Responses to DNR comments on the revised EIR, DNR letter dated December 28, 1984. April 12, 1985

Hansen, Barry J.
Rhinelander, Wisconsin: Exxon Minerals Company, April 12, 1985

EXXON MINERALS COMPANY

P. O. Box 813, RHINELANDER, WISCONSIN 54501

CRANDON PROJECT

April 12, 1985

Responses to DNR comments on the Revised EIR, DNR Letter Dated December 28, 1984

Mr. Robert H. Ramharter
Department of Natural Resources
Bureau of Environmental Analysis and Review
EAR/3
101 South Webster Street
Madison, WI 53707

Dear Mr. Ramharter:

Enclosed are responses to DNR comments contained in H. S. Druckenmiller's letter dated December 28, 1984, on the revised Environmental Impact Report for the Crandon Project. This submittal includes 44 copies of the responses. In addition, one copy will be transmitted to Mr. Terry McKnight at the North Central District office.

The responses to comments on Chapter 2 and on noise and seismic vibration will be integrated into the revised EIR. Most of the responses to comments on Chapter 1 will also be included in the revised EIR; however, several of the responses to comments on Chapter 1 and all responses on Chapter 3 comments will be included as an addendum to the EIR.

Please contact me if you have questions on this submittal.

Yours truly,

EXXON MINERALS COMPANY

Barry J. Hansen
Permitting Manager

BJH:ef

Enclosures (44)

xc/w/encl: Mr. T. C. McKnight
DNR-NCD

Chapter 1 - Description of the Proposed Action

Section 1.1.3.2 - Statutory Requirements

Comment No. 1

The citation of 42 U.S.C. 300 h et seq should be changed to the appropriate state authority since this function has been delegated to the state.

Response:

Comment acknowledged. The citation of 42 U.S.C 300 h et seq will be removed from Table 1.1-3 in the revised EIR.

Comment No. 2

The explanation on page 2 of the table discussing Federal - State delegation should be changed to read "...will remain or become authorized to administer...".

Response:

Comment acknowledged. This change will be included in the revised EIR.

Comment No. 3

A permit for diversion of surface water under Wis. Stats. 144.855(2) is cited. There has been no activity identified which would require this permit and no such application has been submitted to the Department. What activity is envisioned and will a permit application be submitted?

Response:

No Project-related activities that would require a permit for diversion of surface water are proposed. This permit requirement will be removed from the list presented in Table 1.1-3 of the revised EIR.

Comment No. 4

The listing of the County Forest Withdrawal activity is somewhat misleading. Exxon has already applied to and received approval from Forest County for withdrawal of the land. The application before the Department is the County's and, as such, will not be considered along with the other listed permits at the Master Hearing. We will, however, include this Department action in the Project EIS.

Response:

Comment acknowledged.

Comment No. 5

The correct citation for a high capacity well permit authority is 144.025(2)(e).

Response:

Comment acknowledged. This change will be included in Table 1.1-3 of the revised EIR.

Comment No. 6

Section 147.02 is cited as a statutory obligation for the private sewage system. While a large size septic system does not presently require a s. 147.02 permit, one probably will be required for such systems by the time of the Master Hearing. The "Actions" should be "permit issuance (county), permit issuance (DNR), review and approval of final plans (DILHR).

Response:

Comment acknowledged. This change will be included in Table 1.1-3 of the revised EIR.

Comment No. 7

For the Mine Waste Feasibility Report, Plan of Operation, the action should read "Plan Approval and License".

Response:

Comment acknowledged. This change will be included in Table 1.1-3 of the revised EIR.

Section 1.1.3.3 - Project Schedules and Manpower Requirements

Comment No. 8

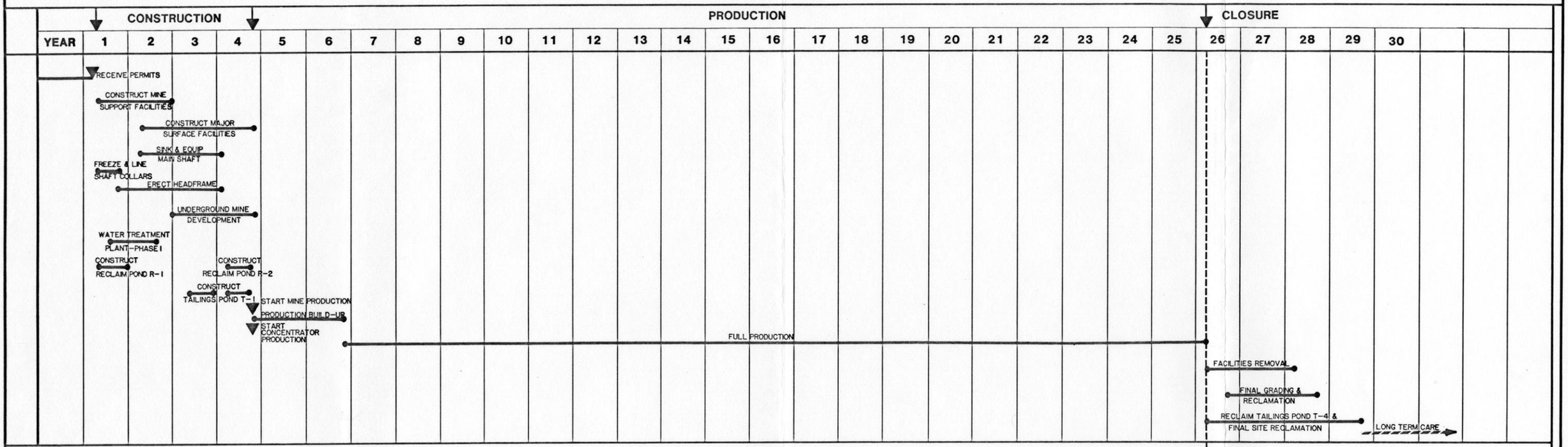
Figures 1.1-15 and 1.3-19 show the construction schedule for the entire project, including that for the wastewater treatment plant (WTP) and the reclaim ponds. These schedules differ significantly from that presented for the WTP in the Preliminary Engineering Report dated October 19, 1984. Which is the correct schedule? Is there an updated EIR project schedule available?

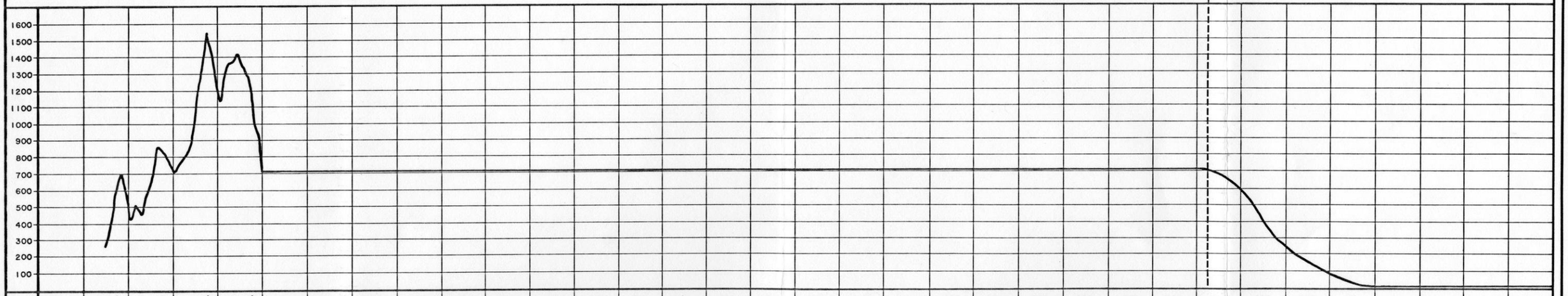
Response:

It is presumed that the above referenced figure is 1.1-5 as there is no Figure 1.1-15.

Figures 1.1-5 and 1.3-19 from the revised EIR showing the Project construction schedules have been updated and are consistent with the wastewater treatment plant (WTP) Preliminary Engineering Report dated October 19, 1984. The updated Project schedules were contained in the February 1985 revision to Chapter 1 of the EIR which was previously submitted to the DNR. Copies of these figures are attached.

EXXON MINERALS COMPANY
CRANDON PROJECT
SCHEDULE





PEAK		696*	872*	1567*	1430*	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703	600	250	80	1	1	1	1
AVG.		516**	652	1101	1206	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703	641	325	165	55	1	1	1	1

NOTES:

1) CONSTRUCTION OF TAILINGS POND 2, 3, & 4 WILL BE DONE AS REQUIRED DURING PRODUCTION. RECLAMATION OF TAILINGS POND 1, 2, & 3 WILL BE DONE DURING PRODUCTION.

2) ACTUAL CONSTRUCTION SCHEDULE MAY VARY DEPENDING ON PERMIT ISSUANCE & ECONOMIC CONDITIONS.

* CONSTRUCTION MANPOWER INCLUDES 20% CONTINGENCY.

** 7 MONTH AVERAGE

REVISED	DATE	BY	DESCRIPTION
3	1-29-85	DRS	GEN REVISION
2	4-2384	DRS	GEN REVISION

Typical Representations: Refinements May Be Made During Final Engineering

EXXON MINERALS COMPANY
CRANDON PROJECT

TITLE: **PROJECT SCHEDULE**

SCALE: NONE | STATE: WISCONSIN | COUNTY: FOREST

DRAWN: DR SPRINGBORN | DATE: 4/84 | CHECKED BY | DATE
APPROVED BY | DATE | APPROVED BY | DATE
APPROVED BY | DATE | EXXON | DATE
DRAWING NO | SHEET ____ OF ____ | REVISION NO 3

FIGURE 1.1-5

GBB 5/1981

ITEM NO.	ACTIVITY	YEAR	YEAR 1											YEAR 2											YEAR 3											YEAR 4														
		MONTHS FROM ACTUAL FIELD START	-5	-4	-3	-2	-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
1	PERMIT RECEIPT			▼																																													▼ PRODUCTION STARTS			
2	ACTUAL FIELD START						▼																																													
3	MINE/MILL SITE PREPARATION																																																		
	TEMPORARY FACILITIES																																																		
4	TEMPORARY BATCH PLANT									▼ LINE COLLAR																																												
5	TEMPORARY POWER EX UTILITY TO TEMP. SITE BLDGS								750 kw AVAILABLE THREE PHASE 24.9 kv																																													
	MINE CONSTRUCTION/DEVELOPMENT																																																	
6	MAIN SHAFT & AIR SHAFT COLLARS																																																	
7	MAIN SHAFT HEADFRAME																																																	
8	MAIN SHAFT SINK & EQUIP																																							▼ MAIN HOIST OPERATIONAL											
9	ORE BINS/CRUSHER																																																▼ U/G CRUSHER OPERATIONAL			
10	INTAKE AIR SHAFT HEADFRAME													▼ SHAFT WASTE ROCK PRODUCTION STARTS																																								
11	SINK & EQUIP TO 392m LEVEL																										▼ DEVELOPMENT HOIST OPERATIONAL																													
12	EMC MINE DEVELOPMENT																													▼ PREPRODUCTION ORE																											
13	MINE WASTE ROCK STORAGE																																																		
14	PREPRODUCTION ORE STORAGE																																																		
15	R.O.M. PRODUCTION																																																		
16	COMPRESSOR STATION																																																		
	SURFACE FACILITIES																																																		
	COARSE ORE STORAGE SYSTEM																																																	
17	EXCAV, FOUNDATIONS, WALLS, SLABS (INC. TRANSFER TOWER)																																																	
18	STRUCTURAL STEEL & FINISH BLDG																																																	
19	EQUIPMENT INSTALLATION																																																	
	CONCENTRATOR																																																	
20	EXCAVATING, FOUNDATIONS, WALLS & SLABS																																																	
21	STRUCTURAL STEEL & FINISH BLDG																																																	
22	EQUIPMENT INSTALLATION																																																	
23	MINE BACKFILL PREPARATION SYSTEM																																																	
	GENERAL FACILITIES																																																	
24	SERVICES BUILDING																																																	
25	PROCESS WATER SYSTEM (PUMPS, PIPING, TANKAGE)																																																	
26	WATER TREATMENT PLANT																																																	
27	PLANT POWER DISTRIBUTION																																																	
28	STANDBY GENERATOR																																																	
29	NATURAL GAS PLANT DISTRIBUTION SYSTEM																																																	
30	SEPTIC TANK																																																	
31	YARD PIPING																																																	
	OFF - SITES																																																	
32	ACCESS ROAD																																																	
33	RAILROAD																																																	
34	115 kv POWERLINE (UTILITY)																																																	
35	PRIMARY SUBSTATION (EMC)																																																	
36	INCOMING NATURAL GAS LINE & METER STATION																																																	
	MWDF																																																	
37	RECLAIM PONDS R1 & R2																																																	
38	TAILINGS POND T1																																																	

TEMPORARY SUBSTATION FOR SHAFT SINKING NO.1

(PART OF YARD PIPING)

COMPLETION IN TIME FOR START OF EMC MINE DEVELOPMENT MANPOWER BUILD-UP

TO ALL OTHER FACILITIES

NO.2

RECLAIM POND R1

RECLAIM POND R2

Typical Representations Refinements May Be Made During Final Engineering

EXXON MINERALS COMPANY
CRANDON PROJECT

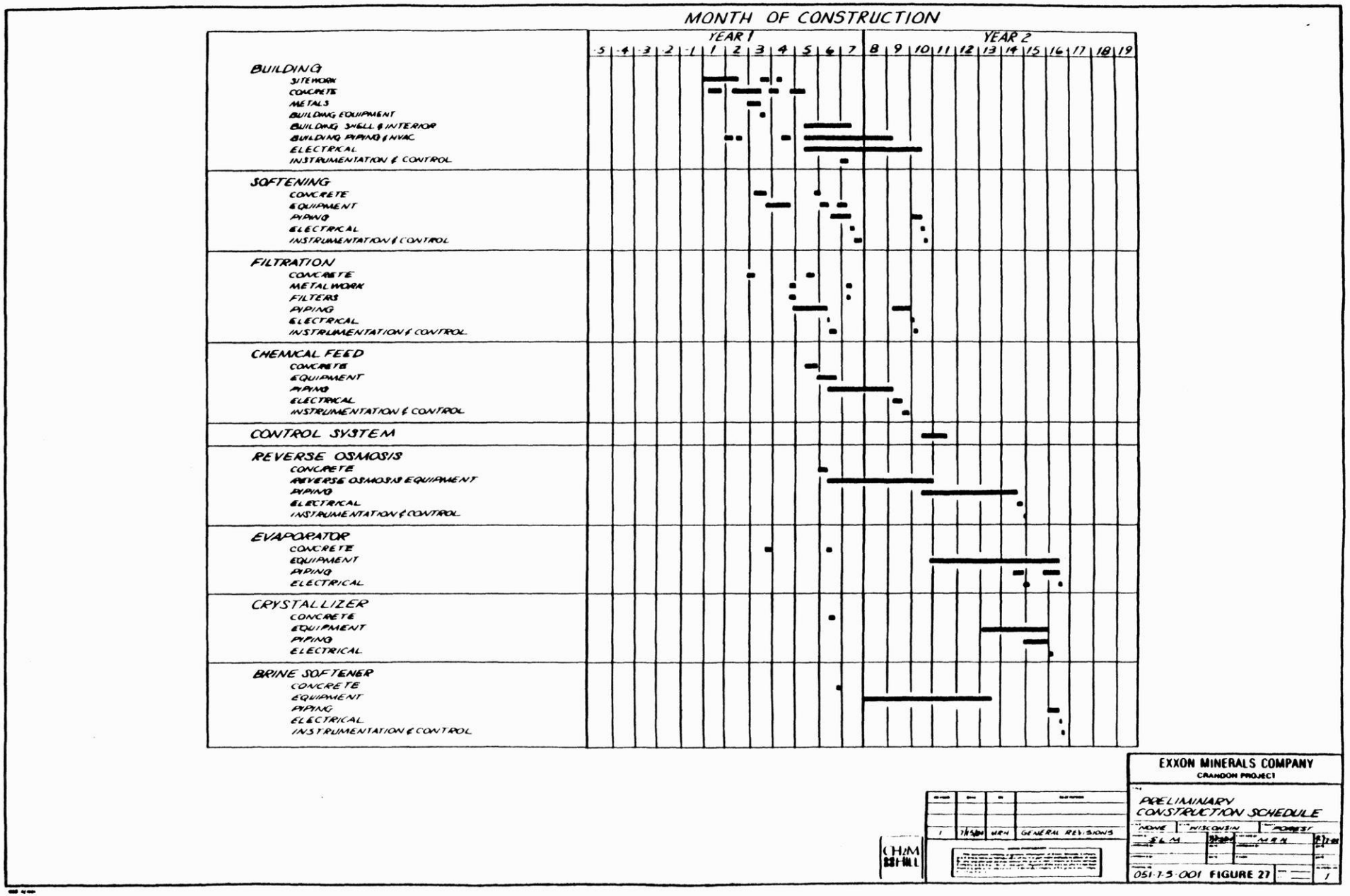
TITLE
CRANDON PROJECT CONSTRUCTION SCHEDULE

SCALE	STATE	COUNTY
NONE	WISCONSIN	FOREST

DRAWN	DATE	CHECKED BY	DATE
DR SPRINGBORN	4/84		
APPROVED BY	DATE	APPROVED BY	DATE
APPROVED BY	DATE	EXXON	DATE

DRAWING NO **FIGURE 1.3-19** SHEET ___ OF ___ REVISION NO 5

GBB 5/1981



(FIGURE FOR THE RESPONSE TO COMMENT NO. 8)

Section 1.1.3.3 - Project Schedules and Manpower Requirements

Comment No. 9

The description of the monitoring program in this section does not reflect our current understanding of the program. This section will likely be inconsistent with the monitoring plan once it is submitted.

Response:

The Monitoring and Quality Assurance Plan (Monitoring Plan) is currently undergoing revisions and it is anticipated that this will remain the situation through the Master Hearing. However, a current version of the Monitoring Plan will be provided to the DNR with the revised Mining Permit Application. Many of the general descriptions of the current version of the Monitoring Plan have been incorporated in the revised EIR subsection 1.1.3.3. There will, however, be portions of this EIR subsection and the revised Monitoring Plan which are inconsistent. These inconsistencies cannot be totally eliminated since the Monitoring Plan will continuously be revised to accommodate the various permit requirements as they relate to predicted Project effects. The general descriptions of the Monitoring Plan provided in subsection 1.1.3.3 of the EIR should enable the DNR, even with the minor inconsistencies, to complete the DEIS and FEIS.

Section 1.2.1.2-16 - Mine Drainage

Comment No. 10

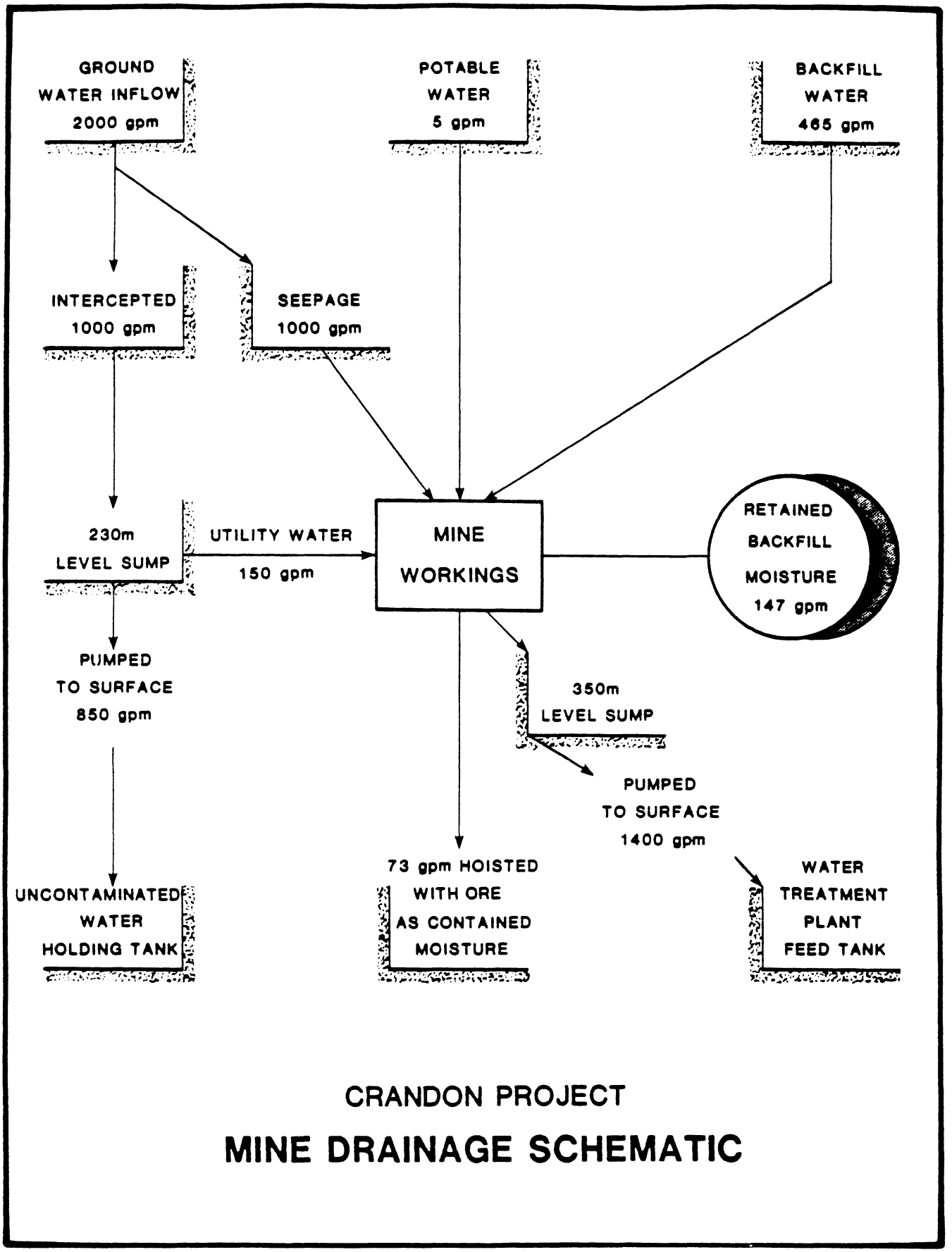
The 2,000 gallons per minute cited for site area impact modelling and system design is inconsistent with the revised Appendix 4.1A. A maximum of 1,600 gallons per minute was used for impact modelling and it is unclear what figure was used for mine water handling system design.

Response:

The mine pumping and drainage design basis, depicted on the attached Figure 1, provides for a steady state ground water inflow of 2,000 gallons per minute or 25 percent more than the steady state inflow range of 934 to 1,592 gallons per minute predicted by the mine inflow computer modelling (D'Appolonia, 1984). Mine pumping systems have been designed for a total capacity of 2,600 gallons per minute to account for other mine water flows such as backfill water drainage, potable water, utility water, bedrock storage depletion and minor downtime on the pumps. Each operating pump will be backed up by an installed spare. Dual full capacity pump discharge columns to the surface will be provided.

Refer to the High Capacity Well Approval Application for the Underground Mine for further discussion of mine water handling system details.

REPLACES DRAWING NO. 050-2.125.M.001 284-1-71M-2



CRANDON PROJECT

MINE DRAINAGE SCHEMATIC

(FIGURE 1 FOR THE RESPONSE TO COMMENT NO. 10)

Section 1.3.1.1 - Mine/Mill Site Preparation

Comment No. 11

Open burning appears to be Exxon's favored method of forest residue disposal. While the EIR mentions using contractors to chip whole trees, Exxon should consider the sale of the residue, its use on-site as fuel, composting for use as a soil amendment, or the use of air curtain destructor to provide cleaner disposal.

Response:

Additional detail regarding disposal of forest residuals has been provided in a November 9, 1984 letter to the DNR. The letter indicates chipping is our preferred disposal method followed by burning. Chipped residuals will be stockpiled and used for mulching or possibly sold for use off-site as fuel. If burning is necessary for any of the forest residuals, an approved air curtain destructor(s) would be utilized.

Section 1.2.4.-12 - Reclaim Water Ponds

Comment No. 12

Page 1.2-86 indicates that the lower liner for the reclaim pond will be six inches thick. The WTP Preliminary Engineering Report indicates that the reclaim pond liners would be eight inches thick.

Response:

The WTP Preliminary Engineering Report, indicating the bentonite modified soil liner is 0.2 m (8 inches) thick, is correct. Subsection 1.2.4.12 will be updated accordingly in the revised EIR.

Section 1.3.1.7 - Mine Waste Disposal Facility and Reclaim Pond Construction

Comment No. 13

The discussion on page 1.3-28 indicates the use of a settling pond and small high capacity clarifiers for wastewater generated during liner construction. The discussion does not, however, clearly designate the fate of the wastewater prior to reclaim pond construction or during tailings pond liner construction.

Response:

The settling pond and clarifiers will handle the water used in preparation of underdrain materials. For this process there is no discharge from the settling pond. Because of the moisture loss continually occurring with the prepared materials, makeup water must be continually added to the process. Based on the processing rates planned and the nature of the materials being processed and prepared, the makeup water requirement is expected to range from 400 to 600 gallons per minute.

In addition to the use for the processing plant, surface runoff from the construction support area will also be routed to this settling pond. Depending on the runoff quantities received, the actual makeup water required would be somewhat reduced.

Section 1.5 - Facilities Closure

Comment No. 14

Air emissions will be generated during the seven year closure period. Fugitive dust emissions during closure are estimated in the January 24, 1984 air permit submittal. While these emissions will be less than those during construction and operation, they are nonetheless significant. This section should provide a summary of emissions during closure including fugitive dust emissions, emissions from fuel consumptions, expected noise emissions and any other sources of air emissions.

Response:

The estimated air emissions and supporting calculations for the Project during closure have been provided to the DNR in the February 1985 Revised Air Permit Application. The estimated air emissions included fugitive dust emissions, emissions from fuel consumptions, and other sources of air emissions (see Tables 1.3-10 of the revised EIR, and 2.5 and 4.2 of the February 1985 Revised Air Permit Application). A summary of this information will be provided in an addendum to Section 1.5 of the EIR.

Similarly, the expected noise emissions during closure will be discussed in an addendum to EIR Section 1.5. The estimated noise emissions are likely to be less than those currently estimated for the construction and operation phase activities as provided in subsections 1.3.5.1 and 1.4.9 of the EIR. The equipment to be used during closure will be similar to that indicated for the construction and operation phases of the Project although it is likely they will be fewer in number. Newer models of the equipment, with improved noise suppression features, are also likely by the time of closure. However, the closure noise emission estimates will conservatively assume the levels of the construction and operation phase activities.

Chapter 2

Section 2.3.1.5 - Water Well Inventory

Comment No. 15

This section should indicate that the well survey was initiated in July, 1984 and that data collection is still in progress.

Response:

Comment acknowledged. Subsection 2.3.1.5 will be revised to indicate the water well inventory was initiated in July 1984 and that the results are presented in the High Capacity Well Approval Application.

Section 2.3.4.1 - Water Quality-Glacial Drift

Comment No. 16

This section indicates that water quality parameter concentrations are highest in the recharge areas and lowest in the discharge areas. Since this is contrary to generally observed trends, a brief discussion is necessary.

Response:

The measured values of alkalinity, calcium and mean hardness are higher in the ground water recharge areas than in the ground water discharge areas, as noted. This is possibly due to the solution of ions as the recharge water passes through the till which overlays the main aquifer. Because water movement through the till is much slower than through the main aquifer, the recharge water has more time to dissolve ions, but as the ground water moves through the drift aquifer it is subjected to dilution and is moving relatively, much faster and does not tend to dissolve more ions. This explanation is substantiated by the fact that water in the streams is very similar in quality to the ground water near them and ground water base flow is a substantial portion of the total flow of the streams.

Section 2.4.1.2 - Stream Flow Rates

Comment No. 17

The values of $Q_{7,10}$ taken from Golder in 1982 (as discussed on page 2.4-13 and in Table 24-19 were derived from incorrect use of the equations in Holmstrom (1980). The equation used for most of the sites has four variables, three of which were misinterpreted in Golder (1982). Entirely incorrect and unrelated values were substituted.

Response:

See response to comment No. 18.

Comment No. 18

Better estimates could probably be made by correlation with a long-term station using measured discharge. Also, the $Q_{7,10}$ estimates for the two U.S.G.S. gauges were different from those found in Golder (1982) without explanation. Golder had 11.6 ft^3/s downstream and 14.6 ft^3/s upstream from Rice Lake, a downstream reduction in flow that is difficult to explain.

Response:

On December 3, 1984, estimates of the $Q_{7,2}$ and $Q_{7,10}$ values for various streams gages in the site area were received from the DNR. Subsequently, EMC recalculated the $Q_{7,10}$ values using the Holmstrom (1980) methods and compared the values obtained with those received from the DNR. All values compared favorably except for those calculated by the DNR for gage SG 3. It is our opinion that the DNR values for SG 3 are in error and should be reevaluated. Otherwise, EMC intends to use the $Q_{7,2}$ and $Q_{7,10}$ values provided by the DNR in the revision of Section 2.4.

Section 2.4.4.1 - Drainage Lakes and Associated Streams

Comment No. 19

The assertion on page 2.4-33 that Hemlock Creek accounts for 10% of the base flow of Swamp Creek at Highway 55 is inadequately supported by the data. It relies on the base flow in Table 2.4-19, but the base flow values in the table are computed in different ways and for different periods of record at the various locations. Comparisons between base flow at different locations are meaningless unless the base flows are determined in a consistent manner for the same period of record.

Response:

Values of base flows and the site-to-site comparisons were intended only to provide a general characterization of the magnitudes and sources of low flows. The specific statement that Hemlock Creek accounts for 10 percent of the base flow of Swamp Creek at Highway 55 is, of course, based upon assumptions that there is a definable average surface water-ground water interchange between the two gage sites and that the base flows used are reasonable estimates of long-term average base flows. Similar assumptions are required to substantiate statements for other tributary sites such as Outlet Creek (page 2.4-42) and Creek 12-9 (page 2.4-59).

The revised version of EIR Section 2.4 will redefine the flow magnitudes used to characterize low-flows and will provide appropriate qualifying statements for any site-to-site comparisons.

Comment No. 20

As noted above, the comparison of base flow rates on page 2.4-37 that were determined for different periods of record is not adequately supported by the data. A comparison of $Q_{7,10}$ determined in a consistent manner would be more meaningful. Some of the base flows are determined by a proportional relationship using drainage areas. Comparisons of these base flows are no more than a comparison of drainage areas.

Response:

Comment acknowledged.

Comment No. 21

It is to be expected that the minimum observed flow at a continuous station would be proportionally lower than the minimum observed flow at gauges read weekly. This is true simply because weekly readings probably do not include the lowest flow for the period.

Response:

Comment acknowledged.

Comment No. 22

Hoffman Creek is included among tributaries that account for 3.8 ft^3/s to base flow, yet there are not enough discharge measurements to calculate base flow for Hemlock Creek (Table 2.4-9 and page 2.4-44).

Response:

Table 2.4-9 describes water and bottom sediment chemistry and we believe this is a typographical error. It should have read Table 2.4-19.

On page 2.4-44, second paragraph, last sentence, there is a statement to the effect that no base flow estimate has been made for Hoffman Creek.

Table 2.4-19 summarizes the flow characteristics of the study area streams. The table indicates that no base flow calculation was made for Hoffman Creek.

Comment No. 23

The above comments on comparing base flow rates also apply to the discussion of Outlet Creek on page 2.4-42. In addition, it is inaccurate to state that base flow in Outlet Creek is 38% of the base flow of Swamp Creek at Highway 55 since the base flow in Outlet Creek is only reported as less than 3 ft^3/s.

Response:

Comment acknowledged. The following correction will be made in line 6, paragraph 2, page 2.4-42: "Outlet Creek accounts for less than 25 percent of the base flow of..."

Comment No. 24

The terminology on page 2.4-56 conflicts with Table 2.4-19. Flow rates which are called "average base flow" in the text are listed under "base flow" in the table.

Response:

In line 4, paragraph 2, page 2.4-56 the word "average" will be deleted.

Comment No. 25

How was a base flow of 0.9 ft^3/s determined for SG 19 if the minimum flow for which the rating curve was valid was 1.8 ft^3/s? The above discussions of base flow comparisons also apply to page 2.4-59 and 2.4-81.

Response:

The base flows shown in Table 2.4-19 that are less than the "lower reliability limit" of the rating curves were defined from minimum recorded flow at the USGS operated Langlade gage and a drainage area ratio. The technique is described on page 2.4-11 and in footnote b of Table 2.4-19.

In the revised EIR Section 2.4, a more technically derived and presumably more precise estimate of low stream flow will be used.

Comment No. 26

A base flow for the outlet of Duck Lake is given as 0.2 ft^3/s on page 2.4-66. While it may be a matter of definition of base flow, it seems that base flow should be zero if there is no base flow for significant periods.

Response:

Appendix 2.4A, Table A-14, lists the record of stream gage SG B on the outlet from Duck Lake. During the period of record for the gage there were three measurements attempted which were small enough to be beyond the range of the rating curve. The outlet from Duck Lake is a wetland and is perched above the ground water table. Therefore, the term base flow, in the classical sense, does not apply to the stream. However, the wetland that borders the outlet channel is large and is probably capable of supplying sufficient water to the stream to maintain some flow for all periods except sustained drought conditions. Perhaps a better word to describe the nearly constant flow in the stream would be "sustained flow." The text on page 2.4-66 in the revised EIR will be changed to read sustained flow instead of base flow.

Section 2.4.7 - Hydrological Relationships

Comment No. 27

The discussion of WATER BALANCES correctly states that significant inaccuracies are likely in the various components of the water budgets. Given a possible error of an order of magnitude in the groundwater term, no significance should be attached to the differences in evapotranspiration between 60% and 67% of precipitation. The possible error in evapotranspiration in the water balance far exceeds any difference between values shown in Table 2.4-21.

Response:

Comment acknowledged. Line 2, paragraph 1, page 2.4-90 will be changed to read: "...transpiration was larger, 67 percent..." This change will reduce the significance of the difference in evapotranspiration percentages of precipitation.

Comment No. 28

How was the determination of 18 ft^3/s discharged in Swamp Creek on page 2.4-91 made? The mean discharge for six years (1978 - 1983) is 31.7 ft^3/s. How were the percentages of flow from Hemlock, Outlet, and Hoffman Creeks determined?

Response:

Based on USGS data for Swamp Creek at the continuous recording gage at State Highway 55, the average base flow at this location for the period of record between April 1977 and November 1980 was 0.54 m^3/s (19 cubic feet per second) (see Table 2.4-19). All discharge values for Swamp Creek and its tributaries will be checked and revised accordingly based on the USGS's 1984 estimates of stream flow.

Material in this subsection and in Table 2.4-21 attempts to characterize the hydrologic flow system by evaluating precipitation inputs, evapotranspiration and streamflow losses and ground water inflows or outflows through a water balance analysis. As discussed, the values of each component were estimated from limited data and balanced either by arithmetic means or by engineering judgements.

Section 2.9.2.1 - Forestry

Comment No. 29

The saw timber volume of 9,928 board feet per acre cited in this section includes Menominee and Shawano Counties and is therefore very high for Forest, Langlade, and Oneida Counties. A more appropriate figure would be in the range of 5,000 to 6,000 board feet per acre.

Response:

Subsection 2.9.2.1 will be revised to designate a saw timber volume of 5,000 to 6,000 board feet per acre in Forest, Langlade and Oneida counties using the DNR as the source for the estimated volume.

Chapter 3

Comment No. 30

We have only a few specific comments on the alternatives section at this time. Please be aware, however, that as our impact analyses proceeds, newly identified impacts may require that additional alternatives be developed.

Response:

Comment acknowledged.

Comment No. 31

We believe, for example, that on-going analyses could indicate adverse impacts to surface waters from the ground water drawdown. By developing alternatives to mitigate these potential impacts now, Exxon could avoid future delays in the process. Specifically, we recommend further evaluation of alternatives to maintain ground water levels and/or surface water levels through discharge of excess water. Exxon should also assess the effect of these alternatives on the wastewater treatment plant design.

Response:

A Contingency Plan is being prepared that will identify and describe potential alternative actions for use in mitigating ground water and surface water impacts caused by mine dewatering in the event that such action is necessary. The effect of these alternatives on wastewater treatment plant design will be included in the plan. When completed, the plan will be provided to the DNR.

Comment No. 32

In addition, it appears that our socioeconomic analyses may reveal that a substantial portion of both construction and operation workers may originate from areas south of the mine site. If this is the case, an access road connecting with Highway 55 at a more southerly location may be preferable. While our analyses of worker distributions are not yet completed, we recommend that Exxon conduct initial evaluations of southern route alternatives at this time.

Response:

An alternative route for the access road located south of alternative route E (Sand Lake Road) would require additional engineering study and could have as much or more environmental impact than the proposed route, depending upon the specific route alignment and its connection with State Highway 55. A more southerly route would still not prevent the flow of Project-related traffic (those workers living north of the Project site) through the Mole Lake Indian Reservation and the community of Mole Lake. The potential for disturbing residences during construction of an access road at a more southerly location would be greater than for the proposed route.

Section 3.4.2.2 - Haul Road Corridor

Comment No. 33

The alternative of paving the haul road should be considered. This alternative would reduce fugitive dust and eliminate the need for chemical stabilizers and watering.

Response:

Paving or possible other permanent treatments of the haul road between the mine/mill site and the MWDF area were considered and after evaluation rejected because of technical and economic reasons. The haul road is designed to support 35-ton off-highway trucks. Trucks of this size are required to provide an economic transfer of waste rock to the MWDF throughout the Project. The use of this size truck also reduces potential fugitive dust emissions because fewer trips are required to transport the rocks.

Construction of the haul road will include an additional thickness to the base course in order to support the 35-ton trucks. Similarly, the top layer of gravel for the haul road surface will require an extra thickness. There would also be an increase in the thickness of the top layer if it were asphalt or other possible permanent treatment in comparison to the gravel.

For example, the access road is currently designed to have a 12-inch crushed aggregate base course covered by a 3-inch asphalt surface. It will support a maximum axle load of 9 tons. The crushed aggregate base layer could double in thickness (i.e., 24 inches) for the haul road to support the 35-ton trucks. An asphalt surface layer would be a minimum of 6 inches or approximately 100 percent thicker than the access road.

The estimated cost for the access road is approximately $9.50/sq. yd. (12 inch base = $3.50/sq. yd.; 3 inch asphalt = $6.00 sq. yd.). The estimated cost for the haul road would be approximately $19.00/sq. yd. (24 inch base = $7.00/sq. yd.; 6 inch asphalt = $12.00 sq. yd.), also an increase of 100 percent.

Similarly, additional costs would be required for maintenance of the haul road. A gravel haul road can be repaired for approximately $7.00/sq. yd., whereas the asphalt surfaced haul road would require approximately $19.00/sq. yd. of maintenance cost.

Frost damage to the haul road is likely to occur every year. Direct repair costs, as presented above, for an asphalt surfaced haul road would be more than double those of a gravel road. In addition, the potential out-of-service costs because of a damaged asphalt surfaced haul road are also much higher than for a gravel road. Several days may be required to fix the asphalt road, whereas a road grader available at the mine/mill site can easily and quickly repair a gravel haul road.

Finally, the estimated fugitive dust emissions for the gravel haul road during the operation phase are generally not greater than 10 tons per year with watering and chemical stabilizers (see Table 4.1 of the February 1985 Revised Air Permit Application). This quantity of fugitive dust emissions would not be reduced below 8 tons per year with a paved road. Therefore, this estimated fugitive dust quantity difference does not warrant the additional cost required to reduce these emissions further.

Comment No. 34

Overall, it appears fugitive dust from general construction, excavation, and hauling could be better controlled through greater use of chemical dust suppressants. This alternative should be evaluated further.

Response:

Chemical dust suppressants were evaluated as a control mechanism for general construction, excavation, and hauling activities of the Project. However, chemical dust suppressants are most effective for longer term (i.e., several days or more) control of exposed dirt surface areas. General construction, excavation and hauling tasks will be short-term activities (i.e., minutes and hours) occurring in succession throughout the day. Therefore, water spraying immediately before clearing, scraping, excavating and hauling activities will sufficiently suppress dust generation. Further, this will be a rather continuous activity with water being sprayed on construction areas prior to work initiation. Since the soil material will be worked and moved while still damp, the fugitive dust emissions will be controlled.

Chemical dust suppressants will not increase the efficiency or be more effective in controlling fugitive dust emissions because the construction activities will rapidly displace the sprayed surface layers. Therefore, the chemical dust suppressant will not have a long-term controlling effect. Further, the additional cost required for the chemical dust suppressant, without additional benefit, is not cost-effective when compared with water spraying. If construction activity will be discontinuous in any area and

soil will be exposed for long periods of time (i.e., days or weeks), chemical dust suppressants will be considered to control possible fugitive dust emissions. Use of chemical dust suppressants would also be evaluated in relation to weather (i.e., rain, wind) and seasonal (i.e., snow cover) conditions.

Noise and Seismic Vibration

Comment No. 35

Our consultants have recently completed their review of your October 31, 1984 letter "Responses to July 9, 1984 DNR comments on the Noise Reports". Their review indicates the responses on noise are adequate for the DEIS. However, additional information is needed for the seismic vibration analyses.

Response:

The response to this comment was provided previously in the letter dated January 4, 1985, from B. J. Hansen, EMC, to R. H. Ramharter, DNR.

Comment No. 36

The analysis method is depicted on p. 61 of the October 31, 1984 responses. While the method is correct, its application is not. It is assumed that blast vibrations will travel in a straight line from the point of explosion to the ground level receptor. In fact, vibrations move a greater distance through the bedrock before traveling through the overburden. This causes surface vibrations to be greater than predicted using Exxon's approach. Since off-site vibrations were shown to be detectable, the analysis should be adjusted to account for this phenomenon. This subject is discussed further in "Vibrations of Soils and Foundations" by Ricardi.

Response:

The response to this comment was provided previously in the letter dated January 4, 1985, from B. J. Hansen, EMC, to R. H. Ramharter, DNR.

Comment No. 37

The analysis predicted blasting vibrations within 1/2 mile from the point of the blast. At 2,500 feet from the surface point above the blast, vibrations were predicted to be 0.14 to 0.26 inches per sec (peak particle velocity). This is well above the detection limit of 0.035 in/sec shown in Figure No. 8 on p. 70. Exxon should extend the analysis to a distance where blast vibrations are still detectable, as this may include nearby residences.

Response:

The response to this comment was provided previously in the letter dated January 4, 1985, from B. J. Hansen, EMC, to R. H. Ramharter, DNR.

Comment No. 38

Figures 2 to 7 on pp. 64-69 display the analysis results. The scale of the figures accommodates the high level of vibrations occurring near the point of a blast, obscuring the detectable vibrations that are greater distances away. The scale should be adjusted so the peak particle velocities off-site are clearly visible. This may also be solved by the use of log-log scale figures.

Response:

The response to this comment was provided previously in the letter dated January 4, 1985, from B. J. Hansen, EMC, to R. H. Ramharter, DNR.

Comment No. 39

Figure No. 8 on p. 70 indicates that structure surveys should be conducted when vibrations exceed 0.2 in/sec. Predicted vibrations at 1/2 mile exceed this criteria. Exxon should expand the area of the pre-blast survey beyond the proposed 1/2 mile to include those structures which will experience vibrations above 0.2 in/sec.

Response:

The response to this comment was provided previously in the letter dated January 4, 1985, from B. J. Hansen, EMC, to R. H. Ramharter, DNR.

Comment No. 40

The analysis shows blast vibrations are likely to be detectable off-site. Exxon should discuss alternatives dealing with complaints from nearby residents. This should include alternatives available to reduce off-site vibrations such as increasing the number of delays, decreasing the size of the charges, and changing the time when blasting occurs.

Response:

The response to this comment was provided previously in the letter dated January 4, 1985, from B. J. Hansen, EMC, to R. H. Ramharter, DNR.

Comment No. 41

Has a plan been developed for monitoring surface level vibrations when blasting begins? If so, this should be submitted. Otherwise, a blast vibration monitoring plan should be developed.

Response:

The response to this comment was provided previously in the letter dated January 4, 1985, from B. J. Hansen, EMC, to R. H. Ramharter, DNR.