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1515 Mineral Square
P.O. Box 11248
Salt Lake City, Utah 84147
Telephone (801) 322-8460
FAX (801) 583-3129

December 15, 1989

Kennecott

87K102

Michael Witt, Chief
Industrial Wastewater Section
Wisconsin Department of Natural Resources
P. O. Box 7921
Madison, WI 53707

Dear Mr. Witt:

RE: Flambeau Project
Revised WPDES Permit Application

The Flambeau Mining Company (Flambeau) is pleased to submit to the Wisconsin Department of Natural Resources (WDNR) a revised application for a WPDES Discharge Permit. This application is being submitted pursuant to Wis. Stat. ch. 147. The permit application includes the following documents:

- Application Form 1 - General Information, Consolidated Permits Program.
- Application Form 2D - New Sources and New Dischargers: Application for Permit to discharge process wastewater.
- Final Engineering Report for Wastewater Treatment Facilities for the Flambeau Project (submitted under separate cover).

Groundwater modeling efforts completed last summer for the Flambeau Project have been presented to the WDNR in the "Groundwater Model for the Kennecott Flambeau Project" by Prickett, et al., July 1989. The original estimation of the average groundwater flow entering the mine, as shown in the April 1989 WPDES permit application for outfall 001, was 397 gallons per minute. The revised estimation of the average flow of groundwater entering the mine based on the modeling information is 106 gallons per minute. This change impacts the calculation of the weekly and monthly effluent limits for the WPDES discharge permit.

As the project has moved forward, additional ideas and information have been generated which also resulted in minor changes to the application. An itemization of these latter changes is discussed below.

1. The name of the applicant has been changed to the Flambeau Mining Company, which is a wholly owned subsidiary of the Kennecott Corporation.

2. An alternate outfall for 001 is shown on the EPA form 2D in item no. 1, Outfall Location. This alternate outfall location, while discussed later in the original application, was inadvertently omitted from form 2D.
3. Item II of form 2D, Discharge Date has been revised to April 1991. This revision reflects more recent projections regarding start-up of the project.
4. Item III A of form 2D reflects the changes in anticipated flows to the wastewater treatment facilities and settling ponds. These changes reflect the changes in the groundwater modeling projections and minor changes in the surface areas receiving precipitation.
5. Item V of form 2D, Effluent Characteristics, has been modified to reflect the changes in average flows from outfalls 001 and 002. These modifications also impact the anticipated pounds per day of constituents in the discharge. The reasons for these changes are listed above.
6. Item V of form 2D, Effluent Characteristics, also lists the anticipated concentration of constituents in the effluent. Values in the original application had raised some concern. The reason for the concern was the apparent discrepancy between the data generated in the bench scale pilot study and the data listed in this section of the original discharge permit application. Of particular concern were aluminum, mercury, selenium, and silver. The concentrations listed for each of these parameters in the original permit application was also higher than proposed effluent limits. The WDNR indicated in the Draft Environmental Impact Statement (DEIS) that they assumed "that Flambeau Mining Co. conservatively estimated high concentrations for the WPDES permit application." This was in fact the case. Conservative estimates were used in the original application largely based on lab detection limits and EPA accepted methods. To clarify this issue, Flambeau has reevaluated the data generated in the pilot study and has listed new anticipated concentrations in this revised application. The discussion below is presented to clarify each change in concentration for the above listed parameters.

Aluminum

An anticipated concentration of <5 mg/l of aluminum was shown in the original application for both outfall 001 and 002. This parameter was not indicated to be a control parameter at the beginning of the bench scale pilot study. Because of this, no data was collected for this parameter during the pilot study. The <5 mg/l value was developed from a very conservative estimate of the anticipated effluent concentration. Both the lime/sulfide and the settling pond treatment technology are capable of producing

an effluent with 1 mg/l or less of aluminum. Flambeau feels confident that the discharge will be well below the 1.5 mg/l aluminum limit proposed by the WDNR. Because of this, the revised permit application lists anticipated aluminum concentrations of <1 mg/l for both outfalls.

Mercury

The anticipated levels of mercury shown for outfalls 001 and 002 in the original application were <0.5 ug/l. These limits reflect analytical detection levels reported throughout the bench scale study and the site environmental investigations. This level is higher than the proposed limit for mercury, listed in the DEIS, of 0.34 ug/l for a monthly average. Mercury was not found to be present in either the baseline groundwater investigation or the waste characterization investigation. While Flambeau feels that a limit of 0.34 ug/l of mercury is below a reliable detection limit, it feels that no detectable mercury will be found even if analyzed by a method capable of a detection limit of 0.3 ug/l. Because of this, the average level of mercury listed in the revised permit application has been changed to <0.3 ug/l.

Selenium

The anticipated maximum levels of selenium shown for outfalls 001 and 002 in the original application were 200 ug/l. The proposed effluent limit for selenium is 120 ug/l. The 200 ug/l selenium level which was indicated in the original application was a conservative level. In fact, the pilot study indicated that the proposed treatment technologies would be able to reach levels of 3 ug/l for selenium. To more closely reflect the pilot study data, yet maintain a conservative approach to our estimating procedures, the revised permit application lists the anticipated maximum levels of selenium to be <100 ug/l.

Silver

The anticipated levels of silver listed for outfalls 001 and 002 in the original permit application were <10 ug/l. These levels reflected the detection capability for flame atomic absorption spectrophotometry. This is the analytical method Flambeau is planning to use on site. The proposed effluent limit for silver is 6.6 ug/l. The pilot study had indicated that the treatment technologies were able to reduce the silver levels in the wastewaters to below 0.4 ug/l. Again, to reflect the pilot study data, yet maintain a conservative estimation, the revised permit application lists anticipated levels of silver to be <6.0 ug/l for both outfalls.

The primary discharge points will consist of an outfall for the project's wastewater treatment plant and an outfall for the

project's settling ponds. Both outfalls will discharge to the Flambeau River. Also included in the proposed project is the flexibility to discharge treated water from the wastewater treatment plant and the settling ponds to a wetland located near the proposed open pit. Hydrologic studies have shown that mining operations may disrupt water flow to the wetland. To avoid adverse impacts to the wetland, the project includes provisions to replace any disrupted water flow when needed, with water from the wastewater treatment plant and/or from the settling ponds.

With respect to NR 207 "Water Quality Antidegradation," Flambeau Mining Company hereby makes the following statements.

1. The Flambeau River is considered a fish and aquatic life water as defined under NR 102.13.
2. As provided for in Wis. Admin. Code NR 207.05(3), Flambeau Mining Company waives the procedure in s. NR 207.05(2) (a) to (d). The mining project will accommodate important economic and social development through an increase in employment and other factors enumerated under NR 207.04(1) (c). Estimations of this impact are available in Section 3.13 of the Environmental Impact Report (EIR)
3. The proposed discharges cannot be altered through the use of additional conservation or recycling measures beyond those already employed. The discharges will consist of treated pit groundwater inflows and storm water runoff which comes in contact with the ore, Type II material, Type I material, overburden, and/or saprolite. Every effort has been made to limit the area impacted by this project and thus limit the amount of storm water runoff generated from the site. See Section 4.0 of the EIR for further discussion of this issue.
4. The wastewater treatment facilities, designed by Ford, Bacon & Davis Utah, Inc. (formerly Ford, Bacon & Davis, Inc.) provide the technology needed to meet water quality effluent limits. This technology has been evaluated through bench scale tests which are discussed in the Final Engineering Report. Alternate technologies were evaluated as part of the preliminary evaluation of the wastewater treatment processes, but were ruled out for various reasons. A discussion on the alternatives considered was previously forwarded to the WDNR in a May 2, 1989 letter. A copy of this letter is included in Appendix A.
5. Alternate discharge locations have been considered. One such alternate includes the discharge of treated water to a wetland. This discharge will be a part of the reclamation process for the mining project. The mine development may cut off the natural water supply for a wetland within the boundaries of the mine site. The effluent discharge is one

Michael Witt, Chief
Wisconsin Department of Natural Resources
December 15, 1989
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alternative for maintaining water in the wetland. The wetland may not need the entire volume of water available through the wastewater treatment systems and therefore cannot be considered the primary discharge point for the effluent discharge.

Based on the statements above, water quality based effluent limitations should not be based on NR 207.

As per an agreement developed with the Department, it is our understanding that the WDNR will distribute this report to all appropriate state and federal agencies. Flambeau Mining Company will distribute this document to appropriate public officials.

We are requesting that the WDNR review this application as expeditiously as possible such that permitting activities associated with the project can continue in a timely manner. If you have any questions or comments as you review this report, please contact us at your convenience.

Sincerely,

Flambeau Mining Company



Lawrence E. Mercado
Vice President

Enclosure

cc: Robert Ramharter, WDNR (w/25 encl.)
John Kaiser, Chairman, Rusk County Board (w/encl.)
Robert Plantz, Chairman, Town of Grant (w/encl.)
Martin Reynolds, Mayor, City of Ladysmith (w/encl.)
Clarence Glotfelty, Rusk County Zoning Administrator (w/encl.)
Edward R. May, James Askew Associates, Inc. (w/encl.)
Ladysmith Office, Flambeau Mining Company (w/encl.)
Henry J. Handzel, DeWitt, Porter et al. (w/encl.)
Master File (w/encl.)

Please print or type in the unshaded areas only
(fill-in areas are spaced for elite type, i.e., 12 characters/inch).

Form Approved OMB No. 158-R0175

FORM 1		U.S. ENVIRONMENTAL PROTECTION AGENCY GENERAL INFORMATION <i>Consolidated Permits Program</i> <i>(Read the "General Instructions" before starting.)</i>	I. EPA I.D. NUMBER <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:5%;">5</td> <td style="width:5%;">6</td> <td style="width:5%;">7</td> <td style="width:5%;">8</td> <td style="width:5%;">9</td> <td style="width:5%;">10</td> <td style="width:5%;">11</td> <td style="width:5%;">12</td> <td style="width:5%;">13</td> <td style="width:5%;">14</td> <td style="width:5%;">15</td> </tr> <tr> <td colspan="10"></td> <td style="text-align: center;">D</td> </tr> </table>	5	6	7	8	9	10	11	12	13	14	15											D
5	6	7	8	9	10	11	12	13	14	15															
										D															
GENERAL INSTRUCTIONS If a preprinted label has been provided, affix it in the designated space. Review the information carefully; if any of it is incorrect, cross through it and enter the correct data in the appropriate fill-in area below. Also, if any of the preprinted data is absent (<i>the area to the left of the label space lists the information that should appear</i>), please provide it in the proper fill-in area(s) below. If the label is complete and correct, you need not complete items I, III, V, and VI (<i>except VI-B which must be completed regardless</i>). Complete all items if no label has been provided. Refer to the instructions for detailed item descriptions and for the legal authorizations under which this data is collected.																									
LABEL ITEMS I. EPA I.D. NUMBER III. FACILITY NAME V. FACILITY MAILING ADDRESS VI. FACILITY LOCATION	PLEASE PLACE LABEL IN THIS SPACE																								

II. POLLUTANT CHARACTERISTICS							
INSTRUCTIONS: Complete A through J to determine whether you need to submit any permit application forms to the EPA. If you answer "yes" to any questions, you must submit this form and the supplemental form listed in the parenthesis following the question. Mark "X" in the box in the third column if the supplemental form is attached. If you answer "no" to each question, you need not submit any of these forms. You may answer "no" if your activity is excluded from permit requirements; see Section C of the instructions. See also, Section D of the instructions for definitions of bold-faced terms.							
SPECIFIC QUESTIONS	MARK 'X'			SPECIFIC QUESTIONS	MARK 'X'		
	YES	NO	FORM ATTACHED		YES	NO	FORM ATTACHED
A. Is this facility a publicly owned treatment works which results in a discharge to waters of the U.S.? (FORM 2A)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	B. Does or will this facility (either existing or proposed) include a concentrated animal feeding operation or aquatic animal production facility which results in a discharge to waters of the U.S.? (FORM 2B)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
C. Is this a facility which currently results in discharges to waters of the U.S. other than those described in A or B above? (FORM 2C)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	D. Is this a proposed facility (other than those described in A or B above) which will result in a discharge to waters of the U.S.? (FORM 2D)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
E. Does or will this facility treat, store, or dispose of hazardous wastes? (FORM 3)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	F. Do you or will you inject at this facility industrial or municipal effluent below the lowermost stratum containing, within one quarter mile of the well bore, underground sources of drinking water? (FORM 4)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
G. Do you or will you inject at this facility any produced water or other fluids which are brought to the surface in connection with conventional oil or natural gas production, inject fluids used for enhanced recovery of oil or natural gas, or inject fluids for storage of liquid hydrocarbons? (FORM 4)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	H. Do you or will you inject at this facility fluids for special processes such as mining of sulfur by the Frasch process, solution mining of minerals, in situ combustion of fossil fuel, or recovery of geothermal energy? (FORM 4)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
I. Is this facility a proposed stationary source which is one of the 28 industrial categories listed in the instructions and which will potentially emit 100 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	J. Is this facility a proposed stationary source which is NOT one of the 28 industrial categories listed in the instructions and which will potentially emit 250 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

III. NAME OF FACILITY	
1	SKIP F L A M B E A U M I N I N G C O M P A N Y

IV. FACILITY CONTACT	
A. NAME & TITLE (last, first, & title)	B. PHONE (area code & no.)
2 M E R C A N D O, L A W R E N C E, E., V I C E P R E S.	8 0 1 3 2 2 8 4 6 0

V. FACILITY MAILING ADDRESS			
A. STREET OR P.O. BOX			
3 1 0 E A S T S O U T H T E M P L E			
B. CITY OR TOWN		C. STATE	D. ZIP CODE
4 S A L T L A K E C I T Y		U T	8 4 1 4 7

VI. FACILITY LOCATION					
A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER					
5 S T A T E H I G H W A Y 2 7					
B. COUNTY NAME					
R U S K					
C. CITY OR TOWN			D. STATE	E. ZIP CODE	F. COUNTY CODE (if known)
6 T O W N O F G R A N T			W I	5 4 8 4 8	

CONTINUED FROM THE FRONT

VII. SIC CODES (4-digit, in order of priority)

A. FIRST				B. SECOND			
C			(specify)	C			(specify)
7	1	0	2	7			
13	16		19	13	16		19
C. THIRD				D. FOURTH			
C			(specify)	C			(specify)
7				7			
13	16		19	13	16		19

VIII. OPERATOR INFORMATION

A. NAME												B. Is the name listed in Item VIII-A also the owner?	
FLAMBEAU MINING COMPANY												<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	
C. STATUS OF OPERATOR (Enter the appropriate letter into the answer box; if "Other", specify.)										D. PHONE (area code & no.)			
F = FEDERAL M = PUBLIC (other than federal or state) S = STATE O = OTHER (specify)										8 0 1 3 2 2 8 4 6 0			
E. STREET OR P.O. BOX													
10 EAST SOUTH TEMPLE													
F. CITY OR TOWN								G. STATE		H. ZIP CODE		IX. INDIAN LAND	
B S A L T L A K E C I T Y								U T		8 4 1 4 7		Is the facility located on Indian lands? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	

X. EXISTING ENVIRONMENTAL PERMITS

A. NPDES (Discharges to Surface Water)						D. PSD (Air Emissions from Proposed Sources)					
C	T	I				C	T	I			
9	N		N	A		9	P		N	A	
13	16	17	18		30	13	16	17	18		30
B. UIC (Underground Injection of Fluids)						E. OTHER (specify)					
C	T	I				C	T	I			
9	U		N	A		9			N	A	
13	16	17	18		30	13	16	17	18		30
C. RCRA (Hazardous Wastes)						E. OTHER (specify)					
C	T	I				C	T	I			
9	R		N	A		9			N	A	
13	16	17	18		30	13	16	17	18		30

XI. MAP

Attach to this application a topographic map of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers and other surface water bodies in the map area. See instructions for precise requirements.

XII. NATURE OF BUSINESS (provide a brief description)

Flambeau Mining Company will be operating an open pit copper mine at this site. The ore will be crushed at this site and then shipped via railroad to an out-of-state processing facility.

XIII. CERTIFICATION (see instructions)

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 persons immediately responsible for obtaining the information contained in the application, 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 and imprisonment.

A. NAME & OFFICIAL TITLE (type or print)		B. SIGNATURE		C. DATE SIGNED	
Lawrence E. Mercado Vice President		<i>LE Mercado</i>		12-13-89	

COMMENTS FOR OFFICIAL USE ONLY

C					
13	16				

Please type or print in the unshaded areas only

Form **2D** NPDES **EPA Application for Permit to Discharge Process Wastewater**

New Sources and New Dischargers

I. Outfall Location

For each outfall, list the latitude and longitude, and the name of the receiving water.

Outfall Number (list)	Latitude			Longitude			Receiving Water (name)
	Deg	Min	Sec	Deg	Min	Sec	
001	45	26	20	91	07	10	Flambeau River
002	45	26	30	91	07	20	Flambeau River
ALT- 001	45	26	20	91	07	10	Wetland Discharge to Maintain Water in a Wetland
ALT- 002	45	26	20	91	07	20	Wetland Discharge to Maintain Water in a Wetland

II. Discharge Date (When do you expect to begin discharging?)
April 1991

III. Flows, Sources of Pollution, and Treatment Technologies

A. For each outfall, provide a description of (1) All operations contributing wastewater to the effluent, including process wastewater, sanitary wastewater, cooling water, and stormwater runoff; (2) The average flow contributed by each operation; and (3) The treatment received by the wastewater. Continue on additional sheets if necessary.

Outfall Number	1. Operations Contributing Flow (list)	2. Average Flow (include units)	3. Treatment (Description or List Codes from Table 2D-1)
001	Storm water runoff from mining operation and Type II material storage pile	121 GPM*	2-C (Lime), 2-D (Polymer) 2-C (Sulfide), 1-Q, 2-K
	Groundwater entering mine	106 GPM**	
002	Storm water runoff from Type I material storage pile	29 GPM*	1-U 2-U (Lime), 2-D (Polymer)***
	Groundwater and precipitation entering the open pit during preproduction stripping	139 GPM****	
	*Estimated flows based on average annual precipitation		
	**Average of the average annual inflows of groundwater into the pit that requires treatment at the WWTP. Taken from Figure 9 of the "Groundwater Model for the Kennecott Flambeau Project" by Prickett, et al., July 1989. Value based on "Best Engineering Judgement" recharge and permeability conditions.		
	***1-U sedimentation is the primary form of treatment if needed, 2-D, polymer and 2-C (Lime) will be used to enhance settling.		
	****Total of average annual precipitation contribution and "Best Engineering Judgement" estimate of the four month average pit inflow rate from Figure 8 of the above referenced groundwater model report.		

B. 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 III-A. 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 (e.g., for certain mining activities), provide a pictorial description of the nature and amount of any sources of water and any collection or treatment measures.

C. Except for storm runoff, leaks, or spills, will any of the discharges described in item III-A be intermittent or seasonal?

Yes (complete the following table)

No (go to item IV)

Outfall Number	1. Frequency		2. Flow		c. Duration (in days)
	a. Days Per Week (specify average)	b. Months Per Year (specify average)	a. Maximum Daily Flow Rate (in mgd)	b. Maximum Total Volume (specify with units)	

IV. Production

If there is an applicable production-based effluent guideline or NSPS, for each outfall list the estimated level of production (projection of actual production level, not design), expressed in the terms and units used in the applicable effluent guideline or NSPS, for each of the first 3 years of operation. If production is likely to vary, you may also submit alternative estimates (attach a separate sheet).

Year	a. Quantity Per Day	b. Units of Measure	c. Operation, Product, Material, etc (specify)
			N.A.

V. Effluent Characteristics

A, and B: These items require you to report estimated amounts (both concentration and mass) of the pollutants to be discharged from each of your outfalls. Each part of this item addresses a different set of pollutants and should be completed in accordance with the specific instructions for that part. Data for each outfall should be on a separate page. Attach additional sheets of paper if necessary.

General Instructions (See table 2D-2 for Pollutants)

Each part of this item requests you to provide an estimated daily maximum and average for certain pollutants and the source of information. Data for all pollutants in Group A, for all outfalls, must be submitted unless waived by the permitting authority. For all outfalls, data for pollutants in Group B should be reported only for pollutants which you believe will be present or are limited directly by an effluent limitations guideline or NSPS or indirectly through limitations on an indicator pollutant.

1. Pollutant	2. Maximum Daily Value (include units)	3. Average Daily Value (include units)	4. Source (see instructions)
B.O.D. mg/l	30	20	4
B.O.D. lbs/day	288	55	
C.O.D. mg/l	50	20	4
C.O.D. lbs/day	480	55	
TOC mg/l	50	20	4
TOC lbs/day	480	55	
T.S.S. mg/l	30	20	1, 4
T.S.S. lbs/day	288	55	
Flow GPM	800	227	1, 4
Flow MGD	1.152	0.32688	
Ammonia (N) ⁽¹⁾ mg/l	< 2	< 2	4
Ammonia (N) ⁽¹⁾ lbs/day	< 19	< 5.5	
Temperature	Ambient		4
pH s.u.	9.0	6.5	1, 4
Sulfate mg/l	400	300	4
Sulfate lbs/day	3,843	818	
Sulfide mg/l	10	5	4
Sulfide lbs/day	96	13.6	
(1) No ammonia will be generated from the mining operation. This should not be a limited or monitored parameter.			

V. Effluent Characteristics

A, and B: These items require you to report estimated amounts (both concentration and mass) of the pollutants to be discharged from each of your outfalls. Each part of this item addresses a different set of pollutants and should be completed in accordance with the specific instructions for that part. Data for each outfall should be on a separate page. Attach additional sheets of paper if necessary.

General Instructions (See table 2D-2 for Pollutants)

Each part of this item requests you to provide an estimated daily maximum and average for certain pollutants and the source of information. Data for all pollutants in Group A, for all outfalls, must be submitted unless waived by the permitting authority. For all outfalls, data for pollutants in Group B should be reported only for pollutants which you believe will be present or are limited directly by an effluent limitations guideline or NSPS or indirectly through limitations on an indicator pollutant.

1. Pollutant	2. Maximum Daily Value (include units)	3. Average Daily Value (include units)	4. Source (see instructions)
Aluminum mg/l	<1	<1	4
Aluminum lbs/day	<9.6	<2.7	
Iron mg/l	1.0	0.3	4
Iron lbs/day	9.61	0.82	
(2) Magnesium mg/l	40	10	4
(2) Magnesium lbs/day	384	27.3	
Arsenic ug/l	90	5.0	4
Arsenic lbs/day	0.86	0.014	
Copper ug/l	20 ⁽³⁾	20 ⁽³⁾	1, 4
Copper lbs/day	0.192	<0.055	
(4) Mercury ug/l	<0.3	<0.3	1, 4
(4) Mercury lbs/day	<0.003	<0.0008	
Selenium ug/l	<100	20	4
Selenium lbs/day	<0.96	0.055	

(2) No permit limits should be applied to Mg-this only represents background levels.

(3) EPA's document "SW-846" lists a detection limit for copper of 20 ug/l.

(4) Background studies have not shown mercury to be in excess of detection limits (0.5 ug/l). No effluent limit should be established.

V. Effluent Characteristics

A, and B: These items require you to report estimated amounts (both concentration and mass) of the pollutants to be discharged from each of your outfalls. Each part of this item addresses a different set of pollutants and should be completed in accordance with the specific instructions for that part. Data for each outfall should be on a separate page. Attach additional sheets of paper if necessary.

General Instructions (See table 2D-2 for Pollutants)
 Each part of this item requests you to provide an estimated daily maximum and average for certain pollutants and the source of information. Data for all pollutants in Group A, for all outfalls, must be submitted unless waived by the permitting authority. For all outfalls, data for pollutants in Group B should be reported only for pollutants which you believe will be present or are limited directly by an effluent limitations guideline or NSPS or indirectly through limitations on an indicator pollutant.

1. Pollutant	2. Maximum Daily Value (include units)	3. Average Daily Value (include units)	4. Source (see instructions)
Silver (5) ug/l	< 6	< 6	1, 4
Silver lbs/day	< 0.058	< 0.016	
Cadmium ug/l	5.0	< 5.0	1, 4
Cadmium lbs/day	0.048	0.014	
Lead ug/l	100	< 100	1, 4
Lead lbs/day	0.96	< 0.273	
Nickel mg/l	1.0	0.04	1, 4
Nickel lbs/day	9.6	0.109	
Zinc ug/l	80	< 30	1, 4
Zinc lbs/day	0.769	< 0.082	
Chromium, total ug/l	50	< 50	1, 4
Chromium, total lbs/day	0.48	< 0.136	
Manganese mg/l	1.0	0.1	4
Manganese lbs/day	9.61	0.273	

(5) EPA's document "SW-846" lists the detection limit for silver at 10 ug/l.

V. Effluent Characteristics

A, and B: These items require you to report estimated amounts (*both concentration and mass*) of the pollutants to be discharged from each of your outfalls. Each part of this item addresses a different set of pollutants and should be completed in accordance with the specific instructions for that part. Data for each outfall should be on a separate page. Attach additional sheets of paper if necessary.

General Instructions (See table 2D-2 for Pollutants)

Each part of this item requests you to provide an estimated daily maximum and average for certain pollutants and the source of information. Data for all pollutants in Group A, for all outfalls, must be submitted unless waived by the permitting authority. For all outfalls, data for pollutants in Group B should be reported only for pollutants which you believe will be present or are limited directly by an effluent limitations guideline or NSPS or indirectly through limitations on an indicator pollutant.

1. Pollutant	2. Maximum Daily Value (include units)	3. Average Daily Value (include units)	4. Source (see instructions)
B.O.D. mg/l	30	20	4
B.O.D. lbs/day	2,918	6.97	
C.O.D. mg/l	50	20	4
C.O.D. lbs/day	4,864	6.97	
TOC mg/l	50	20	4
TOC lbs/day	4,864	6.97	
T.S.S. mg/l	30	20	1, 4
T.S.S. lbs/day	2,918	6.97	
Flow GPM	8,100	29	1, 4
Flow MGD	11.664	0.04176	
Ammonia (N) ⁽¹⁾ mg/l	< 2	< 2	4
Ammonia (N) ⁽¹⁾ lbs/day	< 195	< 0.70	
Temperature	Ambient		4
pH s.u.	9.0	6.5	1, 4
Sulfate mg/l	400	300	4
Sulfate lbs/day	38,911	104	
Sulfide mg/l	10	5	4
Sulfide lbs/day	973	1.74	
(1) No ammonia will be generated from the mining operation. This should not be a limited or monitored parameter.			

V. Effluent Characteristics

A, and B: These items require you to report estimated amounts (both concentration and mass) of the pollutants to be discharged from each of your outfalls. Each part of this item addresses a different set of pollutants and should be completed in accordance with the specific instructions for that part. Data for each outfall should be on a separate page. Attach additional sheets of paper if necessary.

General Instructions (See table 2D-2 for Pollutants)

Each part of this item requests you to provide an estimated daily maximum and average for certain pollutants and the source of information. Data for all pollutants in Group A, for all outfalls, must be submitted unless waived by the permitting authority. For all outfalls, data for pollutants in Group B should be reported only for pollutants which you believe will be present or are limited directly by an effluent limitations guideline or NSPS or indirectly through limitations on an indicator pollutant.

1. Pollutant	2. Maximum Daily Value (include units)	3. Average Daily Value (include units)	4. Source (see instructions)
Aluminum mg/l	< 1	< 1	4
Aluminum lbs/day	< 97	< 0.35	
Iron mg/l	1.0	0.3	4
Iron lbs/day	97.38	0.10	
Magnesium ⁽²⁾ mg/l	40	10	4
Magnesium ⁽²⁾ lbs/day	3,891	3.48	
Arsenic ug/l	90	5.0	4
Arsenic lbs/day	8.75	0.002	
Copper ug/l	20 ⁽³⁾	< 20 ⁽³⁾	1, 4
Copper lbs/day	1.95	< 0.007	
Mercury ⁽⁴⁾ ug/l	< 0.3	< 0.3	1, 4
Mercury ⁽⁴⁾ lbs/day	< 0.03	< 0.0001	
Selenium ug/l	100	20	4
Selenium lbs/day	9.7	0.007	
⁽²⁾ No permit limits should be applied to Mg - this only represents background levels.			
⁽³⁾ EPA's document "SW-846" lists a detection limit for copper of 20 ug/l.			
⁽⁴⁾ Background studies have not shown mercury to be in excess of detection limits (0.5 ug/l). No effluent limits should be established.			

V. Effluent Characteristics

A, and B: These items require you to report estimated amounts (*both concentration and mass*) of the pollutants to be discharged from each of your outfalls. Each part of this item addresses a different set of pollutants and should be completed in accordance with the specific instructions for that part. Data for each outfall should be on a separate page. Attach additional sheets of paper if necessary.

General Instructions (See table 2D-2 for Pollutants)

Each part of this item requests you to provide an estimated daily maximum and average for certain pollutants and the source of information. Data for all pollutants in Group A, for all outfalls, must be submitted unless waived by the permitting authority. For all outfalls, data for pollutants in Group B should be reported only for pollutants which you believe will be present or are limited directly by an effluent limitations guideline or NSPS or indirectly through limitations on an indicator pollutant.

1. Pollutant	2. Maximum Daily Value (include units)	3. Average Daily Value (include units)	4. Source (see instructions)
Silver ⁽⁵⁾ ug/l	< 6	< 6	1, 4
Silver lbs/day	< 0.58	< 0.002	
Cadmium ug/l	5.0	5.0	1, 4
Cadmium lbs/day	0.49	< 0.002	
Lead ug/l	100	< 100	1, 4
Lead lbs/day	9.73	< 0.035	
Nickel mg/l	1.0	< 0.004	1, 4
Nickel lbs/day	97.28	< 0.0014	
Zinc ug/l	80	< 30	1, 4
Zinc lbs/day	7.78	< 0.01	
Chromium, total ug/l	50	< 50	1, 4
Chromium, total lbs/day	4.86	< 0.017	
Manganese mg/l	1.0	0.1	
Manganese lbs/day	97.28	0.035	
(5)	EPA's document "SW-846" lists the detection limit for silver at 10 ug/l.		

C. Use the space below to list any of the pollutants listed in Table 2D-3 of the instructions which you know or have reason to believe will be discharged from any outfall. For every pollutant you list, briefly describe the reasons you believe it will be present.

1. Pollutant	2. Reason for Discharge
None	

VI. Engineering Report on Wastewater Treatment

A. If there is any technical evaluation concerning your wastewater treatment, including engineering reports or pilot plant studies, check the appropriate box below.

Report Available
 No Report

B. Provide the name and location of any existing plant(s) which, to the best of your knowledge, resembles this production facility with respect to production processes, wastewater constituents, or wastewater treatments.

Name	Location
No facilities are known to exist which duplicate the combination of ore type, wastewater constituents, and chosen treatment technology.	

VII. Other Information (Optional)

Use the space below to expand upon any of the above questions or to bring to the attention of the reviewer any other information you feel should be considered in establishing permit limitations for the proposed facility. Attach additional sheets if necessary.

Please see attached.

VIII. Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

A. Name and Official Title (type or print)

Lawrence E. Mercado, Vice-President

B. Phone No.

(801) 322-8460

C. Signature

Lawrence E. Mercado

D. Date Signed

12-13-89

VII. Other Information (Optional)

- A. The following figures can be found in the Final Engineering Report submitted as part of this application:

- Site Topographic Map
- Site Plot Plan
- Flow Diagram - Wastewater Treatment Plant
- Flow Diagram - Sedimentation Basin

- B. Flambeau Mining Company proposes to operate an open pit mine. The ore taken from the mine will only be crushed at the site. The crushed ore will be shipped to an out-of-state processing facility.

Outfalls 001 and 002 will primarily discharge to the Flambeau River. The mine may be interrupting the flow of water to a wetland near the proposed open pit. To mitigate this impact, some or all of the water from outfalls 001 and/or 002 may be directed to this wetland as an alternate water supply. This water will then serve a useful and beneficial purpose.

Flow for outfalls 001 and 002 reflect the stages of mine development. Groundwater and precipitation from the pit will be directed to outfall 002 during preproduction stripping. Once this water has come in contact with the high sulfur waste rock and/or the ore, it will be directed to the wastewater treatment facility for outfall 001. Average flow calculation for Section V of this form reflect pit area discharge through 001.

Simply because a parameter is listed in Section V, Effluent Characteristics, it should not necessarily be regulated through a WPDES discharge permit. This list was prepared with the intention of addressing those parameters listed in Group A and selected parameters which applied to this mining project from Group B. Parameters from the following sections have no applicability to this project:

Section 2

Section 3

- GC/MS Fraction - Volatile Compounds
- GC/MS Fraction - Acid Compounds
- GC/MS Fraction - Base/Neutral Compounds
- GC/MS Fraction - Pesticides

Toxic Pollutant

Hazardous Substances

- C. As part of the permitting process for the proposed project, bioassay testing was completed. A report titled *Chronic Toxicity Test Report, Kennecott Project Ladysmith, Wisconsin - Synthetic Leachate by Hunter/ESE*, describing the tests and their results was submitted to the WDNR on September 25, 1989. This report is incorporated into this application by reference. The results of the tests showed that the treated effluent from the Flambeau Project should have no toxic effect on aquatic life in the Flambeau River. The report concluded that the fact that observable chronic toxicity effects did not occur until the effluent concentration was increased by one to two orders of magnitude allows a considerable "safety" factor in projecting the test results to actual treated effluent. Further information regarding these tests can be obtained from reviewing the report.

APPENDIX A

Letter to WDNR Regarding Wastewater Treatment Options
Dated May 2, 1989

(Note: The attachment referred to in the May 2, 1989 letter is not reproduced here, since it does not pertain to the evaluation of wastewater treatment options.)

BP Minerals America

1515 Mineral Square
Salt Lake City, Utah 84112
(801) 322-7000

BP MINERALS AMERICA

May 2, 1989

Mr. Robert H. Ramharter
State of Wisconsin
Department of Natural Resources
101 South Webster Street, EA/6
P. O. Box 7921
Madison, Wisconsin 53707

Subject: FLAMBEAU - ADDITIONAL INFORMATION

Dear Bob,

In response to requests made by the DNR at our April 25, 1989 meeting, we are providing the following additional information:

ESTIMATE OF REFUSE FROM THE PROJECT

The total volume of unsalvageable waste during operation is estimated to be approximately 2.5 tons per year per employee. At an average employment of 58 people, the estimated annual waste generated will be approximately 138 tons. This information, as well as a discussion of its basis, can be found on Pages 84 and 85 of the Mine Permit Application (see attached).

WETLANDS DISCHARGE

Kennecott has proposed to maintain the water level in Wetland Number 2 as a mitigation measure by discharging effluent from outfall 001 or 002 into the wetland. Not all of the effluent would be discharged into, or through, the wetland. We are prepared to replace up to twenty gallons per minute to maintain Wetland No. 2 during the operation of the mine to replace groundwater and surface water sources.

As currently planned, water level in the wetland would be checked on a daily basis against a surveyed level indicator. Flow would be directed to the wetland as needed, based on the daily readings. Water additions could be as frequent as daily through multiple outlets in the wetland.

WASTEWATER TREATMENT OPTIONS

The proposed Kennecott Flambeau mining operation may produce up to 800 gpm of contact water which will be acidic and will contain

dissolved heavy metals. The condition of the water is such that it will require treatment to remove the heavy metals and neutralize the acid present. Ford, Bacon & Davis Utah was retained by Kennecott to evaluate the best currently available technology and recommend a process which will provide the most reliable, efficient and effective water treatment facility for the proposed mine.

Five treatment methods were selected and evaluated. The treatment schemes were:

- . Lime Precipitation
- . Sulfide Precipitation
- . Ion Exchange
- . Reverse Osmosis
- . Brine Concentration

A brief synopsis of each method is described below along with reasons for the rejection of that process.

Lime Precipitation

Acid mine water is treated with slaked lime. The lime neutralizes the acid and, as the pH rises above 8, heavy metals begin to precipitate out as metal hydroxides. Since the heavy metals were in solution as sulfates, most of the calcium will also precipitate out as gypsum. These suspended solids can be removed from the water by clarification and filtration techniques currently available. The slurry produced can be readily handled and will be stable.

Sulfide Precipitation

Acid mine water would be neutralized with lime, caustic or soda ash to a pH of about 6-8. Sulfide ion is added and heavy metals are precipitated out in the form of highly insoluble metal sulfides. These precipitated solids can be removed by standard clarification or filtration techniques. The slurry produced can be handled and will be stable. The major problems associated with this method is that the large quantities of sulfide required in this particular application would require close operator attention to prevent a possible overdoes of sulfide ions into the effluent. Although it is highly unlikely because of the safeguards that would be provided, there is a potential hazard to the operators because hydrogen sulfide can be generated if the pH of the treated water drops below 4.5.

Ion Exchange

Acid mine water would be filtered, followed by treatment with both cation and anion resins in separate exchange units. The pH would then be adjusted, followed by aeration and another filtration step. The treated water could meet the proposed standards. The main disadvantages to this method is that the resin beds require periodic regeneration. Regeneration is done with acid and caustic, and would produce a hazardous waste stream at 10-15% of the influent rate. This stream would present containment and disposal problems. Ion exchange was rejected for this reason.

Reverse Osmosis

Acid mine water would be filtered to remove all suspended solids. The water would then be forced through a semi-permeable membrane which removes the heavy metals. The effluent could meet the proposed standards.

Reverse osmosis was rejected for the same reason as ion exchange. The hazardous brine by-product is 10-20% of the influent flow. Over the life of the project, the liquid waste would be difficult to handle and store, and the risk of leakage to the environment would be greater than lime or sulfide precipitation.

Brine Concentration

Acid mine water would be filtered and heated. After passing through a deaerator, the water is allowed to vaporize. The vapor is compressed and allowed to condense on the outside of the vaporization tubes. Some of the condensate is collected and discharged. The water quality could meet the proposed standard.

This process is much more efficient, producing a brine flow of only 2% of the influent. This method was also rejected because of the difficulty in storing and containing the hazardous brine.

Conclusion

After careful consideration of the treatment methods evaluated, a combination of lime and sulfide precipitation was selected. The lime step will remove any residual heavy metals and performs +99% of the heavy metal removal producing a stable, easily handled precipitate while providing operator safety. The sulfide precipitation step is now not hazardous to the worker because adequate safeguards have been designed for the system. The effluent will meet the proposed standards.

WASTEWATER TREATMENT DISPOSAL ALTERNATIVES

The Wastewater Treatment Plant will generate a maximum of 124 tons per day of precipitate. It will be 25% solids and is characterized in Section 3.5.6.3.7 of the EIR.

Disposal alternatives for the precipitate include on-site and off-site options. An evaluation of these alternatives are as follows.

On-Site Disposal

The preferred alternative, which will minimize the handling and transport of the precipitate to store it within the lined Type II material storage pile and to place it in the open pit during the backfilling sequence that has been identified for the Type II material.

Additional environmental advantages to this option are related to the chemical characteristics of the precipitate. Because of the large amount of lime utilized in the treatment process, the precipitate will help to neutralize the Type II material that comes in contact with it.

In addition, the secondary minerals formed in the wastewater treatment precipitate, and in the Type II stockpile areas that come in contact with the precipitate will provide a decrease in the overall solubility of the precipitate and the Type II materials it contacts. These conditions will reduce the potential for release of many metals found in the Type II materials under conditions that are expected for the reclaimed pit.

A second on-site alternative is segregating the precipitate from the other solids and placing it in a separate fill somewhere on the mine site. This option presents no apparent environmental advantage over placing it in the open pit with the Type II material where it will have important chemical benefits.

If a separate on-site location is selected, it will require the long-term care and management of a second separate facility and significantly restrict the potential long-term use of the separate closed precipitate disposal site more so than the reclaimed pit under the preferred alternative. Therefore, the long-term impacts of a separate site on land use are adverse.

Off-site Disposal

If the precipitate must be removed from the site for disposal, additional costs for handling and transport will be incurred. Hauling the material off site will increase the potential for spills on the roadways used.

Mr. Robert H. Ramharter
Page 5

The precipitate will be 25% solids and, therefore, will present a special handling problem if trucked any distance from the site. Many Wisconsin landfills are restricted from accepting such materials with less than 40% solids and a suitable landfill may not be available. If one is found, the high moisture characteristics of the precipitate will probably increase the tipping fees over and above the typical disposal costs. Otherwise, Kennecott will be required to install additional dewatering equipment at the WWTP to reduce the moisture content to allow handling and disposal at a licensed landfill in Wisconsin. If a Wisconsin site cannot be found that will take the precipitate under any condition, trucking it to an out-of-state landfill would be the only remaining option.

SLURRY WALL CONSTRUCTION DESCRIPTION

Attached is a description of the plans for constructing the slurry wall, which was prepared by Ford, Bacon & Davis. The description emphasizes the precaution which will be taken to minimize the impact of construction on the surrounding area, particularly the area between the slurry wall and the river.

Please advise us if you require any additional information.

Sincerely,



L. E. Mercado

LEM/gm

cc: C. S. Emmons
H. J. Handzel
D. J. Krohn
W. Orchow
G. W. Sevick
E. C. Tingey