

IN AUSTRALIA

Blasting a nuclear haven

**Typhoon-ridden coast will
be site of the first
atom-engineered harbor**

For some years the prospect of excavating a sea-level canal across the Isthmus of Panama has been the star attraction of the Plowshare Program of peaceful uses for atomic weapons.

It now looks like a good bet that the site of the world's first nuclear engineering project will be not a ditch in the Panamanian jungle but a protected harbor near the Great Sandy Desert on the northwest coast of Australia. Australian authorities are hoping the U.S. Atomic Energy Commission can come up with a harbor-blasting nuclear explosive by the end of 1969 or the first part of 1970. The economic pressure is that great.

The proposed harbor, at Cape Keraudren near the town of Port Hedland, is needed for the shipment of the vast amounts of iron ore now being exploited 85 miles to the southwest. Deposits of nickel, copper, uranium, manganese and phosphate are also in the area.

The spot was singled out two years back by Dr. Edward Teller, director of the Lawrence Radiation Laboratory, who urged that Australia act as a proving ground for nuclear geoengineering. The Australian Government has asked the U.S. AEC for explosives to blast the harbor, and the AEC, with President Nixon's blessing, has agreed to undertake a feasibility study to determine if it can be done.

And, as one AEC official put it, "The AEC wouldn't talk about it publicly if they didn't think it could be done."

The feasibility study will settle the important question of how much nuclear explosive will be needed. An informal preliminary study by Dr. Teller's University of California laboratory estimates that five 200-kiloton, thermonuclear devices, buried 1,100



Lawrence Radiation Laboratory

Blast-produced seawalls protect shipping in proposed Australian harbor.

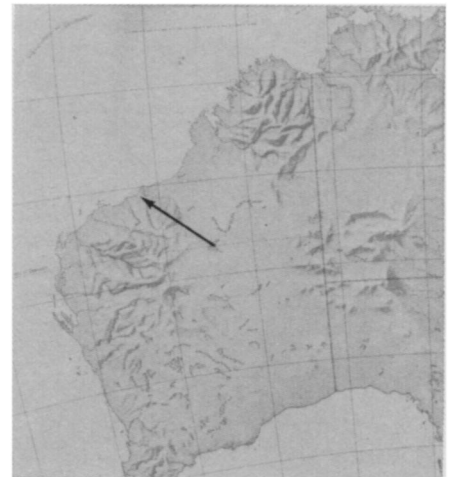
feet apart 800 feet under the ocean floor and detonated simultaneously, will do the job. The explosions are expected to produce a high-lipped crater 200 to 300 feet high, which will protect shipping and dock facilities from periodic typhoons. The crater should be 1,300 to 1,600 feet wide and 6,000 feet long with a depth of 200 to 400 feet in the center, sloping up toward the sides. When finished, the harbor should provide turning room for ships more than 1,000 feet long.

One scheme positions the explosives so that a harbor adjoining the land would be created. About 10 feet of limestone dredging would be needed to clear an area 42 feet deep because of the shallowness of the ocean bottom at this distance.

An alternative plan has the harbor 7,000 feet out in the water; earth from the crater lips would be used to build a causeway to it. This plan would require four feet of dredging. The costs of causeway construction in this plan would have to be weighed against the costs of dredging and the chance of greater radioactive venting in the other.

The nuclear method of excavation, compared to conventional techniques, offers a superior harbor because of the high-lipped crater. During loading operations, a ship is backed into a harbor. When the tide runs out, the ship is loaded; when the tide comes in, the ship sails out. Since Cape Keraudren is on a typhoon coast, ships would have to leave a regular harbor before a typhoon hits. The crater configuration enables the ships to remain safely inside as well as affording protection to port facilities.

An important aspect of the feasibility study will be its geological findings. The results will reveal the type of rock



Rand McNally

Cape Keraudren (arrow): desert port.

under the water and in the immediate area, which in turn will determine how deep the devices must be placed and where. The effect of the blasts on ocean waves will have to be determined, as well as wind currents that would carry any vented radioactivity. To comply with the Limited Test Ban Treaty the proper safeguards to prevent the spread of fallout to other countries will have to be established, along with safeguards to protect Australian people, cattle and crops. The region's marine life will also be studied to avoid contaminating fish that might be eaten.

Fortunately for the project a great deal of this data already exists. If the feasibility study had to start from scratch, it could create a delay that would jeopardize the project.

Time is important because of the plans of the Sentinel Mining Company, the major Australian firm interested in the project. According to David E. Fairbairn, minister for national devel-

15 february 1969/vol. 95/science news/159

opment, "the proposal is being treated as urgent because the company's development program requires port facilities by the end of 1970." Another reason for haste mentioned by Fairbairn is that population and buildings are growing at such a rate that shortly the region will no longer enjoy the luxury of large unoccupied spaces.

This summer a nuclear test will be conducted in this country to make sure the design for the explosive is correct so that it produces the right yield and functions properly for blasting the harbor. The feeling of the AEC is that the tight schedule—a deadline of December 1969 or January 1970 at the latest—can be met. The port should then be in operation by 1971, the date deemed necessary by Sentinel.

The cost of the nuclear explosives is estimated at \$5 million. When completed, the harbor's total cost should run from \$12 million to \$14 million.

The project comes under the AEC Plowshare Program, which seeks to use nuclear explosives for peaceful purposes. The information gained from an Australian nuclear excavation project would be valuable for the upcoming proposed nuclear blasting of a new Panama Canal.

The Cape Keraudren project would set a precedent for the procedures in handling other nuclear excavations outside the United States. Another precedent could be set in the area of international relations, depending on the feasibility results.

The Limited Test Ban Treaty signed by the United States and the Soviet Union in 1963 prohibits nuclear testing in the atmosphere. If the feasibility study shows the possibility of radioactive venting, the U.S. Government would argue that the blast, strictly for peaceful purposes, is not a violation of the treaty spirit. Barring agreement by the signatories, a second possibility is an amendment to the treaty.

On the other hand, the proposed Nuclear Non-Proliferation Treaty, which is still awaiting Senate approval, urges international cooperation in harnessing the atom for peace, including the furnishing of atomic assistance to nuclear have-nots.

According to a U.S. State Department's official view, there is no need as yet for the U.S. to address itself to the potential problem with the Soviets until the feasibility study is completed and its results analyzed.

Representative Craig Hosmer (R-Calif.) disagrees. In view of the conflict between the Test Ban Treaty and the Non-Proliferation Treaty, he says, "I suggest that it is time to discuss with the U.S.S.R. and other appropriate countries the proposition of clarifying, formally or informally, the non-appli-

cability of the Limited Test Ban Treaty's restraints."

For Australia, the project could signal the start of many domestic improvement programs involving nuclear excavation, such as the creation of underground caverns for water storage in case of drought, shaping a new inland sea and dam construction. One Australian company is already looking at Cape Preston, 100 miles to the southwest, as a follow-up to Cape Keraudren.

NUTRITION

Documenting the hungry



U.S. Public Health Service

Mute testimony to hunger in America.

Before he was elected to the United States Senate, George McGovern served as director of an agency called Food for Peace. Its purpose was to make available America's agricultural surpluses to the hungry overseas.

Now McGovern finds himself heading a select Senate Committee which is trying to find some way to feed the hungry at home, and it is one of the ironies of the present human condition that his first job was probably easier.

One of the reasons, undoubtedly, is the intrusion of domestic politics into the problem of domestic hunger. Senators and Congressmen are not eager to have the world know that some of their constituents are malnourished.

Southern legislators, in particular, resent it when Northern colleagues invade their home states and discover festering pockets of poverty. Last April, a Senate labor subcommittee headed by the then Sen. Joseph Clark of Pennsylvania, and including the late Robert F. Kennedy, discovered widespread malnutrition in the Mississippi Delta.

Their findings only underscored an earlier report by a committee of doctors who went to the same area on a foundation grant and came back with the same conclusions.

Both these efforts dealt only with a

relatively small region, while the McGovern committee has taken on the problem in national terms, but opposition in the Senate leaves his committee fiscally undernourished. Last year McGovern asked for \$170,000 and got \$25,000. This year the committee, which bears the impressive title "The Senate Select Committee on Nutrition and Human Needs," would like \$250,000 to carry on its work. As committee appropriations go, this is a modest request. Its expectations, however, are not high.

There are 54 Senators lined up in favor of the committee, but how many of them will deliver the requisite ferocity in the coming floor fight over its budget request is highly conjectural.

With a shrunken budget, and with prospects so highly tentative for getting much more money this year, McGovern's committee has done about the only thing it could do: it has brought nutrition experts to Washington, listened to their testimony, and hoped that an outraged public would exert pressure on Congress to grapple with the problem. Being a select, rather than a standing legislative committee, it has little leverage beyond that hope.

Among the things the committee has learned, and will report to the Senate on June 30 and Dec. 31:

- One-sixth of the United States is ill-fed, according to Dr. Arnold E. Schaefer, a Public Health Service expert on nutrition, who drew his conclusions from a survey of 12,000 poor people in Texas, Louisiana, Kentucky and New York.

- One in every three children under the age of six in the survey was found to be anemic; and 3.5 percent were physically stunted and often mentally retarded as well.

- Goiter, long thought to be a disease of the past, was found in 5 percent of those surveyed.

- Nearly one-third of the children under six years of age suffer from night blindness, a retinal malfunction caused by lack of vitamin A.

- Vitamin C levels were found to be below even minimal nutrition standards in from 12 to 16 percent of all age groups.

- Nearly 4 percent of the children under the age of six showed a vitamin D deficiency.

- Four to 5 percent of the people in Dr. Schaefer's survey exhibited either winged scapula or potbelly, or both. These are diseases associated with protein and calorie malnutrition.

- A direct connection was drawn between poverty and high infant mortality, mental retardation in infancy, and irreversible failure of brain growth due to malnutrition in early childhood. Similar findings were emphasized by