



Nunavut Water Board

Public Registry

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The NRI database is used to assist in replying to public requests for information, and to provide information to other researchers who may wish to undertake similar projects. We hope that sharing information will help to foster growth in Northern science and increase awareness of the value of research to Nunavut residents.

In closing, we trust your research experience in Nunavut has been positive and ask that you please encourage your colleagues to contact NRI if they intend to undertake a research project in Nunavut. We look forward to assisting them in obtaining proper approvals from community agencies, Designated Inuit Organizations for the Nunavut Land Claim and government regulatory bodies.

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Meliadine West Gold Project Water Balance Study 2000 Summary Report

AGRA Earth & Environmental Limited (now AMEC Earth & Environmental Limited) was retained by WMC International Limited in 1997 to conduct a water balance study for the Meliadine West Gold Project. The study has been in progress for four years. This document summarizes the results of work carried out during the 2000 field season.

2000 Work Program

The 2000 work program included measurement of discharges from Meliadine Lake, the Meliadine River and the Char River; snow surveys and measurement of discharges from lakes in the sub-basins of the area expected to be affected by gold mine development; monitoring lake levels and measuring evaporation. Rainfall, temperature and other climate data for the project area were collected and provided by WMC.

Regional Climate

Precipitation for the 2000 hydrologic year (October 1999 through September 2000) was below average. The Rankin Inlet observed total precipitation of 269 mm was 11 percent below the 19-year mean value of 302 mm. The below average result was due to the low rainfall over the summer, especially for the month of June, which was the driest on record; the total snowfall depth over the winter equalled the long-term average.

Meliadine Basin Runoff

The total 2000 runoff for the Meliadine Lake basin was measured to be 134 mm over the catchment area of 569 km². This includes an estimated 14 mm of runoff which is expected to discharge from Meliadine Lake over the December 2000 to June 2001 winter period. This winter discharge is expected to freeze as surface icing in the area immediately downstream of the lake outlet. About 25 mm or 19 percent of the total 2000 Meliadine Lake runoff was discharged through the west outlet into the Diana River basin via Peter Lake. Some 108 mm was discharged into the Meliadine River.

The Meliadine River near the mouth discharged a nominal 112 mm of runoff in 2000 based on the total catchment area of 796 km². In effect however, when the drainage area is reduced in proportion to the amount of runoff diverted through the west outlet of Meliadine Lake, the runoff becomes 130 mm, which agrees closely with that found for Meliadine Lake.

For the 2000 hydrologic year the ratio to runoff to precipitation (Rankin Inlet) for the Meliadine Lake basin was 0.50.

Peninsula Basins Runoff

The runoff of Lake A1 was measured to be 129 mm, which agrees closely with the values found for the Meliadine Basin. The runoff for Lakes B7 and B2 were measured to be 102 mm and 109 mm, respectively, or some 20 percent lower than for Lake A1. The Lake

B7 and B2 measured values are considered to be lower than actual, due to the limitations of the measurement data at the start of the runoff period. However the relative similarity of the two B basin runoff values supports the validity of the drainage area reduction made this year for the B7 basin.

Char River

Runoff observations and discharge measurements were initiated in 2000 at the Char River road crossing near Rankin Inlet. The estimated runoff hydrograph indicated a peak discharge of $12.5 \text{ m}^3/\text{s}$ and a total runoff of 125 mm. The existing crossing, consisting of three 1200 mm diameter culverts, was washed out for a period of one week. The crossing is typically washed out each spring due to plugging of the river channel and the culvert barrels with snow.

Lake A37 Sub-Basin

Snow surveys and spot discharge measurements were conducted to obtain a better understanding of the runoff processes in this sub-basin, where mine development is expected to occur. The estimated runoff hydrograph produced a peak discharge of $0.40 \text{ m}^3/\text{s}$ and a total runoff volume of 96 mm. It was estimated that no runoff occurred after the cessation of the snowmelt runoff at the end of June.

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Van Der Grinten

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