

**APPENDIX 10    2009    YELLOWJACKET    WATER    QUALITY    MONITORING:  
MEMORANDUM; LORAX ENVIRONMENTAL SERVICES INC., 2009**



## **PROPOSAL**

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**To: Bruce Graff, P.Eng., Linda Dandy, P.Geo., Date: March 27, 2009**  
**Charles Downie, P.Geo.**

**From: Justin Bourne, M.Eng., P.Eng. Project #: 489-3**

**Subject: Proposal for 2009 Yellowjacket Water Balance and Water Quality  
Impact Assessment**

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### **1.0 Introduction**

Lorax Environmental Services Inc. (Lorax) has been requested to prepare a scope and budget associated with developing a water balance, making water quality predictions and assessing potential project-related impacts in support of both the Effluent Discharge Permit and Small Mine Permit Applications for Prize Mining's Yellowjacket Property near Atlin, B.C. This document presents the proposed scopes of work and budgets for the above tasks for review. These programs have been designed to ensure that all regulatory permitting requirements are met.

Based on Lorax's current understanding, the Yellowjacket Project has a small footprint (25 ha), which is comprised of:

- Placer mining of surficial materials (145 m x 90 m);
  - Open pit mining of mineralized zones (70 m x 40 m);
  - Process plant – jaw crusher, SAG and grinding mills, Knelson concentrator (gravity flow);
  - Material stockpiles and dumps;
  - Process water sedimentation ponds with discharge to ground;
  - Processing groundwater extraction, including pumps and pipelines;
  - Access roads including internal roads within the pit;
  - Diesel generator for electrical power including on-site transmission;
  - A fuel storage and handling facility (double walled enviro tank system);
  - Office and first aid trailers.
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All of the mine components listed above are currently in place, and development during 2009 will involve the extraction and processing of approximately 30,000 tonnes of material from the open pit. Tailings generated from processing of this material will be deposited, along with process plant discharge supernatant solution, to the sedimentation pond(s). All discharge from the ponds is expected to be via infiltration to ground with no surface releases. As well, the proposed development plans state that any waste rock generated as a result of resource extraction will be backfilled into the open pits.

The scope of the environmental programs proposed for 2009 will involve four components:

- 1) Background review;
- 2) Developing a site water balance;
- 3) Making water quality predictions; and,
- 4) Assessing potential project-related water quality impacts.

## **2.0 Proposed Programs**

The following sections outline the scope of each of the components of the proposed 2009 programs.

### **2.1 Background Review**

Lorax will begin by conducting a thorough review of background information relevant to the Yellowjacket water balance. It is understood that a significant amount of relevant background work has been completed to date at the site, including:

- Yellowjacket Property Bulk Sample Waste Characterization Program, June 2006, Lorax Environmental;
- Pine Creek Baseline Water Quality Monitoring Program, December 2007, Lorax Environmental;
- Atlin Gold Project Pine Creek Diversion, June 2006, BGC Engineering Inc.; and,
- Hydrogeological Investigation and Analyses Report – Proposed Excavation, June 2006, BGC Engineering Inc.

In addition to the above, the Taku Land Corporation submitted an Environmental Impact Statement for the Atlin Hydroelectric Project under the Canadian Environmental Assessment Act by on March 23, 2006. The Atlin Hydroelectric Project is located on Pine Creek in two locations; the control structure is located at the outlet of Surprise Lake approximately 8 km northeast of the Yellowjacket project, and the remaining infrastructure is located between the intake and powerhouse on Pine Creek which are approximately 2 km and 6 km southwest of the Yellowjacket project, respectively. This report has been made available to Lorax and it is understood that it can be relied upon for work on the Yellowjacket project.

While much of the work proposed herein is anticipated to be office-based, Lorax recommends that a site orientation be performed by one of its engineers during the background review phase. This will allow him to become familiar with the site, groundwater and surface water monitoring locations, proposed locations of the sedimentations pond(s) with respect to Pine Creek, etc. While on site, the Lorax engineer will also visually inspect previously installed groundwater monitoring wells and assess their suitability for sampling. If their condition is deemed suitable, select wells will be developed (as required), monitored and sampled for total and dissolved metals. The results of these analyses would be used in a mass balance to help quantify groundwater discharges to Pine Creek.

Should any data gaps be encountered during the background review, Lorax will advise Prize Mining Corporation as soon as possible along with recommendations to address said gaps.

## **2.2 Water Balance**

Assuming that all required information is obtained during the background review, Lorax will proceed to develop a water balance for the Yellowjacket site. The goal of the water balance will be to quantify a range of expected groundwater discharges to Pine Creek from the placer gravels underlying the project sediment pond(s).

## **2.3 Water Quality Predictions**

Lorax will define source concentrations for discharge from the sedimentation ponds based on the results of the ongoing water quality sampling program. Expected water quality in Pine Creek will then be predicted using the sediment pond source concentrations combined with Pine Creek flow rates and groundwater discharges obtained from the water balance above.

## **2.4 Impact Assessment**

Lorax will compare the Pine Creek water quality predictions obtained above to applicable numerical standards and/or guidelines then highlight and comment on exceedances with respect to those criteria. Lorax has not included a benthic survey in this proposal but would be happy to coordinate such work at Prize's request.

## **3.0 Reporting**

As it is understood that others await the results of the water balance for sizing the sedimentation ponds, Lorax will provide a separate report on the water balance within two months of receiving notice to proceed. The results of the remaining components will be provided in a separate report to follow.

The number of report copies requested will be bound and distributed to the site; in addition, an electronic copy of the report will be included with the submission. Any comments, suggestions or additions requested by the client will be incorporated and final hard copies will be compiled, bound and submitted accompanied by the associated digital files.

## **4.0 Budget**

The total proposed budget for professional fees and disbursements for the 2009 Yellowjacket Water Balance and Water Quality Impact Assessment is \$43,630 (details summarized in Table 1), of which \$37,230 is for professional fees and \$6,400 is for disbursements. In the interest of saving costs, analytical expenses, estimated at \$1,020, will be billed directly from the laboratory to the client. Therefore, the total provided in Table 1 does not include analytical costs. All cost estimates are exclusive of applicable taxes.

The budget summarized above includes an estimated cost for liaison with Prize Mining Corp. and regulators. If required, additional time will be billed at the hourly rates outlined in Table 1.

## **5.0 Closure**

We trust this meets your current requirements. Should you have any questions or comments, please contact us at your convenience.

Respectfully submitted,

**Lorax Environmental Services Ltd.**

**ORIGINAL SIGNED BY**  
Justin Bourne, M.Eng., P.Eng.  
Hydrogeological Engineer

JB/PM/AR

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**Table 1: Yellowjacket Water and Water Quality Impact Assessment Balance Budget**

| Phase   | Description  | unit                             | # units | unit rate | total     | Item Total       |
|---|--|----------------------------------|---------|-----------|-----------|------------------|
| 1   | <b>Background Review</b>   |                                  |         |           |           |                  |
|   | • <i>Professional Fees</i>   |                                  |         |           |           |                  |
|   | Data Review and Management   | hours                            | 8       | \$ 190    | \$ 1,520  |                  |
|   |  | hours                            | 16      | \$ 150    | \$ 2,400  |                  |
|   | Site Visit (Orientation)   | hours                            | 26      | \$ 150    | \$ 3,900  |                  |
|   | Groundwater Well Inspection and Sampling                           | hours                            | 8       | \$ 150    | \$ 1,200  |                  |
|   | Field Coordination and Preparation                                 | hours                            | 4       | \$ 150    | \$ 600    |                  |
|   | Liaison with client and regulators                                 | hours                            | 8       | \$ 150    | \$ 1,200  |                  |
|   | Project Management   | hours                            | 2       | \$ 150    | \$ 300    |                  |
|   | Subtotal   |                                  |         |           | \$ 11,120 | \$ 11,120        |
|   | • <i>Disbursements</i>   |                                  |         |           |           |                  |
|   | Air, transport, accomodation, food                                 |                                  |         |           | \$ 4,000  |                  |
|   | Groundwater sampling equipment                                     |                                  |         |           | \$ 800    |                  |
|   | Shipping   |                                  |         |           | \$ 600    |                  |
|   | Subtotal   |                                  |         |           | \$ 5,400  | \$ 5,400         |
| • <i>Analytical Fees*</i>                       |  |                                  |         |           |           |                  |
| ICPMS Metals Scan - Dissolved (4 + dup + blank) | sample   | 6                                | \$ 85   | \$ 510    |           |                  |
| ICPMS Metals Scan - Total (4 + dup + blank)     | sample   | 6                                | \$ 85   | \$ 510    |           |                  |
| Subtotal  |  |                                  |         | \$ 1,020  | \$ 1,020  |                  |
| 2   | <b>Water Balance</b>   |                                  |         |           |           |                  |
|   | • <i>Professional Fees</i>   |                                  |         |           |           |                  |
|   | Hydraulic Conductivity Estimation from Particle Size Distributions | hours                            | 2       | \$ 150    | \$ 300    |                  |
|   | Development of Water Balance                                       | hours                            | 24      | \$ 150    | \$ 3,600  |                  |
|   | Reporting  | hours                            | 16      | \$ 150    | \$ 2,400  |                  |
|   | Senior Review  | hours                            | 4       | \$ 190    | \$ 760    |                  |
|   | Drafting   | hours                            | 2       | \$ 75     | \$ 150    |                  |
|   | Support, report formatting and compilation                         | hours                            | 2       | \$ 50     | \$ 100    |                  |
|   | Liaison with client and regulators                                 | hours                            | 8       | \$ 150    | \$ 1,200  |                  |
|   | Project Management   | hours                            | 2       | \$ 150    | \$ 300    |                  |
|   | Subtotal   |                                  |         |           | \$ 8,810  | \$ 8,810         |
|   | • <i>Disbursements</i>   |                                  |         |           |           |                  |
|   | phone/fax, report preparation                                      |                                  |         |           | \$ 500    |                  |
|   | Subtotal   |                                  |         |           | \$ 500    | \$ 500           |
|   | 3  | <b>Water Quality Predictions</b> |         |           |           |                  |
| • <i>Professional Fees</i>                      |  |                                  |         |           |           |                  |
| Source Term Definition                          |  | hours                            | 8       | \$ 135    | \$ 1,080  |                  |
| Water Quality Modeling                          |  | hours                            | 24      | \$ 150    | \$ 3,600  |                  |
| Reporting                                       |  | hours                            | 16      | \$ 150    | \$ 2,400  |                  |
| Senior Review                                   |  | hours                            | 4       | \$ 190    | \$ 760    |                  |
| Drafting  |  | hours                            | 2       | \$ 75     | \$ 150    |                  |
| Support, report formatting and compilation      |  | hours                            | 2       | \$ 50     | \$ 100    |                  |
| Liaison with client and regulators              |  | hours                            | 8       | \$ 150    | \$ 1,200  |                  |
| Project Management                              |  | hours                            | 2       | \$ 150    | \$ 300    |                  |
| Subtotal  |  |                                  |         |           | \$ 9,590  | \$ 9,590         |
| 4   | <b>Impact Assessment</b>   |                                  |         |           |           |                  |
|   | • <i>Professional Fees</i>   |                                  |         |           |           |                  |
|   | Evaluation of Applicable Standards                                 | hours                            | 8       | \$ 150    | \$ 1,200  |                  |
|   | Comparison of Water Quality Predictions to Applicable Standards    | hours                            | 16      | \$ 100    | \$ 1,600  |                  |
|   | Reporting  | hours                            | 16      | \$ 150    | \$ 2,400  |                  |
|   | Senior Review  | hours                            | 4       | \$ 190    | \$ 760    |                  |
|   | Drafting   | hours                            | 2       | \$ 75     | \$ 150    |                  |
|   | Support, report formatting and compilation                         | hours                            | 2       | \$ 50     | \$ 100    |                  |
|   | Liaison with client and regulators                                 | hours                            | 8       | \$ 150    | \$ 1,200  |                  |
|   | Project Management   | hours                            | 2       | \$ 150    | \$ 300    |                  |
|   | Subtotal   |                                  |         |           | \$ 7,710  | \$ 7,710         |
|   | • <i>Disbursements</i>   |                                  |         |           |           |                  |
|   | phone/fax, report preparation                                      |                                  |         |           | \$ 500    |                  |
|   | Subtotal   |                                  |         |           | \$ 500    | \$ 500           |
|   | <b>Total</b>   |                                  |         |           |           | <b>\$ 43,630</b> |

\* Analytical charges will be billed directly to Prize Mining Corp. and are not included in Total