photo: www.archbould.com

Yukon Energy

Rural Generating Facilities

photo: Yukon Energy

YUKON ENERGY

Yukon Energy's Rural Facilities

Yukon Energy has three hydro plants—one at Whitehorse on the Yukon River, one located at Aishihik Lake and one in Mayo in the central Yukon. Together, the facilities have the ability to generate 75 megawatts (75 million watts) of power.

This brochure provides information about Yukon Energy's operations outside of Whitehorse. Please see our companion brochure "Yukon Energy's Whitehorse Generating Facilities" to learn more about our operations in the Yukon's capital.

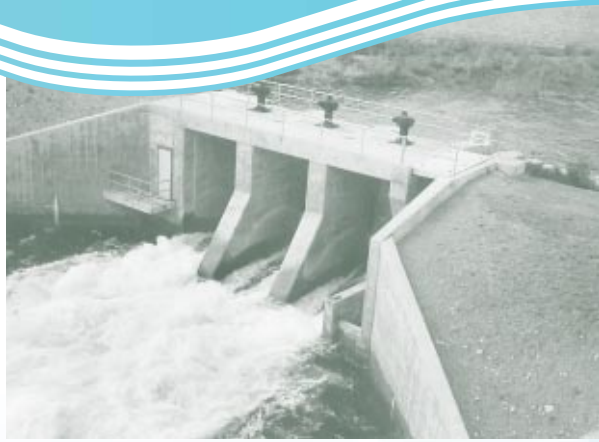

photo: **Yukon Energy**

photo: **www.archbould.com**

top to bottom
Aishihik Lake control structure;
a section of the Mayo to Dawson transmission line;
insulators on the Mayo/Dawson line

photo: **www.archbould.com**

photo: **Derek Crowe**

photo: **Derek Crowe**

The Aishihik Facility

Our Aishihik plant is located about 110 kilometres northwest of Whitehorse. The Northern Canada Power Commission built the Aishihik hydro station in 1975 at a cost of $42 million, and was taken over by Yukon Energy in 1987.

The Aishihik plant was needed to serve the growing electrical demands of Whitehorse and of a large lead-zinc mine at Faro in the central Yukon. The facility can produce 30 megawatts (30 million watts) of power. That's enough to light up half a million 60 watt light bulbs, or supply about 10,000 homes with electricity. Aishihik annually produces about 25 percent of the total energy generated on Yukon Energy's Whitehorse-Aishihik-Faro electricity grid.

The Aishihik plant is extremely important to Yukon Energy's operations. Although the 40-megawatt Whitehorse Rapids hydro facility is larger than Aishihik, the effective capacity of the Whitehorse plan is reduced by about half during the coldest months of the year because of reduced water flows on the Yukon River. Aishihik is the only hydroelectric facility in the Yukon that can store energy in the summer when demand is low, to be used in the winter when demand is high. It can also store energy during wet years, to be used in dry years when the levels of the lake water are lower.

An interesting fact about this facility is that it is located 110 metres underground! It is the first underground power plant north of the 60th parallel in the western world.

Because of its underground location, some special safety features are built in to the facility that will keep people safe and allow them to escape from the plant in the event of an emergency. A safe room, known as the Surge Chamber, has a supply of food, water, blankets, first aid supplies and a telephone. There are also life jackets, hip waders, breathing devices and an inflatable raft that is assembled and ready to lower into the water going through the tailrace, a tunnel that allows water that's passed through the turbines to flow into the West Aishihik River. The one and a half kilometre long tailrace will carry people back above ground to safety.

photo: **Derek Crowe**

above left to right
soldering in the by-pass tunnel; surge chamber with raft

right
buffalo along the bank of the Aishihik power canal

photo: **Derek Crowe**

photo: **Derek Crowe**

photo: **Yukon Energy**

Components of Aishihik's Generating Facility

Water Storage

The Aishihik plant uses natural water storage in nearby Sekulmun, Aishihik and Canyon Lakes. Water storage is regulated by two control structures, one at the outlet of Aishihik Lake and the other at the outlet of Canyon Lake, just above Otter Falls. A fishladder built as part of the Aishihik Lake structure allows fish to travel back and forth freely.

Power Canal

To the west of the Otter Falls day use area, water flows from Canyon Lake through a 5.8-kilometre canal. There are spots at regular intervals along the canal where readings can be taken as a way of monitoring the strength of the canal. The canal ends at an intake structure where water drops 175 metres through an underground shaft, then flows another 915 metres through a tunnel before entering the generating station.

Generating Station

Water flowing from the tunnel turns two turbines, each connected to a 15-megawatt generator. Once the water hits the turbines, it leaves the plant through a large tunnel known as the tailrace and flows one and a half kilometres to the West Aishihik River.

Transformers

Once the generators create electricity, it is carried through lines to transformers, which increase the voltage so the power can more easily travel through transmission lines to Whitehorse and Faro. Once the electricity arrives at its destination, substations lower the voltage so the electricity can be safely used in homes or businesses.

clockwise
control structure at Aishihik Lake; generating facility; power canal

The Mayo Facility

The Mayo hydro facility, located about 400 kilometres north of Whitehorse, has served people in that central Yukon community since 1951. It was originally developed to supply electricity to the United Keno Hill Mine at Elsa, located about 45 kilometres north of Mayo. It also supplies electricity to the communities of Mayo and Keno City and neighbouring areas. It can produce five megawatts of power, which is enough to supply power to about 1,700 homes.

Unlike some hydro plants in the Yukon, the Mayo system has never experienced water shortages, largely because of the huge storage capacity of Mayo Lake. In fact, between 1989, when the United Keno Hill Mine shut down, and 1993, when a new transmission line was built to Dawson City allowing Yukon Energy to provide hydro power to residents there, almost 80 percent of generating capacity was spilled over the Wareham Lake dam.

photo: **www.archbould.com**

left to right
Mayo lines; Mayo facility

photo: **Yukon Energy**

Components of the Mayo Generating Facility

Water Storage

The Mayo generating station uses two lakes for water storage: Mayo Lake, located 50 kilometres north of Mayo and Wareham Lake, 10 kilometres north of the community. The generating plant is also located on Wareham Lake.

Control Structures

The water passes through control structures on both these lakes and travels about half a kilometre through a tunnel at the Wareham dam. The water then drops approximately 36 metres to the hydro plant. The amount of the drop is known as the 'head'.

Generating Plant

The generating plant at Mayo consists of two 2.5-megawatt generators with turbines that require 36 metres of head to drive them to produce electricity. After the water goes through the turbines it leaves the plant and flows into the Mayo River, which in turn flows into the Stewart River south of town.

Transformers

Once the generators create electricity, the power is carried through lines to transformers. The transformers increase the voltage so the electricity can more easily travel through transmission lines. Once the electricity arrives at its intended location, substations lower the voltage so the electricity can be safely used in homes or businesses.

photo: ***www.archbould.com***

photo: ***Yukon Energy***

photo: ***www.archbould.com***

left to right
Mayo generating plant; Mayo Lake control structure; Mayo generator

below left to right
construction of the Mayo to Dawson City line




photos: ***www.archbould.com***

The Mayo to Dawson Transmission Line

To make use of the extra power available after the shutdown of the United Keno Hill Mine, Yukon Energy built a transmission line from Mayo to Dawson City, some 232 kilometres away. This was the largest capital project ever undertaken by the corporation.

When the line was completed in 2003, Yukon Energy was able to meet all of Dawson City's electricity demands with hydro instead of diesel. By replacing the diesel with clean hydro power, Yukon Energy is reducing greenhouse gas emissions by 10,000 tonnes each year. The new power line also provides grid power to residences and businesses along the transmission route, enhancing the potential for business opportunities along that corridor.

photos: ***www.archbould.com***

right
lineman on Mayo to Dawson line

Yukon Energy Corporation

#2 Miles Canyon Road,
Box 5920, Whitehorse, Yukon
Y1A 6S7

(867) 393-5333
communications@yec.yk.ca

Yukon Energy provides reliable and cost-effective energy services for customers throughout the Yukon. For more information visit **www.yukonenergy.ca**

photo: www.archbould.com

YUKON ENERGY