NorthMet Project – Local Mercury Deposition and Bioaccumulation in Fish
Addendum 01
March 13, 2013 – version 2

Background

The Cumulative Impacts Analysis; Local Mercury Deposition and Bioaccumulation in Fish; NorthMet Project (Version 3, July 2012) for the NorthMet Project (Project) estimated that the mercury air emissions from the Project and Mesabi Nugget together could increase mercury levels in fish in nearby lakes by less than two percent over existing levels. The estimated total mercury loading has not changed; however, the report contains an error regarding the relative contribution from the two facilities. The original report attributed nearly all of the impact to Mesabi Nugget. The corrected estimate shows that 80% to 90% of the potential impact to mercury levels in fish would be due to the Project. This addendum summarizes the error and provides a corrected Table 4.

The Plant Site Air Emissions Risk Analysis (AERA), Version 1, December 2012 report prepared for the Project included an analysis of the mercury deposition for the Project only. The information included in the AERA report reflects the corrected calculations included with this document.

Calculation Error

One of the critical assumptions required to model mercury deposition is the distribution of mercury species emitted. This is because oxidized mercury (Hg(II)) and particle bound mercury (Hg(p)) are much more readily deposited from the air to the watershed than elemental mercury (Hg(0)). In this case, nearly all the emissions from Mesabi Nugget are assumed to be Hg(0)[1], with less than one percent as Hg(II) or Hg(p). On the other hand, Project emissions are assumed to be made up of much higher percentages of Hg(II) and Hg(p): up to 50 percent Hg(II) and 25 percent Hg(p) under one scenario. This conservative scenario was used because speciation from the Project's Autoclave is uncertain. Therefore, it represents a conservatively high assessment of the Project's potential impact to nearby lakes.

Because the assumed species distribution is different for the two facilities, the deposition rates of the three mercury species from each facility were modeled separately and then added together to estimate total loading to nearby lakes. This total has not changed. However, the portion of deposition to nearby lakes attributed to the Project was inadvertently based on the proportion of total mercury contributed to the air shed (Column E in the original report). This is only accurate when the species distribution from each facility is the same. In this case the species distribution is different.

Revised Table 4

The corrected calculation is shown in a revised Table 4 below. The original Table 4 is also provided for reference. In summary, the total estimated potential cumulative increase in fish mercury levels in nearby lakes is unchanged (Column D). However, the corrected Table 4 shows that although most of the total mercury contributed to the air shed is from Mesabi Nugget, the Project is responsible for most of the estimated potential change in fish mercury concentration (Column F). This is due to the much higher percentage of Hg(II) and Hg(p) assumed for the Project.
Figure 1 shows these data in graphical form.

[1] Based on speciation data from pilot plant.

Original Table 4:

Table 4 Incremental Increase in Mercury Loading and Fish Concentration

A		B	C	D	E	F	G
			Cumulative		NorthMet Alone		
Lake	Scenario	Existing fish Hg Concentration (ppm)	Increase in fish Hg Concentration (ppm)	% Increase in Hg loading and fish Hg concentration	Proportion due to NorthMet alone (%)	Increase in fish Hg Concentration (ppm)	% Increase in Hg loading and fish Hg concentration
			MMREM Results	Calculated from B and C	Table 3 or below**	Calculated from C and E	Calc from B and F
Colby Lake	1	0.93	0.012	1.2%	10.0%	0.001	0.12%
	2		0.003	0.4%	10.4%	0.000	0.04%
Heikkilla Lake	1	0.65	0.011	1.8%	23.4%	0.003	0.41%
	2		0.003	0.5%	23.7%	0.001	0.11%
Sabin Lake	1	1.02	0.013	1.3%	10.5%	0.001	0.14%
	2		0.004	0.4%	10.6%	0.000	0.04%
Whitewater Lake	1	0.35	0.003	0.8%	8.1%	0.000	0.07%
	2		0.001	0.3%	8.4%	0.000	0.03%
Wynne Lake	1	1.34	0.018	1.3%	12.8%	0.002	0.17%
	2		0.005	0.4%	12.9%	0.001	0.05%

NorthMet Project – Local Mercury Deposition and Bioaccumulation in Fish
Addendum 01
March 13, 2013 – version 2

Revised Table 4
Incremental Increase in Mercury Loading and Fish Concentration
Cumulative Impacts Analysis
Revised November 20, 2012

A		B	C	D	E	F	G
			Cumulative		NorthMet Alone		
Lake	Scenario	Existing fish Hg Concentration (ppm)	Increase in fish Hg Concentration (ppm)	% of Cumulative Increase Above Existing Fish concentration	Proportion due to NorthMet alone (%)	Increase in fish Hg Concentration (ppm)	% Increase in Hg loading and fish Hg concentration
			MMREM Results	Calculated from B and C	Calculated from C and F	Calculated from C and E	Calc from B and F
Colby Lake	1	0.93	0.012	1.2%	90%	0.010	1.1%
	2		0.003	0.4%	79%	0.003	0.3%
Heikkilla Lake	1	0.65	0.011	1.8%	92%	0.010	1.6%
	2		0.003	0.5%	84%	0.003	0.4%
Sabin Lake	1	1.02	0.013	1.3%	91%	0.012	1.2%
	2		0.004	0.4%	79%	0.003	0.3%
Whitewater Lake	1	0.35	0.003	0.8%	77%	0.002	0.6%
	2		0.001	0.3%	58%	0.001	0.2%
Wynne Lake	1	1.34	0.018	1.3%	91%	0.016	1.2%
	2		0.005	0.4%	79%	0.004	0.3%

*MMREM Results for NorthMet alone obtained from the AERA evaluation for the Plant Site.

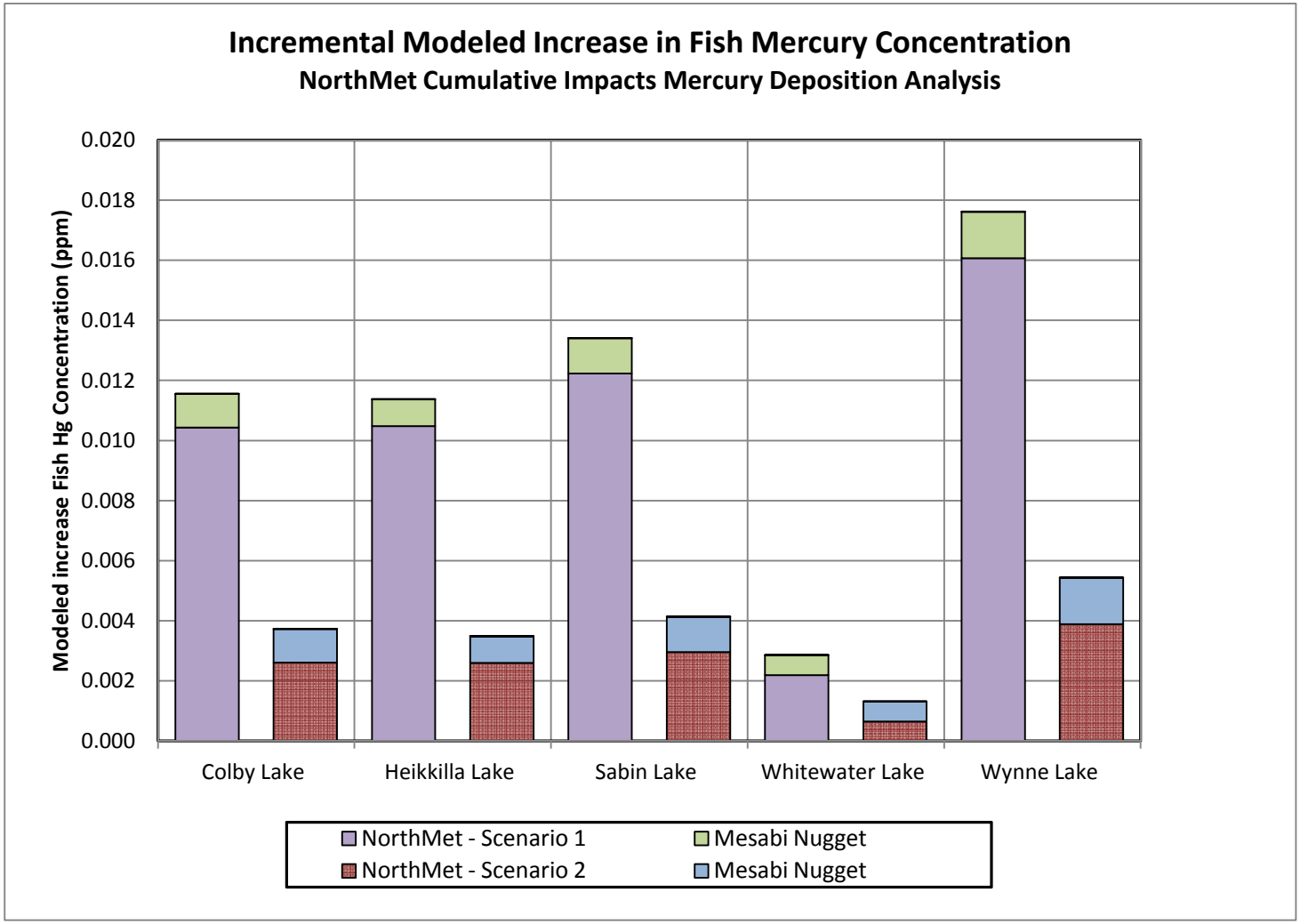

Figure 1 Incremental Modeled Increase in Fish Mercury Concentration