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July 23, 2003
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RE: Resolute Bay Utilidor Assessment

Dear Mr. Slifka;

The purpose of this report is to provide additional information on the Utilidor System in Resolute Bay, specifically cost estimates of the suggested repairs and a review of Michel Caron's memos of July 17/03 and July 18/03 along with some data received from the Hamlet on a year to date water delivery report.

Hamlet Water Delivery Report

This indicates that water use (typical of last three months only) is as follows:

Narwhal	2,310 Igal/day	(airport?)
Commercial users	1,790 Igal/day	
Economic Rate Users	2,830 Igal/day	
<u>Private Residence Users</u>	<u>1,490 Igal/day</u>	
Total	8,420 Igal/day	

If the above is correct, airport water use is significantly less then assumed in our original report. This would mean that consumption is less then stated in our report and bleeder rates and leaking are higher.

Population and Consumption Projections

The above changes slightly Michel Caron's July 18 report about Population and Consumption Projection in Resolute Bay.

Dillon did not report any water use by the airport. It was our understanding that the airport had a separate system in 1997. So bleeder rates may be higher in the Dillon report then shown. Similarly, in the ADWE 2003 report bleeder rates may also be higher.

This does not affect the main conclusion of the tables in that; if bleeders and leaks are reduced to 22,176 Igal/day, then total water use should be reduced to less then 40,000 Igal. /day.

The boiler system at Char Lake will be adequate in size to heat the water in the wet well to 10°C as long as the total water use is kept below 55,000 lgal/day. Therefore, a new boiler at Char Lake will not be required.

Statement of Work

Michel Caron's memo of July 17 provides a statement of work for the Resolute Bay system. This was revised by his report of July 22. We comment on the Technical Service reports as follows:

	ADWE Commentary	Construction Cost
Utilidor System		
1.-5. Main water line to be fixed AV5-6 42m AV9-10 46m AV27-28 70m plus change elbow to long radius elbow AV27 change joint	To be fixed using pipe supplied by the community. We have also allowed for repairing the utilidor between AV8 – 9 which is a 30m section. The condition of this section is unknown	\$133,000
	To purchase new pipe and ship it to Resolute to replace pipe used in repairs	\$50,600
6. All vaults to be set up, cleaned properly and covered properly.	Most manholes are in good shape. Some insulated manhole covers need to be fixed. This item is not expected to require a large effort, 4 man-hours per manhole are assumed.	\$7,500
7. Repair Lateral Pipes.	This item is done by homeowner. New saddles are carried in item 1.	
8. Reduce bleed line rates to about 3.5 gpm per bleeder and a total of 7 bleeders.	This should be done by O&M and should not be contracted out.	

	ADWE Commentary	Construction Cost
Char Lake Pumphouse		
9. Char Lake Building Wall insulation to be upgraded.	Roof and wall area of about 2,000 sqft at \$20/sqft	\$40,000
10. Make sure the ceiling fan works properly.	ADWE is unaware of any problems with the fan. It is manually controlled off in the winter and on in the summer	
11./17. Maintain the boiler and burners. Add a new low water cut-off to the boilers.	Tear down boilers, clean all surfaces, and tune the burners.	\$2,000
12. Make the unit heaters work properly.	Our analysis concluded that the unit heaters did not work correctly due to low flow rates and low entering water temperatures. This will be partly corrected by reducing water production rates and further improved by installing new circulation pumps to increase flow rate in the heating loop.	\$19,000
13. Set up new boiler (relocated existing boiler from Carmartatig School) to heat the Char Lake Building.	If the bleeders are reduced as indicated then the installation of this boiler is superfluous.	\$19,000
14. Remove valve on oil return line from boilers.		\$100
15. Change relief valves on boiler so that they are individually piped rather than in a common pipe.		\$2,000
16. Install a glycol feed system.	Provide an Axiom glycol feed system. No electrical is needed as it is merely plugged in to operate.	\$2,000

	ADWE Commentary	Construction Cost
19. Remove the existing Superhot heat exchangers and install a new flat plate heat exchanger to heat wet well c/w a 60gpm boiler circulation pump to maintain 10C in wet well.		\$19,000
Char to Signal Hill Pipeline		
No changes recommended.	Ensure heat trace is shut off with lower flow rates and higher wet well temperatures. Operate system on one jockey pump if possible.	
Signal Hill Reservoir		
11./17. Maintain the boiler and burners. Add a new low water cut-off to the boilers.	Tear down boilers, clean all surfaces, and tune the burners.	\$2,000
15. Change relief vales on boiler so that they are individually piped rather than in a common pipe.		\$2,000
16. Install a glycol feed system.	Provide an Axiom glycol feed system. No electrical is needed as it is merely plugged in to operate.	\$2,000
19. Remove the existing Superhot heat exchangers and repipe the system to properly supply the existing flat plate heat exchanger to heat wet well c/w a 60 gpm boiler circulation.		\$19,000
Construction Total		\$317,200

Engineering		
Site Condition Survey and Report	Fees: \$8,000 Disbursements: \$3,300	\$11,300
Prepare Drawings and Specifications	Fees: \$15,000 Disbursements: \$2,000	\$17,000
Construction Services	Fees: \$5,000 Disbursements: \$ 150	\$5,150
Site Review (one trip)	Fees: \$3,000 Disbursements: \$3,500	\$6,500
Engineering Total		\$39,950
Construction and Engineering Total		\$357,150
Contingency	20%	\$71,430
Grand Total		\$428,580

We understand that the utilidor repairs need to be done in the next few months, prior to winter setting in. Similarly, the boilers and heating system changes need to be done immediately.

A few items need to be ordered immediately so that they can be shipped to Resolute Bay. Note, the last day for receipt of materials at Montreal is August 2. The following items could be purchased in time:

- 12-50' lengths of 8" diameter 2" thick insulated water pipe to replace water pipe being used in the repairs.
- 2 Glycol fill stations.

Complete drawings and specifications will take 2 to 4 weeks to complete.

It is unlikely that an insulation system for the Char Lake pumphouse can be specified in time to be supplied on the boat. A decision will need to be made as to whether to fly the material in this year or do this project next year.

All other materials including new pumps, piping, heat exchangers, burners, fittings will need to be flown in to facilitate doing the work this year.

The extent of Engineering will need to be minimized in order to minimize the time it will take to produce tenderable drawings. It would be preferred to negotiate the contract with one of the local Contractors in Iqaluit. If this is possible, it would allow the Contractor to begin pricing and ordering materials prior to the completion of drawings.

Sincerely,
A.D. Williams Engineering Inc.

Brian George, P.Eng.
Senior Mechanical Engineer