Appendix 12

Whale Tail 2023 Geomechanical Inspection Implementation Plan

Knight Piesold Observations, Comment and Recommendations					Agnico Eagle Implementation Action Plan					
Category	**Topic**	**2022 Recommendations**	**2023 Status and Comments**	**2023 Recommendations**	**Agnico Eagle Action Plan / Follow-up**	**Status**	**Due Date**	**Completion Date**	**AEM Comments / Update**	**Priority**
Design	**Rock Mass Characterization**	Undertake structural mapping to: a) Define the northwest dipping joint set in the lower Phase 2 Southeast Wall of the Whale Tail open pit b) Better define the extents of Structural Domain 5 in the Whale Tail open pit c) Validate the Brittle Structure model	This work has not yet been completed. The original recommendations remain relevant. Key decisions are being made based on the Brittle / High Strain Structure model (e.g., Whale Tail open pit lower Northeast Wall redesign, tactical measures for the Whale Tail open pit Northwest Wall, design of the IVR V2 open pit North Wall etc.), increasing the importance of validating the model through mapping in the open pits and underground mine. While it is unrealistic to assume that all structures will agree with the model, it is expected that many of the major structures will be able to be identified consistently across the open pit slopes.	Complete the original recommendation, with a particular focus on validating the Brittle / High Strain Structure model. Key areas include Design Sector A1K, E4, D4K, and IVR V2A. If there are significant changes to the interpretation of the structures, the potential impact on the open pit slope performance and design should be assessed. Priority increased to P2.	A recommended, implement a brittle structure variation table. a) See Comments/Updates section b) Undertake systematic mapping on the ramp section adjacent to Structural Domain 5. Calculate the backbreak along the crest of the SD5. c) Mapping of the main brittle contact to be completed.	Open	2024-07-01	-	a)Partly completed, leading to the redesign of design sector F6. b)The Structural Domain 5, in Whale Tail adjacent to the future main ramp, is being open only since in February 2024.	**P2**
		Complete geomechanical mapping on a regular basis, consistent with the commitments in the GCMP. Mapping is particularly important in Q2 and Q3 when the bench faces are clear of snow. The mapping should focus on critical areas of the open pit, including Design Sectors D4K and F6 of the Whale Tail pit and V0A, V2A and V2E of the IVR pits.	The Rock Mechanics team commits to undertaking spot mapping every 150 m along each of the final benches. The mapping is not reliably completed; 18 locations were mapped in the first quarter of 2023 but none were mapped in the second quarter. The mapping to date has been focussed on critical areas in Design Sector D4 of the Whale Tail pit and Design Sector V0A of the IVR V1 pit, which is endorsed. The mapping should also include Design Sectors A1K F6 at the Whale Tail pit and Design Sectors V2A and V2E of the IVR V2 pit.	Complete the original recommendation. The mapping should include Design Sectors A1K, D4, D4K, F6 and IVR V2A and V2E.	Schedule mapping campaigns in the mentioned areas evenly spread throughout the year.	Open	2024-12-31	-	Mapping in design sectors V2A and V2E of the IVR V2 were completed post 2023 Annual Open Pit Geomechanical Inspection.	**P3**
	Open Pit Design	Complete the on-going review and re-design of the Northeast Wall of the Whale Tail open pit. Possible measures under consideration include managing surface water, seasonal mining and double-benching in the lower wall.	The lower Northeast Wall of the Whale Tail open pit has been re-designed based on the results of kinematic analyses and numerical modelling.	None. A separate recommendation has been made relating to the need to use the observed slope performance to validate the results of the stability analyses and the revised slope design.	-	Closed	-	-	-	Complete
		Review the risks associated with future access below the failure in the Phase 1 North Wall of the Whale Tail open pit for water management purposes. Implement mitigation measures as appropriate.	This will be done when access is needed to Phase 1.	Complete original recommendation prior to re-accessing Phase 1 of the Whale Tail open pit.	Task was completed after reviewing the risk associated with the failure in WHL Phase 1 and surrounding push-back. A mitigation plan was done prior to access the area.	Closed	-	2023-09-08	Completed after receiving annual inspection recommendations.	Complete
		(New Recommendation in 2023)	The Whale Tail Extension is planned to be used for water management purposes in the future. This will require periodic access along the ramp. The ramp is located within poor quality Komatiite and ravelling and small-scale rockfall is likely to occur over time.	Review the risks associated with future access along the ramp in the Whale Tail Extension for water management purposes. Implement mitigation measures as appropriate.	Inspect the area prior to use to use the ramp. Implement a mitigation plan in accordance with the field conditions and the nature of the work.	Open	NA	-	To be completed prior to begin the water management work.	**P3**
		(New Recommendation in 2023)	The IVR V1 open pit is currently inactive and barricaded but is planned to be used for water management purposes in the future. This will require periodic access along the ramp and rockfall hazards are present above and below the ramp. An existing multi-bench failure on the North Wall could break back further into the ramp.	Review the risks associated with future access along the ramp in the IVR V1 open pit for water management purposes. Implement mitigation measures as appropriate.	This is already in the plan to be devellopped before anyone go down the pit, July 2024	Open	2024-06-01	-	-	**P3**
		Review the rockfall risk associated with spillover from blasting and the potential creation of noses at the breakthrough between the IVR West 2 and IVR V2 Extension pits.	The IVR West 2 and IVR V2 Extension (referred to as the IVR West West Pit) have not been, and are not planned to be, linked. As a result, this recommendation is no longer relevant.	None	-	-	-	-	-	N/A
		Revert to a 55° pre-shear angle for the IVR V1 Northwest Wall (Design Sector V0A).	The bench design reverted to a 55° pre-shear in Q4 of 2022. Mining of the IVR V1 open pit is now complete.	None	-	-	-	-	-	Complete
	Review of 5-Year Mine Plan and LOM	Document the review of the Budget Mine Plan in greater detail, even if the document remains internal to the team, in order to better capture risks and opportunities.	The review of the IVR V2 007 mine plan by the Rock Mechanics team was well documented.	None	-	-	-	-	-	Complete
		(New Recommendation in 2023)	The review of the IVR V2 007 mine plan considered the potential influence of the high-strain/brittle structures on bench scale failures. However, the potential for inter-ramp scale failures on the footwall was not considered. The influence of changing wall orientation on the potential for kinematic failures was also not considered.	Consider the potential for inter-ramp scale failures in addition to bench and overall slope scale failures during reviews of the mine plan.	Follow KP recommendations when the final slope recommendations report of IVR-2 pushback will be sent. Install instrumentations if relevant.	Open	2024-07-01	-	Already under review as part of the slope recommendation for IVR-2 push-back.	**P3**
	Design Verification and Optimization	Review the failure in the Phase 1 North Wall of the Whale Tail open pit in greater detail to better understand the failure mechanism, likely contributing factors, and the potential for the failure to continue below the ramp. A Maptek scan is recommended to better define the failure geometry.	A detailed review and back-analysis of the failure had not been completed at the time of the audit. A Maptek scan has been completed for the failure.	Complete the original recommendation.	- Maptek scan is already completed. - Position the extend of the brittle structure. - Join the back-analysis with the 2024 ongoing issue.	Open	2024-07-01	-	The failure mechanism is extending on the bench below the original failure. A mitigation plan is already ongoing. The study will be held jointly, including the first failure.	**P3**
		Document the lithology, rock mass structure, and bench performance at regular intervals along the Northeast Wall of the IVR V2 pit in order to better understand the controls on the wall performance. While few benches remain in the pit, the results are relevant to the footwall of the IVR V1 pit.	This recommendation has been grouped with the one below.	None	-	-	-	-	-	N/A
		Document the bench performance and key rock mass characteristics in the IVR V2 open pit and compare them to the design. In particular, it is important to verify that the north wall is being established in the Mafic Volcanics and below the Brittle Structure expected along the contact between the Mafic Volcanics and the Komatiite as the slope geometry recommendations for the V2A and V2E design sectors are based on this premise.	The bench performance of the IVR V2 open pit was reviewed as part of the Open Pit Ground Control Quarterly Reports in Q3 2022 and Q1 2021. The lithologies and high-strain/brittle structures exposed in the open pit slopes have not been reviewed relative to the design. The rock mass quality and structure encountered in the pit had not been quantitatively documented at the time of the audit.	Document the lithology, rock mass quality, and rock mass structure at regular intervals in the IVR V2 pit and compare them to the design. Continue to document and review the bench performance. KP is in the process of completing a detailed review of the design of the IVR V2 open pit , including the bench performance and rock mass characteristics.	A wall performance document was provided to KP as part of the IVR V2 push back slope stability study. "IVR-2_ Wall Performance Review"	Closed	-	2023-11-15	Completed after receiving the 2023 Annual Open Pit Geomechanical Inspection recommendations.	Complete
		(New Recommendation in 2023)	The redesign of the Northeast wall of the Whale Tail open pit is based in part on the results of a numerical model that have not yet been validated. There is a need to validate the numerical model results and thus the slope design.	Use the numerical model to define criteria for comparing the model results to the observed/measured performance of the Northeast Wall. Use these criteria to verify the slope design.	Follow the mentioned recommendations. Provide the necessary measurement and observation for comparison (scan, mapping, backbreak calculation), before and after freshet.	Open	2024-07-01	-	-	**P3**
	Thermal Capping	Remediate the thermal cap in the IVR V2 'Turtlehead".	The thermal cap was not remediated. Mining of the "Turtlehead" is now complete and access to the area has been limited with a berm. As a result, there is no exposure of personnel to the rockfall hazard caused by the gaps in the thermal cap.	Whether or not remediation of the thermal cap is required given the lack of exposure should be confirmed with the WSCC. Priority reduced from P2 as mining is no longer occurring in the area and personnel are not exposed to the rockfall hazard. Recommendation can be removed if WSCC confirms the regulatory requirement is not applicable.	Follow up with WSCC to confirm that the regulatory requirements are not applicable.	Closed	-	2023-12-31	The zone is inaccessible.	Complete
	Bench Performance	Monitor the implementation and performance of the double-benching trial in the Diorite at the Whale Tail pit. In particular, there will need to be an emphasis on scaling and the Bench Approval process to ensure that hazards are managed.	The performance of the double-benches is summarized in the Open Pit Ground Control Quarterly Reports. The benches have experienced between 2.2 m and 2.8 m of backbreak on average, which is greater than the expected 2 m. The difference is attributed to extensive scaling. The benches are otherwise performing well and no rockfalls have been reported.	None	-	-	-	-	-	Complete

Implementation: Excavation		Monitor the implementation and performance of the benches in the Whale Tail Phase 3 Southeast Wall (Design Sector F6). Once the next bench is complete, a review should be completed to assess if the current bench design is achievable or if it needs to be adjusted (i.e., to a BFA of 50°).	The review is summarized in the Open Pit Ground Control Quarterly Report for 2023 Q1. The benches performed better than expected, with backbreak averaging approximately 4.5 m compared to the allowance of 8 m. As a result, the catch bench width was reduced by 3 m from 16 to 13 m.	None	-	-	-	-	-	Complete
	Drill and Blast	Complete the recommended blasting trials. In particular, the development of a blasting pattern for the Komatiite is likely to be beneficial to bench performance.	Initial trials were completed but further work stopped due to the departure of several Drill and Blast personnel. To date, the trials have not resulted in significant changes to drilling and blasting practices. The mine intends to revisit the trials in the future.	Complete the original recommendation.	Blasting trials are currently ongoing. Continue the line drilling program in the komatiite. Analyse the backbreak result for the line drilling with a spacing of 0.5m.	Ongoing	2024-12-31	-	The project was conducted with renewed energy in the late 2023.	**P3**
		Implement a year-round blasting quality control program, at a minimum measuring blasthole depth.	A blasting quality control program has not been implemented.	Complete the original recommendation.	Schedule an engineering departmental discussion on the topic.	Ongoing	2024-12-31	-	-	**P3**
	Water Management	(New Recommendation in 2023)	The sump on the 5081 bench of the South Wall of the Whale Tail open pit is unlined. Water from the sump is seeping through the face of the bench below and will create an ice wall during winter. The ramp will eventually be located below this location.	Evaluate options for lining the sump to limit the re-infiltration of water.	AEM has performed the work of lining of the entire sump.	Closed	-	2023-10-25	Some success was gained with the water retention. However, water is still seeping below the sump through the joints system.	Complete
Implementation: Inspections and Monitoring	**Inspections**	Several areas were identified during the visit that should be a focus of on-going monitoring and inspections: a) The failure in the Phase 1 North Wall of the Whale Tail open pit b) The failed slab in the northwest corner of the Phase 1 North Wall of the Whale Tail open pit c) The potentially unstable blocks in the Whale Tail East Wall d) The accumulation of rockfall on the catch benches of the Whale Tail Phase 2 Southeast wall e) The potentially unstable wedge below the Whale Tail Phase 2 ramp, particularly during blasting below the wedge f) The Brittle Structure with seepage in the southwest corner of the IVR V1 open pit g) The nose on the north wall of the IVR V2 open pit h) The potentially unstable block in the IVR V2 open pit North wall 'Turtlehead" i) The nose between the IVR V1 and IVR V2 open pits	Many of these hazards have been removed as mining progressed. The remaining hazards include a), c), g) and i). These hazards continue to be monitored as part of the Ground Control Program at the mine.	Continue to monitor as part of the Ground Control Program.	-	-	-	-	-	Complete
		(New Recommendation in 2023)	A potential wedge has been identified in the Northwest wall of the Whale Tail Open pit, above the Phase 2 ramp. If the wedge were to fail, it is likely that material would reach the ramp. The wedge is currently being monitored using visual inspections, drone surveys, and the slope stability radar.	Continue to monitor the wedge. If further deterioration of the wedge is observed, review and implement mitigation measures (e.g., knocking down the wedge).	-Monitor for acceleration trend and deterioration. -Have a berm built in the ramp section adjacent to the potential hazard.	Ongoing	-	2024-06-01	The zone is being monitored since establishing the final wall in the area (2020).	**P3**
		Take a series of overview photos (e.g., of each major wall) as part of the visual inspections to generate a record of wall performance over time.	The visual inspections now include a series of overview photos.	None	-	-	-	-	-	Complete
		Implement a formal mechanism (e.g., TARP) to increase the frequency of inspections in the event that an instability is observed or, for example, particular deformation limits are exceeded.	A TARP has not been developed. However, the GCMP now defines cases where additional inspections are to be completed (Table 5-5).	None	-	-	-	-	-	Complete
		(New Recommendation in 2023)	IVR West 2 was barricaded upon completion of mining. This was an effective method of managing the risk associated with the identified rockfall hazards in the pit. It was identified during the 2022 annual review that access would eventually be required for dewatering purposes and that the construction of a rockfall berm along the inside of the ramp was recommended prior to re-entry. However, in late June or early July, dewatering personnel were allowed access to install a pump at the base of the ramp. The rockfall berm had not been constructed. A rock mechanics inspection was not completed prior to personnel accessing the pit. The pump was installed below a rockfall hazard and adjacent several large blocks that had fallen onto the ramp. These rockfall hazards were either not identified by the dewatering personnel or were identified and no action was taken. The hazard was identified during the 2023 annual inspection and the pump was removed and the pit barricaded the following day.	Ensure that a rock mechanics inspection is completed before work activities resume in barricaded areas. The intent is to re- assess existing hazards and to assess whether new hazards have developed over time. All hazards should be mitigated before access is allowed. A rockfall berm should be constructed along the inside of the ramp if the IVR West 2 pit is used for water management in the future. Prior to the removal of the pump and the re-establishment of the barricade, this was a P1 priority.	Inspection and mitigation will be performed prior of conducting water management work. The wall inspection map was reviewed and classified to (grey) no access zone.	Open	2024-07-01	-	Ensure good communication with dewatering engineer and field supervisor, to allow sufficient time to respect the recommendations.	**P2**
	Inspections	Review the use of the Hazard Maps: a) Refine the legend on the Hazard Map to clearly note the restrictions associated with the risk ratings (e.g., Yellow - Spotter Required). b) Provide more detailed guidance, including examples, on how to determine the risk ratings. c) Consider the use of physical markers (e.g., pylons) in the open pit to remind personnel of hazards that are not bermed off (e.g., Yellow Zones). d) Consider a separate method for communicating the corrective actions to Operations so that it is clear that the Hazard Map is focussed on existing hazards rather than whether or not work has been completed. This could be captured within the Bench Approval process. e) Two of the hazards noted as requiring ongoing monitoring in the Hazard Tracking Database have been removed from the hazard map. All current hazards requiring mitigation should be shown on the Hazard Map.	The use of the Hazard Maps has been reviewed. a) The legend has been revised to clearly indicate the need for a spotter in Medium Risk (Yellow) areas b) There continues to be limited guidance on how to determine the risk ratings. The mine relies on practical training by the Rock Mechanics Coordinator. While the training is important, the ratings are a critical aspect of hazard management at the mine and more detailed formal guidance on their selection should be developed. c) The mine has considered the use of physical markers in the open pit to demarcate the Yellow hazard areas that are not bermed off but has concluded that it would be impractical to implement d) The Hazard Map is focussed on rock mechanics hazards. While corrective actions related to the identified hazards are noted on the map, the corrective actions are primarily communicated and tracked through the Pit Wall Approval procedure and the Hazard Tracking Database. e) Not all existing hazards are shown on the map. This is discussed separately as a new recommendation under Hazard Tracking, below	Provide more detailed guidance, including examples, on how to determine the risk ratings. Priority has been revised to P3.	Create a risk rating matrix, including examples. Consider adding the matrix to the wall inspection report or map.	Open	2027-07-01	-	-	**P3**
		Evaluate methods for communicating updates to the Hazard Map outside of the regular two-week period if there are notable changes to the identified hazards. As an alternative to issuing an updated map, a brief addendum describing the change could be issued.	The Hazard Map continues to be issued every two weeks. The mine believes that there has not been a need to update the map more frequently. Slope instabilities have been largely restricted to the existing Red Zones and those that are not have been bermed or barricaded off as they are identified. The hazards associated with newly developed benches are managed using the Wall Approval Procedure.	The existing system appears to be adequately communicating the hazards to the workforce and this recommendation has been closed. However, there are plausible scenarios where interim updates to the Hazard Map could be a valuable part of managing ground control risk given the important role it plays in the Work Close to Pit Wall procedure. Interim updates could be required in the future.	-	-	-	-	-	N/A
		Review the Pit Wall Approval process: a) Review the communication of bench approvals with Engineering and Operations to ensure that the process is reliably followed b) Incorporate a checklist to improve consistency between staff and avoid hazards being missed c) Limit approvals in key sectors (e.g. WHL F6) to experienced staff	The list of upcoming patterns is reviewed each morning during the daily production meeting. This includes whether or not the walls adjacent the pattern have been approved. The mine is in the process of updating the Pit Wall Approval procedure so that patterns are only released to Survey once the required wall approvals are completed. This is endorsed. A checklist has not yet been implemented. The Rock Mechanics team currently relies on practical training in the field for new staff. Approvals in key sectors are now only completed by experienced staff.	Update the Pit Wall Approval procedure as planned. Continue to recommend the development of a checklist to improve consistency between staff and avoid hazards being missed. Priority has been revised to P3.	The procedure was updated “MBK-ENG-PRO_ROCK MECHANICS PATTERN APPROVAL_REV00” Only trained personnel are allowed to approve a pit wall.	Closed	-	2023-08-05	-	Complete

Implementation: Inspections and Monitoring		Inspect the crest of the open pit for evidence of instability (e.g., above D4K) periodically. As a starting point, this could be completed in the spring and fall.	The open pit crest is now inspected for evidence of instability on a monthly basis during the summer as part of the drone surveys.	None. Continue the inspections as planned.	-	-	-	-	-	Complete
		Conduct periodic drone inspections of the open pit slopes. Review the inspection frequency in the GCMP and align it with current needs/capabilities.	Drone inspections are now completed on a monthly basis during the summer (May to September). This commitment is reflected in the GCMP.	None. Continue the inspections as planned.	-	-	-	-	-	Complete
	Instrumentation and Monitoring	Formally identify sectors of the open pit where SSR is a critical control for achieving an acceptable level of residual risk. Develop a process to stop or modify mining activities in these areas when SSR coverage is not available. This could be captured within the SSR TARP.	Sectors of the open pit where SSR is a critical control are now identified in the Ground Control Monitoring Using Radar System Procedure (Northeast and Northwest Walls of the Whale Tail open pit). When the SSR is offline, a Grey Alarm is triggered. On day shift, the Rock Mechanics team would be aware of the alarm and could stop or modify mining activities in these sectors. However, on night shift Dispatch does not contact the Rock Mechanics team if a Grey Alarm is triggered. As a result, no action would be taken until the start of the next day shift.	Empower Dispatch to pull personnel out of sectors where SSR is a critical control in the event that the SSR is offline (e.g., a Grey Alarm triggers). Update the procedure to reflect this change.	Implement the process in the detailed TARP in the event the SSR is to go offline. The dispatch will receive the Alert saying to contact Rock Mechanics. The decision to pull personnel out of a sector when the SSR is to go down will be granted only by Rock Mechanics, unless instructed against, in specific circumstances.	Open	2024-07-01	-	-	**P2**
		Review the effectiveness of the SSR alarm parameters in 2022 and establish a commitment to review the parameters annually.	The SSR alarm parameters had not been reviewed at the time of the audit. It is understood that the mine intends to implement an annual review.	Complete the original recommendation.	Review the SSR parameters by sectors before 2024 freshet.	Open	2024-06-01	-	-	**P3**
		Define a red trigger for the SSR TARP to provide a backstop for unprecedented or unexpected conditions.	A global Red Alarm trigger has not been defined. The intent is to define these on a case by case basis for high risk activities requiring constant monitoring.	Continue to recommend the development of a Red Alarm for at least the areas of the open pit where SSR is a critical control. The intent is to capture unprecedented or unexpected conditions.	Developpe and test the red Alarm on a large number of pixels before 2024 freshet.	Open	2024-06-01	-	-	**P3**
		Adjust the SSR TARP so that the response to Grey and Orange SSR alarms does not explicitly state that mining operations are not to be stopped.	The TARP has been updated. Rock Mechanics personnel are to be contacted in the event that a Grey or Orange alarm triggers.	None	-	-	-	-	-	Complete
		(New Recommendation in 2023)	The TARP indicates that Rock Mechanics personnel are to be contacted if a Grey Alarm is triggered. However, the alarm notification itself says not to contact Rock Mechanics.	Revise the notification for the Grey Alarm so that it is consistent with the TARP.	The notification of the Grey Alert "link down" was changed to "DO NOT ACKNOLEDGE, CALL ROCK MECHANICS IMMEDIATELY". This will ensure that if either the radars or the communications has stopped, a Rock Mechanics member will be aware immediately. "During the critical period in defined zones"	Closed	2024-02-07	2024-02-07	Completed after receiving annual inspection recommendations.	Complete
		Explain in the GCMP or radar monitoring procedure why the SSR alarms have been set at their current values and provide guidance on how they can be adjusted based on different circumstances.	The Ground Control Monitoring Using Radar System Procedure sets out the current alarm triggers and when they can be adjusted. However, no guidance is provided on how to adjust them based on different circumstances.	Complete the original recommendation. While it is recognized that it is not practical to cover all eventualities, recommend providing additional guidance on how to define alarm criteria.	-A document on the subject have been developed focusing g on the komatiite unit. The document should be incorporated when doing a review of the latest procedure. -The procedure "AMQ-ENG-PRO Ground Control Monitoring Using Radar System_Rev04" has been updated on 2023-12-16. However, the update is focusing on the radar line of site and radar placement.	Ongoing	2024-07-01	-	-	**P4**
		Implement an additional surface monitoring system, such as prisms or GPS beacons, to complement the SSR, provide a long-term deformation baseline, and to allow the true displacement vector to be measured.	The Rock Mechanics team has researched the use of GPS beacons but the purchase of these beacons had not been budgeted or planned at the time of the audit. The mine is trialling the use of corner reflectors as history / reference points for the SSR. This is endorsed.	Complete the original recommendation. The GPS beacons are promising. Recommend budgeting for the installation of several beacons.	One beacon has already been installed and is functional. A second beacon is planned to be installed within the next month.	Ongoing	-	-	The GPS beacons (5) will be installed as the mine is being developed in predefined critical areas. Additional beacons will be ordered ahead of the needs.	**P2**
		(New Recommendation in 2023)	The design of the IVR V2 open pit North Wall is sensitive to the position and orientation of the High Strain / Brittle Structures, as well as the presence of Komatiite. This is one of very few design sectors at Amaruq where the potential for inter-ramp scale failures limited the slope design. As a result, increased monitoring is recommended.	Plan for full-time SSR coverage of the North Wall of the IVR V2 open pit once mining extends further to depth in 2024.	Develop the best radar deployment plan according to our needs considering the number pits and radars.	Ongoing	2024-12-31	-	New radar planned to be on the next barge, potentially to be deployed end-September, early October, uncertainty about keeping (3) radars onsite. (2 in WHL, 1 in IVR)?	**P3**
		Install instrumentation (e.g., wireline extensometer) in the potentially unstable wedge below the Whale Tail Phase 1 ramp to supplement radar monitoring.	The wedge has been mined out by the Phase 3 pushback. Instrumentation was not installed in the wedge prior to it being mined out.	None	-	Closed	-	-	-	N/A
		(New Recommendation in 2023)	The mine has planned and budgeted the installation of Shape Array Accelerometers (SAAs) and Vibrating Wire Piezometers (VWPs) in the Northeast wall of the Whale Tail open pit. This is endorsed. The original plan was for three instrumented drillholes but this has since been reduced to two.	Recommend implementing the original plan for three instrumented drillholes. This will improve the coverage of the Northeast wall above the future ramp position and will provide additional redundancy in the event that an instrument is damaged.	A second SAAs and three additional VWPs are being installed (2024-03-01) GNSS units (number to be determined) will replace the third SAAs.	Ogoing	2024-12-31	-	Navstar GPS with real-time data was installed. Additionnal Navstar units are planned to be installed, in key sections of the wall.	**P4**
	Hazard Tracking	Implement a mechanism within the Hazard Tracking Database to flag overdue corrective actions. If an action has been superseded or the hazard mitigated through other means the action should be closed out.	Hazards with overdue corrective actions or that have been unmitigated for extended durations are not flagged. In some cases, corrective actions that have been superseded are noted as such and the action closed out, but this is not consistently done. This aspect of this recommendation is discussed as part of the new recommendation below.	Complete the original recommendation.	The request was sent to the programmer in order to speed-up the process.	Ongoing	2024-07-01	-	-	**P2**
		(New Recommendation in 2023)	Not all identified hazards are documented in the Hazard Tracking Database. For example, the rockfall hazard above the ramp in the IVR West 2 Pit identified during the 2022 annual inspection was not documented and had not been mitigated prior to the 2023 annual inspection. No hazards were recorded in the database in July or August 2023.	Review the use of the Hazard Tracking Database with the Rock Mechanics team. Ensure all identified hazards are documented. Consider tracking the number of entries each month to monitor both wall performance and how well the database is being used.	Review the use of the Hazard Tracking Database with the Rock Mechanics team. Ensure all identified hazards are documented.	Open	2024-01-07	-	The process is done systematically with bi-weekly Wall Inspections.	**P2**
		(New Recommendation in 2023)	There are multiple hazards documented in the Hazard Tracking Database that have not been closed out but are noted as being removed from the Hazard Maps as mining is not currently occurring in the area. There is no mechanism to ensure these hazards are revisited or mitigated before mining in the area resumes.	Develop a process to track hazards that have not been eliminated but are being managed through exclusion zones (or other means of limiting exposure). The intent is to ensure they are identified, communicated to personnel and mitigated prior to resuming work in the area. For example, this could be accomplished using a new status in the database and/or with a separate layer on the Hazard Maps.	Partly capture with and track as part of the hazard data base color codes. Create new status in the database for hazard not eliminated but not representing threats at the current mining elevation.	Open	2024-01-07	-	-	**P2**
		(New Recommendation in 2023)	Not all rockfalls have been documented in the Rockfall Database. This is a key tool for understanding failures and for refining/validating the slope design and other control measures.	Document all rockfalls (at least to the extent practical) in the rockfall database. Define criteria for what type of events are recorded in the rockfall database. Events that resulted in injury or damage to equipment, or could plausibly have done so under different circumstances, should always be recorded in the database.	-The rock fall entry backlog has been cleared. -Any unexcepted rockfall event above 50t is recorded in the Rockfall Database. -Any new event will be documented In the Rockfall Database as usual.	Closed	-	2023-10-15	-	Complete
		Review the Work Close to Pit Wall procedure, how it is communicated and whether it is being consistently used, including: a) Provide refresher training on the procedure to ensure it is understood and implemented consistently b) Review the use of spotters in Yellow Zones, as it is unclear if they are being reliably used c) Review the annual training material and assess its appropriateness	The Work Close to Pit Wall procedure was reviewed and updated in June 2023. The primary change is that the legend on the Hazard Map has been revised to note the requirement for a spotter when working within a Medium Risk area (Yellow Zone). Annual refresher training on the Work Close to Pit Wall procedure was provided to the workforce. The Rock Mechanics team believes that spotters are being consistently used by personnel working in Yellow Zones. It was not possible to verify this during the audit.	None	-	-	-	-	-	Complete

Implementation: Other Controls	**Managing Exposure / Barricades**	Construct, remediate or maintain rockfall or safety berms in the following locations: a) Along the inside of the Whale Tail Phase 2 ramp. The ramp needs to be extended along the upper ramp and built up to a consistent 2 m height b) Along the inside of the ramp on the Northwest Wall of the IVR V1 open pit c) At the end of the crest road on the east side of the IVR V2 'Turtlehead" d) Along the inside of the ramp of the IVR West 2 open pit prior to the pit being used for water management	The Whale Tail Phase 2 ramp has been mined out and mining in the IVR V1 open pit and IVR V2 "Turtlehead" is complete. A rockfall berm had not been constructed along the inside of the IVR West 2 open pit when it was accessed for water management in June or July of 2023. The circumstances of this incident and the associated recommendations are covered under "Inspections" in this table.	None. Outstanding recommendations covered under an earlier recommendation.	-	-	-	-	-	N/A
		Prevent access above the potentially unstable block in the Whale Tail Phase 2 Southeast Wall. Consider leaving some muck against the block to buttress it during drilling and blasting. The area should be monitored when crews are working in the area.	This block has been mined out by the Phase 3 pushback.	None	-	-	-	-	-	Complete
	Scaling	Several areas were identified during the visit that should be scaled or rockfall hazards mitigated: a) Whale Tail Phase 2 South Wall b) Whale Tail Phase 3 South Wall at the Ramp Fault c) Loose slabs and debris from scaling on the Whale Tail Phase 3 Southeast Wall d) Loose slabs and overhangs on the lower northwest wall of the IVR V1 open pit e) Nose between IVR V1 and IVR V2 f) Loose on the North and East walls of the IVR West 2 open pit	Most of these hazards have been removed as mining progressed. The remaining hazards include f). These hazards continue to be monitored as part of the Ground Control Program at the mine.	Continue to monitor as part of the Ground Control Program.	-	-	-	-	-	Complete
Ground Control Program	**Training**	Develop a skills matrix to help identify training needs.	A skills matrix has not been developed. The Rock Mechanics team has experienced significant turnover, with only three staff remaining from a year ago. This puts an increased demand on training and knowledge sharing.	Complete the original recommendation.	-Define the needs. -Define employee area to improve. -Develop a training program tailored specifically for the employee skills to improve in regards of the needs.	Ongoing	2024-12-31	-	-A training program aiming to cover essential needs are being developed. -Employees are met individually discussing year goals and skills to be developed.	**P4**
	Documentation	Add the following to the Quarterly Summary Reports to improve the communication of the completed rock mechanics activities and their effectiveness: a) The reports include a dashboard summary of the activities complete, but there is no reference to the commitments in the GCMP. Recommend including a column in the dashboard indicating the target frequency for the tracked items. b) Consider including a slide commenting on the effectiveness of the mine's controls (e.g. radar alarms, prior identification of rockfalls, etc.)	The recommended changes have not been implemented. While the reviews of the bench performance summarized in the reports are well done, the results are not consistently compared to expectations / the design basis.	Complete the original recommendation. Directly compare the results of the bench performance reviews to the bench design. For example, does the backbreak exceed the amount that was designed for?	-Implement a dashboard with the target frequency in reference to the commitments of the GCMP. -Implement a comparative dashboard for the bench design performance and backbreak expectation and results by design sector.	Open	2024-12-31	-	-	**P4**
		(New Recommendation in 2023)	The commitment to issue the Quarterly Summary Reports is not being met. Reports were issued in Q1 and Q3 2023 but not in Q2.	Issue the Quarterly Summary Reports each quarter.	Continue to issue the Quarterly Reports at each quarter in a timely manner.	Closed	-	2023-12-31	The Quarterly Reports Q1& Q2, 2023, were issued after the quarter in a timely manner. The Quarterly Report Q3 & Q4, 2023, were combined and issued early January 2024.	Complete
		Update the GCMP and subsequently review and update it annually. The GCMP has not been updated since July 2020 and annual updates are a regulatory requirement under the Nunavut Mine Health and Safety Regulations.	The GCMP was updated in April 2023.	None. Continue to review and update the GCMP annually.	-	-	-	-	-	Complete
		The following comments are provided for the GCMP: a) Consider adding a one-page overview of the deposit geology and mine plan, including key information such as the ultimate pit dimensions, approximate mine life, major lithologies, etc. b) (5.2.1.3) - Review and revise the commitments for drone monitoring so that they are focussed and achievable c) (5.3.2) Clarify that the collected data should be compared to the design basis for the open pit in addition to looking for trends d) (5.4.1) Note that crack meters and extensometers have not been installed and clarify that vibrating wire piezometers and thermistors are not currently being monitored. A plan with the location of the instrumentation should be included or referenced. e) (5.5) Reference a register that tracks who has received what geomechanical training f) (8) Provide greater clarity and detail on the input the team provides to the mine planning and approval process. For example, the input to the Bench Master and 3MR g) Describe and include a commitment to the bench approval process	The updates to the GCMP incorporated changes b), c), d), f) and g). While the GCMP now includes a plan showing the location of the instrumentation, the plan is out of date.	a) Consider adding a one-page overview of the deposit geology and mine plan, including key information such as the ultimate pit dimensions, approximate mine life, major lithologies, etc. Focus on the major lithologies/domains and how they perform in the open pits. b) Reference a register that tracks who has received what geomechanical training. c) Update the plan showing the position of the instrumentation.	When the GCMP will be updated, the following will be added to the document; an overview of the deposit including key information, reference on the geomechanical training and an update of the instrumentation plan.	Open	2024-12-31	-	-	**P4**

1 : Priority Level Descriptions

P-1: A high priority or actual structure safety issues considered immediately dangerous to life, health, or the environment, or a significant risk of regulatory enforcement.

P-2: If not corrected could likely result in structure safety issues leading to injury, environmental impact, or significant regulatory enforcement; or, a repetitive deficiency that demonstrates a systematic breakdown of procedures.

P-3: Single occurrences of deficiencies or non-conformance that alone would not be expected to result in structure safety issues.

P-4: Best Management Practice – further improvements are necessary to meet industry best practices or reduce potential risks.

2 : Previous year recomendations are kept only if they are outstanding