NWB

Northwest Territories Municipal and Community Affairs

P.O. Box 2376 **Cambridge Bay, NT** **X0E 0C0**

The Mayor and Council
Hamlet of Kugluktuk
General Delivery
Kugluktuk, NT
X0E 0E0

Attention: Mayor Stanley Anablak

KUGLUKTUK WATER SYSTEM MODIFICATIONS

Attached for your information is a proposed plan of action for the Kugluktuk Water Supply System. The attachment is self-explanatory. However, The Regional Superintendent of MACA, Doug Crossley, the Consultant, and I plan a visit to Kugluktuk to answer any questions Council may have. The tentative date for the visit is: August 31, 1998 or September 14, 1998 to allow Council time to review the material. We request to appear as a delegation at a regular Council meeting, so that we do not disrupt the individual schedules of members of Council. Our work schedules and travel plans favour an August 31, 1998 visit. Please let me know which of the two dates above is suitable for Council.

To avert any difficulties the impending Division of the Territories may pose, the Regional Office will make a formal request to the Minister of Municipal and Community Affairs for a special permission to carry over the unused funds forward to the 1999/00 construction season to complete the project.

Please call me at 1-800-919-1117 or 867-983-7269, if there are any questions.

Sincerely,

Kojo O. Kumi, P.Eng.
Municipal Planning Engineer

cc: Doug Crossley, Regional Superintendent, MACA, Cambridge Bay, NT
Ted McGuire, P.Eng., Project Officer, PW&S, Cambridge Bay, NT
Al Shevkenek, P.Eng. Manager, Capital Programs, MACA, Yellowknife, NT

WATER SYSTEM MODIFICATIONS
Kugluktuk, NWT

August 14, 1998

STATUS:

The Raised Intake Structure is not viable, therefore the following will be implemented: Construction of an Earthen Reservoir; Installation of an RTOH2O Cartridge Filter System; and Repairs and Upgrade of the Existing Water Supply and Distribution System. The construction of the reservoir is differed to the 1999/00 construction season as the 1998/99 season is almost over. As the remainder of the 1998/99 construction season permits, the installation and/or construction of the RTOH2O Cartridge Filter System and items listed under Repairs/Upgrade to Existing System will be undertaken., as applicable.

SALINITY:

Recommendation is for the construction of an earthen dyke reservoir in town to store a 10 day supply of fresh water for distribution during a salt intrusion event. The Estimated Cost for the reservoir is Three Hundred Thousand Dollars ($300,000.00). *The working volume will be 3,000,000 litres. Steel tanks of sufficient volume would be millions of dollars so this option has been discarded (Intake Design Concept Brief - 60% Draft Submission; Page 22, paragraph 5).* This will be a supplement to the Current Water Intake Practices which will be maintained and enhanced as needed.

TURBIDITY:

Recommendation is to install an RTOH2O Cartridge Filter System to resolve the turbidity problem. The installation of an RTOH2O Cartridge Filter System will reduce the turbidity to the requirements of the Canadian Drinking Water Guidelines. Estimated capital cost for the system is One Hundred and Twenty Thousand Dollars ($120,000.00; *includes Building Envelope, Lighting, Mechanical, Engineering and Contingency).*

Diavik and BHP use such a system in their respective mining camps. At BHP's Ekati Mine, the Cartridge Filter System supplies water at the rate of 425 lpcd (lpcd -> litres per capita per day) to the residents of the camp (the population is estimated at 1000).

At MACA's recommended consumption rate of 90 lpcd in a community with trucked service, an identical unit will provide enough treated water for at least 4500 people every day.

REPAIRS/UPGRADE TO EXISTING SYSTEM

MECHANICAL:

Intake (Primary) Pumphouse

- Pipe support (Intake Pumphouse) brackets and anchors were noted to have failed due to the pumphouse building movement/settlement on the clay bed. Repair as required.
- Install Remote Indicator - for salinity detection alarm - in the Water Treatment Plant (Distribution Pumphouse)
- Install a Ventilation System in the Intake Pumphouse to reduce humidity - 3 to 6 air changes per hour is suggested.

- Decommission the Secondary Intake Pumphouse and install the equipment in the Intake Pumphouse and enhance the Intake piping of the Secoindary Pump.

- Install a Fire Extinguisher in the Intake Pumphouse for initial Fire Protection.

ELECTRICAL:

Intake (Primary) Pumphouse

- Relocate the 600 V heater switch to the opposite wall adjacent to the heater itself. The adjacent transformer primary switch could be located several inches to the left (when facing) allowing the branch circuit panel to be relocated to the space previously occupied by the two switches. This would allow minimal movement of the panel, which is the most difficult to move from an electrical point of view.

  The heat trace controllers should be relocated to the adjacent wall next to the compressor starters.

- Add a second ground rod plus a completely new ground conductor. The Canadian Electrical Code requires that ground electrode conductors be free of splice.

- Provide flexible conduit on the pump conductors to a box which is fastened to the intake casing, with the splices being made in this box. Remove and replace the pump receptacles with junction boxes with a hardwired connection in Teck cable or liquid-tight flex made between the box on the pump casing and receptacle junction box. This will allow the splices to be removed from the box when the pumps are required to be pulled out yet provides some mechanical protection for the pump conductors. Grommets or bushings should be provided where cables pass through the pump casing.

- Provide Cold lead kits on the heat trace cables with terminators made in a junction box attached to the pump casing. Remove and replace the heat trace receptacles with junction boxes with a hardwired connection in Teck cable or liquid-tight flex made between the box on the pump casing and the former receptacle junction box. This will allow the splices to be removed from the box when the pumps are required to be pulled. Grommets or bushings should be provided where heat trace cables pass through the pump casing.

- Repair or replace the main utilidor supports to mitigate and/or release strain on the service conductors.

(WATER TREATMENT BUILDING)DISTRIBUTION PUMPHOUSE AND TRUCKFILL FACILITY

- Excessive surface corrosion is present on all mechanical surfaces. This building should be ventilated in order to limit humidity levels as outlined within the applicable ASHRAE standards and the requirements of the Canadian Electrical Code (1994).

- The existing HYDRO THERM boilers have reached the end of there useful life and should be replaced.

- The boiler breaching is severely corroded and should be replaced.

- The S.A ARMSTRONG heat exchangers within the Domestic Water Holding Tanks are single walled heat exchangers only. In the event of a tube failure, propylene glycol will be introduced into the Domestic Water supply. This is contrary to the requirements of the Canadian Plumbing Code of Canada (1995). The heat exchangers should be replaced with double walled heat exchangers as per current practice.

- The exterior fuel oil tank serving the water treatment plant is not ULC listed and should be replaced as outlined within CSA B-139.

- The exterior fuel oil tank does not have a level gauge. This is contrary to the requirements of CSA B-139. This item should be provided.

- The exterior fuel oil tank is mounted on a combustible base. This is contrary to the requirements of the Office of the NWT Fire Marshal.

- The piping insulation on the heating water piping located within this building is either damaged or non-existent. Insulation should be provided to minimize stand-by heat losses and prevent injury.

- The thermostats for the overhead unit heaters have failed and should be replaced.

- An actuator serving a heat exchanger control valve has been removed. Therefore in lieu of the water being heated to 7 degrees Celsius it is heated to 16 degrees Celsius. This is a waste of energy. This component should be replaced.

- The boiler aquastats are set at a higher temperature than the incoming jacket water from the N.T.P.C. power plant. In order to fully utilize the capacity of the power plant waste heat, the boiler should be removed and placed on the primary side of the heating system. This will ensure that reheating of the power plant heating water will occur only when it is needed. It will also ensure that the stand-by losses that are occurring as a result of the boilers "seeing" the full flow of the heating system at all times, will be reduced.

- Presently the Domestic Water storage tanks are being vented into the building. This has led to excessive humidity levels and extensive surface corrosion. An ice build-up was observed underneath of the building insulation layer. The tanks should be vented to the exterior to prevent this reoccurrence.

- The existing Domestic Water storage tanks are Galvanized steel. The acceptability of this item will be reviewed with the Kitikmeot Board of Health for possible revisions.

- The abandoned Domestic Water piping that once served the Health Centre and the School should be removed.

- Provide a remote salinity detection alarm within this facility from the Primary Pumphouse.

N.T.P.C.(NORTWEST TERRITORIES POWER CORPORATION) POWER PLANT

- Balancing valves should be placed on the waste heat recovery system in order to ensure that the Hot Water flow to the heat exchanger is maximized.

- The existing Plate exchanger, piping, pumps, and associated trim should be replaced in order to increase the available heating supply to the Water Treatment Plant.

- Insulate all heating water piping and equipment with a minimum of 38mm thick Insulation to minimize losses and maximize efficiency. The insulation of all heating water piping will minimize the heat being lost through convective heat transfer.

- Provide Energy Totalization Meters on the Waste Heat Hot Water. The provision of an Energy Totalization Meter will permit the Waste Heat Recovery System Users to fine tune their operating protocol based upon energy usage.

- Remove potential "fouling" and "scale" from Heat Exchanger Plates. This will help to increase the effectiveness of the conductive heat transfer.