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REPORT ON WATER SUPPLIES & WASTES DISPOSAL

CLYDE RIVER, N.W.T.

November 29, 1976
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Regional Engineer

Report re Water Supplies and Wastes Disposal
Clyde River, N.W.T.

Clyde River is located 460 miles north of Frobisher Bay, on the east shore of Baffin Island, on the north shore of Clyde Inlet, and at the end of a bay.

It is situated on a south-facing slope that rises gradually to over 500 ft. The townsite itself occupies a shallow gravel ridge 10 to 30 ft above high tide, and lying 500 to 1000 ft from the shore. The bedrock is precambrian crystalline shield mantelled with a thin veneer of glacial till. The land has been submerged to 50 to 60 meters depth and in consequence, there are lacustrine deposits of unconsolidated sand and gravel. The shallowness of the permafrost causes poor natural drainage of the countryside.

The weather is often clear and pleasant, but there are week long periods of fog in summer when aircraft cannot land, partly because the airstrip traverses the prevailing wind direction. There are blizzards in winter which last as long as a week when windspeeds approach 50 mph, and visibility is almost nil.

The original settlement was established in 1922 when the HBC constructed a trading post across the bay, a half mile distant by water. It was moved to the present site during the years of 1967-70. The only remaining buildings are those of the weather station, which are to be moved during the winter of 1976-77.

The economy depends mainly on welfare, Eskimo handicraft, service jobs and hunting and fishing. The animals of primary importance are ringed seal, polar bear and arctic char. Of lesser importance are arctic fox and caribou. The population is 400, and it has been growing recently at approximately 12% per year.

Water Supply

The source of water is a lake a half mile inland from the settlement, at an elevation of 400 to 500 ft. The lake is fed from a series of lakes and streams further inland which is not on a hunters and trappers route.

Water is hauled by means of an International six-wheel-drive truck mounted with a 1000 imp gal tank. A gas engine-driven Wisconsin pump is contained in a compartment behind the tank. The pump is used for both moving water from the lake to the truck tank, and for delivering it to the storage tanks of the residences.

The water delivery hose is wound manually on a reel in the pump compartment. It is dragged on the ground while making deliveries, and it is almost impossible to avoid doing so. Between deliveries the nozzel is laid on the hose.

The water is chlorinated using Javex. At the time of the examination a feedback of 3 oz per 1000 gal was satisfactory. That is equivalent to 1 mg/ proportion, and it resulted in a 0.4 mg/ free residual after 15 minutes.

Discussion re Water Supply

The water is clear, soft and low in dissolved salts. It is slightly corrosive and has a low chlorine demand, and no adverse taste is produced by satisfactory chlorination.

The water in the source lake is subject to minor unavoidable contamination by the water truck and operator.

In summer the suction hose is left lying on the shore with the inlet end satisfactorily submerged. Operation could be improved by supporting the hose on a tripod frame with the outlet hanging at a level convenient for the operator when he connects it to the pump.

In winter the storage of the suction hose usually results in its contamination, however it was not possible to observe this operation at the time of the visit.

Wastes

In this community wastes are collected in a variety of ways. In some residences the plastic toilet bags are collected in the washrooms or in the houses beside the outside doorway. In other cases the householders prefer to leave these bags outside in half 45 gal oil barrels. Garbage is stored outside in 45 gal oil barrels.

Garbage and toilet bags are hauled to the disposal site in barrels on a open box trailer pulled by a John Deer tractor. The disposal site a half mile by road from the settlement. It is on one side of a small valley through which a small stream flows occasionally. It is a good site for the purpose, however the garbage is spread around too much.

Discussion of Wastes Disposal

The discharge of wash water beside all buildings presents a critical public health problem, because it contains human wastes such as diaper washings. People and dogs track through the puddles in summer and over the ice mounds in winter. There is negligible seepage of wastes into the soil, and the excessive runoff water provides a vehicle to spread germs around the settlement.

A sewage haulage truck will be arriving on the supply ship. There will be no garage for parking the haulage truck other than in the garage for the water haulage truck. The two trucks should not be parked together, but it will be necessary this winter if there is to be haulage of sewage.

Unfortunately there will be a public health hazard resulting from the inadvertent spillage of liquid wastes resulting from (1) occasional overflowing of the sewage collection tanks, (2) transfer of the sewage to the haulage truck and (3) from the haulage truck during travel.

The use of half barrels to contain the sewage bags is not as good a system as keeping the bags inside the houses until they are hauled away. One can witness the cleaner conditions outside the homes where this is the practice. This method of storage does pose problems, including an invasion of privacy, but with local planning the most objectionable features can be overcome. In those communities where the half barrels are used for the storage of the toilet bags, the bags become broken and frozen, both those that are in the half barrels and the extra ones that are placed directly on the ground. This is a serious public health problem.

A considerable improvement in the handling and haulage of garbage and sewage bags could be effected by the use of plasticized paper garbage bags at all houses. The use of these bags is discussed on page 30 of the Sanitation Manual for Isolated Regions. Toilet bags would not need to be changed daily by the workmen, but rather they could be changed as desired by the householders. The full bags could be tied tightly, and carefully deposited upright in the garbage bags. Large pieces of burnable trash should be discarded separately.

The plasticized paper bags should be hung outside in protective frames as shown in the photo of the Sanitation Manual, page 30.

The use of these garbage bags reduces the amount of trash that is blown (1) out of the storage barrels, (2) off the haulage truck and (3) away from the disposal site.

Kuluak School

The school serves 151 students in grades kindergarten to eight.

The water supply consists of a 1160 imp gal (13 ft 8 in x 3 ft 7 in x 3 ft x 10 in deep) stainless steel tank and a pressure distribution system.

The only way that this tank can be cleaned of the sediment that is inadvertently admitted with the filling, is for someone to climb inside and wash it. This is an insanitary method of cleaning the tank. The best method is to flush out the tank by hosing it down and draining it. The tank may be hosed by way of the manhole. In order to drain the tank it should be tilted towards one corner and provided with an under drain at that point. See the Sanitation Manual for Isolated Regions, Sixth Edition, page 16.

The gasketted cover on the manhole is satisfactory. The 6 in flanged steel pipe opening for filling the tank requires a cover to prevent the entrance of dust. See Sanitation Manual, page 16.

In the portable classroom No. 404, the 250 gal tank is an oval shape, standing on the oval edge. The tank should be tilted towards one end and fitted with an underdrain. A manhole should be cut, and a cover should be provided. The cover should overlap the manhole a minimum of one inch on all sides. It should be hinged so that it will

not be set on the ground.

In portable classrooms Nos. 403 and 402, there are 165 imp gal (5 ft 5 in x 2 ft 6 in x 2 ft deep) stainless steel tanks set near the ceiling. Each should be tilted towards one corner and fitted with an underdrain for simple cleaning. In each case the manhole would need to be located on the side near the top; it would need to be gasketted. Alternatively the tank could be set on one end beside the pump. It is surprising that pumps are provided, because the water is used in each classroom in two basins only; and it would flow to these by gravity.

Community Planning

This community is located on a good site for a long range plan. However the existing plan for this community does not take into consideration the long range needs of this community. As a result of this evident short-sighted planning, the community is not being planned with an understanding of the faults which will soon become obvious.

It is certain that difficult public health problems will result from further poor community planning and will be compounded year by year. The main public health problems are (1) the poor handling and inadequacy of a hauled water systems, (2) the spillage of wastewater directly on the ground at so many residences, and (3) the inevitable poor handling of sewage in household sewage tanks and haulage tanks. The extent to which the people ingest germs of human intestinal origin was demonstrated a few years ago when there was a high incidence of infectious hepatitis.

Another example of the poor planning is the school being hemmed in by buildings so that the playground has shrunk. There should be an open sports ground at a school that is large enough to play soccer, football, and baseball. These sports are popular in Greenland in those communities in the Northwest Territories where they have the facilities and have tried them.

Summary of Recommendations

1. In order to reduce the contamination of the water while loading the haulage tank, the delivery end of the suction hose should be mounted above ground. It should be suspended in a position so that it is handy for the operator to insert into the haulage tank with a minimum amount of handling.

2. In order to reduce the contamination during delivery, the delivery hose should be dragged on the ground as little as possible, and the nozzel supported on a hook so that it touches neither the hose nor the floor of the pump compartment. A power-driven hose reel would result in less dragging of the hose.

3. In future all household water reservoirs should be constructed according to the suggestions in the Sanitation Manual for Isolated Regions.

4. In order to be assured that the delivered water is safe for drinking, it should be chlorinated. Mr. R. Goulet, E.H.O., Department of National Health and Welfare, Frobisher Bay, is available to provide individual instructions.

5. In order to improve sanitation and decrease the cost of haulage, plasticized paper garbage bags, such as are used in Greenland and the northern European countries, should be used.

6. The wastes disposal area should be improved by segregation of the burnable materials, the ordinary garbage and the large metal objects. The garbage should be covered at intervals as illustrated in the Sanitation Manual, page 34.

7. The community should be planned so that it will be practical to provide piped water and sewer systems when funds are available for this purpose. The plan should include a large playground, suitable for playing such games as soccer, football, and baseball. Such fields are common in Greenland communities where field games are considered to be one of the important methods of bridging the gaps in understanding among the different groups - the newcomers, the seasoned Kabloonas and the Inuit.

Appreciation

The following people in Clyde River were helpful in providing information for this report.

Mr. Tom Enuavaq, Chairman of Council & Teaching Assistant
Mr. Wolfe Cormier, Manager, DPW Maintenance
Miss June Steinkey, Nurse, Acting Nurse in Charge, Nursing Station
Mr. John McPherson, Principal, School

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Chemical Analysis
Water Supply Lake, Clyde River, N.W.T.

Date of Sampling	8 March 74	1 July 76
Date of Analysis	12 Aug. 74	15 July 76
pH	6.8	7.3*
Total hardness (as Ca CO_3)	40	15
Alkalinity (as Ca CO_3)	30	
Total Iron	0.04	0.12
Nitrate Nitrogen	<0.1	<0.1
Sulfate	trace	
Chloride	5	
Fluoride	<0.1	<0.1
Total dissolved solids	42	22
Loss on ignition	19	10
Sampled by	J. Grainge	R. Goulet
Laboratory	EPS, Edmonton	Ontario Ministry of Health, Toronto

* Values are in pH units. All other values are milligrams per litre (parts per million).