

Flambeau Mining Company  
Subsidiary of Kennecott Corporation  
N4100 Highway 27  
Ladysmith, WI 54848  
(715) 532-6690  
FAX (715) 532-6885

**Kennecott**

September 26, 1994

Mr. Tom Bauman  
Department of Natural Resources  
Bureau of Wastewater Management  
101 S. Webster Street  
P.O. Box 7921  
Madison, WI 53707

RE: Flambeau Mining Company - WPDES Permit No. WI-0047376-1

Dear Mr. Bauman:

Flambeau Mining Company (Flambeau) is submitting the following review of progress regarding the Toxicity Reduction Evaluation (TRE) which was initiated during December 1993. This submittal is in accordance with the WPDES Permit, Part I, E. (8)(d) which requires identification of actions taken to reduce the identified toxicity and any results available to date.

Upon initiation of the TRE, Flambeau began taking immediate action which resulted in reducing the potential effect of dissolved metals upon *Ceriodaphnia dubia*. The other test organisms, *Daphnia magna* and *Pimephalas promelas*, have not been affected either acutely or chronically. Table 1 provides a summary of the action which Flambeau has taken to reduce effects to *C. dubia*.

In the Flambeau report dated June 23, 1994, Flambeau presented to the Department the results of extensive research which caused Flambeau to conclude that the use of citric acid in addition to sulfuric acid for pH adjustment within the sulfide treatment process would reduce bioavailable copper to a concentration which would result in a continuance of full compliance with the WPDES permit. Within this same report, Flambeau presented a schedule for implementing the use of citric acid. Table 2 presents the status of the proposed evaluations which were contained within the aforementioned schedule.

The Department's review of Flambeau's June 23, 1994 TRE report contained a list of issues which were to be addressed by Flambeau to enable the Department to approve the addition of citric acid within the treatment process. Flambeau provided the additional information in a submittal dated August 29, 1994. Flambeau staff and Gerald J. Berg, P.E. prepared plans which

Table 1. Action taken to reduce identified toxicity.

	<b>Action</b>	<b>Outcome</b>
Dec 1993	Implement rigorous sand filter backwash.	Reduction of residence time of precipitated metals within filter.
Dec 1993	Modification of controls regulating sulfide feed rate.	Reduction of solubility of precipitated metals within filter.
Dec 1993	Maintain effluent pH between 8.0 - 8.8.	Maximize addition of calcium.
Feb 1994	Increase pH of neutralization/mix tank to 10.0.	Improved metals removal efficiency.
Feb 1994	Replace sand filter media.	Removal of precipitated metals trapped in filter.
Summer 1994	Research of bioavailability of metal ions.	Determination that bioavailability of metal ions reduced by citric acid.

Table 2. Status of evaluations proposed in June 23, 1994 submittal.

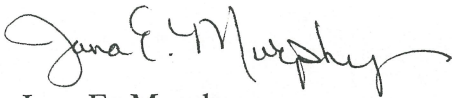
<b>Proposed Evaluation</b>	<b>Conclusion</b>
Additional studies of the effect (of citric acid) upon sulfide treatment.	Bench tests show no interference from citric acid with sulfide precipitation.
Stability of citric acid in dilute sulfuric acid.	Citric acid will not be mixed with sulfuric acid prior to feeding.
Locate effective feed point.	Citric acid feed point will occur immediately prior to sulfuric acid feed point. PE approved.
Chronic effect on <i>C. dubia</i> .	August 22, 1994 research chronic toxicity test verifies no chronic effect associated with citric acid.
Process monitoring to include determination of suitable citric feed rate.	Bench tests have shown the most effective citric acid feed rate is 5.5 ppm with minimal BOD contribution.
BOD analyses 3X/week for one month after implementation.	To be completed upon initiation of citric acid feed.

Mr. Tom Bauman  
Page 4  
September 26, 1994

detailed the citric acid feed system. These specifications and plans were forwarded to you in a submittal dated September 16, 1994.

Based upon our conversations, I understand that Flambeau has provided all the information the Department requires to approve the citric acid feed system. We are looking forward to your approval of the citric acid feed system. If you should have any further questions or comments, please contact me at 715-532-6690 Ext. 717.

Sincerely,



Jana E. Murphy  
Supervisor of Environmental Affairs

cc: Greg Fauquier, Flambeau  
Cindy Emmons, Kennecott Mineral Mines  
Larry Lynch, WDNR  
Ken Markart, WDNR  
Bob Gothblad, WDNR  
Jim Hanson, WDNR  
Bernice Dukerschein, Rusk Co.  
Al Christianson, City of Ladysmith  
Tom Riegel, Town of Grant  
Melvin Spencer, Rusk Co. Zoning  
Jim Hutchison, Foth & Van Dyke  
Paul Kent, DeWitt, Porter et al