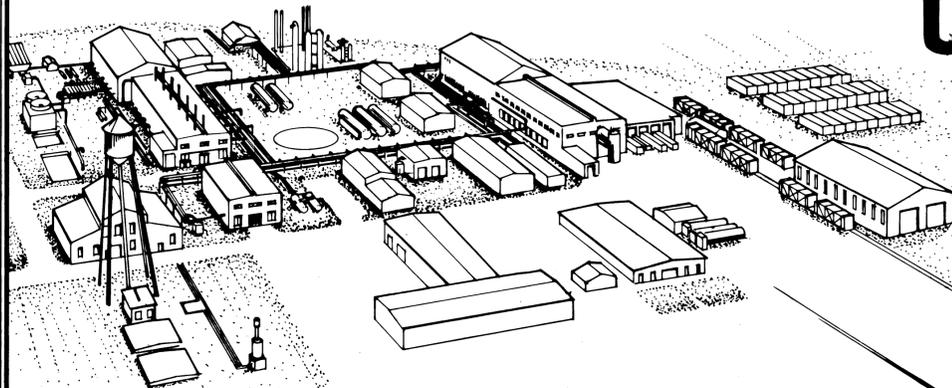


HELIUM ACTIVITIES

U.S. Bureau of Mines



Exell Helium Plant

Not to scale

In 1928 construction began on the Amarillo Helium Plant, which would become the national center for U.S. helium production, shipping, and scientific research. Since 1917, the government and the scientific community recognized the strategic value of helium to national defense. When early, experimental operations in Washington, D.C., and Petrolia, Texas, proved either too dangerous or too inefficient, the U.S. Navy consolidated its helium activities in Amarillo, Texas, under U.S. Bureau of Mines supervision.

Amarillo's proximity to the gas-rich Cliffside field, ample inexpensive land and water resources, and easy access to rail and highway transportation routes, made it the logical site in which to consolidate all future activities. The Amarillo Helium Plant thus became the nation's first fully operational federal industry. Fort Worth contractor James T. Taylor & Company built the new plant under the scrutiny of principal chemist Dr. Clifford W. Seibel. The world's only facility of its kind, the U.S. used an advanced "cryogenics" process to extract helium from natural gas. Reduced costs—\$2,500 per thousand cubic feet (MCF) in 1917 to \$7.10 per MCF in 1933—combined with America's monopoly on helium production, assured Allied forces a viable supply of gas during World War II.

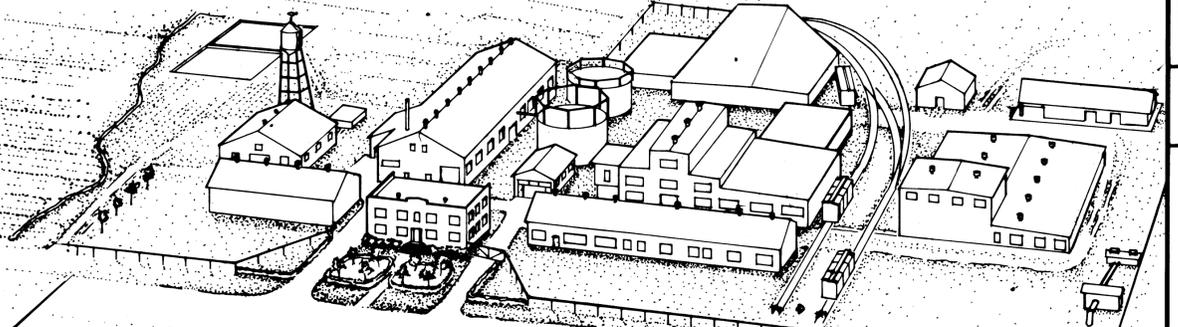
In the late 1930s, as scientific debates whether to sell helium to private and foreign interests raged in Washington, D.C., the hydrogen-filled German airship, Hindenberg, burst into flames killing most of its crew and passengers. More than any other, this incident inspired the Helium Act of 1937, which authorized the first commercial sale of processed helium gas.

World War II caused a dramatic increase in the demand for helium. In response, Congress appropriated \$17 million in 1942 to build additional production plants. By war's end, annual helium production increased from its prewar level of 24 MMCF to 150 MMCF. Accordingly, the Bureau of Mines constructed four new plants: Exell, Texas; Otis and Cunningham Kansas; and Navajo, New Mexico. While the Amarillo plant processed helium until 1970, its principal focus became research and development. The Exell plant replaced Amarillo as the world's leading helium producer.

Denver contractor Stearns & Roger built twenty-seven buildings at Exell during 1942-43. In addition, plant supervisors authorized construction of 75 units to house company employees and their families on site. Exell began operations in March 1943, and within fifteen months it had produced more than 80 MMCF. Government-processed helium supplied all of the Navy's reconnaissance dirigibles. Notably, not one American ship was lost to submarine attack while under naval at-risk protection.

During the war, Amarillo scientists designed a more efficient production process, which resulted in helium of 99.995 percent purity (Grade A). Industrialists preferred the purer grade helium to weld titanium, zirconium, and other metals used in aircraft and bomb fabrication. During postwar demobilization, scientists feared a shutdown of the federal helium program. In response, Amarillo plant engineers and chemists researched new uses for helium as a way to expand markets. By the 1950s, the National Aerospace Administration (NASA) required huge amounts of the inert gas to detect fuel leaks in the Mercury and later Apollo series

This recording project is part of the Historic American Engineering Record (HAER), a long-range program to document historically significant engineering, and industrial works in the United States. The HAER program is administered by the National Park Service, U.S. Department of the Interior. The Bureau of Mines Helium Activities recording project was co-sponsored beginning in 1998 through summer of 2001 by the Bureau of Land Management under the supervision of John Litchfield, Chief of the Division of Closure Operations, Amarillo field office, and the National Park Service, Intermountain Support Office Santa Fe, under the direction of Dr. Robert Spude, Chief, Cultural Resources and National Register Programs.



Amarillo Helium Plant

Not to scale

spacecraft ignition systems. During the lunar landing in 1969, the Eagle depended exclusively on helium to force fuel into its engines to enable lift-off from the moon's surface. Demands from the Atomic Energy Commission (AEC) and various agencies in the Department of Defense (DOD) followed. Physicists across the country required helium for laser and superconductor research, as well as for atomic energy and nuclear weapons production.

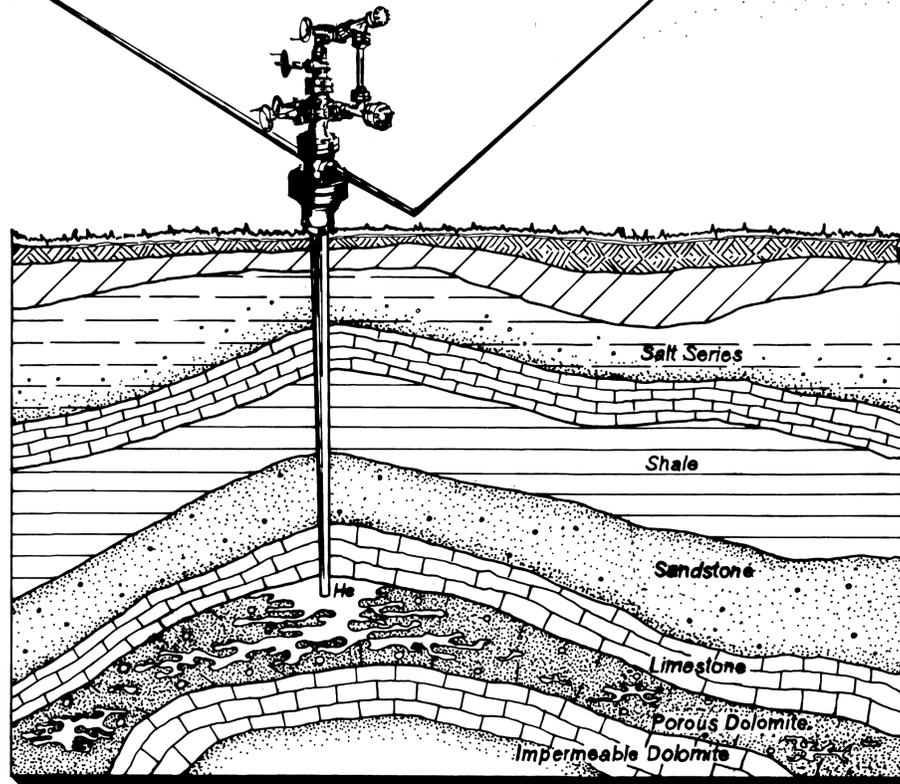
The U.S. Bureau of Mines Helium Activity also searched for cheaper, more efficient means to produce and deliver its product. The result was the production of helium in liquefied form, which influenced an expansion of the Exell plant in 1956. An additional plant at Keyes, Oklahoma helped to address Cold War demands. The two federal helium plants combined produced nearly 500 MMCF annually. As fear of losing millions of cubic feet of helium through non-processed natural gas used for fuel, heating, and other consumptive uses increased, Congress passed the Helium Conservation Act of 1960. A turning point in the federally dominated industry, this act authorized privately produced helium sales to the federal government for conservation purposes.

Since 1945, the government had stored helium in the Cliffside reservoir, but in small quantities. After 1960, the Helium Activities purchased vast quantities of crude helium from fourteen private firms for storage and distribution. In effect, this privatization of the industry hastened the demise of the federal program. By 1970, the Amarillo plant ceased production entirely, followed by the Keyes plant in 1981. Only Exell survived as the lone federal producer until the Helium Privatization Act of 1996 officially ended the eighty-year federal program.

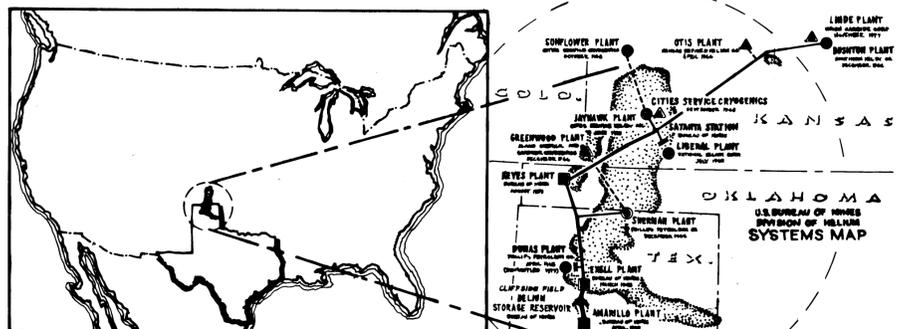
From 1970 to 1990, Exell remained a viable supplier of the inert gas to national defense and space agencies. In addition to more than 500 MMCF of gas, the federal program produced 115 MMCF of liquid helium a year. The West Texas plant supplied helium to NASA for the Challenger Space Shuttle and the Columbia Orbiter. Concurrently, helium greatly enhanced the medical profession as it enabled Magnetic Resonance Imagery (MRI) technology to replace intrusive exploratory surgery.

In 1996, President Clinton endorsed congressional action to privatize the helium industry, by now \$1.4 billion in debt due to the subsidization of non-government producers. The Helium Act of 1996 terminated eighty years of government monopolization. During that time, government-trained chemists, engineers, technicians, and general laborers advanced the helium industry from a scientific curiosity prior to 1917 into a thriving postwar national defense and aerospace industry. Federal scientists, it appears, designed new technology and created new markets with the long-term benefits going to private enterprise. Today, private companies supply helium for national defense and aerospace needs. The seemingly inexhaustible helium resources produced in the U.S. from 1917 to 1997 gave America a strategic edge over competitive world communities. The federal helium program made a lasting contribution toward securing America's preeminence among nations.

The field work, measured drawings, historical reports and photographs were prepared under the direction of the National Park Service, Intermountain Support Office, Santa Fe with assistance from John Litchfield, Chief of Closure Operations Amarillo, Texas. The recording team consisted of Supervisory Architect Barry Sulam, AIA, project leaders: Joseph Thomas (Montana State University), and Todd Delyea (University of Idaho); architects Lucas Dupuis (Montana State University), Thomas Cheney (Montana State University), Domingus Palling (Montana State University), Joe Snider (University of Oregon), Suzanne Rowe Covington (Cal State Polytechnic), and Jon Gamel (Texas Tech University). Dr. Art Gomez, Regional Historian, Santa Fe, assisted by Dr. Christopher Huggard (Northwest Arkansas Community College), provided the historical research and written narrative for the project. Formal photography was completed by John Hantulla.



CLIFFSIDE GAS FIELD



LOCATION MAJOR HELIUM FACILITIES

HISTORIC AMERICAN ENGINEERING RECORD
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