

Copperwood Resources Inc. 310 US Highway 2 Wakefield, MI 49968 906.229.3115

June 26, 2018

Ms. Melanie Humphrey Michigan Department of Environmental Quality MDEQ Oil Gas and Minerals Division 1504 West Washington Street Marquette, MI 49855

Re: Revision to Amendment Application for MP012012 - Copperwood Mine

As requested during our phone conversation of June 18, 2018 Copperwood Resources Inc. is submitting this request to revise its application for amendment to MP012012 submitted on March 22, 2018.

The specific revisions are being submitted as an addendum to the complete application package provided with the above referenced submittal. The most significant change to the amendment application is removal of the plan for a new on-site, natural gas fueled, power generation plant and return to the previously permitted power supply by a public utility via a grid-connected transmission line. In addition, further review of the revised mine ventilation plan has resulted in a decision to add an air heater at the fresh air intake location to better control mine temperatures during the winter months.

Since submission of the amendment application, Copperwood completed and submitted a combined Part 301, 303 and 325 permit application to the MDEQ on May 4, 2018. Proposed wetland impacts discussed in the above referenced Part 632 amendment application have been revised based on the Part 303 wetland impact application.

Please contact myself, Thomas Repaal, with questions or clarification requests at (906) 229-3115 or email at thomas.repaal@highlandcopper.com .

Regards,

Thomas Repaal Sr. Environmental Engineer

Enclosure



Green Bay Location

2121 Innovation Court, Suite 300 P.O. Box 5126 De Pere, WI 54115-5126 (920) 497-2500 • Fax: (920) 497-8516 www.foth.com

June 26, 2018

Mr. Tom Repaal Copperwood Resources, Inc. 310 East US Highway 2 Wakefield, MI 49968

Dear Mr. Repaal:

RE: Addendum to Copperwood Mining Permit Application Amendment

On March 22, 2018, an amendment application was submitted to the Michigan Department of Environmental Quality (MDEQ) to request an amendment to Mining Permit MP012012. Since submission of the amendment application, changes have been made to the Copperwood Project (Project). Changes to the amendment application include the removal of the planned onsite natural gas fueled power generation plant, and the addition of a propane fueled air heater at the mine ventilation intake raise. With the removal of onsite power generation, the Project's electrical demand will now be met by the installation of a transmission line connected to the local power grid via an utility provider. Note this is the same electrical service plan that was included within the mine plan approved within MP012012. Therefore, an amendment request for the inclusion of an onsite natural gas fueled power generation plant is no longer requested.

In addition, proposed wetland impacts discussed in the amended Environmental Impact Assessment (EIA) have been revised based on the combined Part 301, 303, and 325 permit application that was submitted to the MDEQ on May 4, 2018.

The purpose of this letter is to provide updated figures, tables, and narrative in order support the addendum to the Copperwood Mining Permit Amendment Application submitted on March 22, 2018. The following summarizes addendums to the March 22, 2018 amendment application. The overall environmental impact assessment findings presented in the Environmental Impact Assessment (Mining Permit Application Amendment Volume II) remain valid, with a slight overall reduction in wetland impacts.

Mining Permit Application Amendment (Volume I)

• The Project layout presented on Figures 1-2, 2-1, 4-1, 4-5, and 6-1 has been updated to remove the onsite power generation plant and associated natural gas

pipeline. In addition, an overhead electrical transmission line has been added to these figures. These updated figures are provided in Attachment 1.

- Figure 4-2 showing the conceptual design for the mine intake ventilation raise has been updated to account for the addition of a propane fueled air heater. Figure 4-2a replaces Figure 4-2 and shows the revised conceptual design. A new figure, Figure 4-2b, has been added to show the conceptual design for the propane storage area. Figures 4-2a and 4-2b are provided within Attachment 1.
- The anticipated construction and startup schedule presented in Table 4-1 has been revised to account for the removal of onsite power generation and the addition of overhead electrical transmission line. Revised Table 4-1 is provided in Attachment 2.
- Tables 9-1, 9-4, and 9-5, associated with financial assurance, have been revised to remove onsite power generation equipment from the salvage value total. Revised Tables 9-1, 9-4, and 9-5 are provided within Attachment 2.
- Section 4.3 *Surface Facilities and Operations* indicated a natural gas power plant was going to be one of the primary surface facilities associated with the Project. References to the natural gas power plant should be removed from the section and replaced with a power distribution substation.
- Section 4.3.1 *Ventilation Raise Pads* described the ventilation raise pads. The narrative presented in this section should be replaced with the following to account for the addition of a propane fueled air intake heater.

One intake ventilation and two exhaust ventilation raises will be required to support the underground mine ventilation requirements. The location of these three ventilation raises are shown on Figure 1-2. The intake raise is on uninhabited commercial forest property currently owned by the Hancock Natural Resource Group and will require some type of use agreement under mineral lease law. The exhaust raises are both on property owned by Copperwood.

The intake ventilation and west exhaust ventilation raises will be constructed during initial mine development. A direct fired air heater fueled by propane will be installed at the intake ventilation raise location. Propane fuel storage tanks will be added near the intake raise location. The east exhaust ventilation raise is not anticipated to be installed until after year 6. In addition to the east and west exhaust raises, the mine access box-cut will also serve as an exhaust ventilation location. The conceptual design of the ventilation raise pads are shown on Figures 4-2a and 4-3, and the propane fuel storage facility is shown on Figure 4-2b.

• Section 4.3.5.1 *Electric Services and Natural Gas* described electric services proposed for the Project. The narrative presented in this section should be replaced with the following to account for the removal of the natural gas fueled power generation plant.

4.3.5.1 Electric Services

Electric service is not readily available from a utility at the Project location. Electrical demand of the Project will be met by installation of a transmission line. Copperwood is exploring options with utility providers to determine the exact route and grid connection location for power transmission to the mine site.

The facility will also have three diesel-fired emergency generators that will be used as back-up power for the facility in event of a power outage. One of the back-up generators (1,000 kW) will be located near the underground mine access box-cut, while the other two generators (500 kW each) will be located near the process plant. Locations of each emergency generator is shown on Figure 4-1.

• Section 8 *Emergency Response Plan Contingency Plan* described the Integrated Contingency Plan (ICP) and Emergency Response Plan (ERP) Copperwood would develop prior to Project development. The narrative presented in this section should be replaced with the following to account for the removal the onsite natural gas fueled power generation plant and addition of the propane fueled intake ventilation heater.

As described in the MPA, Copperwood will prepare an Integrated Contingency Plan (ICP) and Emergency Response Plan (ERP) prior to Project development, with annual updates thereafter. The purpose of these plans will be as follows:

- Assess the risks to the environment and public health and safety that could result from accidents or failures at the Project, and response measures to be followed.
- Provide procedures for emergency notifications, responsibilities, evacuations, and a listing of emergency response equipment available at the Project.
- Provide plans for testing the contingency plan to assure and improve effectiveness.

The primary elements of the ICP and ERP described in the MPA will continue to be utilized and applied to the revised Project site layout and modified mining methods when the ICP and ERP are formally developed for the Project prior to construction. When the ICP and ERP are developed, the contingencies described in the MPA for ore storage will be updated to reflect that ore storage will now take place in an outdoor ore stockpile. In addition, contingencies for the

> mine ventilation heater propane fuel storage facility will be added to the plans. Emergency contact information will also be updated when the ICP and ERP are developed prior to construction.

Environmental Impact Assessment (Mining Permit Application Amendment Volume II)

- The Project layout presented on Figures 1-2 and 3-1 has been updated to remove the onsite power generation plant and associated natural gas pipeline. In addition, an overhead electrical transmission line has been added to these figures. These updated figures are provided in Attachment 3.
- The preliminary wetland disturbances presented in Table 3-2 have been revised to account for wetland impacts presented within the combined Part 301, 303, and 325 permit application that was submitted to the MDEQ on May 4, 2018. Revised Table 3-2 is provided in Attachment 4.
- Section 3.7 *Floodplains, Shorelines, and Wetlands* described potential impacts to these resources. To account for the removal of the onsite natural gas fueled power generation plant, the addition of the propane fueled intake ventilation heater, and the combined Part 301, 303, and 325 permit application that was submitted to the MDEQ on May 4, 2018, the third and final paragraph within this section should be replaced with the paragraph that follows.

Preliminary analysis indicates there will be a small net decrease in wetland impacts from those of the originally proposed process plant site (2.56 acres) compared to the revised process plant location plus ore stockpile area preliminary impact (2.48 acres). Impacts associated with the ore stockpile area account for 1.70 acres of this combined total. Preliminary plans indicate approximately 0.05 acres of wetland impact will occur from the addition of the ventilation raises. Overall the preliminary analysis indicates there will be a total of 57.84 acres of impacts resulting from the proposed action site layout, which is a net decrease of 0.46% (0.27 acres).

- Section 3.12 *Public Roads, Pipelines, and Powerlines* described the current state and potential impacts to these resources. To account for the removal of the onsite natural gas fueled power generation plant, the reference made to the electrical demand for the proposed action within this section should be disregarded as it no longer applies.
- Section 3.17 *Air Quality and Climatology* described potential air quality impacts. To account for the removal for the removal the onsite natural gas fueled power generation plant, and the addition of the propane fueled intake ventilation heater, references to the onsite power generation plant should be replaced with

references to the propane fueled mine ventilation air intake heater. In addition, the selective catalytic reactor and oxidation catalyst systems associated with the natural gas power plant will be removed from the Project.

- The Section 5.1 *Background* bullet point highlighting the addition of onsite power generation using natural gas fuel is no longer applicable due to the removal of the onsite natural gas fueled power generation plant.
- Within Section 5.2 *Process Plant Relocation*, the process plant location plus ore stockpile area preliminary impact of 2.68 acres should be changed to an impact of 2.48 acres. This revision is due to a revised analysis of impacts described within the combined Part 301, 303, and 325 permit application that was submitted to the MDEQ on May 4, 2018.
- Section 5.4 *Mine Ventilation Plan* described the mine ventilation design. The narrative presented in this section should be replaced with the following to account for the addition of a propane fueled air intake heater.

The MPA mine ventilation design used four portal openings at the base of the mine box cut ramp for both exhaust and fresh air intake openings. The ventilation exhaust was through twin fans at the base of the box cut into a 4.6-meter diameter duct and vertical stack extending to 10.7 meters above ground surface. The height and diameter of the exhaust stack were determined by dispersion modeling to be the minimum dimensions required to meet air quality and stack velocity requirements.

GMining reviewed the existing ventilation plan and determined that it could more effectively and efficiently assure adequate ventilation to meet health and safety requirements with a different ventilation design. The proposed action updated design will use a remote intake raise to deliver fresh air to the mine with two exhaust raises and the mine portal serving as discharge points for the ventilation system. Air dispersion modeling for the proposed action exhaust raises has demonstrated that 3-meter diameter by 8-meter-tall stacks will be sufficient to meet air quality requirements.

An additional change to the existing ventilation plan is the addition of a direct fired air heater at the location of the fresh air intake location. GMining determined during their review of the plan that heating the ventilation air during the winter months will be necessary to control air temperatures in the mine and prevent ice formation in undesirable locations. The air heaters will operate on propane fuel stored in a secured facility near the intake raise location in three 30,000-gallon tanks. With the heaters being direct fired via high efficiency burners, combustion exhaust is mixed with fresh air at the intake raise and eventually emitted at the exhaust raise and portal locations.

> Locations of the ventilation raises and access routes were planned to avoid wetland and stream impacts as much as feasibly possible. A recent revision to the preliminary plans to impact 0.16 acres of wetland impact has reduced the impact to 0.05 acres. This additional impact is less than 0.1% of the total proposed action wetland impacts. This alternative design presents a better alternative from the MPA

• Section 5.5 *On-site Power Generation* is no longer applicable and should be removed.

Sincerely,

Foth Infrastructure & Environment, LLC

Kris Baran Project Director/Associate

Stephen V. Donohue, PH Vice President – Mining

Mark Ciardelli

Mark Ciardelli Lead Environmental Scientist



Path: Q:\Copperwood Resources\17C050\GIS\mxd\MPAA\June 2018\Figure 1-2 Site Layout.mxd Date: 6/25/2018



Path: Q:\Copperwood Resources\17C050\GIS\mxd\MPAA\June 2018\Figure 2-1 Proposed Mining Area Boundary.mxd Date: 6/25/2018



Path: Q:\Copperwood Resources\17C050\GIS\mxd\MPAA\Figure 4-1 Process Plant Area.mxd Date: 6/25/2018



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LEGEND

CONTACT	WATER	DITCH	

CONTACT WATER AREA 112 100m2

NON CONTACT WATER DITCH

NON CONTACT WATER AREA

0

ELEVATION (METER)

ISSUED FOR INFORMATION

NOT FOR CONSTRUCTION

viron	ment, LLC	COPPERWOOD RESOURCES, INC.					
DESCRIF	PTION						
Site La	iyout	FIGURE 4-5					
		MINING PERMIT APPLICATION AMENDMENT					
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Path: Q:\Copperwood Resources\17C050\GIS\mxd\MPAA\June 2018\Figure 6-1 Groundwater Monitoring Locations.mxd Date: 6/25/2018

Table 4-1

Anticipated Construction and Startup Schedule

	Year 1		Year 2			Year 3						
Requirement	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4
Mine Complex Development Schedule												
Site Preparation												
Box Cut Excavation												
Box Cut Access, Initial Utilities & Cover												
Ore Stockpile & Initial Water Management ¹												
Underground Access and Preproduction												
Drill/Blast Production full production after ramp-up												
		-										
Surface Complex Development Schedule												
Site Preparation												
Process Plant Construction												
Process Plant Commissioning/Ramp-up												
Taililngs Disposal Facility - Initial Stage ¹												
Process Wastewater Treatment Plant	No proc	ess wate	r dischar	ge until	year 6 o	f mine oj	peration.					
Support Infrastructure												
Roads												
Ancillary Buildings												
Power												
Water Intake												
Potable Water Treatment												

Notes:

¹ The ore stockpile must be ready to receive ore, an initial contact water management system in place, and the initial stage of the tailings disposal facility must be capable of storing contact water before underground mine access and preproduction work can begin.

Source: Copperwood Resources, Inc.

Sanitary Wastewater Lagoons

Prepared by: JEF1 Checked by: MCC2

Table 9-1

Reclamation Costs by Stage

		Stage 1		Stage 2	Closure		
Years	Years 0 to 4 4 to 8		8 to 14				
Tailings Disposal Facility							
Area (sq.m)		205,000		500,000		970,000	
Unit cost to reclaim (\$/sq.m)	\$	31.53	\$	29.65	\$	29.69	
Reclamation	\$	6,463,650.00	\$	14,825,000.00	\$	28,799,300.00	
Wastewater Treatment							
Median Number of Years to empty TDF		1		2		6	
Treatment Cost per Year		1,700,000		1,700,000		1,700,000	
Treatment Cost	\$	1,700,000.00	\$	3,400,000.00	\$	10,200,000.00	
Reclamation Costs at Closure							
Reclamation	\$	10,222,550.00	\$	10,222,550.00	\$	10,222,550.00	
Salvage Value							
Total Equipment Salvage Value	\$	(10,751,169.00)	\$	(10,751,169.00)	\$	(10,751,169.00)	
General							
Reclamation	\$	56,275.00	\$	56,275.00	\$	56,275.00	
Reclamation Subtotal	\$	7,691,306.00	\$	17,752,656.00	\$	38,526,956.00	
Notes:						Prepared by: JEF1	
\$/sq.m = dollars per square meter						Checked by: MCC1	

\$/sq.m = dollars per square meter sq.m = square meter

TDF = Tailings Disposal Facility

Source: Copperwood Resources, Inc.

Table 9-4					
Equipment Salvage Value					

Clos	sure Year	14
		± 1

Remaining							
	Original Equipment	Economic	Life at	NBV at	Salvage %	a	Salvage Value % of New
Description	Cost	Life	Closure	Closure	NBV	Salvage Value	Equipment Value
120-Workshops/Storage	\$75,000.00	25.00	11.00	43,500.00	43.10%	\$18,750.00	25%
130-Support Facilities	\$1,500,791.20	20.00	6.00	712,875.82	52.63%	\$375,197.80	25%
160-Laboratory	\$1,802,000.00	25.00	11.00	1,095,616.00	49.34%	\$540,600.00	30%
220-Process Plant Electrical Rooms	\$2,355,000.00	14.00	0.00	824,250.00	100.00%	\$824,250.00	35%
310-Raw Water Supply & Potable Water	\$3,145,795.00	14.00	0.00	786,448.75	100.00%	\$786,448.75	25%
400-Mobile Equipment	\$20,962,294.00	14.00	0.00	4,192,458.80	100.00%	\$4,192,458.80	20%
430-Surface Mobile Equipment	\$400,000.00	14.00	0.00	80,000.00	100.00%	\$80,000.00	20%
610-Ore Handling	\$2,740,000.00	30.00	16.00	1,653,133.33	24.86%	\$411,000.00	15%
620-Grinding	\$10,730,000.00	30.00	16.00	6,473,766.67	24.86%	\$1,609,500.00	15%
630-Flotation/Regrind Circuit	\$9,329,900.00	25.00	11.00	4,888,867.60	28.63%	\$1,399,485.00	15%
640-Tailings	\$165,000.00	25.00	11.00	86,460.00	28.63%	\$24,750.00	15%
650-Copper Concentrate Filtration; Thickening & Handling	\$2,098,500.00	25.00	11.00	1,099,614.00	28.63%	\$314,775.00	15%
670-Reagents	\$674,691.00	25.00	11.00	353,538.08	28.63%	\$101,203.65	15%
680-Plant Services	\$485,000.00	25.00	11.00	254,140.00	28.63%	\$72,750.00	15%
Subtotal Direct	\$56,463,971.20			\$22,544,669.05		\$10,751,169.00	20%
				Total Equipment Sa	alvage Value	\$10,751,169.00	
Notes: NBV = Net Book Value							Prepared by: JEF1 Checked by: MCC2

Notes:

NBV = Net Book Value % = percent

Source: Copperwood Resources, Inc.

Table 9-5Financial Assurance Costs by Stage

Stage	1	2	Closure
Years	0 to 4	4 to 8	8 to 14
Reclamation Cost by Stage	\$ 7,691,306.00	\$ 17,752,656.00	\$ 38,526,956.00
Post Closure Monitoring and Care	\$ 3,846,959.00	\$ 3,846,959.00	\$ 3,846,959.00
Total Closure and Reclamation Costs	\$ 11,538,265.00	\$ 21,599,615.00	\$ 42,373,915.00
MDEQ Administration Oversight (5% of Total Costs)	\$ 576,913.25	\$ 1,079,980.75	\$ 2,118,695.75
Subtotal	\$ 12,115,178.25	\$ 22,679,595.75	\$ 44,492,610.75
Contingency Cost (5% of Reclamation/Monitoring and MDEQ Oversight Costs)	\$ 605,758.91	\$ 1,133,979.79	\$ 2,224,630.54
Total Financial Assurance Cost	\$ 12,720,937.16	\$ 23,813,575.54	\$ 46,717,241.29
Incremental Financial Assurance ¹	\$ 12,720,937.16	\$ 11,092,638.38	\$ 22,903,665.75

Notes:

¹ Amount to be added to proposed Certificate of Deposit or approved financial instrument by stage.

MDEQ = Michigan Department of Environmental Quality

Prepared by: JEF1 Checked by: MCC2

Source: Copperwood Resources, Inc.



Path: Q:\Copperwood Resources\17C050\GIS\mxd\EIA\June 2018\Figure 1-2 Site Layout.mxd Date: 6/25/2018

Path: Q:\Copperwood Resources\17C050\GIS\mxd\EIA\June 2018\Figure 3-1 Project Site Wetlands.mxd Date: 6/25/2018

	Dredge Area	Fill Area
Infrastructure	(US Acres)	(US Acres)
Box Cut	0.08	0.00
Exhaust/Intake and Road	0.00	0.05
East Stream Relocation	0.57	0.04
Explosives Plant/Magazine and Road	0.00	0.00
Fire Water Tank and Road	0.00	0.00
Main Access Road	0.17	1.91
Mitigation and Access Road	0.01	0.41
Ore Stockpile and Road	1.46	0.24
Process Plant	0.46	0.33
Sewage Lagoon and Road	0.00	0.00
Tailings Disposal Facility	10.96	40.29
Topsoil Stockpile	0.00	0.00
Water Intake Road and Pump House	0.05	0.05
West Stream Relocation	0.59	0.17
Total	14.35	43.49

Table 3-2Proposed Wetland Disturbances

Note:

The areas have been rounded to the nearest 100^{th} of an acre.

Prepared by: JEF1 Checked by: MCC2

Source: Coleman Engineering Company revised Part 303 application table.