## Panama

World economy needs second canal

by Carlos Wesley

The Panama Canal, built by the United States in 1914 after 30 years of work by French and American engineers, has been rightly called "the eighth wonder of the world." Its construction linked the Orient with Europe and Africa, North America with the nations of western South America, and the Eastern Seaboard of the United States with the West Coast. Today some 14,000 ocean-going vessels pass through the canal each year, carrying over 160 million tons of cargo— over 4 percent of total world trade.

While the Panama Canal is one of the greatest engineering achievements of mankind, its capacity even now is inadequate to modern shipping needs, and given any significant expansion in world trade the canal would soon become a major bottleneck. A ship today must literally "climb" over mountains, by means of locks, as it is lifted from the Atlantic Ocean 85 feet above sea level, across the Continental Divide, and finally down to the Pacific Ocean. The canal locks and channels are too small to allow passage of some 8 percent of the world's ocean-going fleet, ships of over 65,000 tons (many bulk carriers and oil super-tankers are over 250,000 tons). Furthermore, the locks are extremely vulnerable to sabotage or terrorism, and sinking one or more vessels in the lock-chambers could incapacitate the canal.

Proposed routes for a second Panama Canal
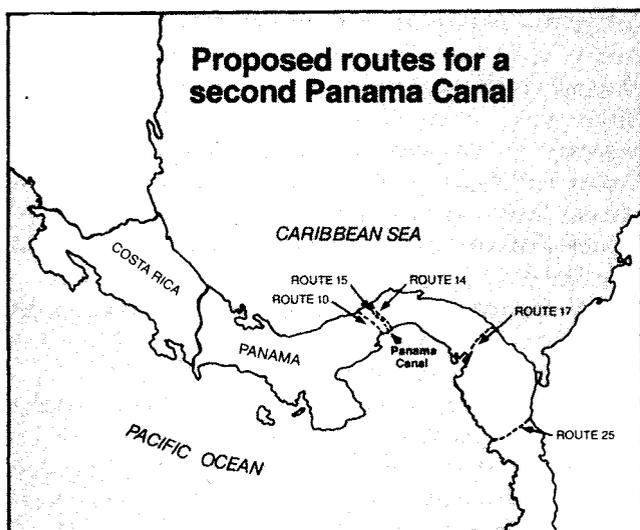
These considerations point to the urgent need for a new sea-level canal, as originally envisioned by the designers of the lock system. This will be one of the most monumental construction projects ever undertaken. Any canal across the isthmus that stretches from the Yucatan Peninsula in Mexico to northern Colombia will have to cross the mountains of the Continental Divide. Canal-builders will also have to contend with tropical forests and jungles before excavation can begin, and they will have to deal with the fact that sea-level on the Pacific is usually slightly higher (about three-quarters of a foot) than on the Atlantic, and that there are marked differences between the tides of the two oceans.

Current estimates are that it will take anywhere from 8 to 20 years to get the job done—even if peaceful nuclear explosives (PNEs) are employed—and that it will cost $15-$16 billion at today's prices.

The Atlantic-Pacific Interoceanic Canal Study Commission (ICSS), appointed by President Lyndon Johnson, in its 1970 report identified five routes across the isthmus, some suitable for building a canal by conventional means, and the others by a combination of conventional techniques and PNEs. Of these routes, Route 10, which is about 10 miles west of the existing Panama Canal, was selected as the best through which to build a canal by conventional means. Route 17, the Sasardi-Morti route through the jungles of Darien in Panama, and Route 25, the Atrato-Truando in Colombia, were identified as the best prospects for building a canal by combined techniques.

While PNEs are significantly cheaper than conventional technologies, the fact that they cannot be employed near population centers limits their use to remote areas, offsetting their cost advantage. However, PNEs have the advantage that excavation and spoil disposal are accomplished in a single operation. According to the ICSS report, "energy produced in nuclear explosions would be used both to fracture material and eject it from the channel. This form of excavation would eliminate mechanical earthmoving, which is the major cost item in most conventional excavation. . . . Studies to date indicate that nuclear excavations may be several times less expensive than present methods in many applications and that effects can be satisfactorily predicted and controlled."

A Panamanian engineer, Demostenes Veragara Stanziola, has recently proposed a non-nuclear construction design—"dredging the mountain"—to be applied on Route 10. This involves excavating, by conventional methods, two large artificial lakes, similar to the man-made Gatun lake that is the basis of the current lock canal. Large dredges and bargelines would then proceed to dredge their way through the lakes, extending them until they are connected. This method would allow for efficient disposal of spoil from the excavation, with attendant cost savings. The finished canal would provide for simultaneous passage by two vessels of up to 250,000 tons, dispensing with the need for tidal-gates at each entrance.