

**ASSESSMENT STUDY OF  
WATER AND WASTEWATER SYSTEMS  
AND ASSOCIATED  
WATER MANAGEMENT PRACTICES  
AT ASHCROFT FIRST NATION**

**A  
REPORT  
TO  
INDIAN AND NORTHERN AFFAIRS CANADA  
BC REGION**

** NovaTec Consultants Inc.  
*Environmental Engineers and Scientists***

**October 2002**

**File No.: 1407.10/12**

**Appendix C**  
**Water Testing Results**

**Page(s) 003423 to\à 003435**

**Is(are) under consultation**



Health  
Canada

Santé  
Canada

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AUG 08 2000

Environmental Health Services  
First Nations and Inuit Health  
Suite 202 - 1315 Summit Drive  
Kamloops, BC V2C 5R9

Our File - Notre référence  
Your file    Votre référence

Our file    Notre référence

### WATER SAMPLE REPORT

Ashcroft Indian Band  
P.O. Box 440  
Ashcroft, BC V0K 1A0

Date: August 4, 2000

This report summarizes the bacteriological data pertinent to water sample(s) collected for the dates shown. Recommendations have been made where appropriate. Complete laboratory reports are on file and are available upon request.

s.19(1)

Location	Date	Community Water System	Total Coliform	Fecal Coliform	Remarks
Band Office - kitchen	2000/08/01	CWS	L1	L1	Satisfactory
	2000/08/01	CWS	L1	L1	Satisfactory

L      Indicates less than.  
 EST    Indicates estimated amount.  
 OG      Indicates overgrowth (other non-coliform bacteria interfere with accurate measurements and resampling is normally requested).

### RECOMMENDATIONS:

Both water samples were found to be satisfactory for both total and fecal coliforms. With positive consecutive results for the last three weeks, the boil advisory can now be lifted. If you have any questions regarding these results, please feel free to contact me at (250)851-4830.

*Jenny McMillan* for Ian McLean  
Ian McLean, Sr. EHO, CPHI(C)  
Environmental Health Officer,

cc:

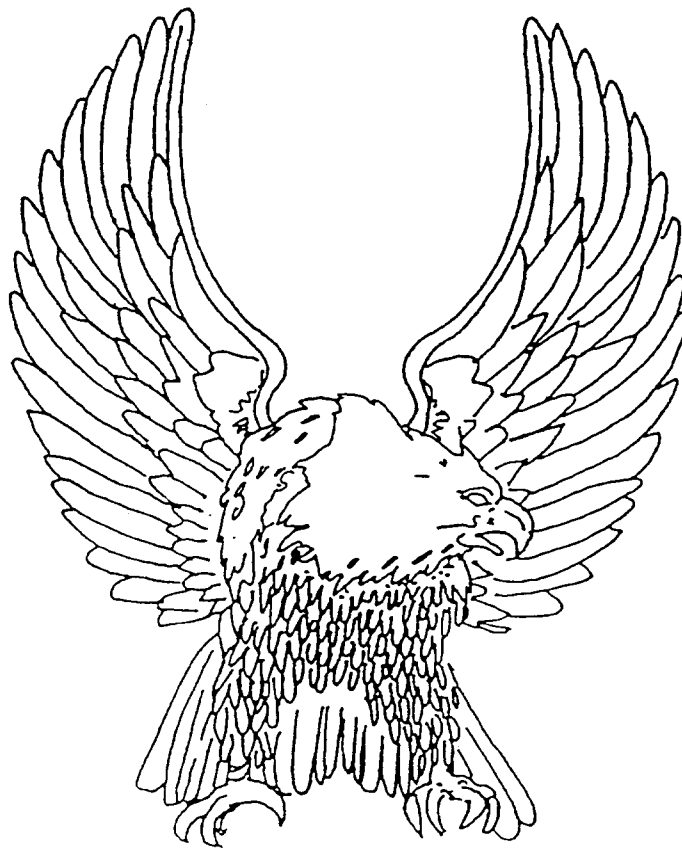
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**Page(s) 003437 to\à 003439**

**Is(are) under consultation**

**ASHCROFT FIRST NATION**  
**New Primary Well Development**

**FEASIBILITY STUDY**



7084307.1 / July 2002

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003440

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## 2.0 EXISTING CONDITIONS AND PROJECTIONS

### 2.1 Existing Conditions

The community's water is supplied by a single drilled well (PW#1), two concrete reservoirs, and distribution system. Typical to the area the water is very hard and of generally poor quality attributable to high levels of dissolved solids, sulfate, and sodium. Details of the water quality can be found in the report prepared by Kala Groundwater, (APPENDIX B). The existing well is located on Certificate of Possession Land. An easement or right-of-way was not acquired at the time of completion of the existing well and distribution system and as a result the well and a large section of the distribution system are located on encumbered land. USL is working with Ashcroft First Nation to establish easements over the encumbered areas of the existing water system. As part of this process USL has contracted Bartell & Fiedrich Land Surveying Inc to provide a legal survey of the proposed right of way through the encumbered areas.

Figure 2 shows the layout of the existing community water system and the main features on IR #2 and IR #4.

The original system built in 1979 consisted of a well, 150 mm diameter ductile iron water mains and a buried concrete reservoir with a storage capacity of 45,000 L (10,000 Igal) with top water level at approximately 526 m. The well has since been abandoned however the water mains and reservoir are still in use.

The current supply was implemented in 1985 when an existing well on I.R. #2 was upgraded and converted to a community supply with a new pump and pitless unit. The well is connected to the distribution system via 100 and 150 mm diameter PVC and ductile iron water main. After recent chemical rehabilitation PW#1 is rated at a capacity of 6.3 L/s. The band administrator reported in May of 2002 that the community has not experienced any water shortages since the well was rehabilitated.

A second buried concrete reservoir with 136,000 L (30,000 Igal) capacity was built in 1987 north of the main village across the Ashcroft Highway with a top water level of approximately 525m. The effective storage capacity of both reservoirs is approximately 163,000 L (36,000 Igal) due to the differing design top water levels.

Associated Electric Services Ltd. last replaced lightning arrestors in July 2001.

There has been some dispute about the projections to be used when forecasting future demand. A flow meter was installed in 1997 close to the community well however due to operational difficulties it has had limited success. A nighttime leak detection survey was performed by Heath Consulting in 2000. The purpose of the survey was to identify accounted for water and unaccounted for water usage, to pinpoint any known leakage within the system, and to assess the accuracy of an existing flowmeter. The study detected only one minor leak that was immediately repaired and reported that the flowmeter readings were out by about 30% (APPENDIX C).

## 2.2 Water Quality and PW#2

The current water quality is a serious concern. Hardness and iron in the water has resulted in the fouling of the pump and screens of the existing well. Water heaters, faucets, and other household fixtures and appliances have suffered from the poor water coming from the existing well. Water heaters have had to be replaced in as little as two years, faucets and other fixtures are wearing out much sooner than they should because of the water quality. This has increased costs for the community as these appliances and fixtures must be replaced. The existing distribution system is also likely suffering from this water. Hydrant flow testing coupled with modelling of the distribution system would give an indication of restrictions present in the water mains that may occur because of the extremely hard water.

Based on the limited testing undertaken so far, the water in PW#2 is better than that in the existing well. However, available testing results (See Appendix B) indicate that the water from PW#2 will require treatment for the following parameters to meet the Guidelines for Canadian Drinking Water Quality (GCDWQ):

- ◆ Iron
- ◆ Hardness
- ◆ Total Dissolved Solids (may be related to iron and hardness)
- ◆ Turbidity (may be related to iron and hardness)
- ◆ Bacteria (unknown extent)

PW#2 is located adjacent to Cornwall Creek (approximately 20m) and is likely fed by water originating within the Cornwall Creek watershed. Treatment of the above constituents is feasible. At this time the exact treatment and/or disinfection processes are unknown. The next phase of testing is required to confirm the best treatment process and system arrangement.

The report: Water Quality Assessment and Objectives for Cornwall Creek Community Watershed – Technical Report (Ministry of Environment, Lands and Parks, February 2001) outlines the current status of the watershed, present concerns, and recommendations for future watershed monitoring and protection. This report notes that coliform (total coliform, fecal coliform, and E. coli) values are very high throughout this watershed, regularly exceeding water quality guidelines.

**KALA GROUNDWATER CONSULTING LTD.**

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August 29, 2001

**REPORT OF FINDINGS:**

**ASHCROFT INDIAN BAND  
GROUNDWATER SUPPLY INVESTIGATION  
CPMS#3920  
IR#2 AND IR#4, ASHCROFT, BC**

Report Prepared for:  
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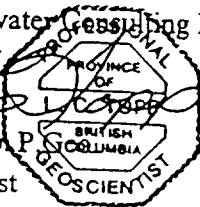
*Attn: Elizabeth Sigalet, P.Eng.*  
Kala Reference: R00313-0829

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Distribution:      1 Copies - Urban Systems Ltd.  
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                         Kamloops/Vernon

PJB/lct/pf/lb/00313/R00313-0829

## REPORT SUMMARY

Kala Groundwater Consulting Ltd. (Kala) was retained by Urban Systems Ltd. (USL) on behalf of the Ashcroft Indian Band (AIB) of Ashcroft, BC to evaluate groundwater resources and develop a new groundwater supply well within Ashcroft IR#2 and IR#4, 5 km southwest of Ashcroft, BC. The objective of the investigation was to develop and evaluate a new groundwater supply well, based on information collected by Kala and qualified subcontractors. Groundwater samples were collected from existing wells at the completion of the drawdown portion of the yield tests for detailed chemical, radiological and bacteriological analysis. In addition to the groundwater supply investigation, existing supply well PW#1 was repaired and chemically rehabilitated. This report presents the findings of a groundwater supply investigation undertaken between December 2000 and July 2001. This project consisted of two fieldwork phases, the evaluation of accessible existing water wells within IR#2 and IR#4 and the chemical rehabilitation of PW#1 within IR#2 between December 2000 and February 2001, and the completion of a test and production well drilling program within IR#4 between March and July 2001.

USL provides planning and engineering services to the AIB. IR#4 is located approximately 5 km southwest of Ashcroft, BC, along the east side of Highway 1. The IR#2 and IR#4 communities abound each other and are provided water via a single existing groundwater supply well (PW#1) and a small spring located within IR#2. The well, completed in 1983 under the supervision of Kala, is 150 mm diameter and 35.0 m in depth. The groundwater quality is poor with elevated mineralization and hardness. USL reported the per capita band member water demand as high as 2,200 L/d. Onsite sewage disposal occurs via individual domestic septic tanks and tile fields. The groundwater quality from PW#1 does not meet SGCDWQ-2001 standards and is not treated or disinfected. Band members report taste, staining and odour problems associated with the current groundwater source, PW#1. The current program was undertaken to establish whether better quality groundwater could be sourced from other areas within Ashcroft IR#2 and IR#4, and also to construct a second water well to supply increasing community demands. The scope of services included but was not limited to the following tasks and/or items:

- a) Groundwater potential evaluation and well citing;
- b) Pumping test evaluation of existing on reserve water wells;
- c) Construction supervision of one groundwater test well within IR#4;
- d) Based on the findings of testwell drilling construct one new production well;
- e) Monitoring of yield tests on completed testwells;
- f) Groundwater sampling and analysis for the determination of chemical, radiological and bacteriological quality; and
- g) Covering report with interpretation, location and layout diagrams.

During the evaluation of PW#1 (during item b) it was determined that the well was suffering from excessive iron and carbonate encrustation of the well screens. Subsequently it was determined that in addition to the well fouling the installed submersible pump was damaged beyond repair. A well repair and rehabilitation program was initiated. The following salient conclusions and recommendations are provided for client and owner consideration:

- a) Existing groundwater supply well PW#1 was successfully rehabilitated using an acid and shock chlorination procedure. PW#1 is now capable of a sustained yield of 6.3 L/s, up from less than 2.0 L/s prior to rehabilitation. PW#1 water quality is very hard and highly mineralized with elevated concentrations of hardness, total dissolved solids, sulphate, colour, turbidity, iron and manganese.

## REPORT SUMMARY - CONTINUED

- b) The new groundwater supply well is completed within the Cornwall Creek valley approximately 300 m southwest of the band hall. PW#2 is completed to 41.8 m below surface within a medium sand semi-confined aquifer, which is recharged by the easterly Veneables Valley area with some recharge occurring from the Boston Flats area north of the site. PW#2 will yield a sustainable 10.0 L/s. The approximate pumping level for PW#2 at 10.0 L/s will be approximately 7.1 m bgs.
- c) The groundwater quality at PW#2 complies with the SGCDWQ-2001 with the exception of TDS, turbidity, colour and total iron concentrations. The water quality at PW#2, while hard and mineralized is considerably better than PW#1. The groundwater is hard and mineralized, but lower in dissolved mineralization and hardness than PW#1. In general, better water quality may be expected from PW#2 than PW#1. Retesting of PW#2 is required.
- d) Elevated turbidity concentrations, due to insufficient well development or natural colloidal materials within the aquifer has impacted water quality findings. Total metals concentrations are impacted by elevated turbidity.
- e) There are no existing or current sources of wellhead contamination within 100 m of PW#2.
- f) Based on considerable groundwater monitoring by Wastech Industries Ltd. and agents, pertinent to the existing Cache Creek Landfill site, leachate impacts to groundwater have not been detected. Vigilant and continuous monitoring of local groundwater quality both during landfill operations and post closure is required. The potential development of a proposed landfill upgradient (west) of Ashcroft IR#4 must involve a detailed understanding of existing groundwater conditions and preservation of groundwater quality.
- g) The new PW#2 requires retesting in accordance with Health Canada guidelines. Kala recommends a second yield test for a minimum 8 hour period at a flowrate of not less than 10.0 L/s. Field measurements of target parameters should be undertaken. Water samples would not be collected until field instrumentation indicated a turbidity concentration of less than 0.5 NTU. Sampling and analytical retesting of elevated parameters should be undertaken. Class C costs are provided under separate cover.
- h) The completion of tile fields within a 100 m radius of the new wellhead should be reviewed by Kala to provide wellhead protection considerations.
- i) Vigilant monitoring is required to ensure potability of the groundwater supply. Currently groundwater disinfection is not required, however the need for disinfection should be based on regular sampling and bacteriological analysis. The two water wells are relatively shallow and agricultural or anthropogenic alterations in the basin may modify the groundwater quality.
- j) The AIB should request that additional groundwater monitoring wells be constructed within the northwest corner of IR#4 and monitored on a quarterly basis by Wastech Industries Ltd. The proposed well would serve as a predictive risk sampling location. If Wastech Industries Ltd. proposes development of the Ashcroft Ranch property as a new landfill, wellhead protection considerations for the new groundwater supply wells must be reviewed in detail.
- k) The AIB should endorse an active role in any stakeholders meetings and environmental steering committees regarding the proposed Ashcroft Ranch landfill site as this development may impact the groundwater quality of PW#2.

This report must be used in its entirety. Detailed conclusions and recommendations are provided within the report. Class C costs to address recommendations are provided under separate cover.

<b>Table 11 – Water Quality Comparison - PW#1 &amp; PW#2</b>				
<b>Parameter</b>	<b>Units</b>	<b>PW#1</b>	<b>PW#2</b>	<b>SGCDWQ*</b>
Hardness	mg/L	1120	505	500
Total dissolved solids	mg/L	1720	870	500
Total/(dissolved) iron	mg/L	0.49 (0.06)	0.449 (0.06)	0.3
Turbidity	NTU	2.0	8.1	1.0
Colour	Units	5	15	5
Antimony	mg/L	<0.02	<0.02	0.006**
Uranium	mg/L	<0.07	<0.07	0.02**

NOTES: \* Summary of Guidelines for Canadian Drinking Water Quality, March 2001.

**BOLD** exceeds SGCDWQ-2001 AO or MAC

\*\* Detection limit too coarse, retesting.