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Foth & Van Dyke

**Application for Water Regulatory
Permits and Approvals for the
Kennecott Flambeau Project**

Scope I.D.: 87K10

*Kennecott Minerals Company
Ladysmith, Wisconsin*

April 1989

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1515 Mineral Square
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April 1, 1989

Kennecott

Mr. Roger Jasinski
Wisconsin Department of Natural Resources
Park Falls Area Office
P. O. Box 220
Park Falls, WI 54552

87K10

Dear Mr. Jasinski:

RE: Kennecott Flambeau Project
Chapter 30 Permit Applications

We are forwarding a Joint State/Federal Application for Water Regulatory Permits and Approvals at Kennecott's proposed mine site located approximately 1.6 miles south of Ladysmith on STH 27. The required fee of \$115 is also enclosed. The application encompasses the following permit and/or approval requests:

<u>Permit</u>	<u>Fee</u>
1. Outfall structures (2) (Wis. Stat. 30.12)	\$75
2. Site Grading (Wis. Stat. 30.19)	\$10
3. Reconfiguration of drainage to intermittent Stream C (Wis. Stats. 30.12, 30.19, 30.195 and 30.20)	\$10
4. Temporary removal of a non-navigable stream (intermittent Stream B) (Wis. Stat. 30.20)	\$10
5. Construction of artificial channel to drain settling ponds (Wis. Stat. 30.19)	\$10

Currently, the Department has indicated that Stream C is navigable for the lower 1,000 to 1,500 feet of its course. However, since a final judgement has not been made for its upper reaches in the area to be constructed, Kennecott is applying for permits regarding this stream in order to expedite the overall project permitting process.

Mr. Roger Jasinski
Wisconsin Department of Natural Resources
April 1, 1989
Page 2

At your suggestion, these requests are being submitted as one application. Attached to the application is the supporting data separately prepared for each request. Also enclosed is a general description for the entire project. Reference will be made to the Environmental Impact Report or Mining Permit Application where possible. These documents include a full legal description of the project among other things.

If you have any questions concerning this application, please contact Gerald W. Sevick, P.E. at (414) 497-2500, or myself. Mr. Sevick is an engineer with Foth & Van Dyke and Associates Inc., Green Bay, Wisconsin, Kennecott's consultant for this project.

Sincerely,

KENNECOTT

Lawrence E. Mercado

Lawrence E. Mercado
Director, Process Development

LEM:psl

Enclosures

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APPLICATION FOR WATER REGULATORY
PERMITS AND APPROVALS
FOR THE
KENNECOTT FLAMBEAU PROJECT

Prepared for:

KENNECOTT MINERALS COMPANY

Prepared by:

FOTH & VAN DYKE and Associates Inc.
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2737 S. Ridge Road
P. O. Box 19012
Green Bay, Wisconsin 54307-9012

APRIL 1989

Engineering contributions by Foth &
Van Dyke and Associates Inc.
Prepared under the direct
supervision of:



Engineering contributions by Ford,
Bacon & Davis Utah, Inc. Prepared
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1.0 DESCRIPTION OF THE PROPOSED PROJECT

1.1 Introduction

The project facilities will consist of an open pit mine; an unlined (Type I) stockpile for storage of overburden, saprolite, sandstone, and waste rock containing very low levels of sulfide mineralization; a lined (Type II) stockpile for storage of saprolite and waste rock containing slightly higher levels of sulfide mineralization; a topsoil stockpile; water control features; a wastewater treatment plant; and ancillary facilities such as an office, railroad spur line, and maintenance building.

Figure No. 1 has been prepared to graphically illustrate the proposed project. The figure is a plan view of the mine area showing the location and relative size of key project elements.

1.2 Geology

1.2.1 Description of Site Geology

Precambrian volcanic rock, Cambrian sandstone, and Quaternary glacial and fluvial sediments are present beneath the project area. The geology has been defined from hundreds of soil borings and core samples drilled on site and from scattered outcrops along the banks of Meadowbrook Creek.

The steeply dipping Precambrian rock has been highly altered during mountain building processes to schist, which was later weathered and further altered. The top ten to 20 feet of Precambrian waste rock has been weathered to a silty-clay rock termed saprolite.

Small amounts of disseminated pyrite have been oxidized below the saprolite to several tens of feet in depth. This rock is termed Type I waste rock and contains less than one percent sulfur. Type I material has been leach column-tested and found to produce water of quality that can be discharged without treatment. Type II waste rock occurs in the lower levels of the proposed open pit. Because this material contains greater than one percent sulfur, it will be stored on a lined stockpile area.

The Precambrian rock is overlain by Cambrian sandstone which consists of a poorly cemented, fine to coarse-grained quartz sand. Thickness of the sandstone varies from zero to greater than 30 feet within the proposed pit perimeter.

Near-surface materials consist of unconsolidated Quaternary glacial-fluvial sediments. Most of the deposit is covered by a dense, silty-sand glacial till. Glacial-fluvial sand and gravel generally occur in the northwest part of the project area in the vicinity of the abandoned gravel pit.

1.2.2 Deposit Description

The Flambeau deposit is tabular in shape, strikes in a northeast direction, and dips steeply to the northwest. The upper portion of the sulfide mineralization has been enriched in copper as a result of ancient fluctuating groundwater tables to about 225 feet below the present land surface. The deposit to be mined is 2,600 feet long, averages 50 feet wide, and contains approximately 1.9 million tons of material. The upper part of the deposit consists of zero to 30 feet of iron oxide-rich gossan. Below the gossan are varying proportions of chalcocite and bornite (copper sulfide minerals) in a matrix of chert (cryptocrystalline quartz) and pyrite (iron sulfide). No significant or economic amounts of sulfide mineralization have been found by drilling in either direction from the deposit. Sulfide

mineralization occurring beneath the proposed pit has been determined by Kennecott to be uneconomical based upon projected metal prices.

1.3 Description of Key Project Elements

1.3.1 General Mine Plan

Enriched ore will be mined from an oval-shaped open pit designed to cover approximately 32 acres to a maximum pit depth of 225 feet. All excavated materials will be hauled to the surface, which is at about 1,140 feet Mean Sea Level. Ore will be transported by truck to a crushing facility adjacent to the pit and crushed to minus 12 inches for rail shipment to an out-of-state processing facility.

Two open pit mining phases will be used. The first will mine the southwest half of the deposit to the 970-foot elevation. The second mines the balance of the pit to its final lateral limits and extends the pit bottom to the 900-foot elevation. Due to variation in the orebody grades, two ore-mining faces will be available at all times. Hydraulic shovels will operate from 20-foot high benches. The next bench is prepared as soon as working room becomes available to allow for construction of a sump to handle in-pit water flows and for emergency storage during heavy precipitation.

Waste material will be classified in the pit by sulfur content and stored on either lined or unlined storage sites adjacent to the pit. Eventually waste materials from the separate stockpiles will be returned to the pit as backfill. Upon completion of the mining operation, the project site will be contoured and reclaimed. Land owned by Kennecott but not included in the project area will mostly remain in its current use.

1.3.2 Mining Operation

Preproduction activities will take approximately 10 months to develop the open pit, the waste rock stockpiles, and plant facility. Chief tasks will be clearing the site; preproduction stripping; construction of access roads, the railroad spur, powerline, wastewater treatment plant, storage areas, etc. Disturbed soil areas will be stabilized and water control measures installed at that time.

The Flambeau orebody will be mined from the open pit over a period of approximately six years. The pit area at the end of the mine life will embrace an oval-shaped area of approximately 32 acres. The pit will be 2,600 feet long and average about 550 feet wide. Open pit mining will take place five to six days a week, eight hours per day, to produce approximately 320,000 dry short tons of ore per year.

The steeply dipping rocks will accommodate a pit, with slopes at 36° for the glacial till and 50° interramp for rock sections. Twenty-seven-foot wide catch benches will be left at 60-foot intervals for safety considerations. The access ramp has a design width of 60 feet and a gradient of ten percent.

Overburden, ore, and waste rock will be excavated from 20-foot high benches using conventional mining equipment. The excavated overburden will be transported to the Type I stockpile or to construction areas elsewhere on the project site.

It is anticipated that most of the Cambrian sandstone, all of the saprolite and some of the oxidized waste rock (Type I) can be broken by using a dozer with a ripper blade. However, certain areas of the deposit, such as those portions of the orebody that contain quartz or hard waste rock, will require drilling and blasting. Fresher and harder rock and ore can be

expected as the open pit deepens during the first year of full production. Therefore, blasting during preproduction and into the first year of production will likely be performed only on an infrequent basis.

Controlled blasting procedures will be used to minimize the generation of seismic waves and noise. Due to the small scale of the mining method and operations, ore blasts will be relatively small. Blasting is anticipated to occur from one to five times per week. A set of blasting standards will be carefully followed to keep risks of flyrock, ground vibrations, and noise to a minimum.

Two four-cubic yard shovels and a seven-cubic yard loader will be used to load the broken ore and other materials into 35-ton or 50-ton trucks. At first, only four trucks will be required. The truck fleet will be increased to a maximum of seven trucks as the pit deepens and haul distance increases. A 4,000-gallon water truck will wet haul roads and truck unloading areas for dust control.

Anticipated production and operation schedules are found in Table No. 1-1. The tonnages shown in the table are averages since ore and spoils production vary from year to year.

TABLE NO. 1-1

Anticipated Production and Operation Data

Preproduction Stripping	1,500,000 tons
Daily Ore Production	1,300 tons
Annual Ore Production	320,000 tons
Total Ore Production	1,900,000 tons
Total Overburden & Waste Rock	8,000,000 tons
Total Material Moved (Includes Backfill)	17,500,000 tons
Open Pit Size	32 acres
Project Area	300 acres
Total Project Life	8 to 9 years
Preproduction and Construction	1 year
Mining	6 years
Rehabilitation & Backfilling	1 to 2 years
Open Pit Operating Schedule	5 to 6 days/week 8 hours/day, 1 shift
Crushing Plant	5 to 6 days/week 8 hours/day, 1 shift
Employment During Operations	
Initial	56
Peak	61
Average	55

1.3.3 Water Inflow Controls

When topsoil is stripped and excavation begins, control methods will be provided for surface water and groundwater that could flow into the open pit. Hydrologic studies indicate that a simple system of grading and ditching to a series of sumps can capture and control most of the water expected to inflow. The water will then be diverted to settling ponds or to the wastewater treatment plant. A slurry wall of either grout or

bentonite clay will be constructed at the end of the pit adjacent to the river to minimize potential inflow from that direction. Detailed geologic mapping will be routinely conducted to identify, monitor, and control any areas of significant water inflow which might develop.

Two water collection systems are planned for the pit. During preproduction stripping, an upper sump will catch surface and groundwater inflows from the glacial overburden and Cambrian sandstone. This water, which will not come into contact with sulfide mineralization, but which could carry suspended solids such as clays, will be pumped to settling ponds to remove suspended materials and colloids. The clear overflow will be used to provide water to an adjacent wetland or be discharged to the Flambeau River. A lower sump will collect all groundwater inflow and precipitation that comes into contact with ore and waste rock. Water from the lower sump will be pumped to the wastewater treatment plant, treated, and then separately discharged to the Flambeau River or an adjacent wetland.

A flood control dike will be constructed at the west end of the open pit to prevent overflow of the river into the pit during potential severe flooding conditions (100-year flood). The dike will be constructed using specially selected materials overlying the orebody. Rip rap protection will be installed on the river side of the dike. The west toe of the flood-control dike would be approximately 70 to 90 feet from the east edge of the current Flambeau River channel. The edge of the open pit will be no closer than 140 feet from the east edge of the river channel.

1.3.4 Crushing Facilities

The crushing facility consisting of a crusher, crushed ore stockpile, and railcar loading area will be built on the southwest side of the Type II waste rock stockpile. The crusher will be separated from the Type II stockpile by a retaining wall

to contain rock and runoff water. The proximity of the crusher facility and stockpile to the pit minimizes haul distances. The crushing and ore loading areas will be contoured and underlain with a 60-mil HDPE liner to direct water to a runoff catchment pond for transfer to the wastewater treatment plant. All crushing will occur during daylight operations. The crusher will be oriented in a southwest direction to direct noise away from populated areas. The crusher is designed to crush coarse ore to minus 12 inches. A dust suppression spray system will control dust generated by the crusher and conveyor belt discharge point.

The crushing facility is designed for 250 tons per hour and allows for production variations and maintenance. Crushed and bypassed ore will be discharged onto a conveyor belt and transported to the crushed ore stockpile, where a front-end loader will load railroad cars at the rate of up to 20 to 24 cars per working day. It is planned to ship 15 to 24 loaded cars every other operating day.

1.3.5 Infrastructure

1.3.5.1 General

Several buildings will be erected to support the open pit operation and crushing plant. Chief infrastructure components will consist of a wastewater treatment plant, railroad spur, utilities, administrative building and shop, storage tanks, and explosives magazine. Most of these ancillary facilities will be clustered east of the crushing plant.

1.3.5.2 Wastewater Collection and Treatment Plant

The wastewater treatment plant, located southeast of the crushing facility, will be designed to treat water from four sources: 1) pit contact water, 2) ore haul road drainage, 3)

Type II material storage pad drainage and runoff, and 4) site runoff from the crushing and loadout facilities and other ancillary facilities. Water from these combined sources will average approximately 617 gallons per minute on an annual basis.

A uniform feed of untreated wastewater to the treatment plant aids optimum plant performance. It is important, though, to consider surge capacity in its design, since water volume and metal loading can change with the seasons. Therefore, the wastewater treatment plant design provides for water storage in both a lined runoff catchment pond and a lined wastewater treatment surge reservoir. The open pit will also be used for emergency water storage. A 25-year rainfall event has been used as the design basis for the wastewater treatment system.

The wastewater treatment plant has been designed to process wastewater for acid neutralization and metal removal in a three-stage process. The process consists of lime treatment, sulfide precipitation, and mixed media filtration.

Sludge handling and treated water disposal make up the final components of the wastewater treatment system. Some of the treated water will be recycled for plant operations, makeup water, washdowns, and dust control with the balance discharged to the Flambeau River or an adjacent wetland. Sludge at approximately 25 percent solids will be trucked from the treatment plant to the Type II stockpile where it will be mixed with the stored waste rock.

1.3.5.3 Access Roads and Railroad Spur

Two access roads and a railroad spur will be constructed for the project. A new, paved plant site access road will be built from State Highway 27 into the project site. The road will be constructed opposite the intersection of Jansen Road and State Highway 27. A second access road to a visitors' observation

platform is planned to be constructed approximately 2,700 feet north of the plant access road.

A single line railroad spur approximately 6,500 feet long will be constructed from the Wisconsin Central Ltd. railroad line southwesterly to the crusher plant site to provide access to railroad cars used for shipping ore. The spur line at the crusher plant site will consist of two parallel tracks for ease in loading and switching railroad cars. The primary route for the railroad spur is north of Jansen Road along a location which avoids as much of existing wetlands as possible.

1.3.5.4 Utilities

The electrical power supply for the Flambeau Project will be delivered at 13.8 Kv from the Northern States Power Company power grid to a main substation adjacent to the wastewater treatment plant. Natural gas will be extended to the site for space heating needs.

A low capacity potable water well will be drilled to supply water to field offices and shops.

1.3.5.5 Buildings and Shops

A maintenance shop, office building, and guard house will be erected south and east of the crushing plant. The existing utility building east of the pit will be used to house a limited inventory of equipment and supplies. A peripheral security fence will be constructed around the entire plant site and open pit.

1.3.5.6 Mining Materials and Storage Tanks

Two portable magazines will be located in a remote bunkered area north of the Type I stockpile settling ponds. A blasting cap storage building will also be located in the same general area, but separated from the magazines. A 15,000-gallon diesel fuel tank and associated piping will be installed to provide fuel for mining equipment.

1.3.6 Solid Materials Stockpiles

Topsoil, overburden and Type I and Type II material will be removed and segregated in accordance with their characteristics, then stockpiled in the appropriate location for use in reclamation following the completion of mining.

1.3.6.1 Topsoil Stockpile

The top 12 to 18 inches of soil will be removed from all construction sites and placed in the topsoil stockpile. In some areas, such as the railroad spur cut and fill banks, access road slopes, and exposed berms, the topsoil will be moved to one side and then returned to stabilize and support temporary revegetation of these areas upon completion of construction. Topsoil from the open pit, crusher plant and excess topsoil from the storage areas will be removed and stockpiled. The topsoil stockpile area will be located east of the pit. This stockpile will serve as a visitors' viewing area. Stockpiled topsoil will be used to reclaim the site after mining activities are completed. The topsoil stockpile area will cover approximately seven acres.

1.3.6.2 Overburden/Type I Stockpile

Overburden and Type I material (less than one percent sulfur) will be stored on an unlined area located between the open pit and Blackberry Lane. A bermed swale at the base of the stockpile will contain internal runoff and direct it to the settling ponds. The stockpile will occupy about 40 acres, reach a height of about 60 feet, and have a design capacity of approximately 2.8 million cubic yards.

1.3.6.3 Type II Stockpile

Type II material (more than one percent sulfur) will be stockpiled separately in a lined area located southeast of the open pit and northeast of the crushing plant site. Approximately 27 acres will be required for this stockpile, which has been designed with a capacity of approximately 2.2 million cubic yards. The Type II stockpile will be built with an impervious liner and leachate collection system at its base. A lined berm and runoff containment swale will encircle the area to collect all precipitation that comes into contact with this material. Collected leachate and runoff will ultimately be directed via piping to the surge reservoir and then to the wastewater treatment plant.

Perimeter berms for the Type II stockpile will be constructed using overburden or soil excavated during base grade preparation. A protective layer of coarse-grained soils will be placed over the HDPE liner to protect the liner as waste rock is hauled onto the stockpile. The projected height of the stockpile is approximately 70 feet. The outside of the perimeter berm will be topsoiled and vegetated.

1.3.7 Surface Water Controls

As previously discussed, precipitation falling within the limits of the open pit, Type I and II storage piles, and plant area will be collected and directed to either the settling ponds or the wastewater treatment plant. Some of the surface water drainage originating from outside the active mine area will be intercepted by a series of drainage swales and directed to existing natural drainage features.

1.3.8 Reclamation

Disturbed soil areas will be revegetated and woodlands maintained during the life of the mining project. The open pit will be backfilled once mining is complete. The plan is to return the project site to as close to approximate original contours, such that it will be suitable for other land uses. Stockpiled Type II material will be placed at the bottom of the pit, with Type I waste rock placed over it and compacted as part of normal traffic of equipment used for backfilling. Saprolite, followed by sandstone and till will then be placed within the pit over the Type I waste rock. Finally, the pit site covered with topsoil and the area revegetated. Surface facilities, including the railroad spur, will be dismantled at the end of mine operations unless a beneficial plan for keeping all or some of the facilities is developed by Kennecott, the WDNR, and local residents.

Section 2.0

Completed Forms and Supplemental Information

State of Wisconsin
Department of Natural Resources
(Return to appropriate
DNR District Office)

U.S. Army Corps of Engineers
St. Paul District
Regulatory Functions
1135 U.S. Post Office Bldg.
St. Paul, Minnesota 55101

JOINT STATE/FEDERAL APPLICATION
FOR WATER REGULATORY PERMITS
AND APPROVALS

Form 3500-53 Rev. 2-87

(Hwy. 70, WEST, Box 309
SPOONER, WI 54801)

PLEASE COMPLETE BOTH SIDES OF THIS APPLICATION. PRINT OR TYPE.

1. Applicant (Individual or corporate name) Kennecott Minerals Company		2. Agent/Contractor (firm name)	
Street or Route 1515 Mineral Square		Street or Route	
City, State, Zip Code Salt Lake City, UT 84112		City, State, Zip Code	
Telephone No. (Include area code) 801/322-8460		Telephone No. (Include area code)	
3. If applicant is not owner of the property where the proposed activity will be conducted, provide name and address of owner and include letter of authorization from owner. Owner must be the applicant for structure, diversion and channel change activities.			
Owner's Name Applicant is the Owner		Street or Route City, State, Zip Code	
4. Is the applicant a business? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If yes, is the permit or approval you are applying for necessary for you to conduct this business in the State of Wisconsin? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If it IS necessary, please explain why (attach additional sheets if necessary):		5. Project Location Street/Route 0.3 mile west of STH 27 Village/City/Town 1.6 miles south of Ladysmith Waterway Flambeau River County Rusk Govt. Lot OR all 1/4 of Section 9, lying east of Township 34 N, Range 6 West (East)	
6. Adjoining Riparian (Neighboring Waterfront Property Owner) Information Flambeau River and south of Blackberry Lane			
Name of Riparian #1		Street or Route City, State, Zip Code	
Name of Riparian #2		Street or Route City, State, Zip Code	
7. Project Information			
(a) Describe proposed activity (include how this project will be constructed) See attached sheet 16			
(b) Purpose, need and intended use of project Development of an open pit mining operation.			
(c) I have applied for or received permits from the following agencies: (Check <input checked="" type="checkbox"/>) <input checked="" type="checkbox"/> Municipal <input checked="" type="checkbox"/> County <input checked="" type="checkbox"/> Wis. DNR <input checked="" type="checkbox"/> Corps of Engineers			
(d) Date activity will commence if permit is issued 1990; be completed 1998.			
(e) Is any portion of the requested project now complete? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, identify the completed portion on the enclosed drawings and indicate here the date activity was completed:			
Signature of Applicant Lawrence B. Mercado		Date Signed 4-1-89	
LEAVE BLANK - FOR RECEIVING AGENCY USE ONLY			
Corps of Engineers Process No.		Wisconsin DNR File No.	
Received By		Date Received	

Attachment to Application Form

7.(a) Project Information

(a) Describe proposed activity (include how this project will be constructed)

- 1) Outfall structures (2) (Wis. Stat. 30.12)
- 2) Site grading (Wis. Stat. 30.19)
- 3) Reconfiguration of drainage for intermittent Stream C (Wis. Stats. 30.12, 30.19, 30.195, 30.20)
- 4) Temporary removal of a non-navigable stream (intermittent Stream B) (Wis. Stat. 30.20)
- 5) Construction of artificial channel to drain settling ponds (Wis. Stat. 30.19)

1. Is the applicant a business? ☒ Yes ☐ No
If yes, please answer the next question.

2. Is the permit or approval you are applying for necessary for you to conduct this business
in the State of Wisconsin? ☒ Yes ☐ No

If yes, please explain why This permit is necessary for the project to be built as discussed
herein.

(Please attach additional sheets if necessary)

Note: This information is needed for the Department to determine whether permit processing time limits contained
in chapter NR 305, Wisconsin Administrative Code, are applicable to your project.

2.1 Outfall Structures (2)

The two outfall structures to be constructed in the project area are generally shown in Figure No. 2 (outfall locations). One outfall (001) structure will be constructed at the outfall line from the wastewater treatment plant. The second outfall (002) structure, consisting of the placement of rip rap materials, will be constructed for the drainage channel from the settling ponds.

A backhoe will be used to dig the pipe trench and to install the pipe for outfall 001. Pipe placement will be on a six-inch compacted sand base with the remainder of the trench backfill materials consisting of acceptable compacted on-site materials. A concrete headwall will be constructed at the terminal point of the outfall pipe adjacent to the Flambeau River (Figure No. 3 typical outfall to river). Rip rap materials will be placed from the wastewater headwall to the Flambeau River.

For outfall 002 a backhoe will also be used to trench the drainage channel from the settling ponds and for placement of rip rap from the end of the channel to the Flambeau River. See Figure No. 3 for a typical detail of the drainage channel and outfall.

A permit is sought for the placement of rip rap or similar material on the bed or bank of the Flambeau River under Wis. Stat. 30.12(3)(a)3. The proposed outfalls will not materially affect navigation and will not be detrimental to the public interest. The proposed outfall structure will protect the bank and adjacent land from erosion.

2.2 Site Grading

A permit for grading more than 10,000 square feet in the bank of any navigable water body is being sought under Wis. Stat.

30.19(1)(c). The proposed project will require general site grading for the area shown in Figure No. 1. The total area to be graded for the project is approximately 140 acres. However, the area that falls within the bank of any navigable water body is substantially less than the total disturbed area.

The grading will consist of the removal and stockpiling of topsoil and overburden materials. The removal of the overburden materials will expose the area that is to be developed as an open pit mine. This process is described in detail in the EIR and Mining Permit Application. Over 40,000 cubic yards will be moved during the grading process for the entire project.

As part of the site grading process, a flood control dike will be constructed adjacent to the Flambeau River approximately 130 feet east of the river's edge. The purpose is to keep the 100-year storm flood waters of the Flambeau River from entering the open pit. The dike is to be constructed of compacted site excavated overburden materials. See Figure No. 1, site plot plan for the location of the dike.

The site grading process will also disturb some wetlands, as shown on Figure No. 4, disturbed wetland areas. Refer to the EIR Appendix 3.8-C titled, "Wetlands Inventory and Assessment" for detailed discussions concerning the affected wetland area.

Other information required under Wis. Stat. 30.19 or NR 340.04 is provided as follows:

1. Name and address of applicant is attached on permit application forms.
2. Legal description for the project is contained in the Mining Permit Application, Section 2.1. Kennecott owns the real property adjacent to the affected water bodies. See Mining Permit Application, Figure No. 4-3.
3. The timetable is set forth above in the permit application form in Section 2.0.
4. Project reclamation and associated costs are discussed in detail in the Mining Permit Application Section 5.0.
5. Evidence with respect to the other approvals is found in the Mining Permit Application Section 2.0.
6. Technical and financial qualifications are contained in the Mining Permit Application.
7. Erosion control measures are described in Section 4.8 of the Mining Permit Application.

2.3 Reconfiguration of Drainage To Intermittent Stream C

Several minor modifications need to be made to intermittent Stream C to assure that drainage to the stream is not interrupted by the construction of the railroad spur and access road. A general location of Stream C in relation to the project is shown in Figure No. 5.

First, it will be necessary to place a small 36-inch culvert in intermittent Stream C where it crosses the proposed plant access road. During the placement of the 36-inch culvert pipe in the bed of intermittent Stream C, it will be necessary to disturb the side slopes and bottom of the stream. Straw bales will be strategically located downstream from the construction areas to alleviate possible problems of silt runoff. After placement of the culvert pipe, backfill materials will be compacted in 12-inch lifts to subgrade. A backhoe will be used for this work. The construction of the plant access road will proceed at that time. The straw bales will remain until the seeded, disturbed side slopes and filled areas have an established natural vegetative growth. The straw bales will then be removed from the bed of stream.

A permit is sought for the removal of materials from the bed or banks of a stream under Wis. Stat. 30.20. Issuance of such a permit is consistent with the public interest, particularly given the minimal stream flow and minor disturbance of the stream banks. A permit is sought under Wis. Stat. 30.12 for the placement of the culvert structure in Stream C in the event it is determined to be navigable. Issuance of such a permit is appropriate since the culvert will not materially impair navigation or be detrimental to the public interest.

Second, it will be necessary to place a similar culvert in Stream C at the point it crosses the proposed railroad spur. This culvert will be constructed in the same manner as the culvert for the access road and will be subject to the same requirements.

Third, in conjunction with the placement of the culvert under the railroad spur, a permit for some minor relocation of Stream C is sought under Wis. Stat. 30.195 in the event Stream C is determined to be navigable. The proposed relocation involves moving approximately 190 feet of Stream C 30 feet to the north (Figure No. 6). This relocation meets the requirements of Wis. Stat. 30.195 for the following reasons:

1. A culvert under the railroad spur following the existing stream channel will require a culvert of approximately 150 feet in length. Given the limited culvert size and the gradient of Stream C, a culvert of approximately 150 feet would be subject to frequent blockage. Relocation of Stream C would reduce the culvert length to approximately 40 feet and minimize this problem.
2. The relocation of Stream C and the culvert will allow a drainageway running along but outside the Type II stockpile to drain into Stream C without the necessity of a separate culvert under the railroad spur. This drainageway is discussed at greater length in Section 2.5 of this permit.
3. Intermittent Stream C may not even be considered navigable at the point of proposed relocation. Even if it is, the stream channel is not well defined. Moving the channel will not adversely affect the flood capacity of the stream or be detrimental to public rights on the stream. Moreover, the applicant is the only riparian owner for the entire reach of Stream C.

Fourth, an artificial drainageway will be constructed along but outside the Type II stockpile (Figure No. 6). Under Wis. Stat. 30.19(1)(a) and (b), the connection of an artificial waterway into a navigable stream requires a permit. As designed, this drainageway will flow into the culvert noted above and into Stream C. This drainage area will be vegetated following contouring activities. No other structures will need to be placed into or on the bed or bank of Stream C. This drainageway is depicted in Figure No. 6. This drainageway will not injure the rights of the public or riparian owners for the same reasons noted above.

Other information which may be required under NR 340 or applicable statutes is provided above in Sections 2.1 and 2.2.

2.4 Temporary Removal of A Non-Navigable Stream

A permit is sought under Wis. Stat. 30.20 for the removal of material from the bed of Stream B. Intermittent Stream B, as shown in Figure No. 7, will be temporarily removed in its entirety during the site grading phase and construction phase of the open mine pit. This is necessary to permit the construction of the mine. Detailed descriptions of site grading and construction of the mine are contained in the EIR and Mining Permit Application.

It is anticipated that upon completion of the mining operation in about nine years when site reclamation returns the open pit area to its approximate original topography that another stream will be constructed in the approximate original location of Stream B. The reclamation process is described in the Mining Permit Application Reclamation Plan (Section 5.0), other information which may be applicable under NR 340 is provided above in Sections 2.1 or 2.2.

The removal is consistent with the public interest in the water because the removal is only temporary, not permanent, and because the water affected is of minimal significance.

2.5 Construction of Artificial Channel To Drain Settling Ponds

Associated with the Type I stockpile will be the construction of a series of settling ponds to be used to clarify runoff from the Type I stockpile prior to discharge to the Flambeau River. The final construction activity associated with the settling ponds will be the construction of a drainage channel from the ponds to the Flambeau River and to Wetland No. 1. The channel will be constructed to design grades, topsoiled, and vegetated. At the time the channel is constructed, a structure to divert runoff to Wetland No. 1 will also be constructed. See Figure No. 2 for a diagram of this channel.

A permit is requested for this channel pursuant to Wis. Stat. 30.19(1)(a) or (b). Other information which may be required under Wis. Stat. NR 340.04 is provided above in Section 2.1 or 2.2.

The discharge point from this channel at the Flambeau River will be protected with rip rap to prevent erosion. Construction of the channel will be accomplished while minimizing disturbance to surrounding areas. Details regarding the construction of this outfall are contained in Section 4.7.4.13 of the Mining Permit Application and in Section 2.1 of this permit.

Figures for Sections 1.0 and 2.0

37000 E 38000 E 39000 E 40000 E 41000 E 42000 E 43000 E 44000 E 45000 E



NOTES:

1. SITE LOCATION: SECTIONS 9, 10, 15 & 16, T34N, R6W, RUSK COUNTY, WISCONSIN.
2. TOPOGRAPHIC BASE MAP PREPARED FROM AERIAL SURVEY BY SURDEX CORPORATION, CHESTERFIELD, MISSOURI. DATE OF PHOTOGRAPHY - APRIL 24, 1970. ROADS, TREES AND BUILDINGS WERE UPDATED AS PER AERIAL PHOTOGRAPH TAKEN BY MARKHURD CORPORATION, MINNEAPOLIS, MINNESOTA. DATE OF PHOTOGRAPHY - SEPTEMBER 14, 1987.
3. ELEVATIONS BASED ON MEAN SEA LEVEL DATUM. CONTOUR INTERVAL IS TWO FEET.
4. HORIZONTAL DATUM BASED ON PROJECT SITE GRID SYSTEM. SITE GRID COORDINATES CORRELATION TO STATE PLANE COORDINATES DERIVED AS FOLLOWS:

SITE GRID COORDINATES	STATE PLANE COORDINATES
CONTROL MONUMENT F-1	
40000 N =	587,357.8087 N
40000 E =	1,713,516.1229 E

THE ANGULAR ROTATION FROM STATE PLANE BEARINGS TO SITE GRID BEARINGS IS 359°13'23" RIGHT WITH CONTROL POINT F-1 AS THE BASE POINT.

5. MINE FACILITIES DESIGN BY FORD, BACON & DAVIS, INCORPORATED, SALT LAKE CITY, UTAH AND PINCOCK, ALLEN & HOLT, INCORPORATED, LAKEWOOD, COLORADO.

LEGEND

- 1100— EXISTING CONTOUR
- EXISTING PAVED ROADWAY
- - - EXISTING TRAIL/GRAVEL SURFACE
- TREES AND/OR BRUSH
- FENCE
- F-1 CONTROL MONUMENT



FOTH & VAN DYKE

GEOSCIENCES & ENVIRONMENTAL MANAGEMENT DIVISION
GREEN BAY, WISCONSIN

FLAMBEAU PROJECT
LADYSMITH, WISCONSIN

KENNECOTT
MINERALS
COMPANY
1515 MINERAL SQUARE
SALT LAKE CITY, UTAH
84102

FIGURE NO. 1
SITE PLOT PLAN

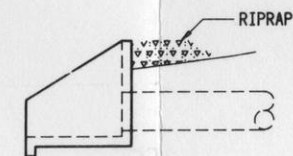
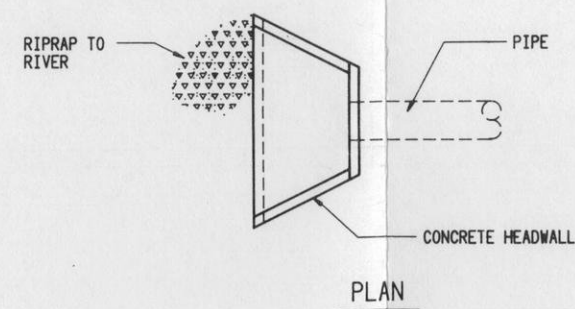
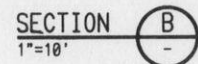
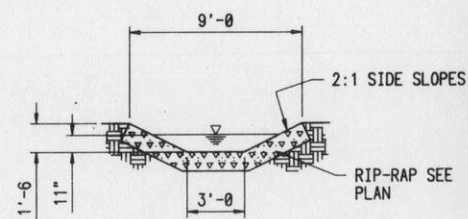
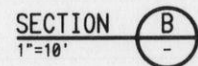
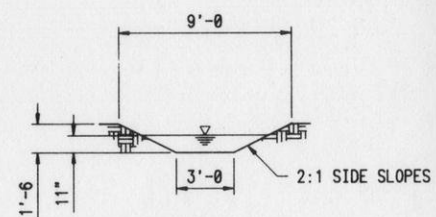
MICROFILM	JOB
DRAWING NO.	REV.
DIVISION DRAWING NO.	
SCALE	SEE BAR SCALE

NO.	DATE	REVISIONS	BY	CHK'D	ENGR	ENGR	NO.	DATE	REVISIONS	BY	CHK'D	ENGR	ENGR

NO.	DATE	REVISIONS	BY	CHK'D	ENGR	ENGR

NO.	DATE	REVISIONS	BY	CHK'D	ENGR	ENGR

NO.	DATE	REVISIONS	BY	CHK'D	ENGR	ENGR

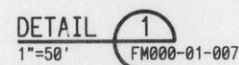


ELEVATION

OUTFALL 001

TYPICAL OUTFALL TO RIVER

N.T.S.



TYPICAL DRAINAGE SWALE & OUTFALL

Jford, Bacon & Davis, Incorporated
ENGINEERS-CONSTRUCTORS
SALT LAKE CITY, UTAH



FLAMBEAU PROJECT
LADYSMITH, WISCONSIN

**KENNECOTT
MINERALS
COMPANY**

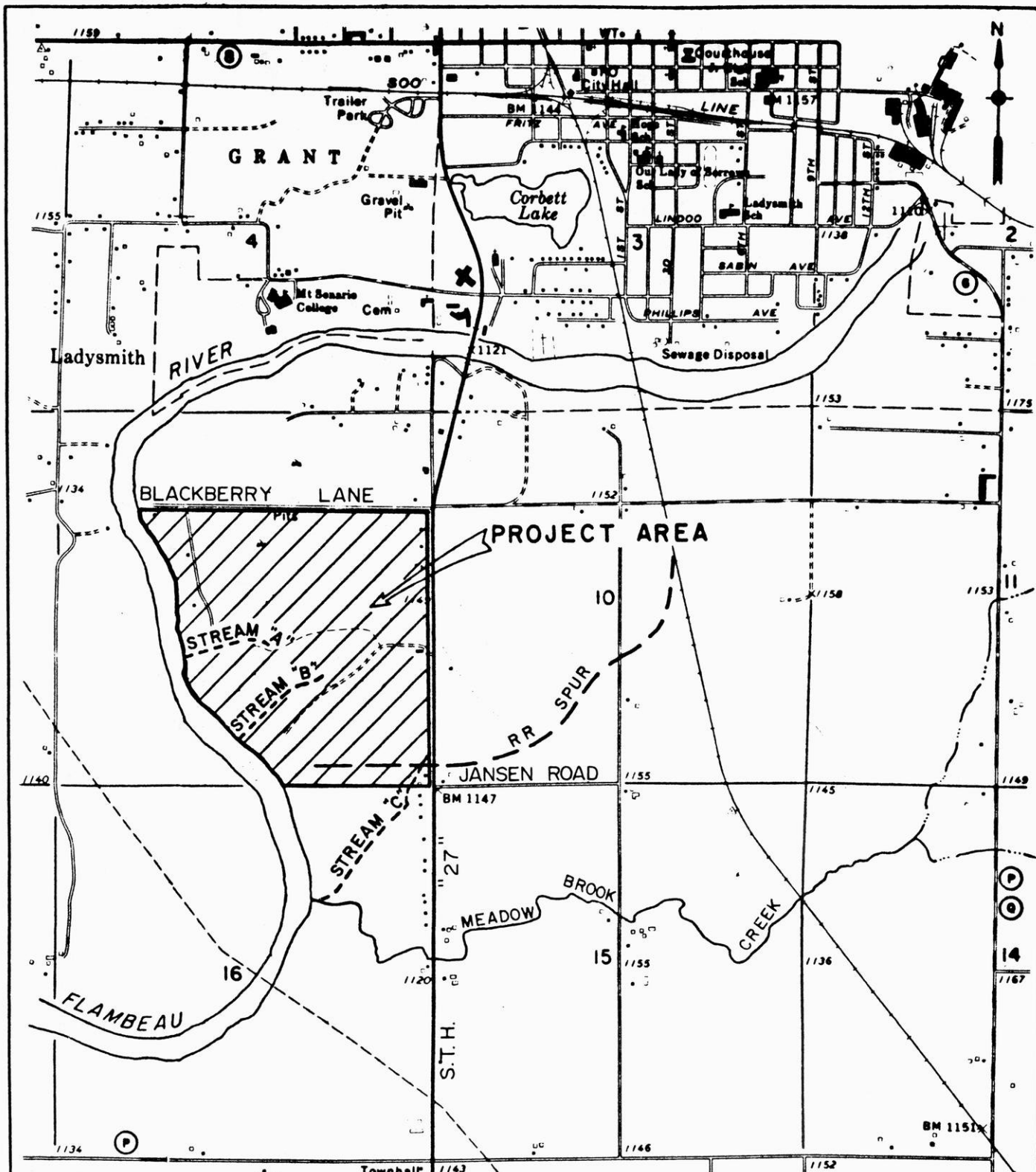
1515 MINERAL SQUARE
SALT LAKE CITY, UTAH
84112

FIGURE NO 3

SITE GRADING

MISC. SECTIONS

MICROFILM		JOB	
		M603JR	
DRAWING NO.		REV.	
FM-000-01-015		1	
DIVISION DRAWING NO.			
OWNER OPERATED			
SCALE		NOTED	



NOTES:

PROJECT AREA INCLUDES A 36 FOOT WIDE CORRIDOR
ALONG RAILROAD SPURLINE EAST OF STH 27.

BASE MAP PREPARED FROM U.S.G.S MAPS 7.5 MINUTE
SERIES, LADYSMITH AND THORNAPPLE WL. QUADRANGLES

FOTH & VAN DYKE GEOSCIENCES & ENVIRONMENTAL MANAGEMENT DIVISION GREEN BAY, WISCONSIN		
NOTES	APPROVAL	DATE
	DESIGNED BY	
	DRAWN BY S.J.L.	2/89
	CHECKED BY GWS	3/89
	APPROVED BY	
	CAD No.	SCALE 1" = 2000'

KENNECOTT MINERALS COMPANY FLAMBEAU PROJECT LADYSMITH, WISCONSIN		
FIGURE NO. 7 INTERMITTENT STREAM LOCATIONS		
Job No	Dwg No	REV

UW-STEVENS POINT



3 1775 677586 1