

The VILLANO Ecuador Heliportable Oil Drilling and Flowline Project

**with
Potential
Applications
for Oil and
Natural Gas
Exploration
and
Production
in
North Eastern
British
Columbia**

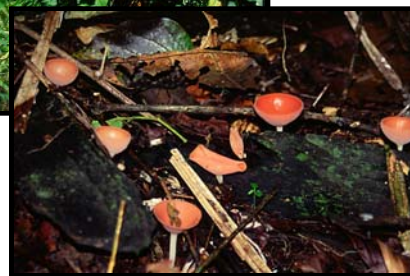
**by Wayne Sawchuk
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The Villano Project

The Villano project is a heliportable oil drilling project located in the sensitive rain forest environment of eastern Ecuador. Now owned and operated by Agip Oil Ecuador B.V., the project was originally conceived and developed by ARCO Oriente. This project utilized a unique above ground flowline construction technique. Also, eight wells are clustered on the single wellsite, thus minimizing environmental impacts.

Ecuador is home to some of the most dynamic and diverse tropical forests in the world. In some areas these forests are home to up to 300 species per hectare. Although beset by difficult economic pressures, Ecuador has made the decision to develop their environmentally sensitive areas only in a way that protects the rainforest. This decision was set out in Presidential Decree # 2982, which stated that exploratory wells in remote rainforest areas should be drilled using helicopter transported (heli-portable) equipment.



**Ecuadorian Rainforest
at the Villano Wellsite**



**Chinook 234 in Service Area
at the Central Processing Facility
east of Puyo, Ecuador.**

Helicopter Transported Drilling Technology

From the beginning, the goal of the Villano project was to minimize the project's impact on the tropical environment and protect fragile ecosystems, and so the field was developed completely without access roads. Rigs, people and supplies were transferred to and from the field by helicopter.

A Chinook 234 Helicopter with a lift capacity of 22,500 pounds, operated by Columbia Helicopters, of Portland, Oregon, provided heavy lift capability for the operation. The rig, along with startup materials and supplies, was moved by the Chinook in 240 loads.

New Techniques in Wellsite Construction.

The 3.8 ha. Villano wellsite was cleared, graded and covered with a geotextile mat. Next, gravel hauled by helicopter was placed on the matting to provide a working surface. This technique provided a solid base for the wellsite, in an area of poor soils.



**Chinook 234 slinging gravel used in
Wellsite Construction**

Flowline Construction

In challenging terrain all over the globe, helicopters are being used to transport men, materials, and pipe for pipeline construction. In the case of the Villano project, a twelve inch above ground flowline was installed, entirely without road access, using a small monorail to string the pipe and move equipment. The flowline virtually weaves between the trees, minimizing the number of trees cut and eliminating extended breaks in the forest canopy. It was installed 1 meter above ground, floating on “H” frames of I-beam. In the rainforest, there is always the threat of damage to the flowline being caused by falling trees. It has been found that the floating flowline design allows the “H” supports to fail when struck by falling trees, with the flowline being forced to the ground without rupturing.



**Above Ground Flowline
leaves the Villano Wellsite**



**Ecuadorian Soldiers guarding
the Villano Wellsite**

Flowline damage due to sabotage is also a matter of concern in Ecuador. To minimize the release of oil into the surrounding environment, should a rupture occur, valves have been installed that shut off the line in response to a drop in line pressure

Drilling

Drilling is nearing completion on eight wells drilled from the single Villano wellsite, utilizing horizontal drilling techniques to access oil some 11,000 feet underground, and as far as 7,000 feet away from the wellsite. Maximum downhole distance is some 15,790 feet. Casing size in the producing horizon is 7 inches. Oil is currently being produced at some 17,000 barrels per day.



Well Bay and Wellheads

ARCO stated that:

“The Villano drillsite is located some 40 kilometres into the rain forest. Only the wells and minimal facilities are located at the actual point of production. Oil is transported out of the forest by a unique flowline system specifically designed to minimize impact on the environment... In addition to being Ecuador's newest oil field, Villano has been regarded as setting a new standard for environmental and socially responsible development in the rain forest.”



Applications in Northeastern British Columbia

Northeastern British Columbia contains some of the world's most important wilderness and wildlife areas. One of these is the recently created Muskwa Kechika Management Area. This spectacular portion of B.C. contains unspoiled Parks and world class Special Management Areas. The M.K. supports many species of large mammals including stone sheep, moose, elk, caribou, mountain goat, wolves, black bears, grizzly bears and plains bison in population densities of global importance.



The Muskwa Kechika Management Area legislation requires that the wilderness quality, the diversity and abundance of wildlife, and the ecosystems on which it depends, be maintained in perpetuity. At the same time, sensitive and temporary resource development and use, including mining, natural gas exploration and development, and forest harvesting, is allowed in parts of the Area designated for those purposes.

The Challenge of Access

One of the toughest challenges for industrial operators in northeastern BC and the Muskwa Kechika concerns the issue of access.

From an ecological point of view a road or any linear disturbance that creates access is like an open wound constantly reinfecting the surrounding environment.

Roaded access impacts water quality and hydrological patterns, damages views, increases noise levels, increases habitat fragmentation, directly removes habitat, introduces both plant and animal species non-native to the area, brings about the destruction of wilderness values, and increases access for predators both human and non-human. Of greatest concern is that these impacts are long term in nature. In many cases, if a road is built, it may be next to impossible to meet the objective of returning lands to their natural state as development activities are completed. And, while some impacts can be mitigated by control of human access, many impacts will still occur to some degree even in a controlled situation.

The Villano Project offers an example of helicopter transported drilling technology, above ground flowline technology, and multi-well drilling from one central location. The technologies used in Villano appear to have the potential to address the negative effects of road building associated with natural gas exploration, particularly on the eastern slopes of the Rocky Mountains of northeastern BC within the Muskwa-Kechika Management Area.

These technologies would eliminate the damage caused by unnecessary roads built to unsuccessful wellsites, shown opposite and on the following page.



The Villano Flowline snakes through the Ecuadorian Rainforest



Road to Dry Wellsite, Northern BC

Roads to Nowhere

Access Roads to Dry Wellsites.



Wildcat drilling has left a legacy of thousands of kilometers of unused and abandoned access roads in northeastern BC. Many of these roads continue to cause environmental problems, affecting water quality, scarring viewscapes, and disrupting animal movement patterns. Each road increases access for humans and animal predators, with corresponding negative impacts on existing ecosystems.



Abandoned natural gas exploration road- Sukunka River.



Talisman Energy's Bickford Road (note road failure into Bull Trout Stream)

Husky Road,
Near the Graham River



Shell road near
Mount Stephanson,
Brazion River



If Helicopter Transported Drilling Technology had been used in these projects, (and many others,) habitat damage would have been limited to a wellsite only.

