TRIM LINE

EXELL HELIUM PLANT

U.S. Bureau of Mines, Masterson, Texas

The Exell Helium Plant of the U.S. Bureau of Mines originated with World War II. Dramatic increases in the demand for helium during the war translated into the need for an expansion program. By the 1940s, the Amarillo Helium Plant's 24 million cubic feet (mmcf) annual production paled in light of the projected wartime requirements of 150 mmcf. President Franklin D. Roosevelt had by now approved the construction of 200 lighter-than-air craft for naval reconnaissance. In response, Congress appropriated nearly $17 million to expand the federal helium operations. In order to satisfy the 150 mmcf annual production quota, the federal workforce increased from 36 employees at Amarillo, to more than 400 men and women employees working at five separate plants.

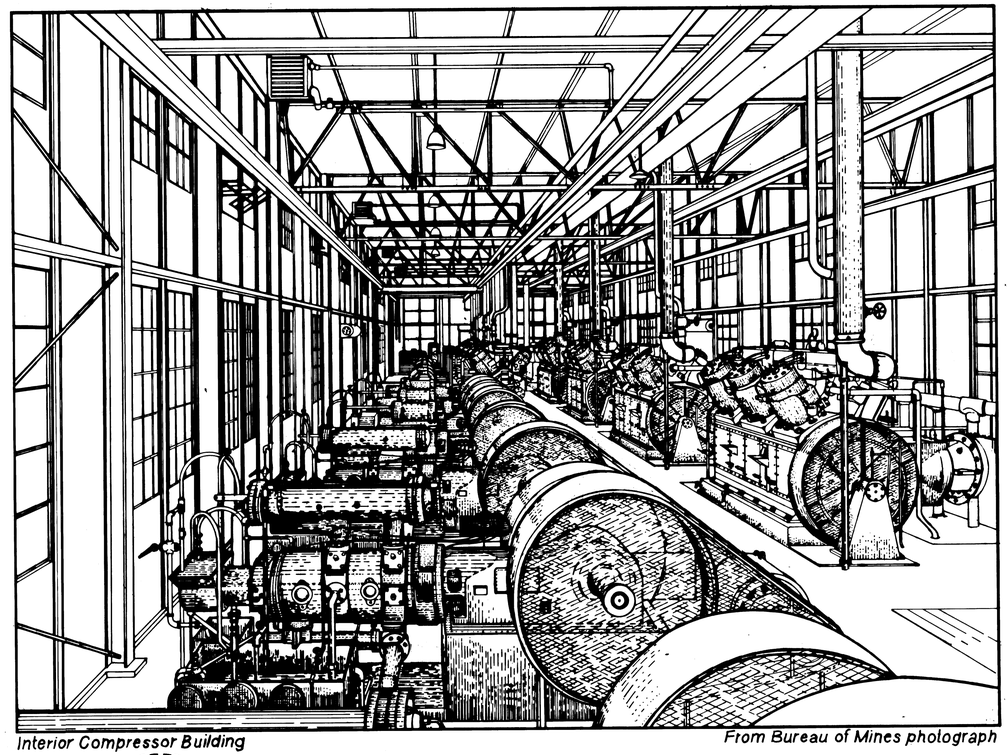
Among the four new plants constructed (Otis, Kansas; Cunningham, Kansas; Navajo, New Mexico; and Masterson, Texas) the Exell plant in Masterson was the wartime program's crown jewel. Located thirty-five miles north of Amarillo, contractors designed the plant with the most modern equipment and machinery, including vastly improved Carbon Dioxide Removal units. Besides the new CO_2 units the Exell plant housed ten helium separation units; eight natural gas, five nitrogen, and six helium compressors; three gas-engine driven 2,300-volt generators; and two steam boilers.

The U.S. Bureau of Mines also authorized 75 employee houses built on the 320-acre site. In May 1942, C.C. Anderson, an Amarillo plant engineer, supervised the construction of the Exell Helium Plant by Stearns & Roger Manufacturing of Denver. During construction in 1942-43, Exell managers designed two unique 72-passenger semi-trailer buses and tractor trucks to transport workers to and from the Amarillo plant. Because of wartime labor shortages, women played a key role not only in the construction but also in the operation of the plant.

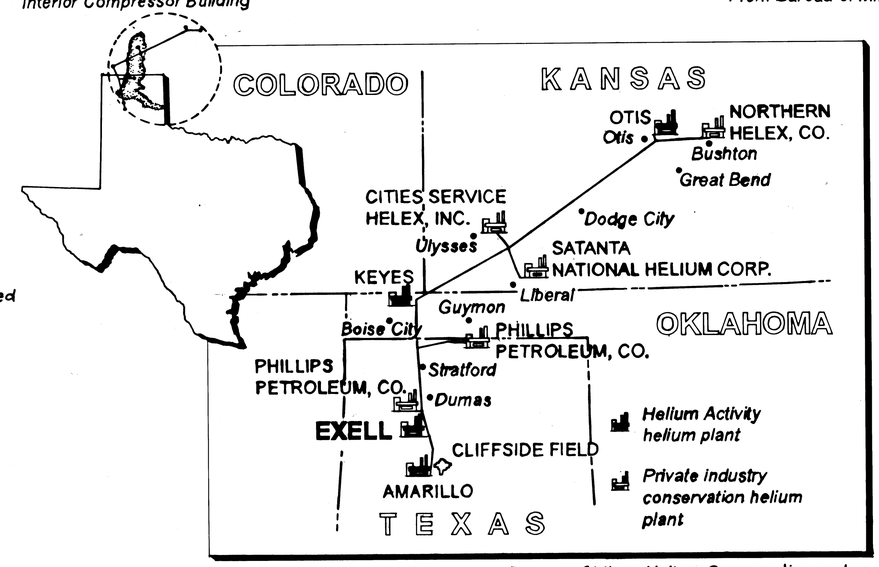
The Exell Helium Plant processed its first helium on March 13, 1943. From its inception, Exell outproduced the Amarillo plant because of the sheer size of its machinery and its improved technology. By 1944, Exell had produced 80 mmcf of helium, or more than one-third of the entire production of the Amarillo plant since 1929. By the end of the war, the Exell Helium plant showcased American industrial strength that hastened the defeat of Germany and Japan.

Helium was indispensable in ending World War II. Naval convoys used dirigibles to protect them from enemy submarines and warships. Manhattan Project scientists at Los Alamos, New Mexico, used helium to make the atomic bomb. Industrial welders needed helium to create an inert atmosphere for bonding magnesium, aluminum, stainless steel, as well as newer strategic metals such as, titanium and zirconium. Meteorologists depended on helium-filled balloons to gather data and predict weather. Helium used as a carrier for anesthetics proved to be a lifesaver. soldiers suffering from respiratory diseases were also administered helium.

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.



Interior Compressor Building *From Bureau of Mines photograph*



Bureau of Mines Helium Conservation system

Amarillo engineers modernized the Exell plant with a refrigerated charcoal purification system in 1946. When other wartime plants ceased operations by 1951, Exell became the federal helium activities' leading producer. The initiation of the so-called "space race," however, warranted a second major expansion of the federal helium program. In 1956-57, Congress appropriated $6 million for a subsequent Exell plant expansion, which increased annual production levels from 60 to 150 mmcf. During this expansion period, the bureau authorized the construction of another new plant at Keyes, Oklahoma. By 1959, the combined federal helium operations produced in excess of 500 mmcf.

During these decades, Exell and Keyes shipped their product to numerous Department of Defense, Atomic Energy Commission, Office of Defense Mobilization, Department of Interior, and defense contractor production and research facilities throughout the United States. In 1960, the Exell Helium Plant witnessed still another brief expansion to meet the mandates of Congress's proposed helium conservation program, not implemented until 1962. Equipped with six larger separation units (replacing the 10 smaller originals) and two new purification units, Exell consistently demonstrated a 300 mmcf annual production capability. At the peak of the federal helium program in 1967, Exell, combined with the other plants produced nearly 800 mmcf of helium.

After the United States lunar landing in 1969, helium requests dropped significantly throughout the early 1970s. As a result, the Amarillo plant ceased production entirely in 1970, followed by the closure of the Keyes, Oklahoma, plant a decade later. Only Exell survived to become the bureau's choice for the long-term production of federally manufactured helium from 1980 to 1996.

During World War II and the Cold War that followed, the Exell Helium Plant produced the lion's share of America's federally produced helium. As a national defense industry, Exell proved to be very successful in mobilizing the latest technology to insure efficiency in production. Exell helium was valued for laser research, medical applications, and aerospace and atomic energy experimentation. Without the strategic commodity, the United States would not have emerged as a dominant world power. While Exell plant's production terminated with the Helium Privatization Act of 1996, its legacy lives on through private helium producers who carry on the tradition and apply the technology first established by the federal helium program. Today, the Exell plant and its hundreds of loyal employees serve as testimony to our nation's cutting edge scientific contributions before, during, and after World War II.

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 and Conrad De Anda, team leader for closure operations at the Exell Plant, Masterson, 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), Dominggus Palilling (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.

HISTORIC AMERICAN ENGINEERING RECORD
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SHEET 1 of 9

U.S. BUREAU OF MINES, HELIUM PLANTS, EXELL HELIUM PLANT 1943
HIGHWAY 287N
MOORE COUNTY
TEXAS
MASTERSON

HELIUM ACTIVITIES RECORDING PROJECT

DELINEATED BY: DOMINGGUS PALILING 2001

NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

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