Proposed Changes to SNP Outlined in Schedule J of 2AM-DOH1323

Schedule J. Conditions Applying to General and Aquatics Effects Monitoring

Table 1 MONITORING GROUPS

Group	Analytical Parameters	Measurement Units	Colour Reference
General (**G**)	pH	pH units	
	TSS	mg/L	
Nutrients (**N1**)	Total Ammonia-N	mg-N/L	**Blue**
	Nitrate-N		
	Nitrite-N		
Nutrients (**N2**)	Orthophosphate-P	mg/L	**Orange**
	Total Phosphate-P		
Total Metals - Unfiltered (**MT**)	T-Aluminum	mg/L	**Green**
	T-Arsenic		
	T-Copper		
	T-Iron		
	T-Nickel		
	T-Lead		
	T-Zinc		
Dissolved Metals - Filtered (**MD**)	D-Iron	mg/L	**Purple**
	D-Copper		
	D-Arsenic		
	D-Zinc		
	D-Cadmium		
	D-Nickel		
Biological (**B**)	Biological Oxygen Demand	mg/L	**Yellow**
	Fecal Coliforms	CFU/100 mL (colony forming units)	
Hydrocarbons (**HC**)	Total Oil and Grease	mg/L	**Dk. Green**
	T-Lead		
	Benzene		
	Toluene		
	Ethyl-Benzene		
Discharge (**D**)	Flow	m^3/day	**Grey**
	Volume	m^3	
	Duration	Day	

GROUP REFERENCE

STATION PARAMETER	TL-1	TL-2	TL-3	TL-4	TL-5	TL-6	TL-7	TL-8	TL-9	TL-10	TL-11	TL-12	ST-1	ST-2	ST-3	ST-4	ST-5	ST-6	ST-7	ST-7a	ST-8	ST-9	ST-10
pH	x	x	x	x	x			x	x	x	x	x	x	x	x	x	x	x	x		x	x	
Electrical Conductivity											x												
TSS	x	x	x	x	x			x		x		x	x	x	x	x	x	x	x		x	x	x
TDS	x	x	x	x						x													
Cl	x	x	x	x						x				x									
Free CN	x	x	x	x	x			x		x									x	x			
Total CN	x	x	x	x	x			x	x	x	x		x	x	x				x	x			
WAD CN					x		x		x		x												
Total Ammonia-N	x	x	x	x	x			x		x	x	x	x	x	x	x			x	x			
Nitrate-N	x	x	x	x	x			x		x	x	x	x	x					x	x			
Nitrite-N	x	x	x	x	x			x		x	x	x	x	x					x	x			
Sulphate					x						x	x	x	x	x								
Orthophosphate-P	x	x	x	x				x		x									x	x			
Total Phosphate-P	x	x	x	x				x		x									x	x			
T-Al	x	x	x	x	x	x		x		x			x	x	x				x	x			
T-Ag	x	x	x	x				x		x									x	x			
T-As	x	x	x	x	x	x		x		x			x	x	x				x	x			
T-Ca	x	x	x	x						x									x	x			
T-Cd	x	x	x	x	x	x		x		x									x	x			
T-Cr	x	x	x	x	x	x		x		x									x	x			
T-Cu	x	x	x	x	x	x		x		x			x	x	x				x	x			
T-Fe	x	x	x	x	x	x		x		x			x	x	x				x	x			
T-Hg	x	x	x	x	x	x		x		x									x	x			
T-K	x	x	x	x						x													
T-Mo	x	x	x	x	x	x		x		x									x	x			

STATION PARAMETER	TL-1	TL-2	TL-3	TL-4	TL-5	TL-6	TL-7	TL-8	TL-9	TL-10	TL-11	TL-12	ST-1	ST-2	ST-3	ST-4	ST-5	ST-6	ST-7	ST-7a	ST-8	ST-9	ST-10
T-Mg	x	x	x	x						x													
T-Na	x	x	x	x						x													
T-Ni	x	x	x	x	x	x		x		x			x	x	x				x	x			
T-Pb	x	x	x	x	x	x		x		x			x	x	x	x	x	x	x	x			
T-Se	x	x	x	x	x	x		x		x									x	x			
T-Zn	x	x	x	x	x	x		x		x			x	x	x				x	x			
T-Tl	x	x	x	x				x		x									x	x			
T-Radium 226				x																			
Dissolved Oxygen & Redox Potential	x									x													
Acute Lethality	x			x																			
Flow	x	x	x	x	x			x				x	x	x	x	x	x	x	x	x	x	x	
Volume	x	x	x	x	x			x				x	x	x	x	x	x	x	x	x	x	x	
Water Level	x																						
Total Metals by ICP-MS*					x							x		x									
Total Metals ICP-MS including Sulphur						x	x																
Trace Metals by ICP-MS											x												
Alkalinity											x			x									
Acidity											x												
Dissolved Fe									x														
D-Cu									x														
D-As									x														
D-Zn									x														
D-Cd									x														
D-Ni									x														

STATION PARAMETER	TL-1	TL-2	TL-3	TL-4	TL-5	TL-6	TL-7	TL-8	TL-9	TL-10	TL-11	TL-12	ST-1	ST-2	ST-3	ST-4	ST-5	ST-6	ST-7	ST-7a	ST-8	ST-9	ST-10
BOD_5				x															x	x	x	x	
Fecal Coliforms				x															x	x	x	x	
Cyanate					x		x																
Thiocyanate					x		x																
Moisture content							x																
Total Oil and Grease			x										x	x	x	x	x	x	x	x	x	x	
Benzene																x	x	x					
Toluene																x	x	x					
Ethyl-Benzene																x	x	x					
Tonnage						x	x																
Chemical Oxygen Demand									x														
Total Inorganic Carbon						x	x																

***** (definition: metals consistent with baseline data previously collected and any other metals of current interest)

Table 2: MONITORING REQUIREMENTS

Station	Description	Phase	Monitoring Parameters	Frequency during Care and Maintenance prior to any deposit of Tailings to the TIA	Frequency (during Operations and any time after initial deposit of Tailings to the TIA)
TL-1	TIA at the Reclaim Pump Barge - depth 1.5m below surface	Operation, Closure, Post Closure (for up to nine (9) years after cessation of mining)	**G, N1, N2, MT** and TDS, Cl, Free CN, Total CN, T-Ag, T-Ca, T-Cd, T-Cr,T-Hg, T-K, T-Mo, T-Mg, T-Na, T-Se, T-Tl	Three times per week for one (1) week prior to discharge and two times per week for two (2) weeks after discharge commences, then reducing to once per week during remainder of annual discharge	Every second day for two (2) weeks prior to discharge and for two (2) weeks after discharge commences, then reducing to once per week during remainder of annual discharge period
			Dissolved Oxygen and Redox Potential	Every second month	Every second month
			Acute Lethality	Once prior to discharge	Once prior to discharge
			D	Daily during periods of discharge	Daily during periods of discharge
TL-2	Doris Outflow Creek - upstream (at the flow monitoring station adjacent to the bridge)	Operation, Closure, Post Closure (for up to nine (9) years after cessation of mining)	**G, N1, N2, MT** and TDS, Cl, Free CN, Total CN, T-Ag, T-Ca, T-Cd, T-Cr, T-Hg, T-K, T-Mo, T-Mg, T-Na, T-Se, T-Tl,	When discharging to the creek, o~~O~~ne duplicate sample collected prior to discharge; single samples collected twice per week for two(2) weeks after discharge commences, then reducing to once per week	When discharging to the creek, ~~E~~every second day for two (2) weeks prior to discharge and for two (2) weeks after discharge commences, then reducing to once per week during remainder of annual discharge period
			D	Daily during periods of discharge from Tail Lake to the creek	Daily during periods of discharge from Tail Lake to the creek

TL-3	Doris Outflow Creek (~80m downstream of the base of the waterfall)	Operation, Closure, Post Closure (for up to nine (9) years after cessation of mining)	**G, N1, N2, MT** and TDS, Cl, Free CN, Total CN, T-Ag, T-Ca, T-Cd, T-Cr, T-Hg, T-K, T-Mo, T-Mg, T-Na, T-Se, T-Tl, Total Oil and Grease	When discharging to the creek, o~~O~~ne duplicate sample collected prior to discharge; single samples collected twice per week for two(2) weeks after discharge commences, then reducing to once per week during the remainder of annual	When discharging to the creek, every~~Every~~ second day for two (2) weeks prior to discharge and for two (2) weeks after discharge commences, then reducing to once per week during remainder of annual discharge period
			D	Daily during periods of discharge from Tail Lake to the creek	Daily during periods of discharge from Tail Lake to the creek
TL-4	TIA Discharge End-of-Pipe (taken at a valve at the discharge end of the transfer pump pipeline at either Doris Creek or immediately prior to entry into Roberts Bay)	Operation, Closure, Post Closure (for up to nine (9) years after cessation of mining)	**G, N1, N2, MT,** and TDS, Cl, Free CN, Total CN, T-Ag, T-Ca, T-Cd, T-Cr, T-Hg, T-K, T-Mo, T-Mg, T-Na, T-Se, T-Tl, T-Radium 226	Weekly during periods of discharge	Weekly during periods of discharge
			Acute Lethality	Once approximately midway through annual discharge	Monthly during discharge
			B	Monthly	Monthly
			D	Daily during periods of discharge from Tail Lake	Daily during periods of discharge from Tail Lake
TL-5	Combined Tailings Discharged into TIA (Water Component) taken from a valve in the mill at the discharge end of the mill tailings pumps	Operations	**G, N1, MT**, and Free CN, Total CN, WAD CN, Sulphate, T-Cd, T-Cr, T-Hg, T-Mo, T-Se, and Total Metals by ICP-MS		Daily initially, reduced to weekly after 3 months of operation
			Cyanate and Thiocyanate		Quarterly
			D		Daily initially, reduced to weekly after 3 months of operation

TL-6	Combined Tailings Discharged into TIA (Solid Component) taken from a valve in the mill at the discharge end of the mill tailings pumps	Operations	Tonnage of dry tailings solids		Monthly during periods of discharge
			MT and T-Cd, T-Cr, T-Hg, T-Mo, T-Se,		Sampled on a weekly basis with analyses carried out monthly on a composite sample of the TL-6 weekly samples
			Total Inorganic Carbon and Total Metals by ICP-MS (must include Sulphur)		
TL-7	Filtered Cyanide Leach Residue sent underground as backfill	Operations	Dry tonnage of CN leach residue sent underground, WAD CN, Total Inorganic Carbon, Total Metals by ICP-MS (including Sulphur), Moisture content of backfill trucked underground,		Monthly
			Cyanate and Thiocyanate		Quarterly
TL-8	Reclaim water pumped from TIA to Mill Process water tank taken from a valve at the discharge end of the reclaim water pump	Operation	**G, N1, N2, MT** and Free CN, Total CN, T-Ag, T-Cd, T-Cr, T-Hg, T-Mo, T-Se, T-Tl,		Monthly
			D		Daily during periods of pumping
TL-9	Barren Bleed Solution sent to tailings taken from a sampling valve within the mill	Operations	**MD** and pH, Total and WAD CN, Chemical Oxygen Demand,		Monthly

TL-10	Water Column in deepest portion of Tail Lake and at a location away from the TIA Reclaim water floating pump house, sampled at surface, mid-depth and near bottom.	Operation, Closure, Post Closure (for up to nine (9) years after cessation of mining)	**G, N1, N2, MT** and TDS, Cl, Free CN, Total CN, T- Ag, T-Ca, T-Cd, T-Cr, T-Hg, T-K, T-Mo, T-Mg, T-Na, T-Se, T-Tl, Dissolved Oxygen and Redox Potential	Monthly during discharge starting two (2) weeks prior to start of discharge season	Monthly during discharge starting two (2) weeks prior to start of discharge season
TL-11	Seepage from underground backfilled stopes	Operations	Visual inspection for seepage. If seepage present parameters to be monitored include **N1** and pH, EC, Trace metals by ICP-MS, Alkalinity, Acidity, Sulphate, Total and WAD CN,		Survey Twice annually
TL-12	Underground Minewater - water pumped from the underground mine into the Mill tailings pump box	Operations	**G, N1** and Sulphate and Total Metals by ICP-MS		Monthly
			D		Monthly during pumping
ST-1	Discharge from Sedimentation Pond taken at a depth of ~0.25 m	Construction, Operation, Closure	**G, N1, MT** and Total Sulphate, Total CN, Total Oil and Grease,	Once before any discharge, daily when discharging onto the tundra	Once before any discharge, daily when discharging onto the tundra
			D	Daily during periods of discharge	Daily during periods of discharge

ST-2	Discharge from Pollution Control Pond taken at a depth of ~0.25m	Construction, Operation, Closure	**G, N1, MT** and Total Sulphate, Total CN, Total Oil and Grease, Alkalinity, Chloride, and Total Metals by ICP-MS	Monthly during open water season	Monthly during open water season
			D	Daily during periods of discharge	Daily during periods of discharge
ST-3	Discharge from Non-hazardous Landfill pollution control sump	Construction, Operation, Closure	**G, MT** and Total Ammonia-N, Total Sulphate, Total CN, Total Oil and Grease,	Once before any discharge, daily when discharging onto the tundra	Once before any discharge, daily when discharging onto the tundra
			D	Daily during periods of discharge	Daily during periods of discharge
ST-4	Discharge from Landfarm sump	Construction, Operation, Closure	**G, HC**	Once before any discharge, daily when discharging onto the tundra	Once before any discharge, daily when discharging onto the tundra
			D	Daily during periods of discharge	Daily during periods of discharge
ST-5	Discharge from the Plant Site Fuel Storage and Containment Area Sump	Construction, Operation, Closure	**G, HC**	Once before any discharge, daily when discharging onto the tundra	Once before any discharge, daily when discharging onto the tundra
			D	Daily during periods of discharge	Daily during periods of discharge
ST-6a And ST-6b	Discharge from the Roberts Bay Fuel Storage and Containment Area Sumps	Construction, Operation, Closure	**G, HC**	Once before any discharge, daily when discharging onto the tundra	Once before any discharge, daily when discharging onto the tundra
			D	Daily during periods of discharge	Daily during periods of discharge

ST-7	Freshwater pumped from Doris Lake taken from a valve on the discharge end of the freshwater pump	Construction, Operation, Closure	**G, N1, N2, MT** and Free CN, Total CN, T-Ag, T-Cd, T-Cr, T-Hg, T-Mo, T-Se, T-Tl, and Total Oil and Grease	Monthly during periods of pumping	Monthly during periods of pumping
			B		
			D		Monthly during periods of pumping
ST-7a (new)	Freshwater pumped from the Windy Lake freshwater intake (Appendix H of the Application),	Construction, Operation, Closure	**G, N1, N2, MT** and Free CN, Total CN, T-Ag, T-Cd, T-Cr, T-Hg, T-Mo, T-Se, T-Tl, and Total Oil and Grease	Monthly during periods of pumping	Monthly during periods of pumping
			B		
			D		Monthly during periods of pumping
ST-8	Discharge from Wastewater Treatment Plant bio-membrane	Construction, Operation, Closure	**G, B,** and Total Oil and Grease	Monthly during periods of pumping	Monthly during periods of pumping
			Location of discharge		Monthly during periods of discharge
			D		Monthly during periods of discharge
ST-9	Runoff from Wastewater Treatment Plant discharge - downstream of wastewater treatment plant discharge point and just prior to flow entering Doris Lake	Construction	**G, B,** and Total Oil and Grease	Monthly	Monthly

ST-10	Site Runoff from Sediment Controls	Construction, Operations, Closure	TSS	Daily during periods of discharge	Daily during periods of discharge
ST-11 (new)	Discharge from the Reagent and Cyanide Storage Facility Sumps.	Construction, Operation, Closure	G, HC and D	Once before any discharge, daily when discharging onto the tundra	Once before any discharge, daily when discharging onto the tundra
Monitoring Strip #1	Shoreline (location provided in S4 DWG T-14 dated March 2007)	Construction, Operations, Closure	Erosion via bathymetric survey of the underwater section of the monitoring strip down to the original Tailings Impoundment Area water level of 28.3 m	Annually	Annually
Monitoring Strip #2	Shoreline (location provided in S4 DWG T-14 dated March 2007)	Construction, Operations, Closure	Erosion via bathymetric survey of the underwater section of the monitoring strip down to the original Tailings Impoundment Area water level of 28.3 m	Annually	Annually
Monitoring Strip #3	Shoreline (location provided in S4 DWG T-14 dated March 2007)	Construction, Operations, Closure	Erosion via bathymetric survey of the underwater section of the monitoring strip down to the original Tailings Impoundment Area water level of 28.3 m	Annually	Annually
Monitoring Strip #4	Shoreline (location provided in S4 DWG T-14 dated March 2007)	Construction, Operations, Closure	Erosion via bathymetric survey of the underwater section of the monitoring strip down to the original Tailings Impoundment Area water level of 28.3 m	Annually	Annually

Monitoring Strip #5	Shoreline (location provided in S4 DWG T-14 dated March 2007)	Construction, Operations, Closure	Erosion via bathymetric survey of the underwater section of the monitoring strip down to the original Tailings Impoundment Area water level of 28.3 m	Annually	Annually
Monitoring Strip #6	Shoreline (location provided in S4 DWG T-14 dated March 2007)	Construction, Operations, Closure	Erosion via bathymetric survey of the underwater section of the monitoring strip down to the original Tailings Impoundment Area water level of 28.3 m	Annually	Annually

Table 3 THERMAL MONITORING

Station	Location	Location Reference	Phase	Monitoring Parameters	Frequency Prior to Operations; During Care and Maintenance	Frequency during Operations
T1	Jetty	SD4 - DWG J-01	Operation	Temperature		IA
T2	Jetty	SD4 - DWG J-01	Operation	Temperature		IA
T4	Beach Laydown	SD4 - DWG S-01	Operation	Temperature		IA
T5	Fuel Storage and Containment Facility at Robert's Bay		Operation	Temperature		IA
T7	Airstrip	SD4 - DWG S-03	Operation	Temperature		IA
T8	Airstrip	SD4 - DWG S-03	Operation	Temperature		IA
T9	Airstrip	SD4 - DWG S-03	Operation	Temperature	A	A
T-1	Bridge Abutment	SD4 - DWG S-12	Operation	Temperature	D	A
T-2	Bridge Abutment	SD4 - DWG S-12	Operation	Temperature	D	A
DOR-1	Camp	to be confirmed	Operation	Temperature		IA
DOR-2	Camp	to be confirmed	Operation	Temperature	D	A
DOR-3	Pollution Control Pond	to be confirmed	Operation	Temperature	D	A
DOR-4	Sedimentation Pond	to be confirmed	Operation	Temperature	D	A
DOR-5	Float Plane Dock Laydown Area	to be confirmed	Operation	Temperature		IA
DOR-6	Road	to be confirmed	Operation	Temperature	D	A
DOR-7	Road	to be confirmed	Operation	Temperature	D	A
DOR-8	Road	to be confirmed	Operation	Temperature	D	A
DOR-9	Road	to be confirmed	Operation	Temperature	D	A
DOR-10	Road	to be confirmed	Operation	Temperature	D	A
SRK-53	Shoreline	to be confirmed	Operation, Closure	Temperature	D	B
SRK-54	Shoreline	to be confirmed	Operation, Closure	Temperature		IA

SRK-55	Shoreline	to be confirmed	Operation, Closure	Temperature		IA
SRK-56	Shoreline	to be confirmed	Operation, Closure	Temperature		IA
SRK-57	Shoreline	to be confirmed	Operation, Closure	Temperature	D	B
SRK-58	Shoreline	to be confirmed	Operation, Closure	Temperature	D	B
NI1 - NI28	North Dam	SD4 - DWG T-09	Operation, Closure	Temperature	C	C
SI2 -SI22	South Dam	SD4 - DWG T-10	Operation, Closure	Temperature	C	C

A - Monthly, increasing if warming trend is observed
B – Monthly
C - Monthly readings taken manually; data loggers installed to collect continuous data at key locations. Frequency maintained until dam reaches pseudo steady state conditions. The frequency may then be reduced but will have to coincide with the peaks of the annual climatic cycles
D – Annually at the end of summer when the active layer should be at maximum thickness.
AWM – Monthly during periods of active water management (Prior to Operations and during Care and Maintenance)
IA – Inactive