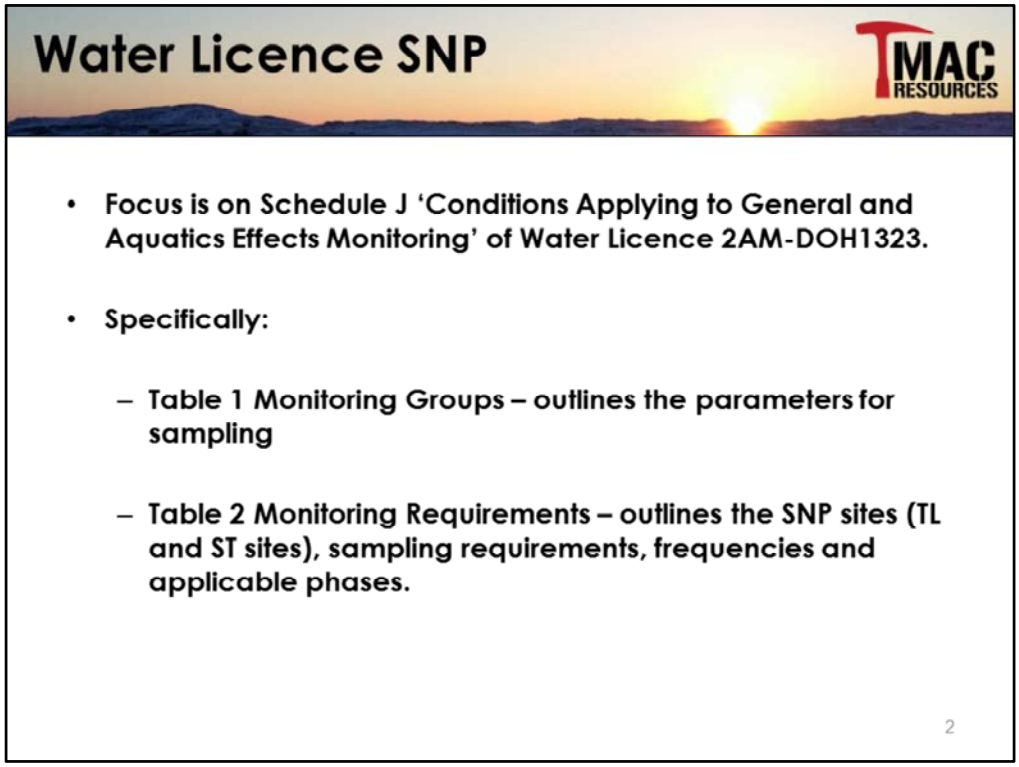
Aquatic Working Group Meeting: Proposed Surveillance Network Program Revisions for Water Licence 2AM-DOH1323

Doris Project

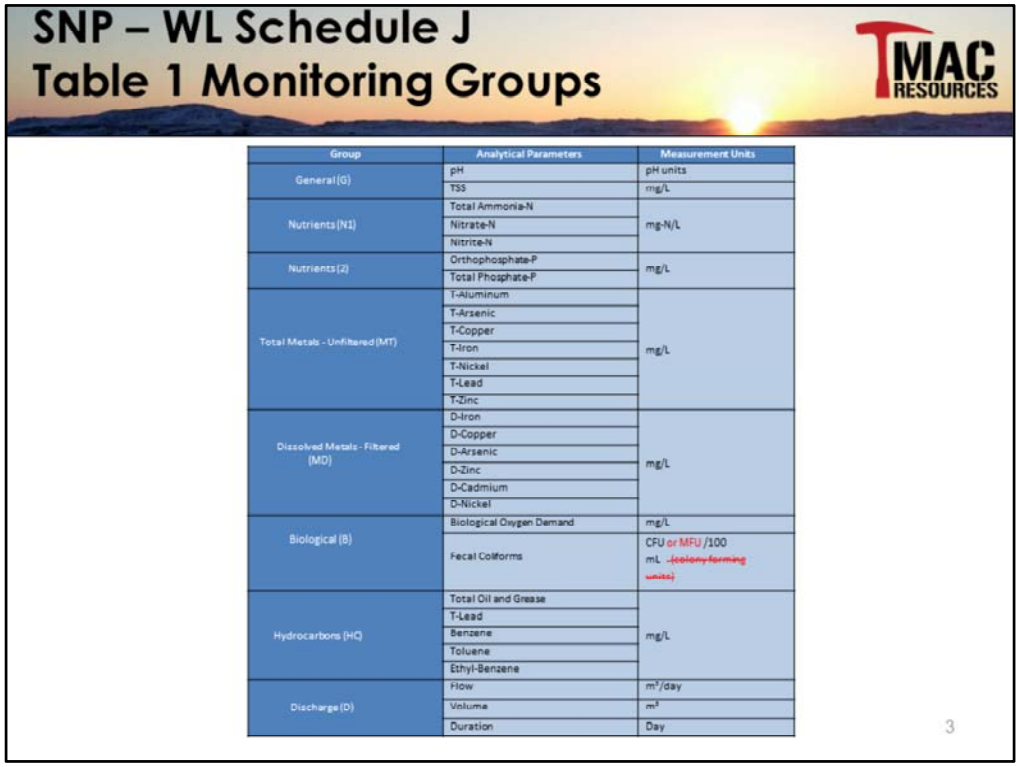
June 6, 2016

Edmonton, AB & Iqaluit, NU

Participants: NWB, INAC, KIA, ECCC, DFO, NIRB, TMAC



Proposed revisions have been focused on these tables, as changes to these tables would drive any related changes in the rest of the WL, as well as to the 'Group Reference' table.

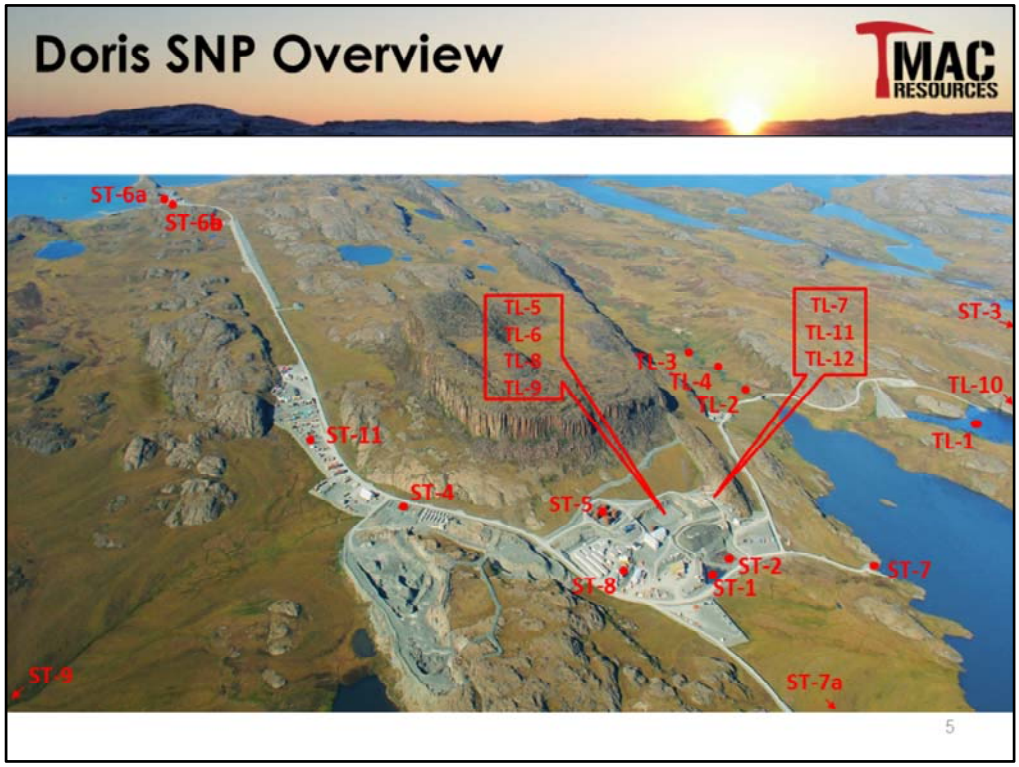


Group	Analytical Parameters	Measurement Units
General (G)	pH	pH units
	TSS	mg/L
Nutrients (N)	Total Ammonia-N	mg-N/L
	Nitrate-N	
	Nitrite-N	
Nutrients (2)	Orthophosphate-P	mg/L
	Total Phosphate-P	
Total Metals - Unfiltered (MT)	T-Aluminum	mg/L
	T-Arsenic	
	T-Copper	
	T-Iron	
	T-Nickel	
	T-Lead	
	T-Zinc	
Dissolved Metals - Filtered (MD)	D-Iron	mg/L
	D-Copper	
	D-Arsenic	
	D-Zinc	
	D-Cadmium	
	D-Nickel	
Biological (B)	Biological Oxygen Demand	mg/L
	Fecal Coliforms	CFU or MFU /100 mL ~~(colony forming units)~~
Hydrocarbons (HC)	Total Oil and Grease	mg/L
	T-Lead	
	Benzene	
	Toluene	
	Ethyl-Benzene	
Discharge (D)	Flow	m^3/day
	Volume	m^3
	Duration	Day

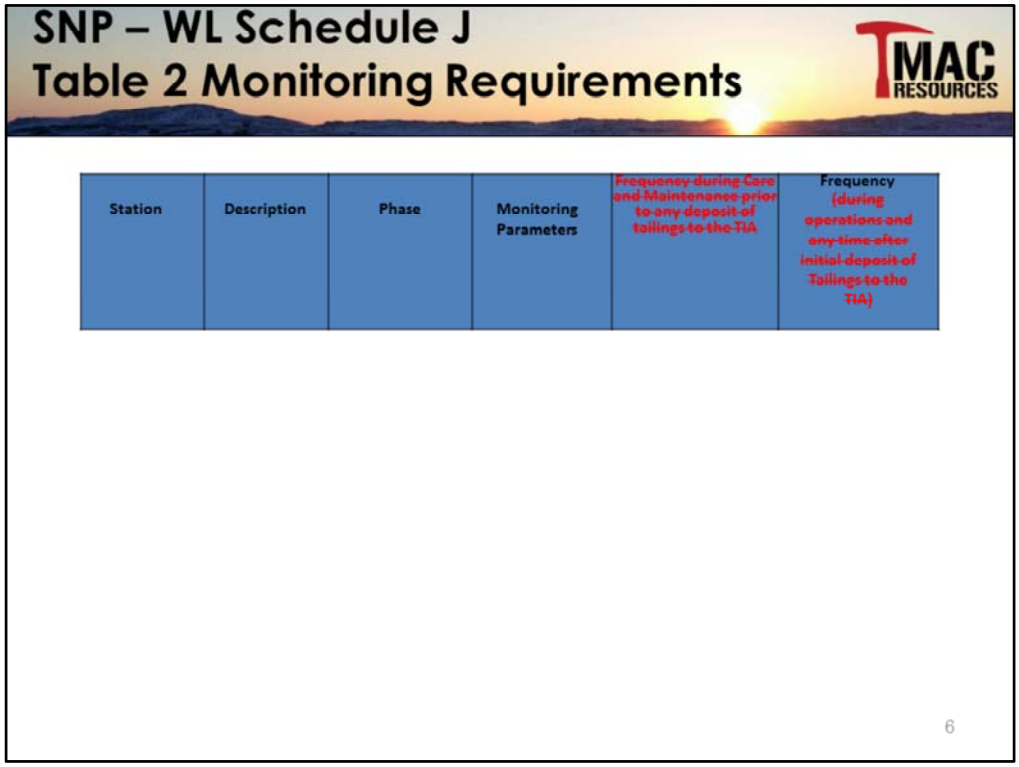
Text in red in this slide and those to follow indicates proposed changes to the existing Water Licence text.

'Colony Forming Units' or 'Most Probable Number' represent different methodologies for determining the same information, and results of either are comparable to the same guidelines and are acceptable to most regulators and health jurisdictions. The CALA-accredited analytical laboratory currently used (ALS Environmental), uses MFU.

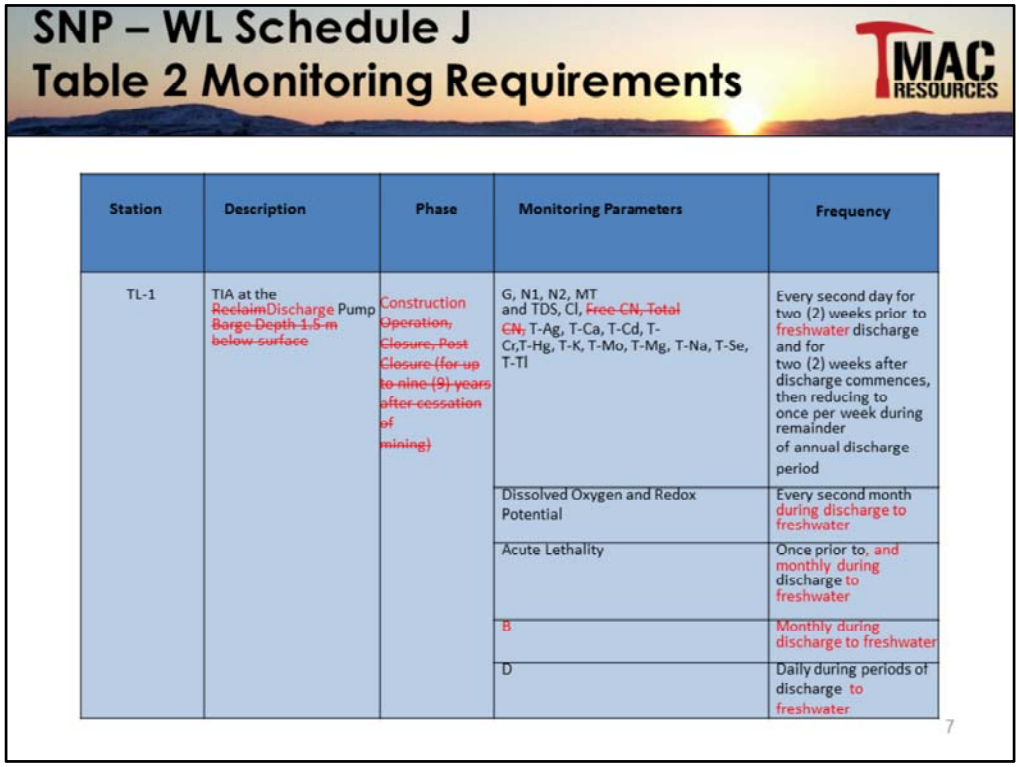
Overview of Doris North Project and permitted infrastructure and description of relevant proposed infrastructure changes from the Amendment Application.



Current SNP sampling locations prescribed in Water Licence 2AM-DOH1323.



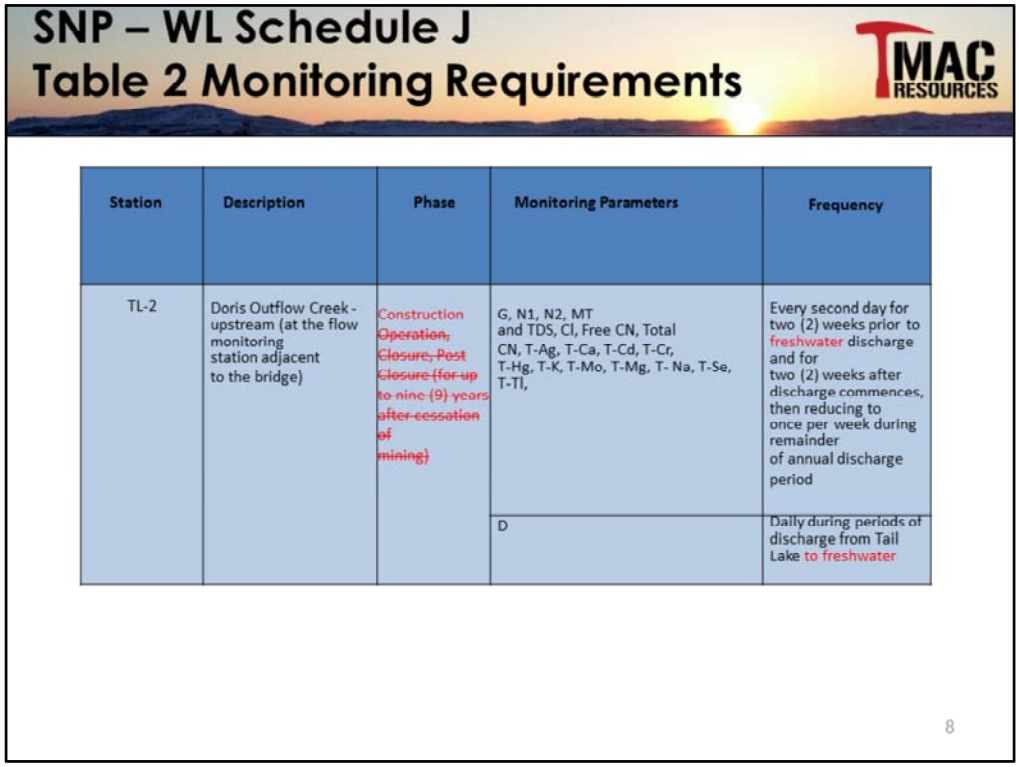
Column titled 'frequency during care and maintenance prior to any deposit of tailings to the TIA' will no longer be needed by the time the revised Water Licence is issued.
The changes indicated here will be adopted ('accepted') in the following slides for improved readability.



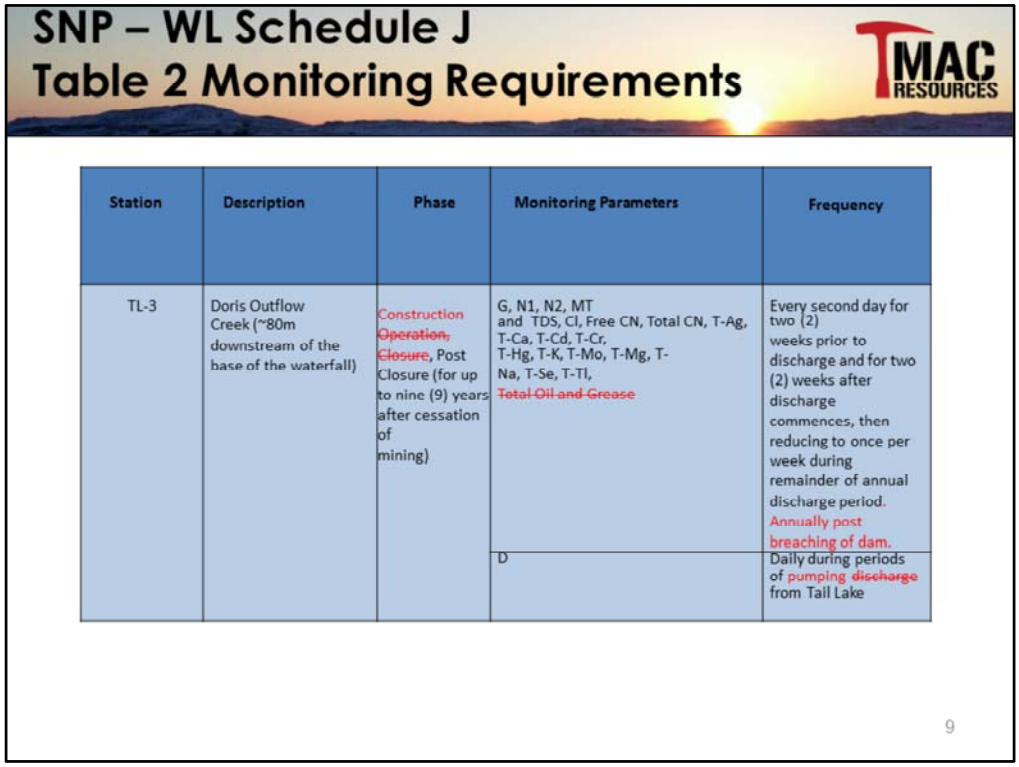
There will no longer be any freshwater discharge during operations and closure. Once tailings deposition starts, the only discharge will be to the ocean.

As a result, milling-related parameters (Cyanide) have been removed.

TL 1 and TL 4 are equivalent (they represent either end of same pipe with no alteration of the water between them), so requirements have been combined here (addition of 'B' parameters and frequency).



Clarification that this sampling pertains to freshwater discharge, and is limited to the construction phase.



SNP – WL Schedule J
Table 2 Monitoring Requirements

Station	Description	Phase	Monitoring Parameters	Frequency
TL-3	Doris Outflow Creek (~80m downstream of the base of the waterfall)	Construction ~~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~~	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. Annually post breaching of dam.
			D	Daily during periods of pumping ~~discharge~~ from Tail Lake

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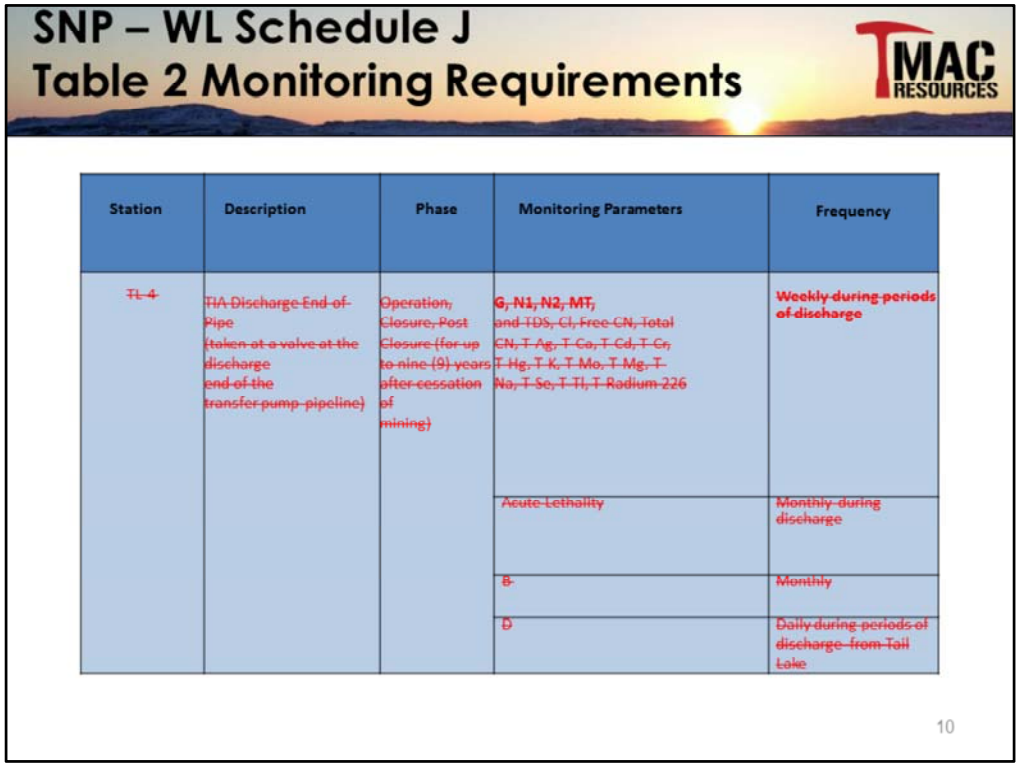
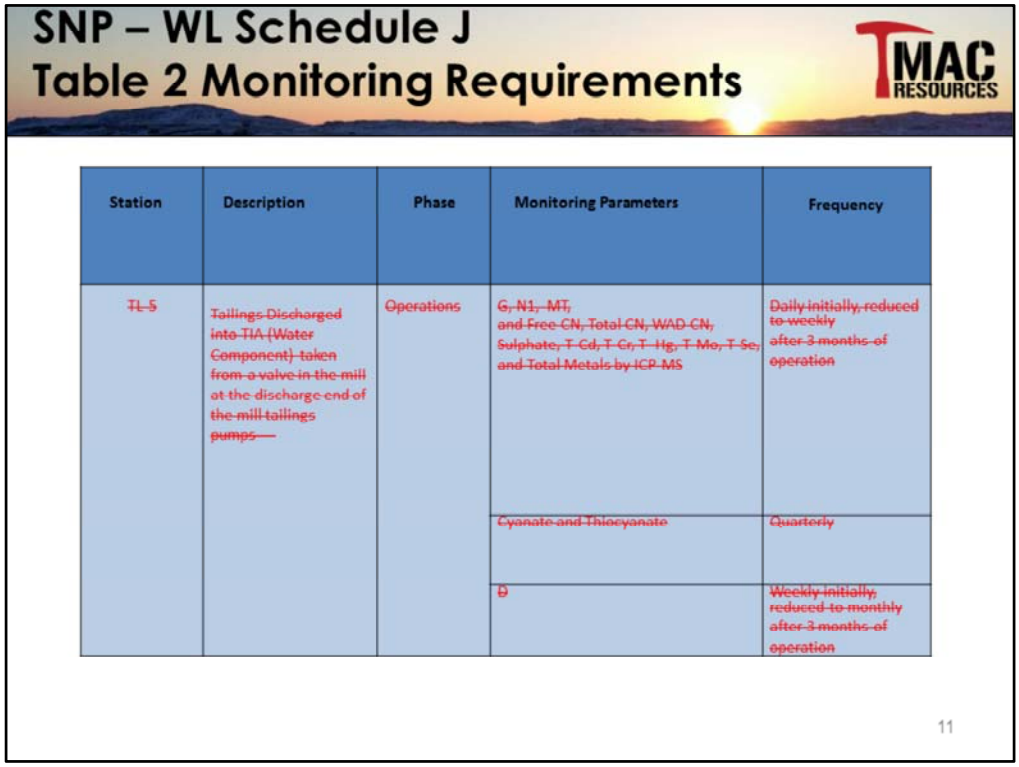
Total oil and grease is not included in the WL criteria for TL1 or 2, and appears to have been erroneously added here.

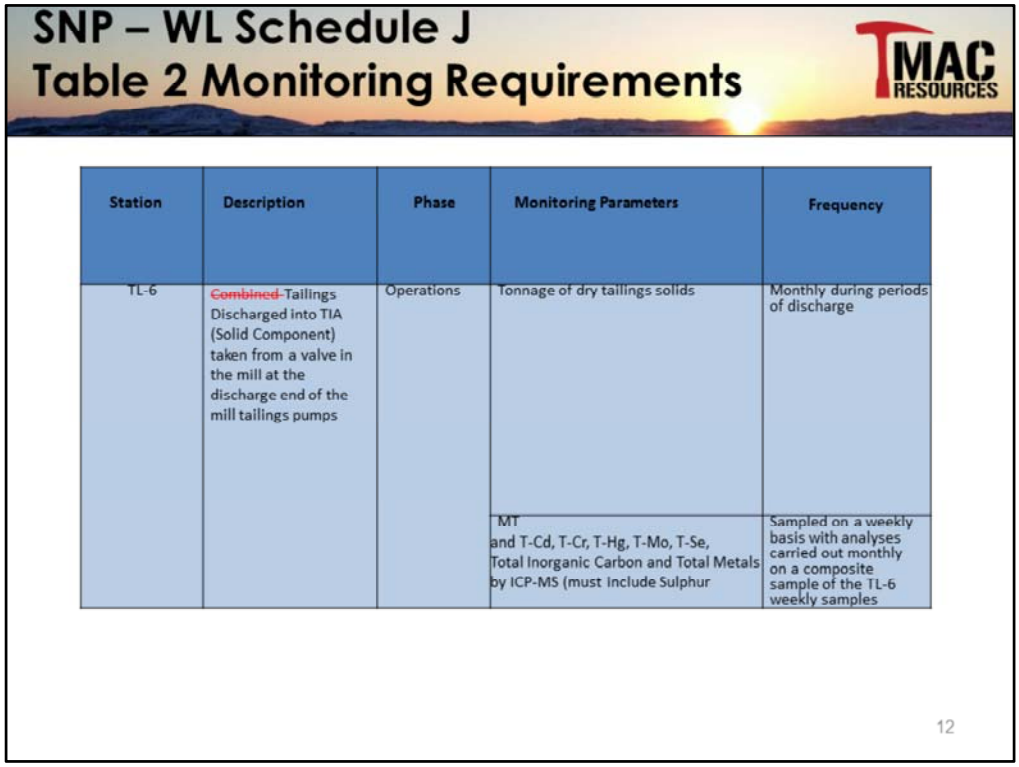
Frequency reduced during post-closure, and discharge monitoring tied specifically to active pumping (the construction phase).



TL-1 and TL-4 will be the same (either end of same pipe, no change between). Have combined requirements into TL-1.

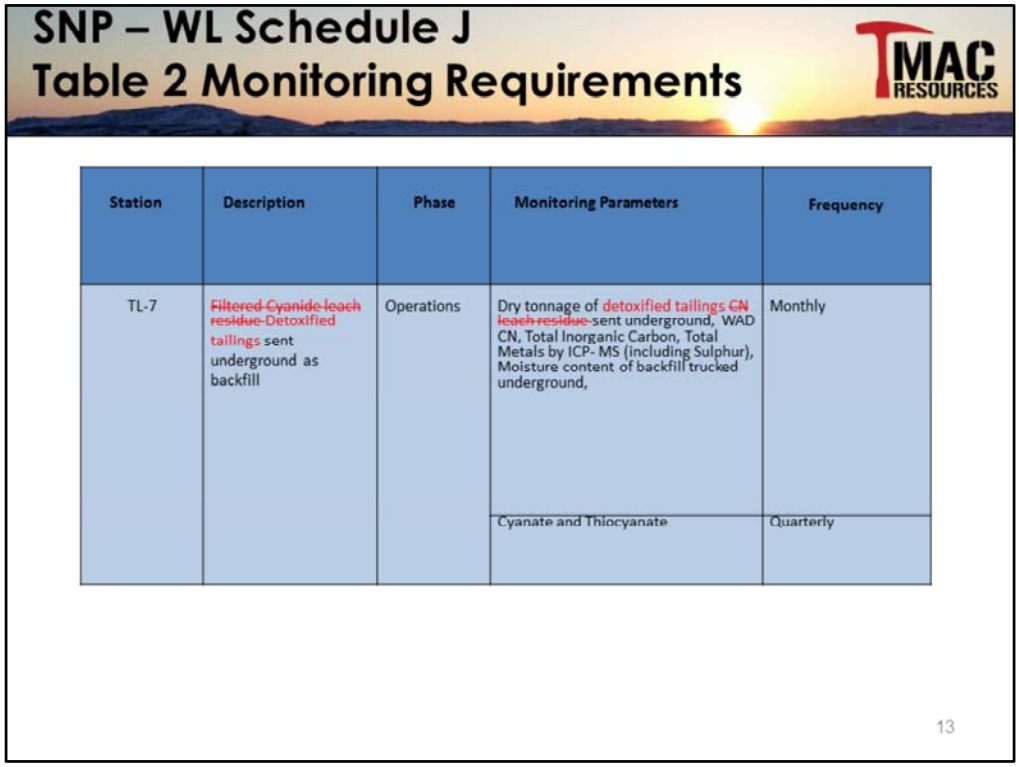


Characterization of waters discharged into the TIA for the purposes of Water and Load balance model calibration will be outlined in the Water Management Plan. TIA water will be discharged to the ocean.

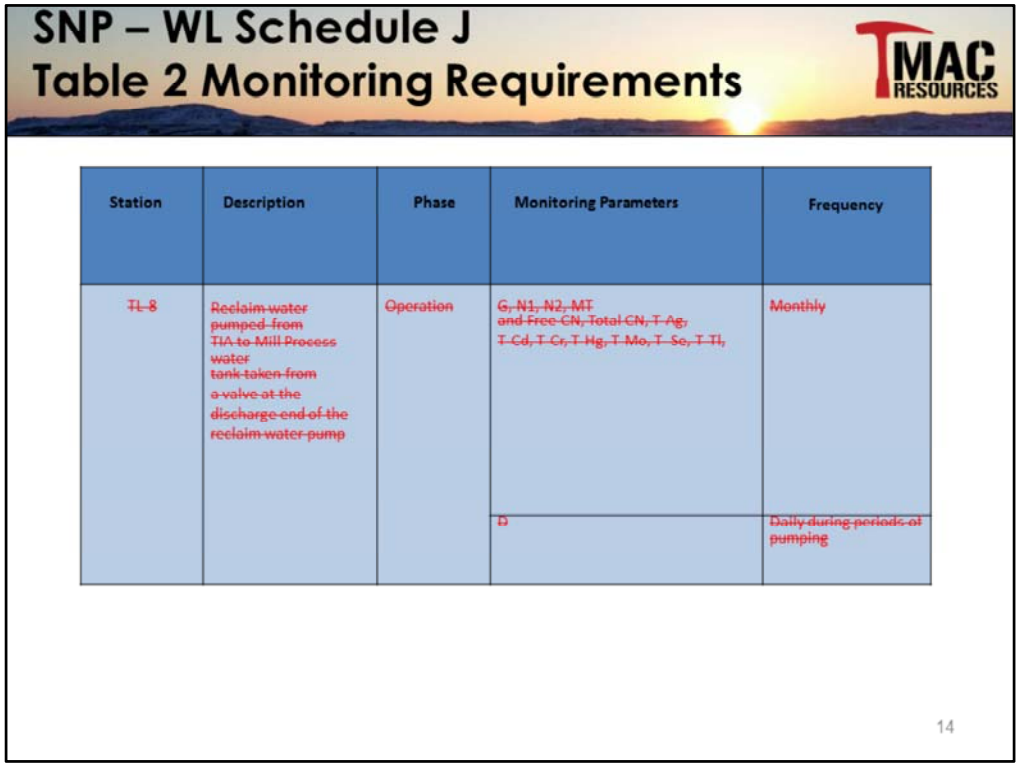


Permanent deposition of solid waste in TIA.

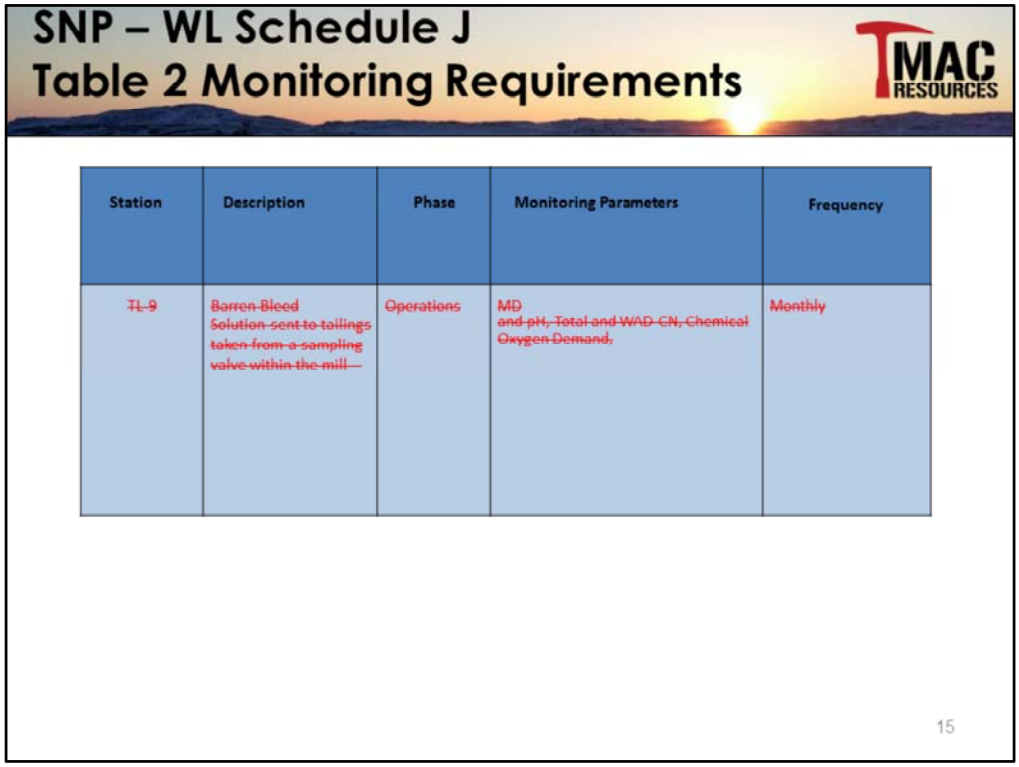
Detoxified cyanide leach tailings will be placed underground.



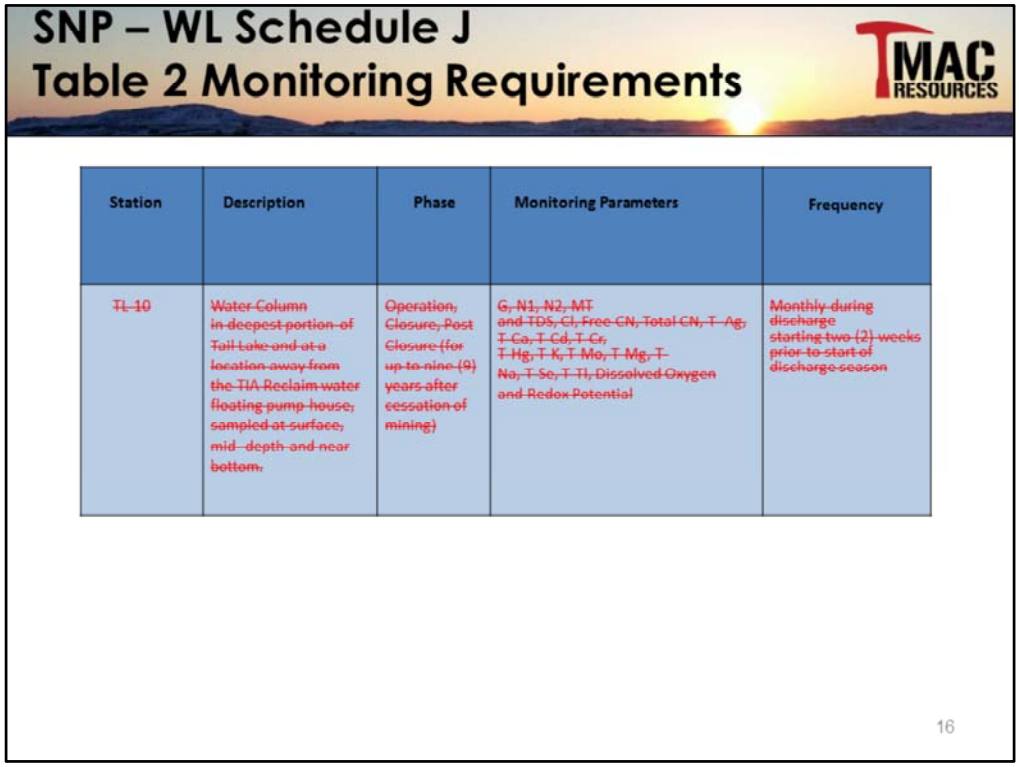
Language correction



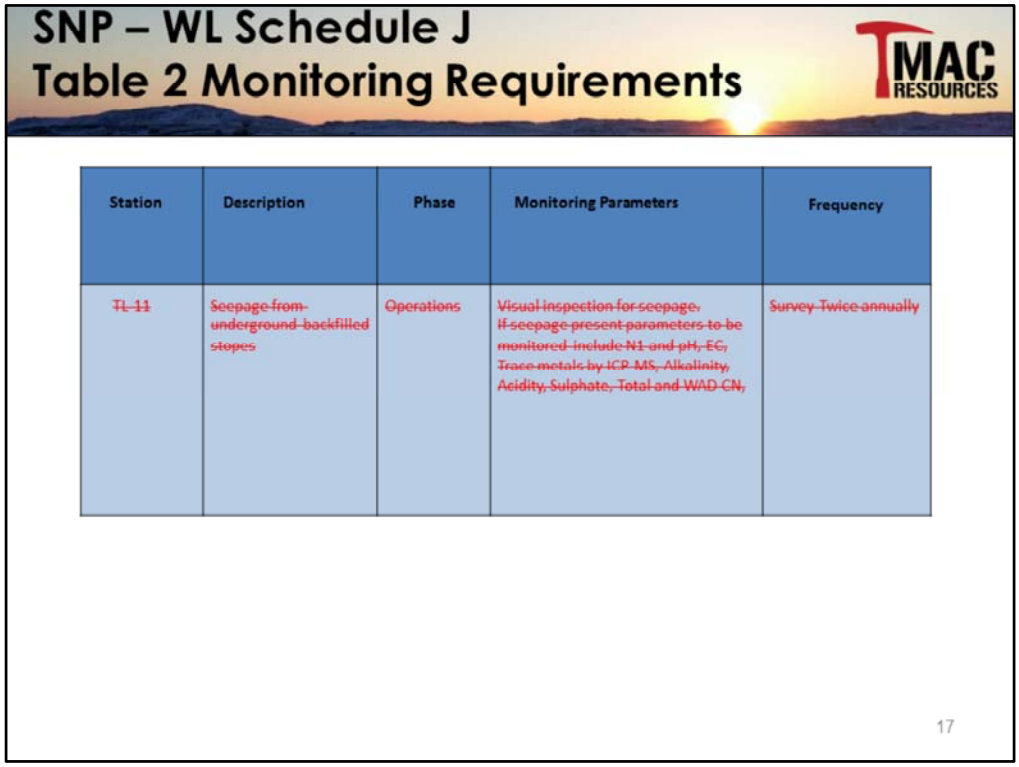
Any characterization required for re-use of this waste would be done as needed, based on operational needs.



This is no longer a product of the amended Project (it was a part of the Merrill Crowe process).

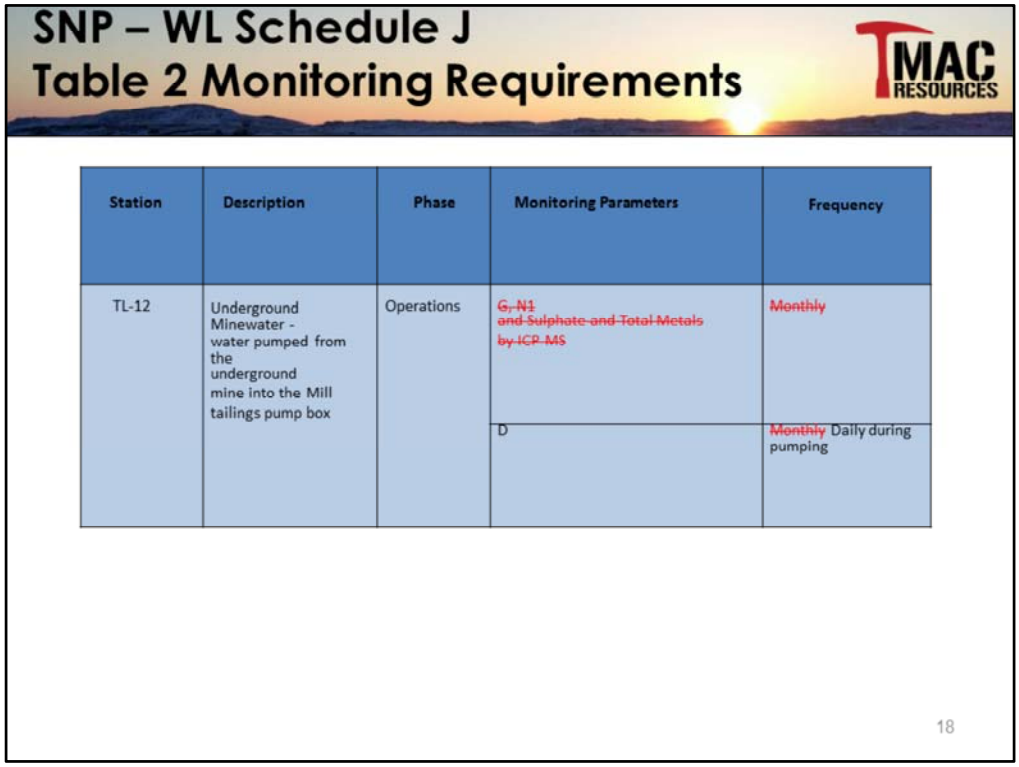


Sampling at TL-1 is sufficient to characterize the water being discharged.



Groundwater will either be discharged directly to the ocean, or to the TIA and then to the ocean.

Groundwater seepage will be monitored under the Groundwater Management Plan.



Groundwater chemical characterization will now be monitored under the Groundwater Management Plan and will be discharged to the ocean.

Discharge monitoring has been increased to daily to effectively monitor surface water drawdown effects and mine operability.

Break

(prior to starting the 'ST' sites)

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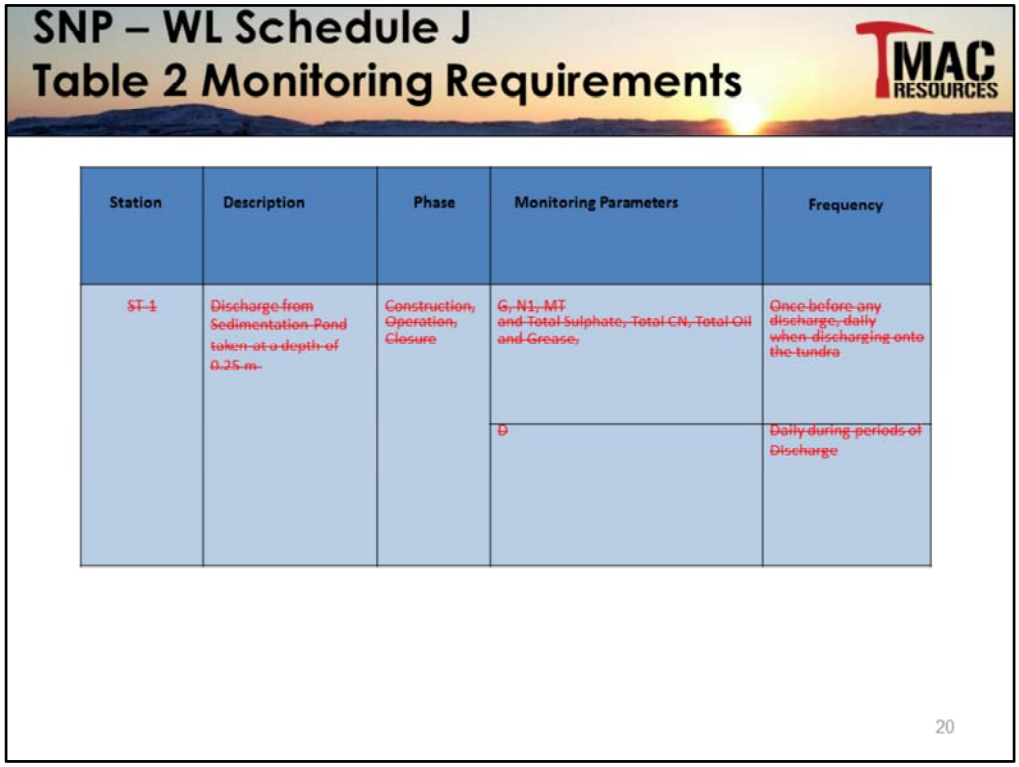
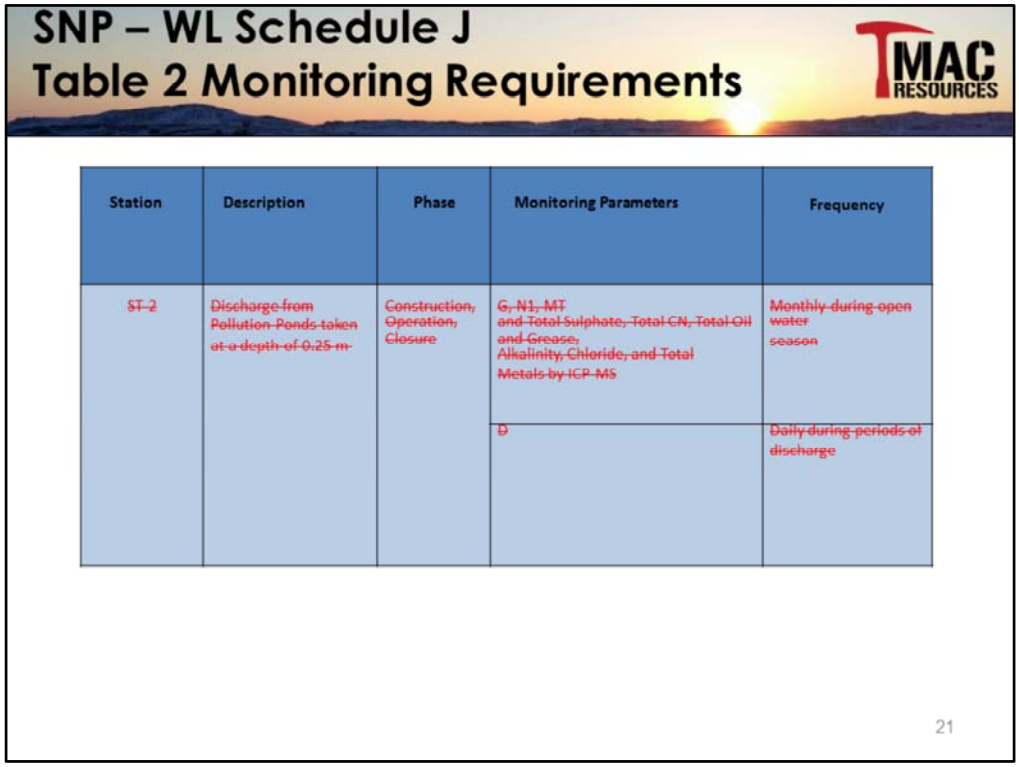


ST-1 was a sedimentation control pond which is now used as a holding pond for site contact water (including ST-2 water) prior to pumping to the TIA, as per the Water Management Plan. As a result, no water will be discharged from this site to the tundra.

Characterization of waters discharged into the TIA for the purposes of Water and Load balance model calibration will be outlined in the Water Management Plan. TIA water will be discharged to the ocean.



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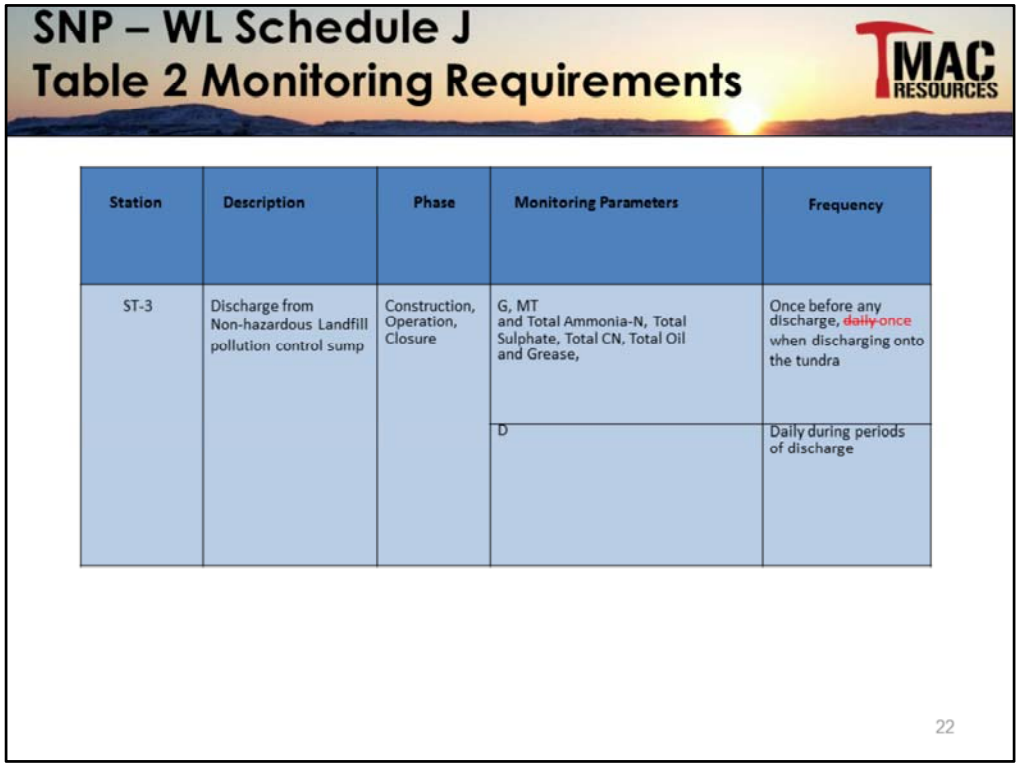
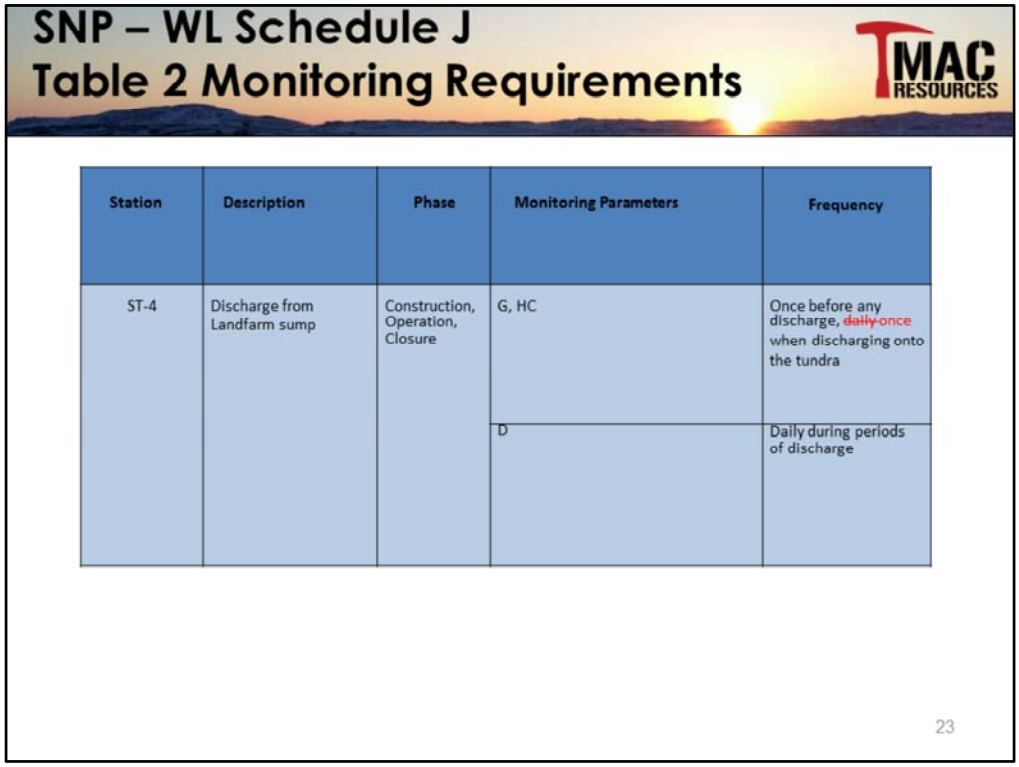


Reduction of sampling to once during discharge.



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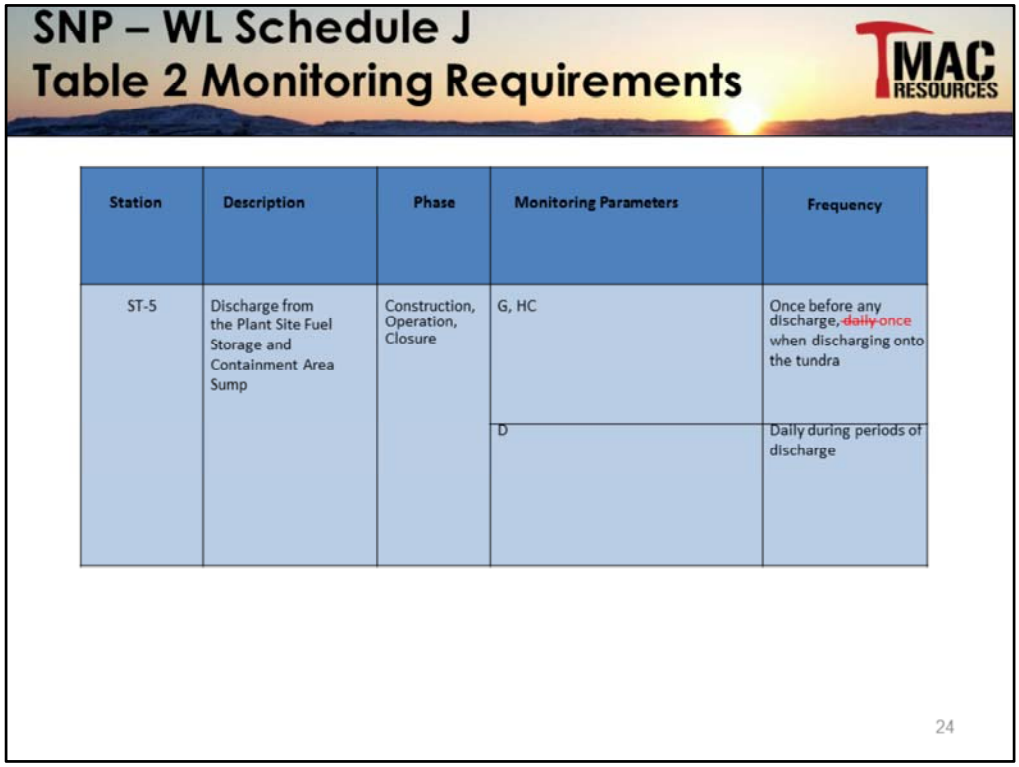

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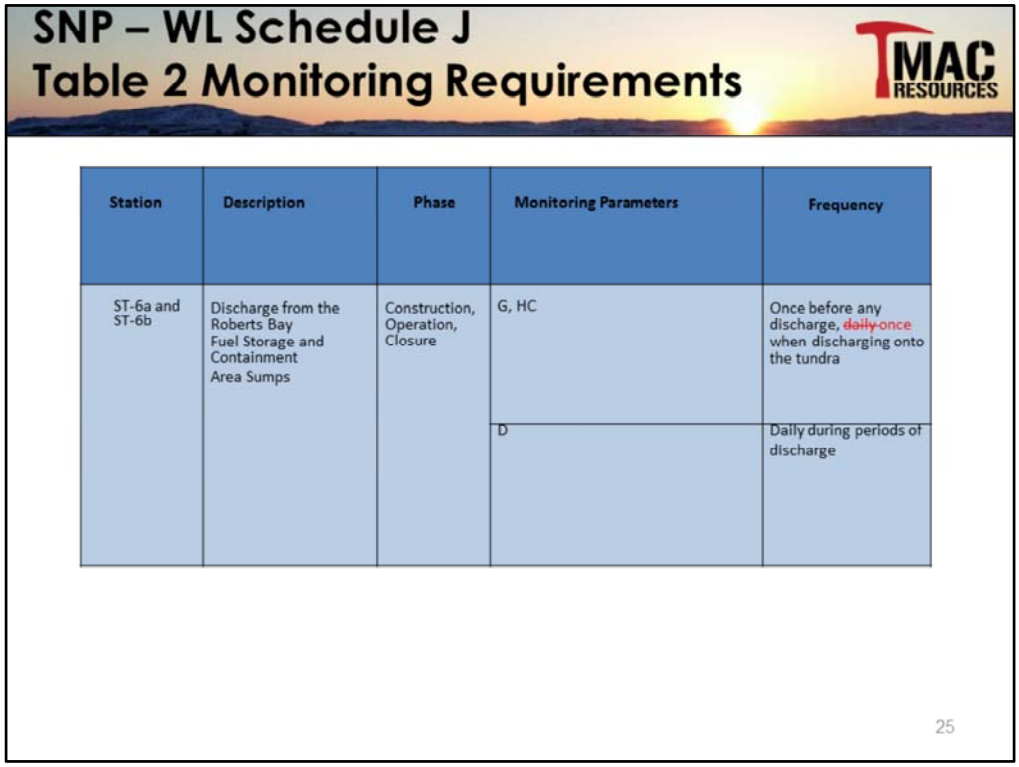

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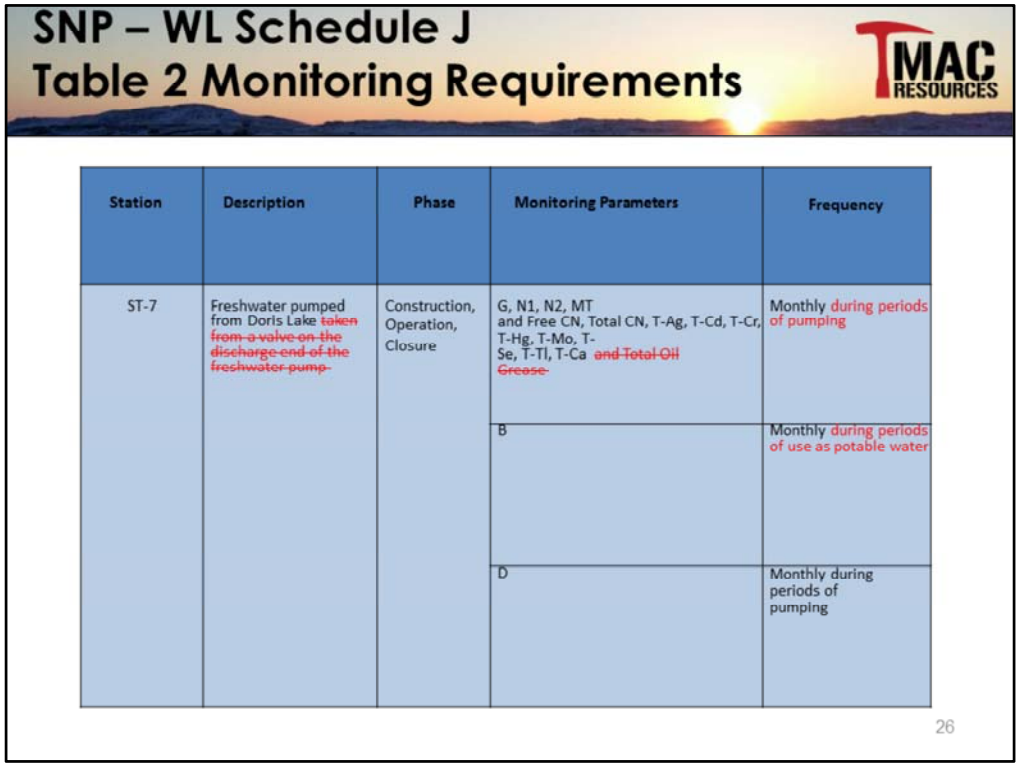
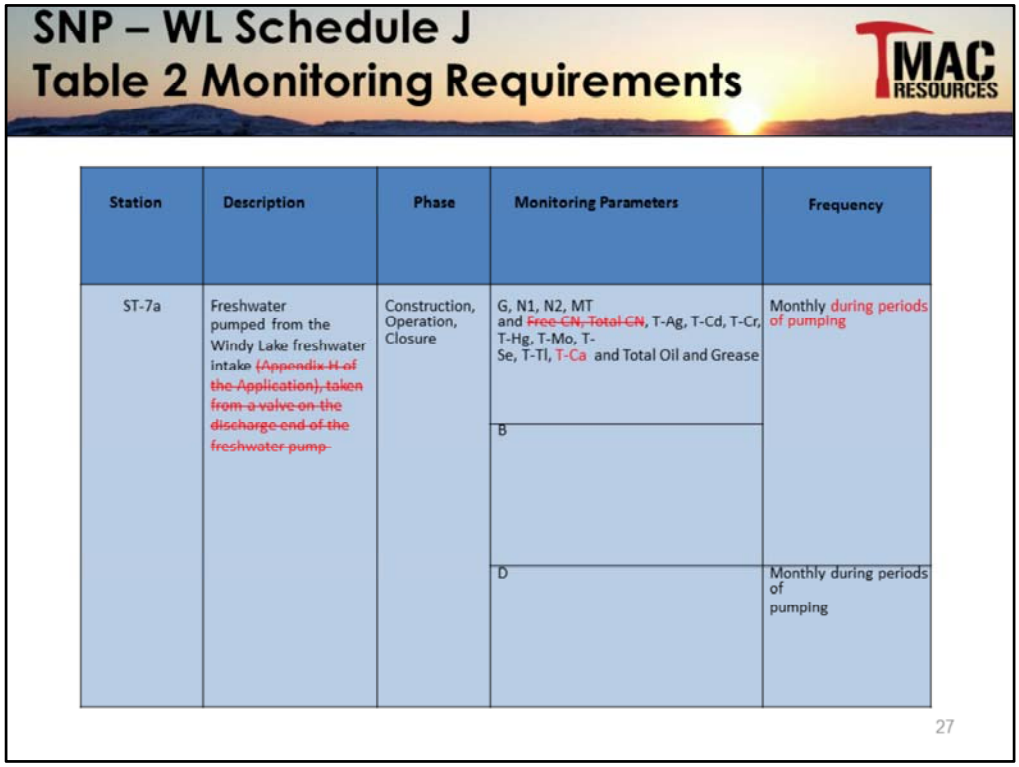


Sampling location is currently in the uptake line or from near uptake point (shoreline, or ice surface) when the pump is not in operation, but would routinely be determined in discussion with the INAC inspector.

Coliform data is highly time sensitive, and would only be pertinent if water is being used for potable purposes, which has not been the case in recent years.

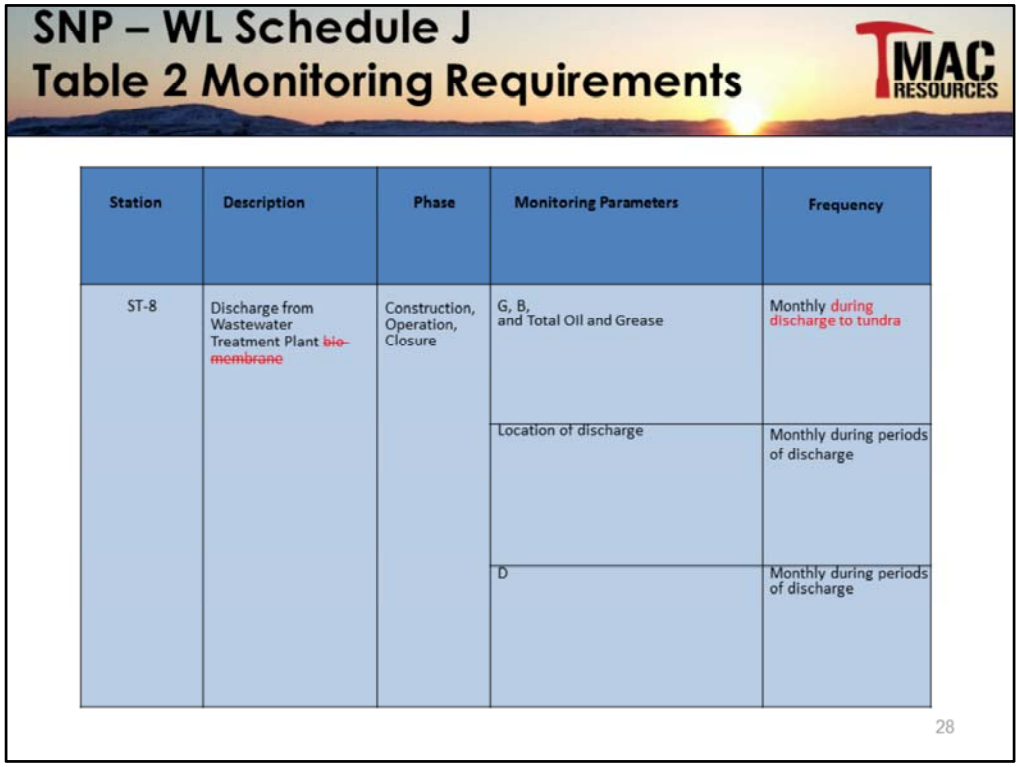
Oil and Grease is similarly unnecessary.



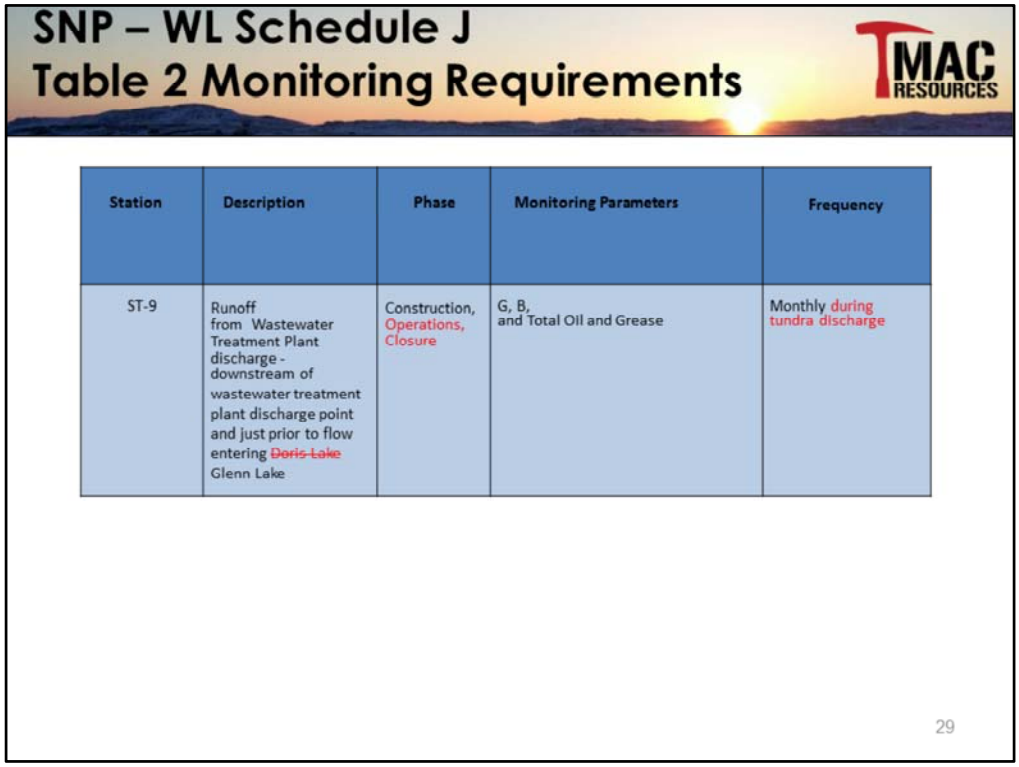
Sampling location is currently in the uptake line or from near uptake point (shoreline or ice surface) when the pump is not in operation, but would routinely be determined in discussion with the INAC inspector.

There is no pathway for CN contamination of Windy Lake due to Doris Activities, it is in a separate watershed from the milling process.

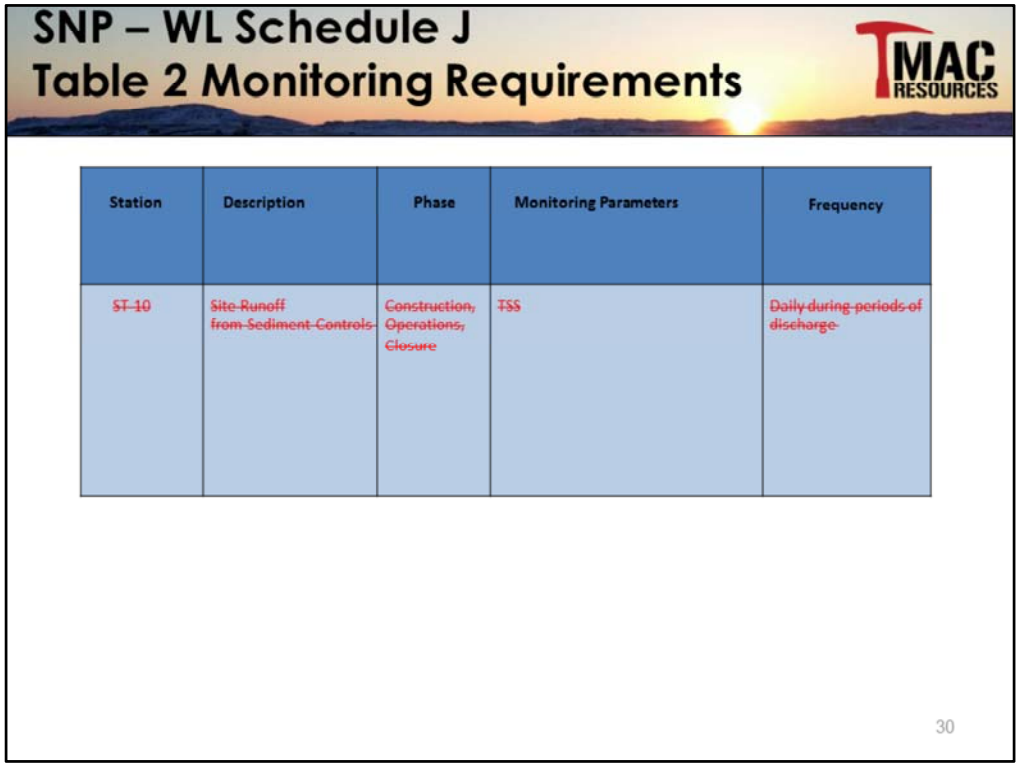
T-Ca was listed in Schedule J, Table 1 Group Reference of the existing WL, so was added here as well.



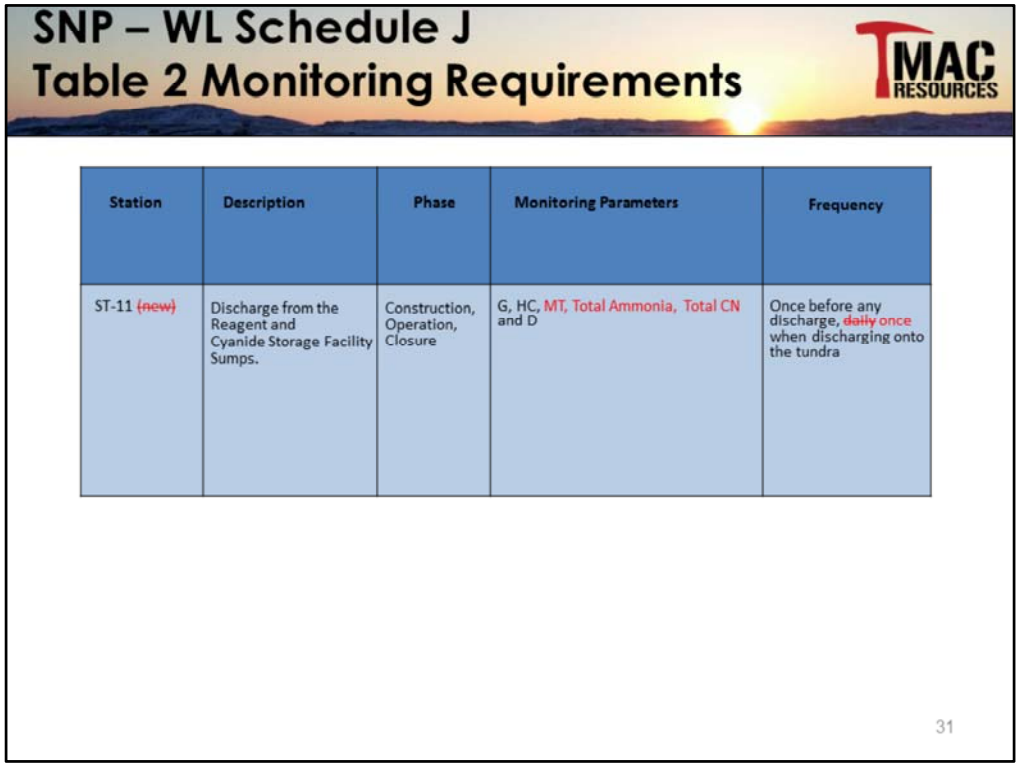
Discharge is either to tundra (two designated locations) or to TIA.



Tundra discharge points are ~ 1 km upslope from Glenn Lake and may be used if necessary through closure.

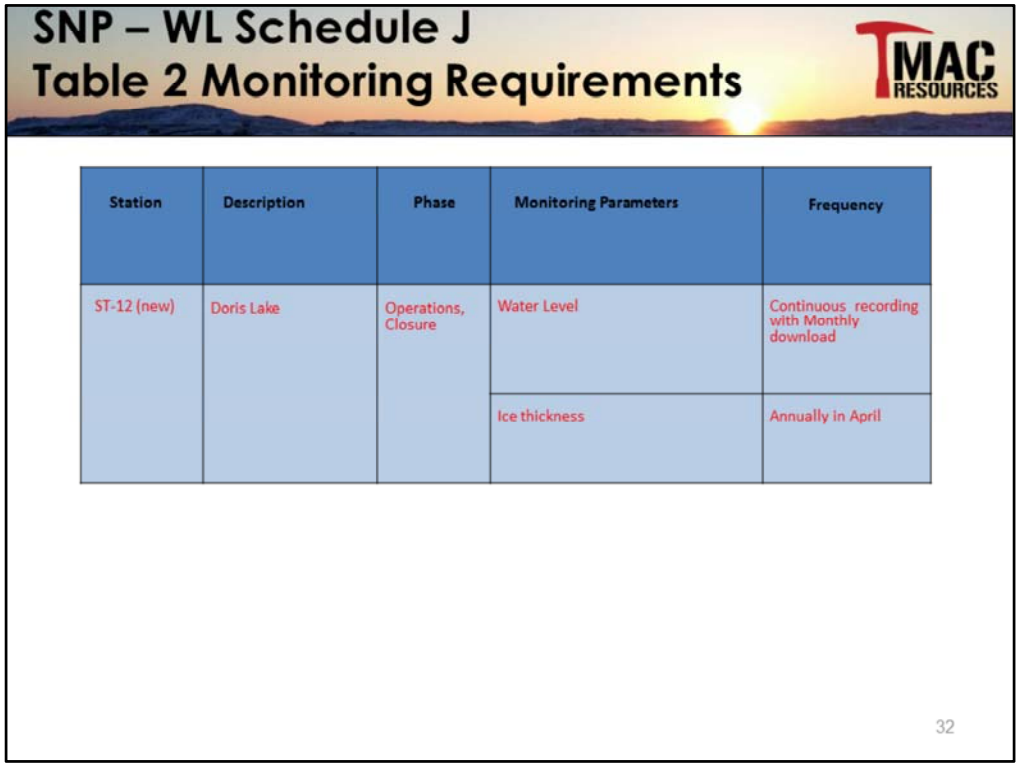


Rock is used solely for construction on site in accordance with the construction technical specifications.

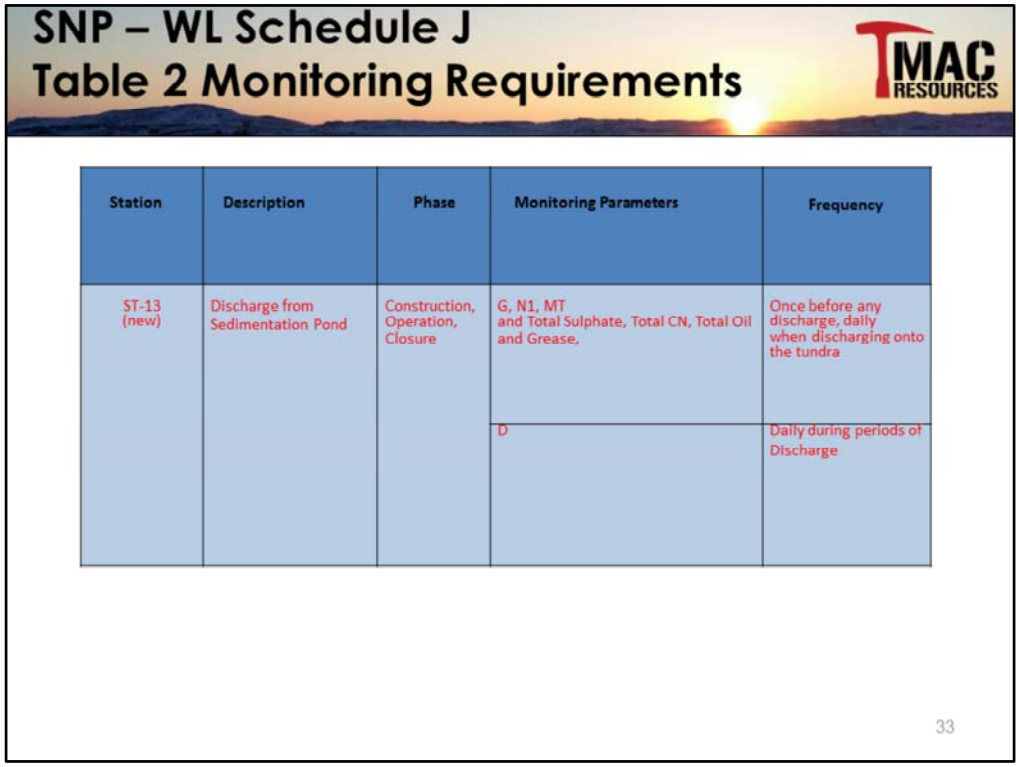


Added parameters that were indicated in WL text.

Reduction of sampling to once during discharge.

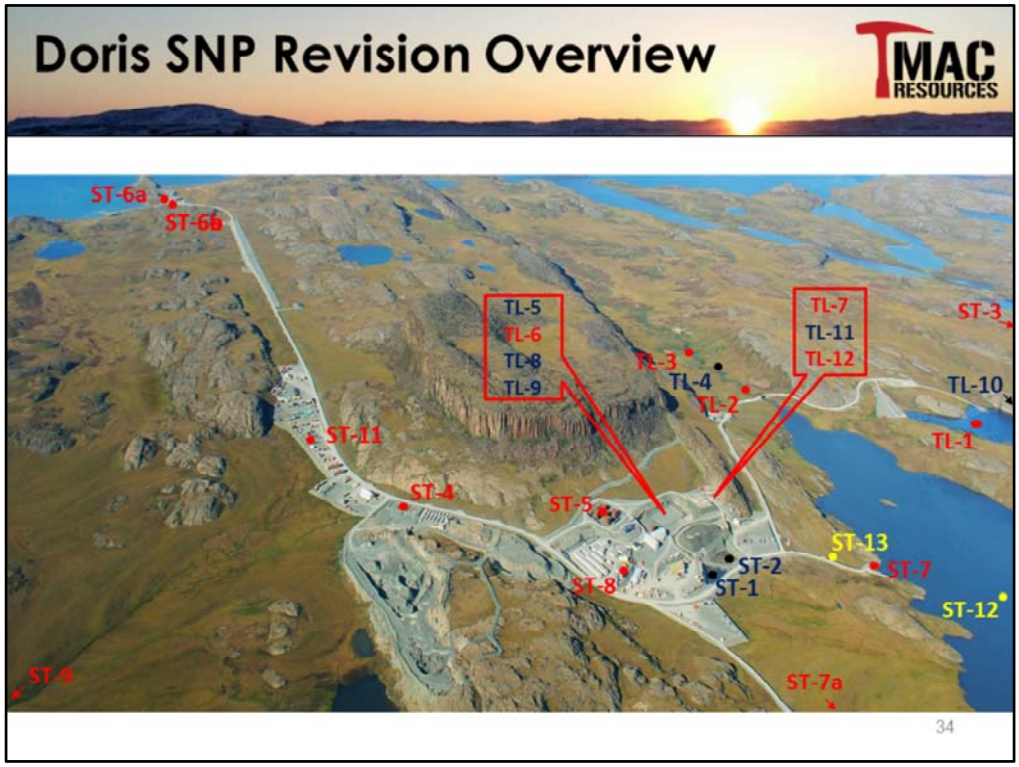


New proposed SNP station for water level and ice thickness monitoring.



ST-13 represents the new sedimentation control pond for Pad U.

Proposed sampling is based on ST-1, the previous sedimentation pond which is now used as a holding pond for site water pumping to the TIA.



Review and discussion of the proposed changes.

Black SNP locations – those no longer necessary.

Yellow SNP locations – those added.

Red SNP locations – those from 2AM-DOH1323.