1995 Belize Review



When it begins operating, the Mollejon Hydroelectric Project will generate power cleanly and efficiently from its site in the western part of the nation. Construction is on schedule and commercial operations are expected in mid 1995.

In a typical year the project is designed to produce enough power to satisfy most of the energy needs of Belize today. When the facilities operating at its rated capacity of 25,000 Kilowatts, it will produce enough power to light 250,000 100 watt light bulbs.

The Mollejon project lies on the scenic Macal River, near its confluence with Mollejon Creek in the Cayo District. It will harness one of Belize's natural resources well suited for hydroelectric power generation.

The Macal River originates at an elevation of more than 3,000 feet in the mountains, creating a powerful natural

downhill flow that cascades southeast to the Belize River and then to the Caribbean Sea. This enabled the p l a n n i n g, permitting and construction of a station that will have little impact on its surroundings.

No changes in the quality of the environment. are created by the presence of the project which was subject to a detailed and lengthy environmental study. Life along the river, upstream and downstream, will go on unchanged while the project creates cleanly produced hydroelectric power.

#### HOW IT WORKS

The Mollejon project utilizes a proven and long-used technology known as run-ofriver hydroelectric generation.

This involves building a diversion structure that is designed to divert a portion of existing river flow to an underground power tunnel. The tunnel carries the water downstream to a powerhouse, which houses three hydroelectric generating turbines.

After the water powers the electric turbines, it will flow back to the Macal River through a tailrace channel, resuming its natural flow and course exactly as it did before the project was constructed.

The diversion structure impounds a small reservoir of water which will provide more than a full day's back up water supply for one of the three electric turbines. The reservoir will also be used for daily regulation of electricity generation to better meet the needs of Belize. Its visible surface is about the size of a small 30 acre lake.

A key feature of the project is the underground power tunnel. It is about 15 feet in diameter, more than 2.5 miles ong, and is carved entirely in bedrock granite. Instead of building a massive dam to raise the water level high above the powerhouse, the power tunnel is used to carry the water down to the powerhouse - 400 feet lower than the diversion structure. It is this long, unimpeded downfall that gives the water enough power and pressure to spin the three electric turbines.

Each turbine will generate 8,400 Kilowatts of electricity, creating a total station capacity of about 25,000 Kilowatts. After leaving the turbines the water once again returns to the Macal River for its journey to the Caribbean Sea.

The powerhouse will contain not only

the electric turbines but also the plant's administrative offices and the control room. It will be beside the river, at the foot of a large hill. An unpaved road will service it and the adjoining агеа where electric equipment is located.

Assuring that the power produced by the Molleion facility is transported éfficiently and reliably to the nation's major population centers is a fundamental goal of BECOL. So BECOL is constructing я transmission line



that originates at the project and ends at the existing power station site in Belize City.

The transmission cables will be carried by a series of treated pine structures arranged to generally run parallel to the Western Highway The transmission line will interconnect to substations in San Ignacio, Belmopan, Ladyville and Belize City so the electricity can be provided to the homes and businesses that need it. This transmission system will be turned over to Belize Electricity Limited, free of charge, when it is completed and fully tested.

# **ECOHOMIC BENEFITS**

The Mollejon facility will do more than provide clean, efficient electricity. It has provided construction jobs and will provide operations jobs through its 40 year life. It will play an important role in the nation's economy.

It will also play a vital role in the nation's long-term environmental outlook. When it is used to displace national generation fired by fossil fuel, the facility will be able to do so with no fuel emissions because it is a hydroelectric facility. And because it is using the river for fuel, the nations total energy costs will not be affected by the fluctuating costs of other imported fuel sources.

BECOL is also becoming an enthusiastic new member of the nation's community of international businesses. The company is financially supporting positive local projects such as exhibit improvements at The Belize Zoo, waste disposal facilities in nearby communities, and local beautification projects.

The project will play a vital role in helping Belize meet its growing demand for new energy. It will do so in an environmentally safe way and in a cost effective way that allows the nation to compete for economic and industrial development in the increasingly global economy.

Editor's Note: For more information on the hydrodam you can contact general manager Kevin Nantz at 093-2592 or write to them at BECOL, Arenal Road, Benque Viejo del Carmen.



The powerhouse will contain administrative facilities, the control room and the plant's turbine generators



The diversion structure will channel river water to three electric turbines

# HYDRO DAM QUICK FACTS

# **Project Description**

- Hydroelectric station capable of generating 25 megawatts of electricity
- o Is in the Cayo District on the Macal River
- o Is comprised of three principle components: diversion structure, power tunnel and powerhouse

#### **Diversion Structure**

- o Will divert water from the river into the tunnel to deliver to generating equipment located in the powerhouse
- o Will provide small amount of storage for generation in the dry, low river season
- o Will create a 30 acre reservoir regulated by an overflow spillway
- o . Is 28 meters high and 140 meters long
- o Requires 38,00 cubic meters of concrete

#### **Power Tunnei**

- o Will carry water from reservoir behind diversion structure to powerhouse
- o Contained within indigenous hard, stable granite bedrock
- o Is 4,444 meters long, 4.5 meters in diameter and horseshoe shaped
- o Is located about 120 meters lower in elevation than reservoir level

#### Powerhouse

- Will house all equipment and controls needed to produce reliable power, including three 8.4 megawatt turbine generators
- o Is 33 meters long, 20 meters wide and 32 meters in height
- Is located 5 1/2 miles downstream of diversion structure

#### **Environmental Aspects**

- Detailed environmental assessment performed by government consultant concluded that the location and design of this project are such that the impacts will be minimized and the opportunities enhanced
- o Will use no fuel source other than Belize's own indigenous resource water
- o Will produce no smoke, soot, ash, toxic fumes or other emissions
- o Will reduce air emissions and noise by decreasing diesel generators
- o Will reduce fuel traffic created by use of existing diesel generators
- o Will not consume, harm or alter water diverted to powerhouse turbine generators
- o Will not heat or cool water, nor add chemicals
- Will not create adverse land use, noise or aesthetic impact on area communities due to remote location
- o Will have minimal impact on tropical rainforest, animal or aquatic life
- o Will utilize strict procedural controls at all times during operation to assure continued protection of the environment

## **Quality and Reliability Aspects**

- o Hydroelectric facility and integrated transmission system will provide primary and backup power for the areas now served by individual diesel fueled power plants in Belize City, Ladyville, Belmopan and San Ignacio
- o Will increase reliability and stability of power to all areas served by the new, modern grid
- o Will allow for expansions of transmission service to accommodate national growth
- o Will use reliable, proven technology in hydroelectric plant and transmission system
- Will improve quality of power delivered to customers

## Economic Aspects

- o Created over 400 construction jobs for Belizeans
- o Will create 20 permanent operations jobs for Belizeans
- o Will actively stimulate local economy through purchases of materials, goods and services
- o Will actively support community projects through corporate contributions to civic and charitable endeavors

## **Project Ownership**

- Dominion Energy Incorporated of Richmond, Virginia indirectly owns 95% and is one of the largest independent power developers, having interests in more than 2200 megawatts of power plants using a wide variety of fuels
- o The Social Security Board owns 5%