

# the Yukon Energy Building



**ON OCTOBER 30, 1997,** Yukon Energy experienced a disastrous fire that knocked out three of the four Whitehorse hydro-electric turbines and the entire office complex including the Territory's system control centre.

After the fire, the company applied to the NRCan Commercial Building Incentive Program to build its new headquarters. The new building is successfully certified in the CANMET/NRCan C-2000 Program for advanced commercial buildings.

Yukon Energy is proud of the new building and has found that you don't have to pay more to get good results.

C-2000 sets exacting performance standards for commercial buildings and is referred to as the commercial equivalent to the R-2000 program for residential energy efficiency. But the criteria for the C-2000 is more wide ranging.

As well as using about 50% less energy than conventional office buildings, C-2000 buildings must also minimize their impact on the environment and be comfortable, healthy places to work. The Yukon Energy building was one of only six buildings in 1999 built to C-2000 standards, and the first in the harsh environment that exists north of 60°.

## A FEW SIMPLE IDEAS THAT WORK

The Yukon Energy building received the 1999 Canada Energy Efficiency Award for Commercial/Industrial Projects.

In accordance with the experiences and premises of C-2000 standards, the Yukon Energy Building is the result of a process of fully integrated design.

Yukon Energy helped the design team work together to achieve performance standards from the beginning and pointed out

areas where a more innovative design could be incorporated.

The building, designed by Mauer Kobayashi Architects Ltd. and built by Ketz Construction Corporation, contains many energy-efficient and cost-saving features. Whenever possible, local material was used for construction, including wood framing, providing relatively low-embodied energy.

## SITE AND BUILDING CONFIGURATION

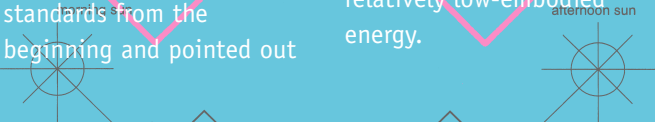
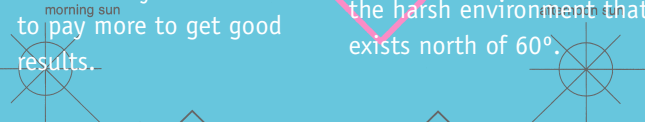
The building contains no chemical coolant or linoleum flooring and no plastics.

The Yukon Energy Building pays a great deal of attention to natural lighting. Built in a south-pointing boomerang shape with two wings facing south, the building features relatively narrow wings allowing natural light to penetrate as far as possible into the building. Certain periods of the day see 100%

daylight effect throughout the building. The shape also allows separate corporate divisions to use a single main access point, simplifying vehicle and pedestrian access and minimizing site impact.

warm

warm



## LIGHT, HEAT AND ENERGY CONSERVATION

The Yukon Energy Building contains innovative lighting fixtures that provide for evenly diffused light throughout the building. They are controlled by photo sensors that automatically turn the lights off when there is sufficient light inside the room, thereby saving energy costs.

For heating and ventilation, the new building uses a decentralized system. When air first enters the building, it is heated to about 15 degrees Celsius, and then distributed to 26 different units around the building. Each unit has its own thermostat system which controls heating and cooling delivery. The big payoff with these features is in the spring, summer and fall when it is more difficult to evenly regulate the temperature in a large building, in an energy efficient manner.

For air-conditioning, cold groundwater is pumped from a small well into the air-conditioning coils. After cooling the air in the coils, the water runs back through gravel beds and back into the water table.

A dual boiler system means that either fuel oil or

electricity can be used to run the building's heating plant. When water flow from Marsh Lake is high, the surplus electricity can be used to run the electric boiler. A system for piping hot water from the diesel plant to supplement the boilers in the office building will be finished in the future.

### KEY DESIGN AND PERFORMANCE CHARACTERISTICS

The Yukon Energy building has more and larger windows than one usually sees in the north. Triple-pane, low-e glazing windows provide a high level of daylighting while minimizing solar cooling loads and winter heat loss. The windows lose more

heat than they gain, but the savings on lighting costs offset the extra heating costs.

A simple device called a sunshade keeps down the amount of glare inside the building and reduces the need for air conditioning. The horizontal shelf, installed about two-thirds of the way up the window, will provide diffuse natural light inside the building.

In summer when the sun is high, most of the light will bounce off the top of the sunshade and be directed through the window to the ceiling of the room, producing a more diffuse natural light.

In winter, when the sun is lower on the horizon and does not provide as much light or heat, the sun shades are designed to let in a maximum amount of sunlight to keep

the building both brighter and warmer.

A direct digital control system makes control, monitoring and efficient operation of the building much easier.

The boilers are surprisingly small, relative to the floor area of the building (1200 sq. meters). The insulation in the walls and roof (R24 fibreglass bat and R40 (blown-in) was optimized using computer models, resulting in significant energy savings.

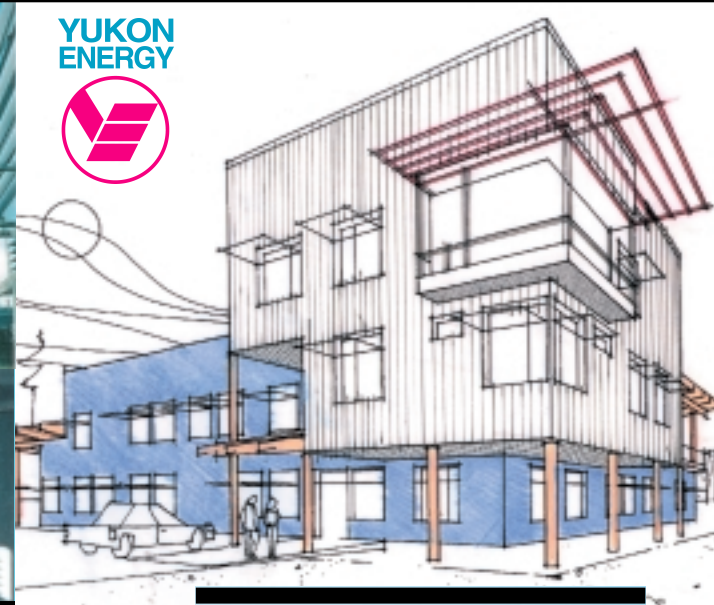
The building was designed to balance energy consumption, heating, plant capacity, occupant comfort and construction costs.

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1999 National Winner

Canada Energy Efficiency Award for Commercial/Industrial Building Projects

