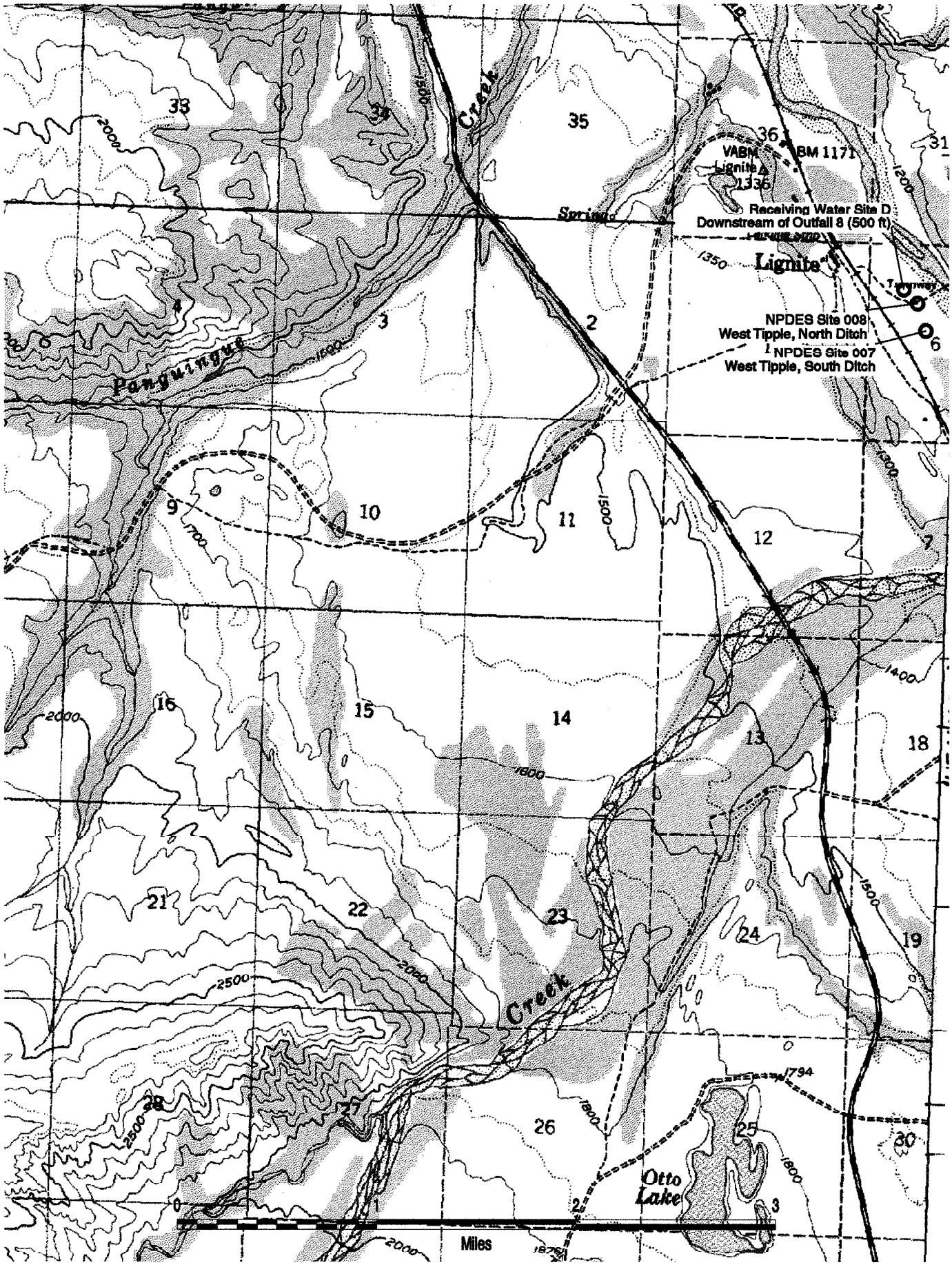
***Metals criteria are based on a Total Recoverable Analysis**

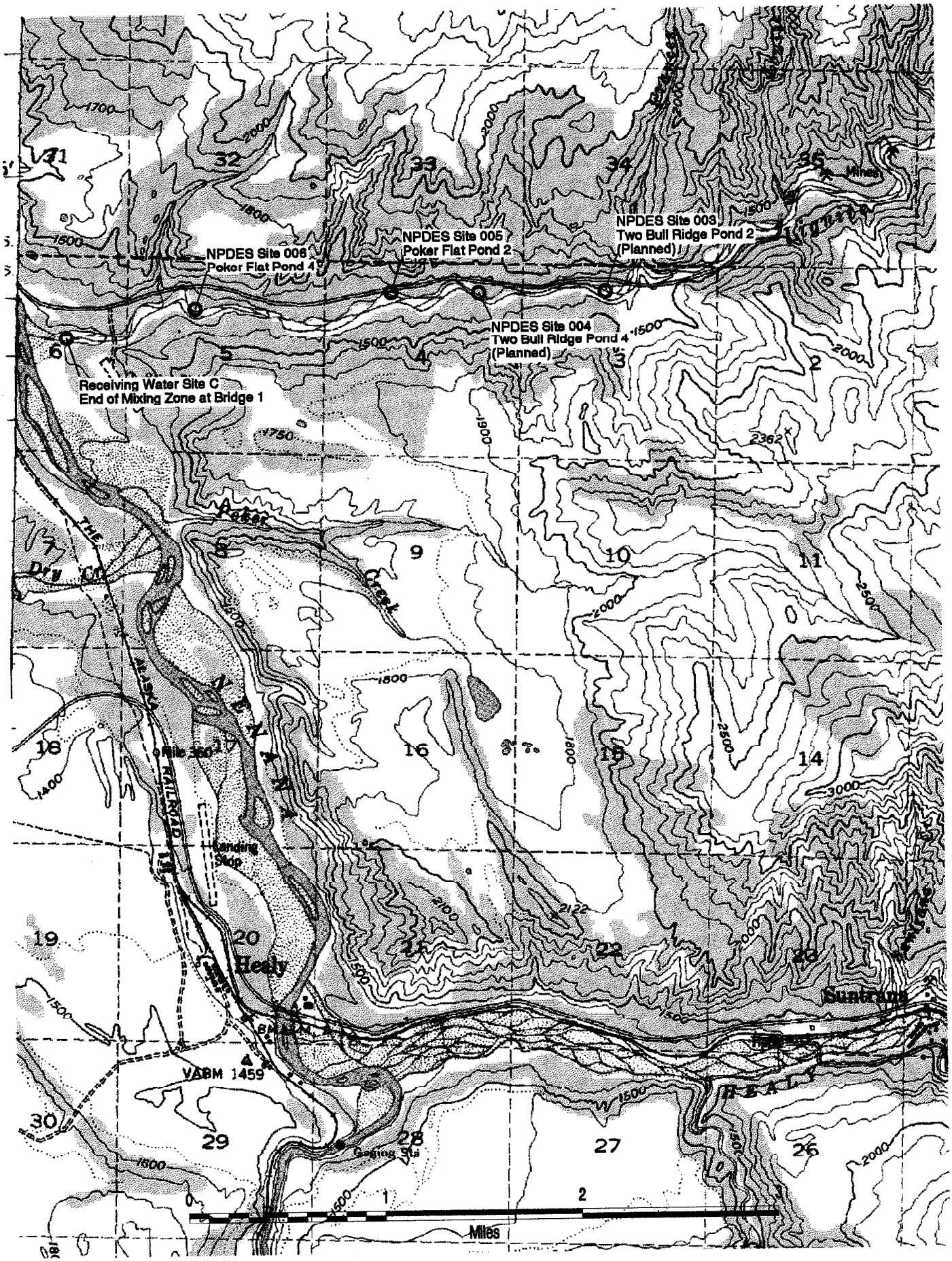
Parameter	Fresh Water Acute	Fresh Water Chronic	Drinking Water	Reference (for most restrictive Std.)
Arsenic	360	190	**50**	1994 AK DW Reg. 18 AAC 80
Barium	---	---	**2,000**	1994 AK DW Reg. 18 AAC 80
Beryllium	---	---	**4**	1994 AK DW Reg. 18 AAC 80
Cadmium (hardness dependent**)**	$e^{(1.128\ [\ln(\text{hardness})]\ -3.828)}$ @ 100 mg/L CaCO3 = 3.9	$e^{(0.7852\ [\ln(\text{hardness})]\ -3.490)}$ @ 100 mg/L CaCO3 = **1.1**	5	July 29, 1985 FR
Chloride			**200,000**	1998 WQ Std. 18 AAC 70
Chromium (Total)	---	---	**100**	1994 AK DW Reg. 18 AAC 80
Chromium III (hardness dependent)	$e^{(0.8190\ [\ln(\text{hardness})]\ +3.688)}$ @ 100 mg/L CaCO3 = 1,700	$e^{(0.8190[\ln(\text{hardness})]\ +1.561)}$ @ 100 mg/L CaCO3 = **210**	---	1985 FR
Chromium VI	16	**11**	100	1985 FR
Copper (hardness dependent)	**$e^{(0.9422[\ln(\text{hardness})]\ -1.464)}$** @ 100 mg/L CaCO3 = 18	**$e^{(0.8545[\ln(\text{hardness})]\ -1.465)}$** @ 100 mg/L CaCO3 = **12**	1,000	1985 FR
Fluoride	---	---	**4,000**	1994 AK DW Reg. 18 AAC 80
Iron	1,000	1,000	**100** (secondary)	1976 EPA Quality Criteria For Water
Lead (hardness dependent)	**$e^{(1.273[\ln(\text{hardness})]\ -1.460)}$** @ 100 mg/L CaCO3 = 82	**$e^{(1.273[\ln(\text{hardness})]\ -4.705)}$** @ 100 mg/L CaCO3 = **3.2**	50 (1976 RedBook)	1985 FR
Magnesium and Total Dissolved Solids (TDS)	---	---	(Magnesium is related to TDS) **500,000**	1988 WQ Std. 18 AAC 70
Mercury	2.4	**0.012**	2	1985 FR

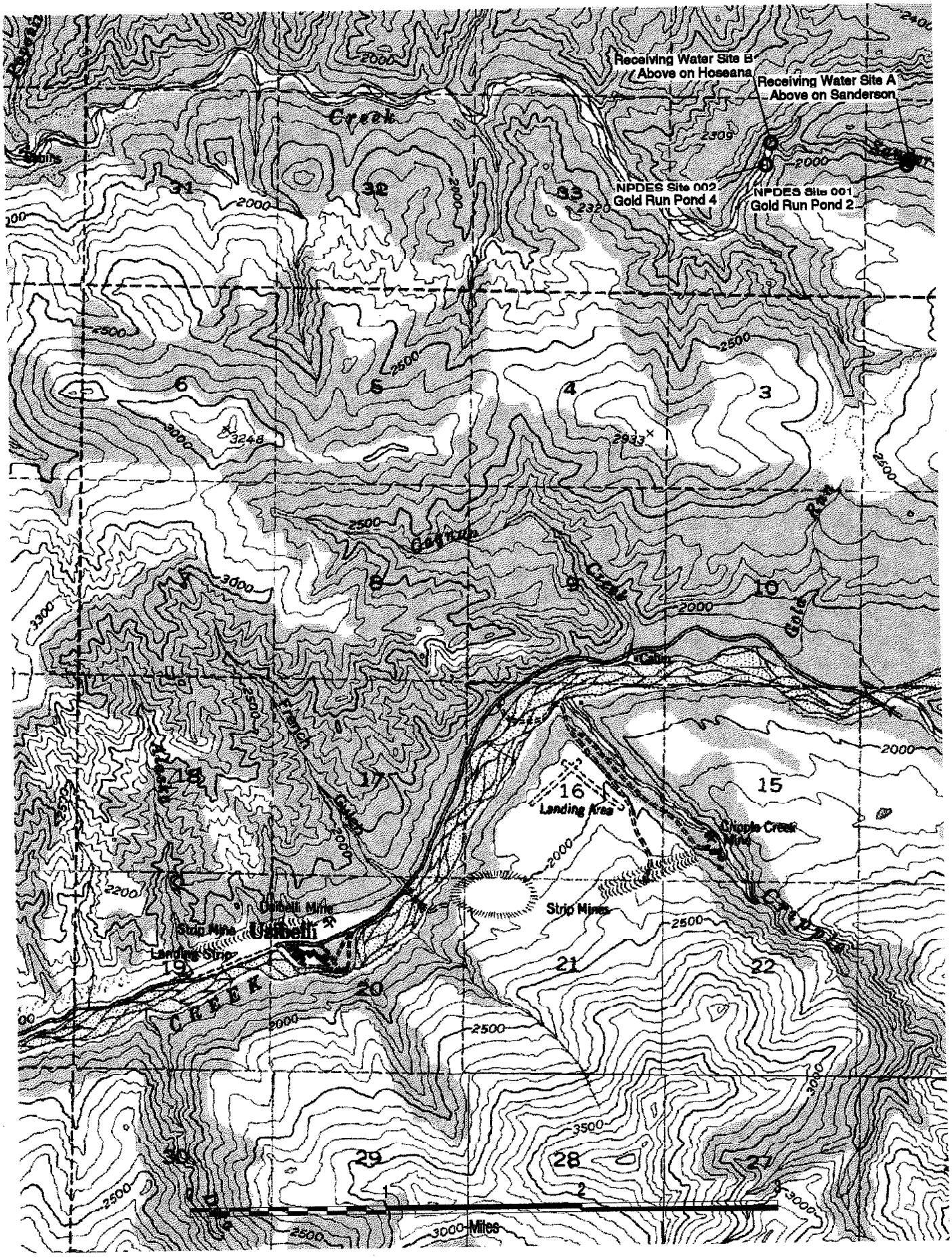
Parameter	Fresh Water Acute	Fresh Water Chronic	Drinking Water	Reference (for most restrictive Std.)
Nickel (hardness dependent)	$e^{(0.76[\ln(\text{hardness})] + 4.02)}$ @ 100 mg/L CaCO3 = 1,800	$e^{(0.76[\ln(\text{hardness})] + 1.06)}$ @ 100 mg/L CaCO3 = **96**	100	1980 FR
Nitrate	---	---	**10,000 as N**	1994 AK DW Reg.18 AAC 80
Nitrite	---	---	**1,000 as N**	1994 AK DW Reg. 18 AAC 80
Nitrate plus Nitrite	---	---	**10,000 as N**	1994 AK DW Reg. 18 AAC 80
Selenium	20	**5**	50	EPA 1980 Ambient WQ Criteria for Selenium
Silver (Acute is hardness dependent)	**$e^{(1.72[\ln(\text{hardness})] - 6.52)}$** @ 100 mg/L CaCO3 = **0.12** (LOEL)	---	100 (Secondary)	EPA 1980 Ambient WQ Criteria for Silver
Sulfate	---	---	**200,000**	1988 WQ Std. 18 AAC 70
Thallium	1,400 (LOEL)	40 (LOEL)	**2**	1994 AK DW Reg. 18 AAC 80
Zinc (Acute is hardness dependent)	**$e^{(0.83[\ln(\text{hardness})] + 1.95)}$** @ 100 mg/L CaCO3 = 320	**47**	5,000 (Secondary**)**	EPA 1980 Ambient WQ Criteria for Zinc

1. Because the Alaska Water Quality Standards are revised and updated regularly, these criteria are valid only on the above date for the purposes of this permit. The local ADEC Water Quality Section office should be contacted for any new changes.
2. Bold -- Indicates probable most restrictive state water quality standard as of June 30, 1998.
3. Red Book -- 1976 EPA Quality Criteria for Water.
4. LOEL -- Lowest Observed Effect Level.

APPENDIX G -- RECEIVING WATER SAMPLING SITES AND DISCHARGE POINTS




NPDES Site 006
Poker Flat Pond 4
NPDES Site 005
Poker Flat Pond 2
NPDES Site 003
Two Bull Ridge Pond 2
(Planned)
NPDES Site 004
Two Bull Ridge Pond 4
(Planned)
Receiving Water Site C
End of Mixing Zone at Bridge 1
Poker Creek
THE Dry Cr
ALASKA RAILROAD
Mile 350
Landing Strip
Healy
VABM 1459
Gaging Sta
Suntrana
HEALY
Miles


Receiving Water Site B
Above on Hoseana
Receiving Water Site A
Above on Sanderson
NPDES Site 002
Gold Run Pond 4
NPDES Site 001
Gold Run Pond 2
Creek
Cabins
Gold Run
Gold Run Creek
Gold Run
Landing Area
Cripple Creek
Mine
Strip Mines
Strip Mine
Landing Strip
Jabelli Mine
Jabelli
CREEK
3248
2933
3565
Miles