

YUKON WATER BOARD
REASONS FOR DECISION, WATER USE LICENCE QZ04-065
YUKON ZINC CORPORATION

Water Use licence QZ04-065, is a type A licence for quartz mining undertaking, was issued to Yukon Zinc Corporation on October 4, 2007. The project is an underground mine located in the south east Yukon, commonly known as the Wolverine Project.

Expatriate Resources Inc. submitted an application to the Yukon Water Board (“the board”) in November 2004. In January 2007, Yukon Zinc Corporation submitted revisions to the application, including notice of a registered name change.

Notice of application and public hearing was provided in accordance with the requirements of the *Waters Act*. In response, the board received interventions from:

Government of Yukon,
Ross River Dena Council together with Liard First Nation,
Environment Canada, and
Yukon Conservation Society.

A public hearing was held on May 2, 3 and 4, 2007, in Whitehorse.

Environmental Assessment

An environmental assessment screening report was prepared by Government of Yukon, pursuant to the requirements of the *Environmental Assessment Act*, and it was included in the water use register as exhibit 9.1.

Term of Licence

Yukon Zinc requested a twenty year licence, but did not specify an expiry date. In order to allow for a full 20 years, the board decided that the expiry will be December 31, 2027.

Reports

The licence requires Yukon Zinc to submit annual reports, including analysis and interpretation of the data collected in the monitoring program. Annual reports are required by the *Waters Act Regulation*. The board recognizes that the last annual report will be submitted after the licence has expired. However, it would be unreasonable to expect a licensee to meet the analysis and interpretation requirements of this section of the licence, without allowing adequate time for that purpose after the conclusion of monitoring period. Therefore, the final annual report is due after the licence expiry. Since the more critical monitoring data is the data that is collected and analyzed during the early years of the project, rather than the later years, this will not be a serious matter.

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The licence does not specify the format to be used in the reporting of monitoring data, except that it must be in an “. . . IBM compatible format . . . ” which is a typical licence requirement. Yukon Zinc is encouraged to provide the data in a spreadsheet format that can be readily be used by other parties.

Security

Yukon Zinc submitted a copy of Quartz Mining Licence QML-006, which was included in the register as exhibit 1.9.

Government of Yukon’s position was that security is adequately addressed through the quartz mining licence, particularly since it includes a requirement for regular review.

The Yukon Conservation Society expressed concern regarding the security provisions of the quartz mining licence, but did not submit any specific recommendations.

The board recognizes that it has only limited authority regarding security. The *Waters Act* provides that the board may require security, and it sets out parameters that must be considered, but the board has no authority, or input, regarding the return of security. As a result, if Government of Yukon advises that, in their opinion, the security provisions of the quartz mining licence are adequate, then it would not be productive for the water board to examine the question of security any further, since the Government of Yukon could immediately, and unilaterally, refund the water licence security.

Discharges to Wolverine Creek and Monitoring in the Wolverine Creek Watershed

Yukon Zinc proposed discharging excess water from dewatering wells at the mine to Wolverine Creek, to compensate for anticipated reduced flows in the creek resulting from the dewatering. It qualified this proposal by stating that the discharges would be subject to meeting “baseline” water quality conditions in the creek. Environment Canada and the Government of Yukon both argued against the discharge.

The board accepted Yukon Zinc’s rationale for the discharge and has included it in the licence, subject to several conditions. Discharges to Wolverine Creek are limited to water obtained from the dewatering wells and all such water must meet the minimum water quality standards that are specified in the licence. It is the board’s intent that such discharges also include discharges from the freshwater storage pond which temporarily stores water from the dewatering wells. The minimum standards are those that were proposed by Yukon Zinc, based on the addition of one standard deviation to the previously observed mean values at Station W9. The board is satisfied that those standards are likely to result in no real change to water quality in the creek. Yukon Zinc is also required to provide continuous flow monitoring of discharges from the dewatering wells to Wolverine Creek. The board is satisfied that no net increase in flows in Wolverine Creek will likely result from the authorized discharge; however, the continuous flow monitoring will provide data that can be used to corroborate this on an ongoing basis. Monthly monitoring at

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stations W82 and W9 in Wolverine Creek is required, except when there is a discharge from the dewatering wells, in which case the monitoring is weekly.

Ross River Dena Council / Liard First Nation recommended additional monitoring between stations W82 and W9. The board determined that those two stations provide sufficient monitoring of Wolverine Creek.

Environment Canada recommended quarterly monitoring for dissolved organic carbon at station W1. Yukon Zinc proposed monthly sampling. The board determined that the sampling should be monthly, to be consistent with the other parameters.

Environment Canada recommended monthly flow monitoring at station W8. The board understands that this station is not equipped with continuous flow monitoring; however, monthly flow measurement at the same time as the other sampling is taking place will not be onerous and it has been included as a licence requirement.

Environment Canada recommended additional monitoring in Wolverine Lake. The board concluded that the monitoring requirements of the licence, which include both the inlet and the outlet of the lake, will be adequate to determine the effects, if any, on Wolverine Lake, and the benefit of additional monitoring was unclear. Therefore, the licence does not require additional monitoring in the lake.

Minor Modifications

The licence requires Yukon Zinc to design and construct all structures according to the drawings submitted as part of the application, and to provide as-constructed drawings. The board notes that the application did not include final detailed design drawings, and that it is reasonable, for any project, to expect some minor changes will be needed to accommodate actual site conditions. The licence requires Yukon Zinc to provide specific information in those circumstance.

The board has not attempted to define “minor modifications” because the important issue is not whether the modification is “minor” but rather the reason for the modification and its potential impact on the performance of the works.

Temporary and Permanent Closure

Although some consensus developed at the public hearing regarding the definition of temporary and permanent closure and the conditions under which temporary closure could be interrupted, some differences still remained. Environment Canada’s position was that five years of temporary closure should trigger permanent closure and decommissioning. The Government of Yukon’s position was that three years of temporary closure should be the determinant. The board accepted the Government of Yukon’s recommendation. However, the board also accepted Environment Canada’s recommendation that some significant action should take place in order for temporary closure to be interrupted. The licence reflects Environment Canada’s recommendation that

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temporary closure should only be interrupted by at least 90 days of milling at no less than 25% of the mill capacity.

Definitions for “Temporary Closure” and “Start of Operations” have been included in the licence, using language that is consistent with the Quartz Mining License.

Discharge Standards

There was disagreement among the parties regarding the appropriate discharge standard for Zinc. The applicant proposed 0.45 mg/L. Government of Yukon proposed the *Metal Mining Effluent Regulation* (MMER) standard of 0.5 mg/L. Environment Canada proposed 0.3 mg/L. The board concluded that sufficient rationale for imposing a standard stricter than that contained in the MMER had not been provided, and accordingly, the MMER standard is reflected in the licence.

Environment Canada recommended that testing for the presence of Radium 226 should be carried out. A maximum limit for Radium 226 is specified in the MMER. The board determined that monitoring for Radium 226 should be carried out only at Station R1 in the Retention Pond, which is the last point of control prior to discharge to Go Creek. The board notes, however, that Radium 226 is included in the specified standard for discharges to Go Creek and, accordingly, applies to any discharge point regardless of its location. The distinction is that monitoring is required only at R1.

Environment Canada also recommended monitoring for dissolved carbon, and the board accepted that recommendation.

The licence requires that any discharge must pass a standard 96-hour LC₅₀ bioassay. Those bioassays are not included in the monitoring schedule, but if any party carries out such a test, the sample must pass.

Compliance Points and Monitoring Points

There was discussion at the public hearing regarding compliance points, together with a suggestion by some parties that water quality objectives should be established for such points. The board issues licences with minimum waste discharge standards that must be met at defined compliance points, not objectives. In this licence, the compliance point is any point where a discharge is occurring to either Go Creek or Wolverine Creek.

In addition to compliance points, the licence includes a number of monitoring points in the Go Creek and Wolverine Creek watersheds. Monitoring data from those points will provide information that will alert all parties to water quality problems should any become apparent over time.

In its joint intervention, Ross River Dena Council / Liard First Nation recommended additional monitoring points near the high point of the road access from the Campbell Highway. The board

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determined that station W73 will address that recommendation.

Ross River Dena Council / Liard First Nation also recommended additional monitoring points on the Finlayson River and in Francis Lake. The board concluded that station W21 is adequate to monitor inputs from the project to the Finlayson River, and there are no additional points of input before the Finlayson River enters Francis Lake. Similarly, station W40 provides monitoring of any inputs to Francis Lake from the Go Creek/Money Creek watershed. The board concluded that the benefits of any additional monitoring were not clear, and accordingly, none have been included in the licence.

Environment Canada recommended that monitoring at stations W80 and W14 should include cyanide. The board concluded that the two locations were too distant from the mine site to be useful for monitoring cyanide.

The board has included monitoring site R2 in the licence. This site is located at the outlet from the retention pond, and it will not exist until the pond is constructed. Annual reporting of the quantity of waste discharged is a requirement of the *Waters Act Regulation*. Accordingly, R2 is specified as requiring only continuous flow monitoring. Although no other monitoring is required, the overall discharge standards specified in the licence will apply, and both the licensee and the enforcement agencies may choose to conduct monitoring for other parameters at this site.

The board considers that the monitoring that will be carried out in the pond at station R1 will be representative of the discharge from the pond. However, the board reiterates that the specified discharge standards are intended to apply to any discharge at any location, except to Wolverine Creek where a different set of criteria will apply.

Fish Tissue Sampling

The Ross River Dena Council / Liard First Nation recommended that a fish tissue sampling program should be carried out to examine the impact of the project on fish as a food source. Yukon Zinc responded that such a program would be detrimental to the limited fish population, and Environment Canada supported that position. Environment Canada is responsible for the section of the *Fisheries Act* that prohibits the deposit of deleterious substances into waters frequented by fish. The board accepts that the effluent standards proposed by Environment Canada are designed to ensure the protection of fish, and that the monitoring program specified in the licence will provide accurate information without the need to kill fish in a system that has limited fish. Accordingly, a fish tissue sampling program has not been included in the licence.

Decommissioning and Reclamation

A decommissioning and reclamation plan was submitted as part of the application. The board recognizes that this plan will be revised and updated as the project proceeds. A schedule for such updates is contained in exhibit 1.9, the Quartz Mining Licence, and the board are satisfied that this will meet the need for an up to date plan. The licensee is required to submit to the board any

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updates as they are completed. The licence also requires that, in the event of temporary closure, the temporary closure provisions of the then current plan must be implemented. In the event of permanent closure, the permanent closure provisions of the plan must also be implemented.

The board recognizes that other authorizations or approvals may be required before the plans can be implemented, and the licence includes a general statement that none of the conditions limit the application of any other law. In order to provide further assurance, and clarification, the requirement to implement the closure plans specifies that this is subject to any other authorizations or approvals. The board has not identified the specific authorizations or approvals, because it would be impossible to predict what laws or rules might exist over the life of the licence and because it is beyond the jurisdiction of the board to specify what other laws may need to be considered.

Domestic Wastewater Treatment Plant

The application contained little information regarding the camp domestic wastewater treatment facility. At the hearing, Yukon Zinc elaborated that treated camp wastewater would be discharged to the tailings impoundment, and provided details about the treatment system. No direct discharge of camp wastewater, treated or untreated, will occur to Go Creek during the operation of the mine. Therefore, no separate discharge standards for the camp wastewater have been specified. Instead, they have been included in the overall standards for any discharge from the tailings impoundment through the retention pond.

However, prior to the construction of the tailings impoundment, there will be a period of time when a direct discharge from the camp wastewater treatment plant to Go Creek will occur. This is authorized by the licence, subject to the discharge meeting the overall discharge standards of the licence.

Seepage Discharges

The project includes a seepage collection dam below the tailings impoundment that is intended to collect any seepage from the tailings facility. Notwithstanding the inclusion of this secondary containment structure, the licensee is required to report any seepages from the tailings facility, together with a plan for collecting, testing and managing the discharges. The board's reasoning is that, although a structure and a plan may be in place, any seepage that is actually noted during the undertaking may require a modified or an individualized plan that cannot be fully anticipated at the time of licensing.

Groundwater Monitoring

The board accepted Yukon Zinc's proposed groundwater monitoring program, with monitoring to be carried out quarterly during construction, monthly during operation, quarterly during temporary closure and annually during permanent closure. Both Yukon Zinc and Environment Canada referred to monitoring during the "post closure" period. The board interpreted "post

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closure” to mean after permanent closure has been implemented.

Environment Canada recommended that there should be triggers included in the licence that would require some action if groundwater quality was found to be deteriorating. The board decided that Environment Canada had not provided sufficient rationale or level of detail to support this recommendation, and accordingly, it is not included in the licence.

Environment Canada also recommended that provision be made in the licence for additional groundwater monitoring points around the mine site, without specifically identifying their locations. The board considers that additional monitoring locations will very likely be established as the project proceeds, but that those locations cannot be predetermined in appropriate licensing language. Accordingly, the licence includes a requirement that any monitoring point coordinates that have changed for any reason must be reported to the board. It is the board’s intent that this also includes any new surface or groundwater monitoring points.

Fencing of the Tailings Impoundment

The Ross River Dena Council / Liard First Nation recommended that a fence be installed around the tailings impoundment to protect wildlife. The Quartz Mining Licence includes specific provisions regarding a wildlife protection plan, and that is the appropriate mechanism to deal with wildlife protection for this project

Retention Pond Liner

Ross River Dena Council / Liard First Nation recommended that a liner be installed in the retention pond. The board noted that the retention pond will only contain treated water from the lined tailings impoundment, and some precipitation. The board determined that the tailings impoundment is designed in such a manner as to provide adequate protection, and that an additional liner in the retention pond is not necessary.

Backup Seepage Dam

Ross River Dena Council / Liard First Nation recommended the construction of an additional seepage dam. The board noted that seepage is predicted to be 0.0001 litres per second, and that the seepage collection system has been designed for up to 0.5 litres per second. The board determined that the system is adequately designed and that another seepage dam is not necessary.

Evaporation Monitoring`

Environment Canada noted that pan evaporation tests would provide more accurate data about water loss from the tailings impoundment through evaporation. The board determined that the method for measuring evaporation loss was not sufficiently critical to warrant a licence requirement.

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Watercourse Crossings

Schedule 4 of the application indicated the inclusion of watercourse crossings, but none were specifically identified elsewhere in the application or during the public hearing. The access road has already been constructed. Accordingly, the operating conditions of the licence do not include an authority to construct watercourse crossings.

Conclusion

The board recognizes and appreciates the cooperative and constructive participation of all parties at the public hearing and encourages Yukon Zinc to continue to consult with those parties as this project moves forward.

A handwritten signature in black ink, consisting of several loops and strokes, positioned above a horizontal line.

November 2, 2007