ANNEX B: QIA Final Submission to NWB

Qikiqtani Inuit Association's Technical Support for Effluent Quality Criteria

On March 6, 2013 Baffinland Iron Mines Corporation (BIMC) provided the Qikiqtani Inuit Association's (QIA) with proposed draft water license terms and conditions. Effluent quality criteria have been proposed in this document by BIMC for use at the Mary River project. QIA has, where possible, reviewed these proposed values, and has developed QIA preferred water effluent quality criteria.

Wastewater discharge criteria for the Mary River, Milne and Steensby Inlet camps have been proposed by BIMC for potential inclusion within the water license. QIA defers to the expertise of Environment Canada in recommending criteria that are protective freshwater water quality for wastewater discharge. QIA understands that effluent regulations for sewage have been developed by Environment Canada for Southern Canada, and these regulations will likely be tailored for the North and implemented in the next several years. QIA recommends that the effluent criteria in the license be revised when these updated regulations from Environment Canada become available.

There are several sources of hydrocarbon contaminated water. BIMC has proposed discharge criteria for these different sources. The discharge criteria change depending on the source, which QIA regards as a irregular choice, as similar treatment equipment is being used in all cases for the treatment of hydrocarbon contaminated water (further discussion is available in Section 2.6 of the Final Technical Comments Main Document). QIA believes that the Canadian Council of Ministers of the Environment (CCME) water quality criteria for the protection of aquatic life are the suitable discharge water quality criteria for water that has been in contact with hydrocarbons.

Table 1 through **Table 3** display a comparison of BIMC recommended water discharge criteria versus QIA recommended discharge criteria. Generally, the BIMC recommended criteria are significantly higher then what QIA deems suitable for the project's environment.

Water will come into contact with waste at the proposed landfills at the Mary River project. As such, discharge criteria need to be imposed. **Table 4** is the summation of a comparison between the BIMC recommended discharge criteria for this effluent versus the QIA recommended discharge criteria. The BIMC recommended criteria are comprised of a limited number of parameters, concerned solely of metals and oil and grease. Due to the variety of materials that can be deposited within a landfill, QIA believes that their more comprehensive waste discharge recommendations are more suitable for this waste discharge source. Furthermore, the BIMC recommended discharge values are significantly higher then what QIA believes is suitable for the project location.

Water that comes into contact with waste rock and ore stockpiles is regulated under the Metal Mining Effluent Regulation (MMER). As such, at a minimum, the water quality discharged from these sources must meet the MMER water quality discharge standards. There are however, additional considerations when selecting water discharge criteria from these sources. Receiving environment quality criteria will be selected for Camp Lake and Sheardown Lake, as part of the Aquatic Effects Monitoring Program. BIMC has informed stakeholders that the water quality criteria for the receiving environment have yet to be determined, and will be selected at a later

date[1]. QIA recommends the use CCME water quality Guidelines for the Protection of Aquatic Life, or site specific water quality criteria for the monitoring of receiving environments water quality at the Mary River project.

Provisions for the mixing of discharged wastewater and natural freshwater have been made between the waste discharge from the waste rock and ore stockpiles and the freshwater receiving environment. It has not been sufficiently demonstrated by BIMC that the discharge criteria proposed will ensure that appropriate water quality is achievable within the receiving environment for their proposed discharge limits and the expected mixing between the waste discharge and the receiving environment. Discharge limits for waste from the waste rock and ore stockpiles should be selected to ensure that appropriate, protective water quality criteria are achievable in the freshwater environment surrounding mine operations.

[1] Teleconference. Thresholds and Environmental Effects Monitoring Study Design Meeting. February 23, 2013.

Environmental Quality Criteria Comparison

Table 1 Oily Water Treatment Plan Effluent Discharge Quality Criteria

Parameter	Maximum Grab Sample	
	BIMC Recommended (ug/L) (Guidelines : Industrial Waste Discharge in Nunavut)	**QIA Recommended (ug/L)**
pH	6 – 9.5	6 – 9.5
TSS	35000	25000
Aluminum	1000	5 if pH<6.5 100 if pH > 6.5
Ammonia	10000	See Table 5
Arsenic	1000	5
Benzene	370	370
Cadmium	100	0.017
Chromium	100	1 for hexavelent, 8.9 for trivalent
Copper	1000	2
Ethylbenzene	90	90
Iron	1000	300
Lead	50	1
Mercury	6	0.026
Nickel	1000	25
Oil and Grease	15000 and no visible sheen	15000 and no visible sheen
Phenolic Compounds	20	20
Phosphorous	1000	10
Toluene	2	2
Total Suspended Solids	15000	15000
Zinc	500	30

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Table 2 Bulk Fuel Storage Facility Contact Water

Parameter	Maximum Grab Sample	
	BIMC Recommended (µg/L)	QIA Recommended (µg/L)
pH	-	6 – 9.5
TSS	-	25000
Aluminum	-	5 if pH<6.5 100 if pH > 6.5
Ammonia	-	See Table 5
Arsenic	-	5
Benzene	370	370
Cadmium	-	0.018 or equation
Chromium	-	1 for hexavelent, 8.9 for trivalent
Copper	-	2
Ethylbenzene	-	90
Iron	-	300
Lead	1	1
Mercury	-	0.026
Nickel	-	25
Oil and Grease	15000 and no visible sheen	15000 and no visible sheen
Phenolic Compounds	-	20
Phosphorous	-	10
Toluene	2	2
Total Suspended Solids	-	15000
Zinc	-	30

Table 3 Land Farm Contact Water

Parameter	Maximum Grab Sample	
	BIMC Recommended (µg/L)	**QIA Recommended (µg/L)**
pH	-	6 – 9.5
TSS	-	25000
Aluminum	-	5 if pH<6.5 100 if pH > 6.5
Ammonia	-	See Table 5
Arsenic	-	5
Benzene	370	370
Cadmium	-	0.018 or equation
Chromium	-	1 for hexavelent, 8.9 for trivalent
Copper	-	2
Ethylbenzene	-	90
Iron	-	300
Lead	1	1
Mercury	-	0.026
Nickel	-	25
Oil and Grease	15000 and no visible sheen	15000 and no visible sheen
Phenolic Compounds	-	20
Phosphorous	-	10
Toluene	2	2
Total Suspended Solids	-	15000
Zinc	-	30

Table 4 Landfill Runoff/Seepage Water Quality Criteria

Parameter	Maximum Grab Sample	
	BIMC Recommended (µg/L)	QIA Recommended (µg/L)
pH	-	6 – 9.5
TSS	15000	15000
Aluminum	-	5 if pH<6.5 100 if pH > 6.5
Ammonia	-	See Table 5
Arsenic	500	5
Benzene	-	370
Cadmium	-	0.017
Chromium	-	1 for hexavelent, 8.9 for trivalent
Copper	300	2
Ethylbenzene	-	90
Iron	-	300
Lead	200	1
Mercury	-	0.026
Nickel	500	25
Oil and Grease	no visible sheen	15000 and no visible sheen
Phosphorous	-	10
Toluene	2	2
Total Suspended Solids	-	15000
Zinc	500	30

Table 5 CCME Water quality guidelines for total ammonia for the protection of aquatic life ($mg*L^{-1}$ NH_3).[2]

Temp (°C)	pH							
	6.0	6.5	7.0	7.5	8.0	8.5	9.0	10
0	231	73.0	23.1	7.32	2.33	0.749	0.250	0.042
5	153	48.3	15.3	4.84	1.54	0.502	0.172	0.034
10	102	32.4	10.3	3.26	1.04	0.343	0.121	0.029
15	69.7	22.0	6.98	2.22	0.715	0.239	0.089	0.026
20	48.0	15.2	4.82	1.54	0.499	0.171	0.067	0.024
25	33.5	10.6	3.37	1.08	0.354	0.125	0.053	0.022
30	23.7	7.50	2.39	0.767	0.256	0.094	0.043	0.021

[2] Canadian Council of Ministers of the Environment, Canadian Water Quality Guidelines for the Protection of Aquatic Life (Ammonia). 2010.