<u>Memorandum</u>

To: Dan Cornett, Access Consulting Group From: Ken Nordin, Laberge Environmental Services

February 26, 2004

<u>Re:</u> Galkeno 300 Fugitive Flow Investigation Winter Sampling Event of February 18 to 20, 2004

The following is a brief summary of the receiving water and fugitive flow sampling event at Elsa– Keno, which was carried out between February 18 and 20, 2004. All of the water samples were collected on February 19 and 20. The site at the mouth of Christal Creek was not sampled due to access difficulties.

Sample containers were obtained from Access Consulting. General parameters were collected in clean new one liter plastic bottles. Total metals samples were collected in 100 ml acid washed bottles. Samples to be filtered for dissolved metals were collected in 250 ml acid washed bottles, left unpreserved, and marked "to be filtered for dissolved metals". Insulated plastic gloves were used for sample collection. All containers were rinsed at least 3 times in the sample waters.

In Situ measurements of conductivity were made with an Orion instruments model 115 meter. Please note that this meter is consistent among readings but is not accurate (reads lower than conductivity calibration standard solution). It was used as a field screening tool and for discharge measurements. For real conductivity, see lab report.

Please call if you have any questions about this report.

Ken Nordin, AScT CCEP

1 BACKGROUND

Laberge Environmental Services (LES) was engaged by Access Consulting Group (ACG) on February 10, 2004 to assist in the investigation of fugitive flow from the Galkeno 300 adit. This sampling event was part of a larger project to characterize the flow distribution, quality, and migration of metals laden water draining from the Galkeno 300 adit. Concurrently, plans were being implemented to treat the adit discharge at its source so as to prevent migration of metals to Christal Creek, or to the South McQuesten River.

ACG summarized the sampling events related to the G300 investigation in a January 22, 2004 memo to Bill Dunn, Yukon Government Project manger, Operation and Maintenance of Environmental Control Facilities keno Hill Mining Properties. During sampling events in December and January, ACG established a number of sites for weekly monitoring. LES was asked to help with a monthly sampling event which would include the weekly sample sites as well as receiving water sites further downstream in the system.

Galkeno 300 Receiving Water Sample Sites						
Site #	Site Description					
LES #32	Galkeno 300 adit flow					
ACG-WQ-10	Galkeno 300 fugitive flow at Culvert #5					
Culvert #4	Galkeno 300 fugitive flow at Culvert #4					
Culvert#3	Galkeno 300 fugitive flow at Culvert #3					
Culvert#2	Galkeno 300 fugitive flow at Culvert #2					
ACG-WQ-5	Christal Creek u/s of Keno Hwy and the diversion ditch					
Site A	Christal Creek u/s of the flow path of Culvert #4					
Site C (ACG-WQ-11)	Flow from Culvert #5 just u/s with confluence with Christal Creek					
Site D	Christal Creek d/s Culvert #5 flow but u/s Erickson Cr					
LES 1B	South McQuesten d/s Christal					
LES 7B	Christal Creek @ mouth					
LES 7	Christal Creek u/s Hanson Lake Road Crossing					
LES#1	South McQuesten River u/s Christal Creek					
LES#2	South McQuesten River at Pump House					

The sites selected for the sampling event were as follows:

2 RESULTS

Ken Nordin (LES) prepared for the sampling event and traveled to Elsa on Wednesday, February 18, 2004. R. McIntyre and the caretaker, G. Ewing and sampler J. Germaine were on site as well. The logistics of sampling were discussed. On February 19, Ken met Larry Buyck of the Nacho Nyak Dun (NND) and began the sampling event. The day was spent sampling the South McQuesten River at the pump house, South McQuesten River upstream of Christal Creek, and Christal Creek at the Hanson Lake road. Some time was spent trying to access Christal creek at the mouth. First, an attempt was made to snowmobile down the South McQuesten River from LES #2. This route proved impassable due to deep snow (150 cm) and open water stretched of the river, about 1 km downstream of LES #2. Snowmobiles were stuck and it took some time to retreat from this attempt. The crew then tried to access the mouth of Christal Creek via a summer walking trial, but could not find the correct trail head. Christal Creek was sampled at the Hanson Lake Road.

On Friday, February 20, 2004, Larry Buyck and Ken Nordin were helped by Jeremy Germaine and Grant Ewing. All of the Christal Creek sites were accessed by snowmobile. Each culvert was checked carefully, and a robust flow was detected at Culvert #4, with all of the remaining culverts having no flow. A bioassay sample was collected at Culvert #4.

A second attempt to reach the mouth of Christal Creek was made. The walking trail was found, but proved to be impassable by snowmobiles; even the Summit driven by Mr. Ewing. (The trail was heavily overgrown and too narrow for the machines, which got stuck reputedly. Larry Bucyk lefty the site at 4 PM, and Ken Nordin then accompanied Grant Ewing to the G300 adit and collected a sample from the V notch weir. Ken returned to Laberge on February 20th, and prepared and shipped the samples to Norwest Labs on February 21st. The air waybill (Air North) number was 2870018753. The chain of custody control numbers were W 51511 and W51512.

Snow was deep. There was an average of 140 cm in the McQuesten Valley and about 130 cm in the Christal Creek valley near Keno City. Winter water sampling protocol was followed throughout. Discharge measurements were made using the salt dilution method and by volumetric where possible. One field duplicate sample was collected. One field blank was made using deionized water. The Chain of Custody forms and copy of field notes are attached.

In Situ results and photos follow.

	G300 LES #32	Culvert #4	ACG WQ 5	Site A	Site B	LES 7 KV - 7	Site C	Site D	LES#1 KV-1	LES #2 KV-2
*Specific Conductance (μ̃S/cm)	1536	1521	771	862	846	714	1481	864	389	421
Water Temp. (⁰ C)	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Air Temp. (⁰ C)	-15	-14	-14	-14	-14	-20	-14	-14	-18	-19
Discharge	NM	+- 8 L/SEC	NM	NM	NM	0.18 M3/sec	+- 0.3 L/SEC	NM	2.29 M3/sec	2.24 M3/sec

In Situ Data February 19/20, 2004



South McQuesten at Pump house Pond



Same site looking D/S





Sample site s McQuesten u/s Christal



South McQuesten 1 km d/s KV 1



Field crew. Grant Ewing, Larry Bucyk



Jeremy Germaine at Christal Creek upstream of Hanson Lake road



Jeremy and Larry at Christal Site A



Christal Site A





Christal at Site D



Christal at Site D



Site D flag



ACG WQ5 Christal U/S Hwy



Culvert #3 (dry)



Culvert #2 (dry)



Culvert #4



Culvert #4



Culvert #5, Glacier. No Q through Hwy.



G300 thawing pond footprint



G300 Gen bldg

