



National Helium Corporation

HELIUM FOR SPACE—Incoming natural gas for the helium plant of the National Helium Corporation drops from 50 degrees above to 50 degrees below zero Fahrenheit as it passes through the huge heat exchanger in the foreground. In the background is the cryogenic portion of the plant which is located near Liberal, Kans.

MILITARY SCIENCE

Stockpile Still Increasing

► THE U.S. STOCKPILE of nuclear weapons will still continue to increase, despite the 25% cut in production of fissionable uranium and plutonium ordered by President Lyndon B. Johnson.

The cutback means that the rate at which the nuclear stockpile increases will not be as high in the future as it has been in the recent past, Government sources explained.

The U.S. already has on hand tens of thousands of nuclear weapons. They range in size from hydrogen bombs with explosive power the equivalent of millions upon millions of tons of TNT to the warheads carried in the B-47 bombers now being replaced by intercontinental ballistic missiles to nuclear explosives for battlefield bazookas, equivalent to hundreds of tons of TNT.

In estimating its requirements for nuclear weapons during the next five years, the Department of Defense found that the rate of increase during the past few years was much too high for the future.

Not only nuclear weapons, but all defense expenditures are expected to be reduced during the next few years, official sources said, provided there are no serious changes in the international scene.

The 25% reduction in production of plutonium-239 and enriched uranium-235 will also bring a built-in savings of one billion dollars between now and 1970, since the raw materials for making the fission products will not have to be purchased.

Although the 25% cutback may sound

large, it is only a small fraction of the so-called Phase I, or first step, of the disarmament proposals discussed at Geneva, which called for an across-the-board 30% reduction in all kinds of military equipment and weapons, both nuclear and conventional.

Also, Government sources noted, the reduction does not mean an admission that those who charge the U.S. with "overkill" capacity are correct. Proponents of overkill hold that this country has anywhere from two to ten to hundreds of times as many nuclear weapons as needed to devastate completely the cities of an attacking enemy.

Some argue, therefore, that production of all nuclear weapons material should be halted.

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CHEMISTRY

Savannah River Plant To Produce Curium-244

► A NEW PROJECT will be undertaken in the Savannah River plant facilities of the U.S. Atomic Energy Commission for the production of curium-244, radioactive material having potential as a long-lived thermal energy source for use in space applications.

The program, announced by Dr. Glenn T. Seaborg, chairman of AEC, will begin in the spring of 1964. It is the most significant yet planned in using Savannah River Plant facilities for peacetime purposes involving nuclear energy.

The program will require nearly two years to complete and will produce around 3,000 grams of curium-244.

Curium-244 has a high specific activity and a half-life of 18 years. When used in space applications, the heat from radioactive decay would be converted to electrical energy to power instruments and for other purposes.

Curium-244 will be produced in the Savannah River nuclear reactors by extended irradiation of plutonium during which plutonium isotopes are burned out and subsequently converted to the element americium, which in turn is converted to curium-244.

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CHEMISTRY

New Helium Plant Yields Billion Cubic Feet Yearly

► THE NEW HELIUM PLANT now in operation near Liberal, Kans., will add a billion cubic feet yearly to the nation's supply of this element so essential to today's space and atomic age.

Although helium was known primarily ten years ago for lifting blimps and filling balloons, it is now vital not only in research, but also in such practical fields as welding the paper-thin stainless steel shell of the astronaut-boosting Atlas missile.

The National Helium Corp. has built the largest plant in the world for extracting helium from natural gas. The plant has started to extract 850 million cubic feet of natural gas daily.

All chemicals in the gas stream are cooled to a temperature of 270 degrees below zero Fahrenheit at a pressure of 480 pounds per square inch. Under these conditions only a helium-nitrogen mixture remains as a gas. This mixture is delivered to the U.S. Bureau of Mines in a Government-owned pipeline and stored 200 miles away near Amarillo, Texas.

As by-products, approximately 335,000 gallons of propane, butane and natural gasoline are produced daily.

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GEOPHYSICS

Meteoroids Almost as Hot As Near Boiling Water

► METEOROIDS just before they enter the earth's atmosphere have temperatures near that of boiling water, two scientists reported.

This finding, contrary to the popular belief that these specimens are space-chilled, was made by Drs. Clay P. Butler and Robert J. Jenkins of the U.S. Naval Radiological Defense Laboratory, San Francisco. The scientists used a carbon arc to simulate the sun and a cooled vacuum chamber to simulate the space environment.

Tests of a small sample of the Canyon Diablo meteorite under these conditions showed it would have a temperature near earth of 90 degrees centigrade or 194 degrees Fahrenheit, they reported in *Science*, 142:1567, 1963.

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