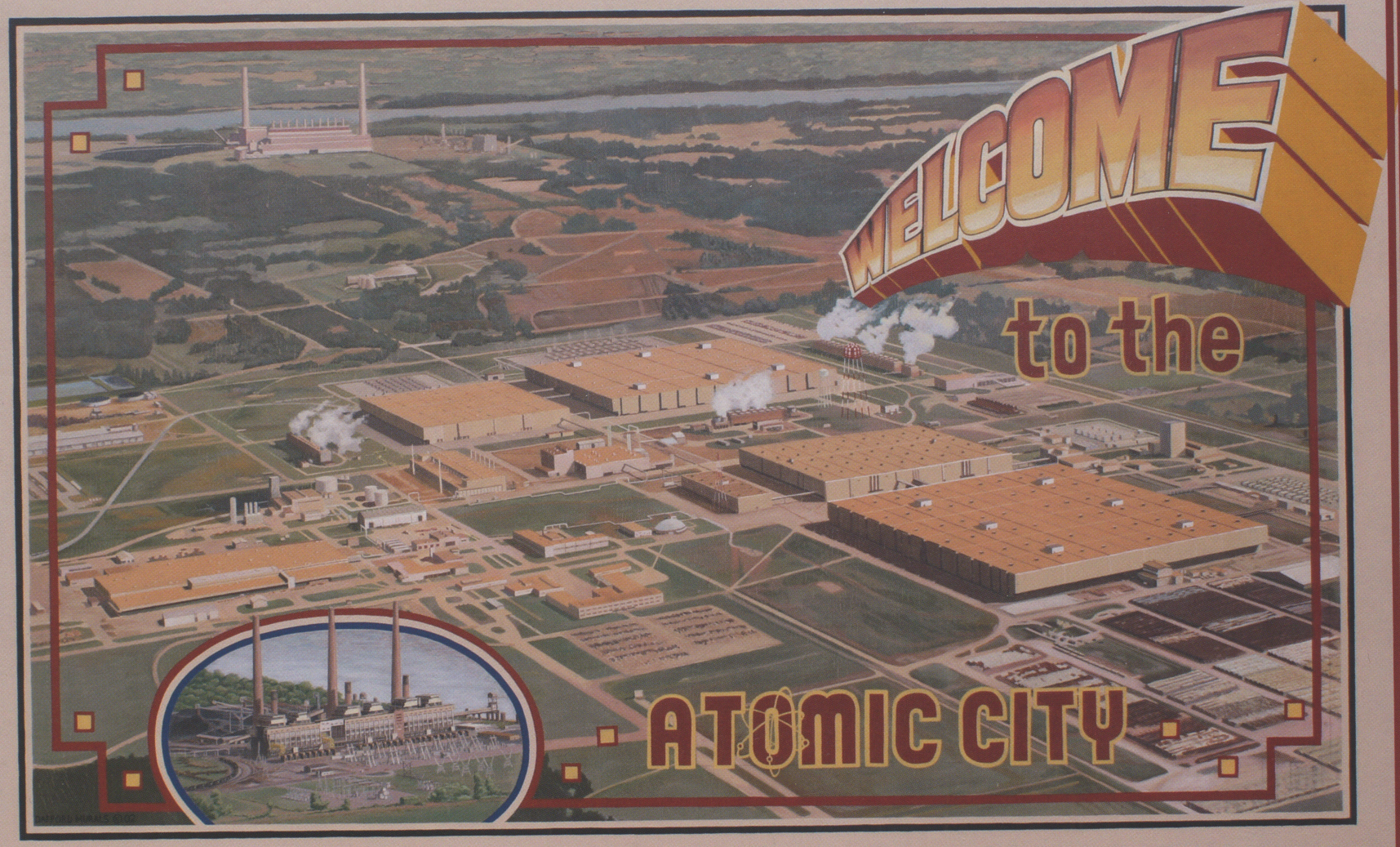
THE STORY OF THE PADUCAH GASEOUS DIFFUSION PLANT

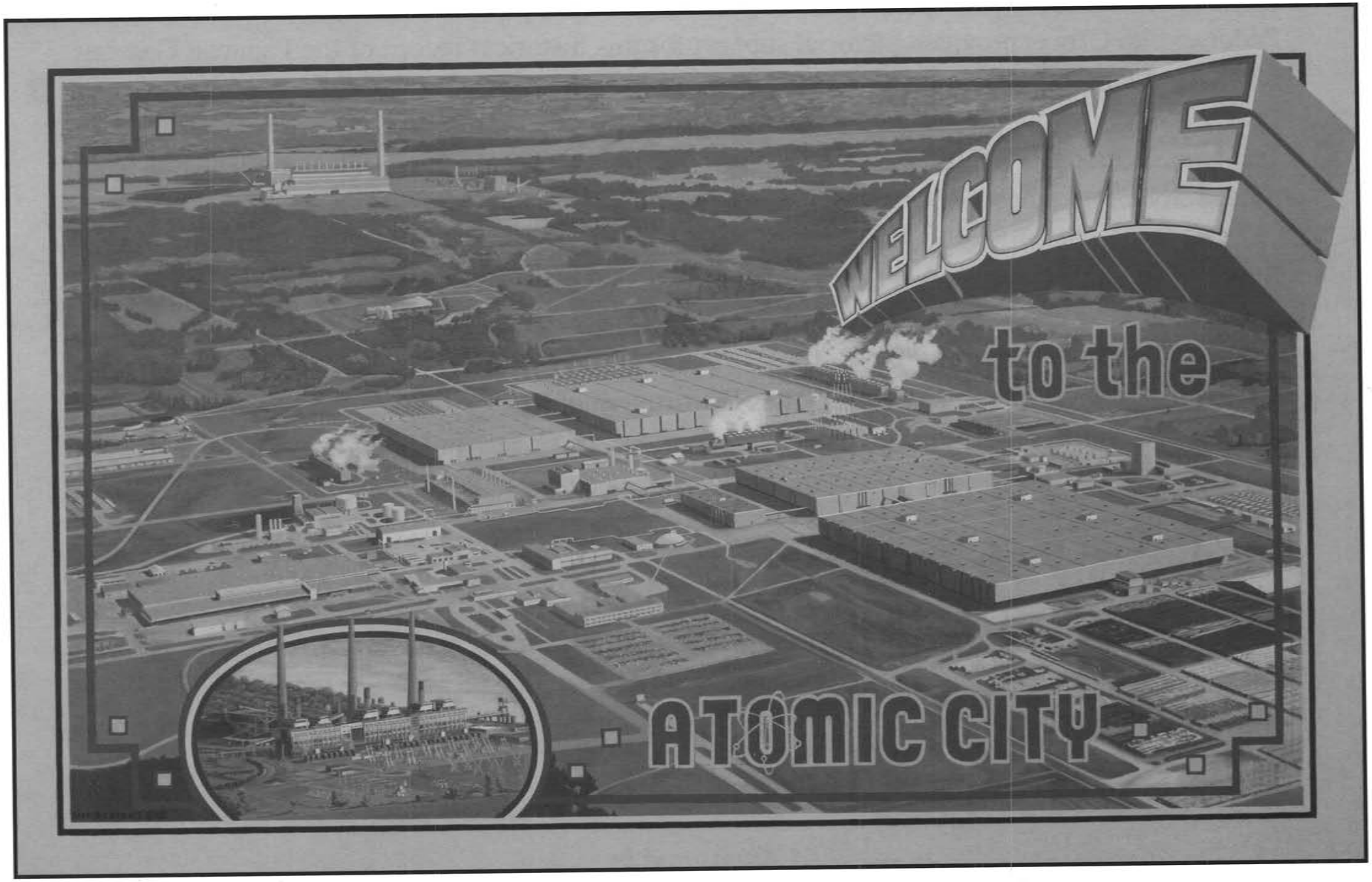


MEGAWATTS TO MEGATONS TO MEGAWATTS

Sponsored by

Swift Staley

THE STORY OF THE PADUCAH GASEOUS DIFFUSION PLANT



MEGAWATTS TO MEGATONS TO MEGAWATTS

Upon the recommendation of the Paducah Citizens Advisory Board, the Department of Energy, Paducah Site Office, provided pictorial support for this historical record of the Paducah Gaseous Diffusion Plant.

The United States Enrichment Corporation was also instrumental in providing information, photographs, and advice. Special recognition goes to Georgann Lookofsky and Valerie Render.

Babcock & Wilcox Conversion Services, LLC provided information and photographs for the DUF6 facility.

Photographs provided by the United States Department of Energy; the United States Enrichment Corporation; Babcock & Wilcox Conversion Services, LLC; Dafford Murals; and Paducah Wall to Wall unless otherwise noted.

Book design provided by Dave Moore.

Every effort was made in researching and writing this volume to make it as accurate as possible. Mistakes, however, are bound to have crept into the book. For these, the researchers, writers, and publisher apologize and hope readers will look beyond them to the treasure of the memories preserved herein.

INDEX

A BRIEF HISTORY

Photo courtesy of Adrian (BB) Freels

Covering 750 acres, the Paducah Gaseous Diffusion Plant was constructed from 1951 to 1956 as part of a United States Government program to produce highly enriched uranium to fuel military reactors and produce nuclear weapons. Enrichment at Paducah was limited to low levels, and the plant served as a "feed facility" for other defense plants in Oak Ridge, Tennessee, and Piketon, Ohio. (1) Officially named the Paducah Gaseous Diffusion Plant (PGDP), the plant began enriching uranium in September of 1952. By November of 1952 the first product was shipped to Oak Ridge, Tennessee. Employment has ranged from 1,200 to 2,200 people during the 60 years of continuous operation. It's mission changed in the 1960s, and it now produces enriched uranium for use in supplying fuel rods to the nation's 104 nuclear power reactors, as well as providing enriched uranium to foreign customers. North of the plant one can see the twin towers of the Shawnee Steam Plant, one of two power plants that were built specifically to provide energy to the Paducah Plant.

Over its lifetime, more than $5 billion have entered the regional economy through payroll wages, procurements, and taxes. Charitable organizations have benefited from the generous donations of employees and the operating contractors, namely Union Carbide, Martin Marietta, Lockheed Martin, and most recently the United States Enrichment Corporation.

Honolulu Star-Bulletin 1st EXTRA

WAR!

SAN FRANCISCO, Dec. 7.—President Roosevelt announced this morning that Japanese planes had attacked Manila and Pearl Harbor.

OAHU BOMBED BY JAPANESE PLANES

SIX KNOWN DEAD, 21 INJURED, AT EMERGENCY HOSPITAL

Attack Made On Island's Defense Areas

Hundreds See City Bombed

Names of Dead and Injured

Schools Closed

Editorial

Why was it necessary to build the Paducah Plant? The answer has its beginnings in World War II and the Korean Conflict.

On the morning of December 7, 1941, tragic events struck America. That morning Japanese planes attacked Pearl Harbor. Four American battleships: *Arizona, Oklahoma, West Virginia,* and *California*, and four smaller ships were sunk. Four battleships and 7 other ships were badly damaged. 188 planes of all types were destroyed and another 159 damaged. Over 3,500 of America's finest young men were killed or wounded. (2) America was at war with Japan. Before war's end, 108,504 American soldiers would lose their lives. (3)

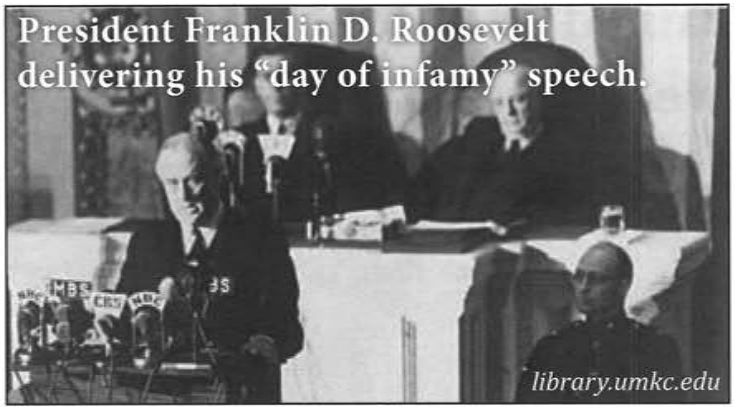
Three days later, America found herself involved in a war on two fronts when Italy and Germany declared war on the United States. The European Theater, which ultimately claimed the lives of 183,588 American soldiers, was fought and eventually won by conventional weaponry. (3)

It was not until atomic weapons were used on Japan at Hiroshima and Nagasaki that the war in the Pacific Theater came to a successful conclusion.

On December 8, 1941, residents of Paducah awoke to learn that the Japanese had attacked Pearl Harbor. President Franklin D. Roosevelt addressed Congress and the Nation with his now-famous "day of infamy" speech. Like the rest of the Nation, citizens of Western Kentucky rallied to support the war effort. Husbands, fathers, and brothers went to fight, while women replaced them in the factories at home.

Less than three months after the United States entered World War II, local residents first became aware of the government's intention to build a munitions plant west of Paducah. On February 27, 1942, the Paducah Sun Democrat carried the headline: *$30,000,000 Arms Plant to be Built in McCracken County*. The location remained secret until April 5, when a Federal Court granted the U. S. Department of Defense permission to acquire a 16,100 acre tract of land. (4) An explosives manufacturing facility would be built ten miles west of the city. Little did area residents know that, for them, this was just the beginning of a chain of events that would continue to have an impact on the area well into the twenty-first century.

The munitions factory would come to be known as the Kentucky Ordnance Works (KOW).



President Franklin D. Roosevelt delivering his "day of infamy" speech.


Senator Alben Barkley

IN THE DISTRICT COURT OF THE UNITED STATES
FOR THE WESTERN DISTRICT OF KENTUCKY
AT PADUCAH

NO. 144

UNITED STATES OF AMERICA — PETITIONER

vs — NOTICE TO VACATE

16,100 ACRES OF LAND, more or less,
situate in McCracken County,
Kentucky, Mrs. A. M. Anderson, et al. — DEFENDANTS

Please take notice that a petition in condemnation and Order of Immediate Possession covering the land which you own or occupy has been filed and entered in the office of the Clerk of the United States District Court for the Western District of Kentucky.

IT WILL BE ABSOLUTELY NECESSARY THAT YOU VACATE THIS LAND NOT LATER THAN 12 O'CLOCK NOON, APRIL 20, 1942.

You are further advised that if you have any questions to ask relating to the acquisition of your land, or if you desire to negotiate regarding the sale price of same, you should call immediately at the Kentucky Ordnance Works, Paducah, Kentucky.

Eli H. Brown III

Eli H. Brown, III
United States Attorney

April 3, 1942.

Two hundred and fifty families received Notice to Vacate letters which gave them ten days' notice to vacate their property. Families had just a few days to find somewhere new to live and move their belongings. Anything remaining on the property after noon of April 20 would become Government property. (4)

Few wanted to move from land that had been in the family for generations. While some families were able to move in with relatives who lived outside of the condemned area, others had no choice but to live in tents or garages until they could find more permanent housing. Moving at such short notice meant many personal belongings and items of furniture were abandoned. Meanwhile, the cancellation of key events such as the Heath High School play added to the sense of loss for the community. (4)

Charles Duncan was a young child when his family was forced to move from their property.

"They gave them ten days to vacate the property. It rained five of the ten days. We moved in with relatives."

Charles Duncan
Former KOW Resident
Paducah, Kentucky

Ruth Story was 18 years old when her family was evicted from the area. Her family was fortunate in that her uncle had recently built a coal shed at Grahamville and her father was able to make it habitable. It had never had coal in it, so they were able to move there. She said that they lost contact with former neighbors and friends because no one knew where their neighbors found accommodations.

"People had little time to prepare for moving, and alternate housing was nearly impossible to find."

Ruth Story
Former KOW Resident
Paducah, Kentucky

Wilma Bivin, who lived with her family on land which adjoined the condemned property, vividly remembers when people were forced off their land. Her grandfather was forced off his 60-acre family farm on which he had raised dark fired tobacco, strawberries, and dewberries for northern markets. He was compensated $4,600.

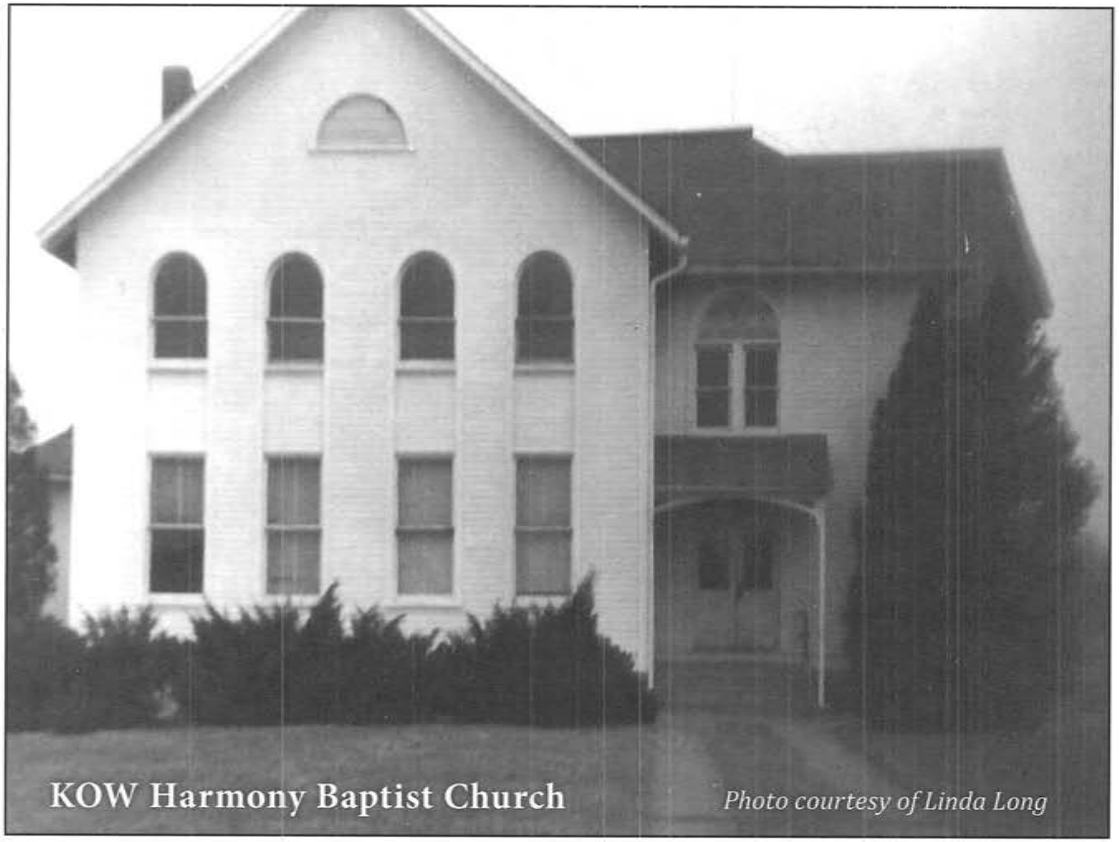
Some homes were moved, but most were torn down to make way for the new construction.

Wilkins Family

Photo courtesy of Wilma Bivin

"People were desperate and upset. My grandfather had to move in with relatives."

Wilma Bivin
Former KOW Resident
Heath, Kentucky



KOW Harmony Baptist Church

Photo courtesy of Linda Long

The Harmony Baptist Church congregation was forced to move, as the land the church sat on was also condemned. The congregation met in the old Heath High School gymnasium until the church building could be relocated.

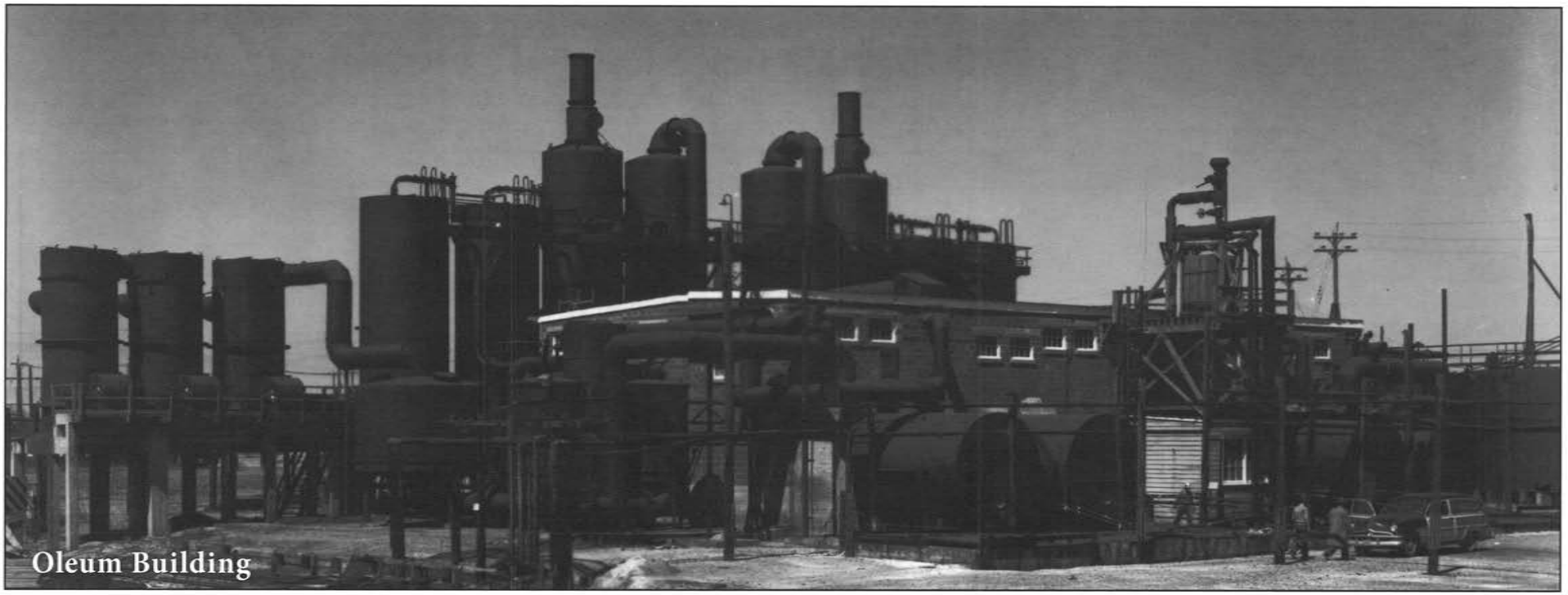
Agriculture was the primary occupation of local residents at that time. The harsh economy of the Great Depression years hit farmers especially hard. Many farmers struggled because of falling crop and land prices. Although many persons were dislocated by the KOW, the employment opportunities it brought to the area provided a positive impact to the local economy. (4)

"Harmony Baptist Church was located within the condemned area. Church services had been held regularly at the old church since 1875, but with the coming of the KOW, the last service in the building was held April 10, 1942."

Wilma Bivin
Former KOW Resident
Heath, Kentucky

"We moved from the family farm to Grahamville. Our bumper crop of strawberries was nearly ready to pick, but we weren't allowed to pick any. We left the beautiful apple and peach orchards behind. Dad had to get rid of our dairy herd. Moving wasn't easy."

Linda Long
Harmony Baptist Church Member
Grahamville, Kentucky



Oleum Building

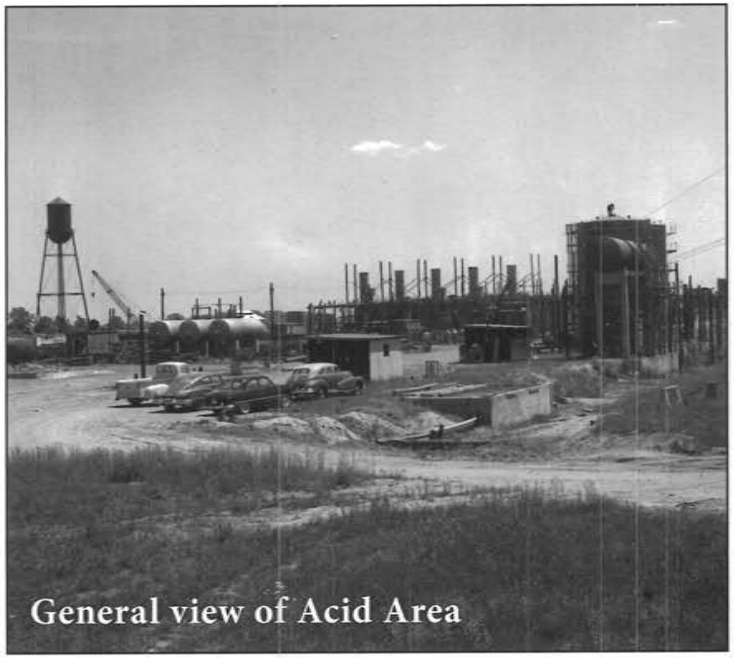
The site for the Kentucky Ordnance Works was largely composed of farmland and woodlands near the small community of Forrestdale in western McCracken County. The initial contract for the construction of this plant was for $4,128,490, and on March 10, 1942, the Rust Engineering Company was awarded the contract to build the facility. The Atlas Powder Company, a subsidiary of DuPont, was contracted to operate the plant. (5)

Construction began on April 15, 1942, and the first unit went into production on December 28, 1942. The plant was completed on April 30, 1943. The KOW was one of eleven munitions factories in the United States producing trinitrotoluene, more commonly known as TNT, for the war effort. In addition to the TNT plant, there was an oleum plant, a sellite plant, an ammonia oxidation plant, and a nitric acid plant. The production buildings stood on stilts, with lead floors and escape chutes. (4) Hundreds of workers were employed at the KOW during the war years. (5)

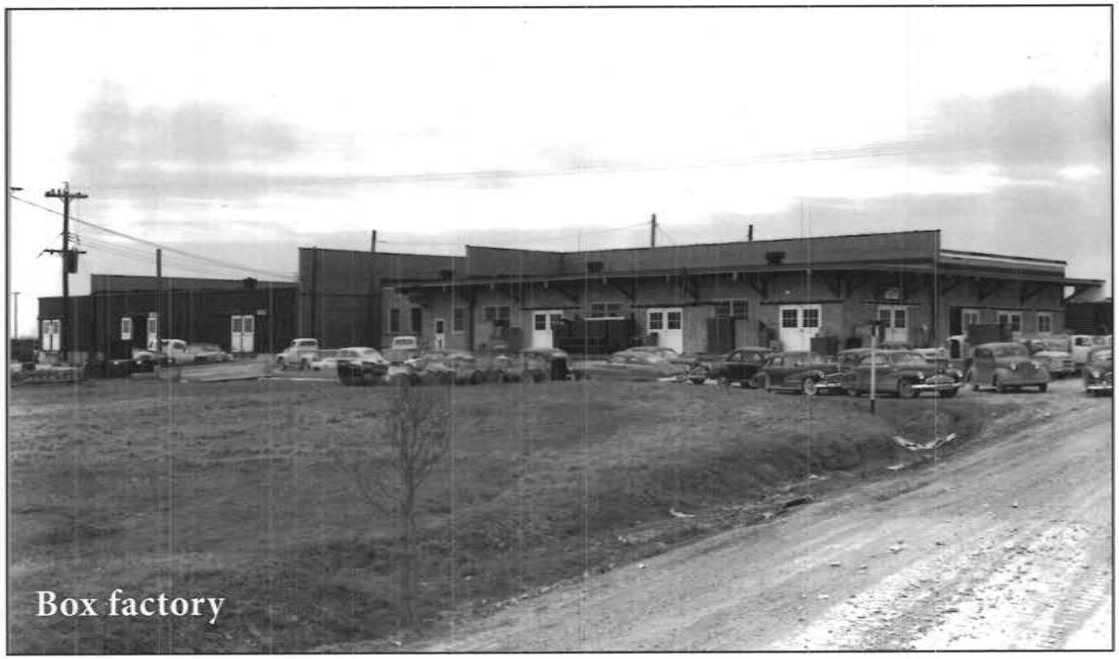
Six operational lines produced TNT and concentrated sulfuric acid for use in bombs, mines, torpedoes, and other munitions. (5) From the beginning of production through closure in 1946, the KOW produced nearly 196,490 tons of TNT. (6)

The plant was virtually self-sufficient with its own cafeteria which could seat 248, water and sewer systems, steam plant for electricity, hospital, laundry and box factory. The water system was one of the most modern in the state and is still in operation today, being used by the Paducah Gaseous Diffusion Plant. The plant also had its own railroad with 16 miles of track along with engineers. The "KOW Local," the train serving the private railroad, is the only place today where the name is still actively used. (4)

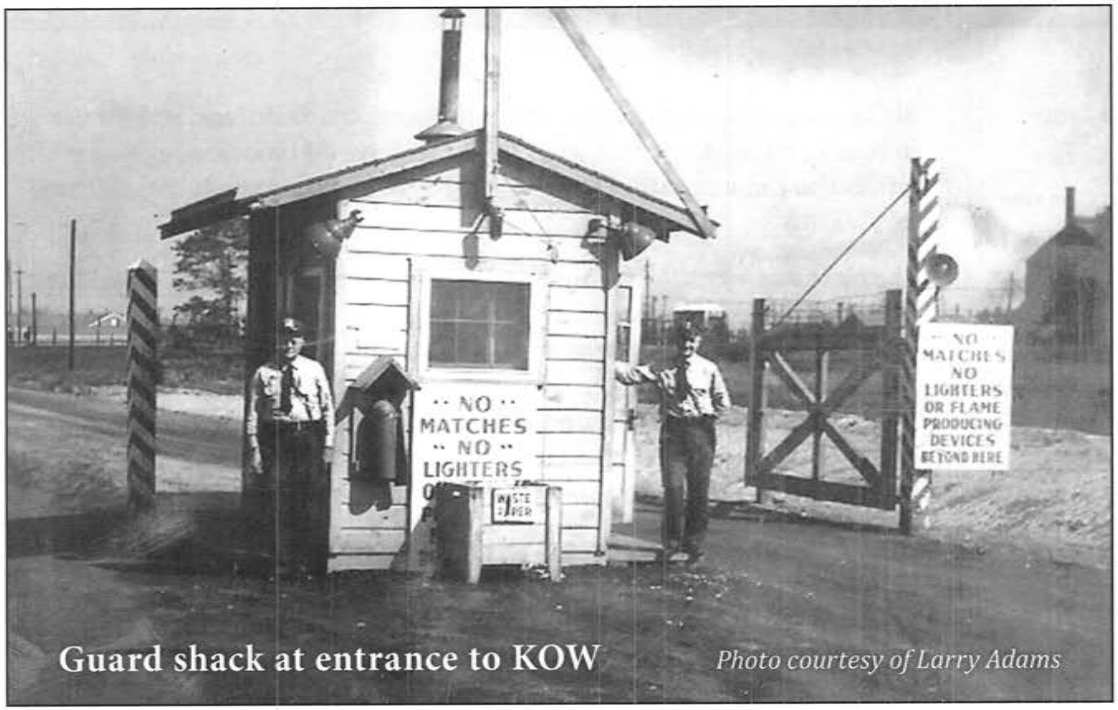
Operators making TNT received $1.10 per hour while the local labor wage averaged $.60 per hour. Employees had to wear white clothing, and once a month operators had to have a blood test to determine if any TNT had gotten into their system. Working with the TNT caused hair color change and skin color to turn yellow. (4)



General view of Acid Area



Box factory



Guard shack at entrance to KOW

Photo courtesy of Larry Adams

Upon closure, the government retained 4,000 acres of land which was used for the KOW facilities. This land would later become the base for the Paducah Gaseous Diffusion Plant.

The box factory was later used by F. H. McGraw, prime contractor during the construction of the Paducah Gaseous Diffusion Plant.

Regrettably, all the munitions manufactured for World War II could not bring peace to the Pacific Theater. Through European refugee scientists, America had learned of the feasibility of harnessing the power contained within the atom and had begun a top secret project, the Manhattan Project, to develop an atomic bomb. The program was administered through the Manhattan District of the U. S. Army Corps of Engineers.

ATOMIC BEGINNINGS

In 1938, scientists at the Kaiser Wilhelm Institute in Berlin split a uranium atom, thus trailblazing the way for nuclear fission, and the potential for atomic weapons.

A small group of physicists who had fled Europe recognized the dangers that could arise from the Berlin experiments. These scientists knew that, given sufficient time and resources, Nazi Germany would be able to create a super weapon — an atomic bomb. In the summer of 1939, three of these scientists, Leo Szilard, Eugene Wigner, and Edward Teller approached Szliard's old friend, Albert Einstein. Realizing that they alone did not have sufficient influence to reach President Roosevelt, they asked Einstein to write a letter to the President explaining the dangers. The Szliard-Einstein letter led to the creation of a secret uranium committee on October 19, 1939, and ultimately to the creation of the Manhattan Project on August 13, 1942. (7)

Albert Einstein
Old Grove Rd.
Nassau Point
Peconic, Long Island

August 2nd, 1939

F.D. Roosevelt,
President of the United States,
White House
Washington, D.C.

Sir:

Some recent work by E.Fermi and L. Szilard, which has been communicated to me in manuscript, leads me to expect that the element uranium may be turned into a new and important source of energy in the immediate future. Certain aspects of the situation which has arisen seem to call for watchfulness and, if necessary, quick action on the part of the Administration. I believe therefore that it is my duty to bring to your attention the following facts and recommendations:

In the course of the last four months it has been made probable - through the work of Joliot in France as well as Fermi and Szilard in America - that it may become possible to set up a nuclear chain reaction in a large mass of uranium,by which vast amounts of power and large quantities of new radium-like elements would be generated. Now it appears almost certain that this could be achieved in the immediate future.

This new phenomenon would also lead to the construction of bombs, and it is conceivable - though much less certain - that extremely powerful bombs of a new type may thus be constructed. A single bomb of this type, carried by boat and exploded in a port, might very well destroy the whole port together with some of the surrounding territory. However, such bombs might very well prove to be too heavy for transportation by air.

The United States has only very poor ores of uranium in moderate quantities. There is some good ore in Canada and the former Czechoslovakia, while the most important source of uranium is Belgian Congo.

In view of this situation you may think it desirable to have some permanent contact maintained between the Administration and the group of physicists working on chain reactions in America. One possible way of achieving this might be for you to entrust with this task a person who has your confidence and who could perhaps serve in an inofficial capacity. His task might comprise the following:

a) to approach Government Departments, keep them informed of the further development, and put forward recommendations for Government action, giving particular attention to the problem of securing a supply of uranium ore for the United States;

b) ,which is at present being carried on within the limits of the budgets of University laboratories, by providing funds, if such funds be required, through his contacts with private persons who are willing to make contributions for this cause, and perhaps also by obtaining the co-operation of industrial laboratories which have the necessary equipment.

I understand that Germany has actually stopped the sale of uranium from the Czechoslovakian mines which she has taken over. That she should have taken such early action might perhaps be understood on the ground that the son of the German Under-Secretary of State, von Weizsäcker, is attached to the Kaiser-Wilhelm-Institut in Berlin where some of the American work on uranium is now being repeated.

Yours very truly,
A. Einstein
(Albert Einstein)

In the summer of 1942, Colonel Leslie Groves was appointed to head the Manhattan Project. He was widely respected as intelligent, hard driving, and efficient. Groves appointed physicist Robert Oppenheimer as the project's scientific director. (7)

The project pursued two paths toward the creation of two types of atomic weapons: A uranium-based bomb and a plutonium-based bomb. Scientists had determined that a uranium bomb could be produced using 25 pounds of highly enriched uranium-235, and would produce an explosion equivalent to that of 1,800 tons of TNT. Since U-235 is only 0.7% natural uranium, various physical methods were considered to separate it from its more plentiful U-238 isotope. Gaseous diffusion emerged as the technology of choice. The U-238, however, could be used to produce plutonium in a cyclotron or in a nuclear "breeder" reactor. (7)

The project succeeded in developing and detonating three nuclear weapons in 1945: A test detonation of a plutonium implosion bomb on July 16 near Alamogordo, New Mexico; an enriched uranium bomb code-named "Little Boy" detonated on August 6 over Hiroshima, Japan; and a second plutonium bomb code-named "Fat Man" detonated on August 9 over Nagasaki, Japan. (7)

During the project, scientists at more than thirty different sites in the United States, Canada, and the United Kingdom collaborated in secret. However, the project was carried out largely in three secret scientific cities which were established for primary research and production. (7)

Oak Ridge, Tennessee mainly produced U-235 in the gaseous diffusion buildings at K-25. Another method, electromagnetic isotope separation was employed, but was abandoned in favor of gaseous diffusion after the war. Hanford, Washington hosted nuclear reactors cooled by the Columbia River, and was the plutonium production center. Los Alamos, New Mexico, chosen primarily for its remoteness, was responsible for final assembly of the bombs, mainly from materials and components produced by other sites. (7)

K-25 Gaseous Diffusion Plant at Oak Ridge, Tennessee, was the prototype for the PGDP.

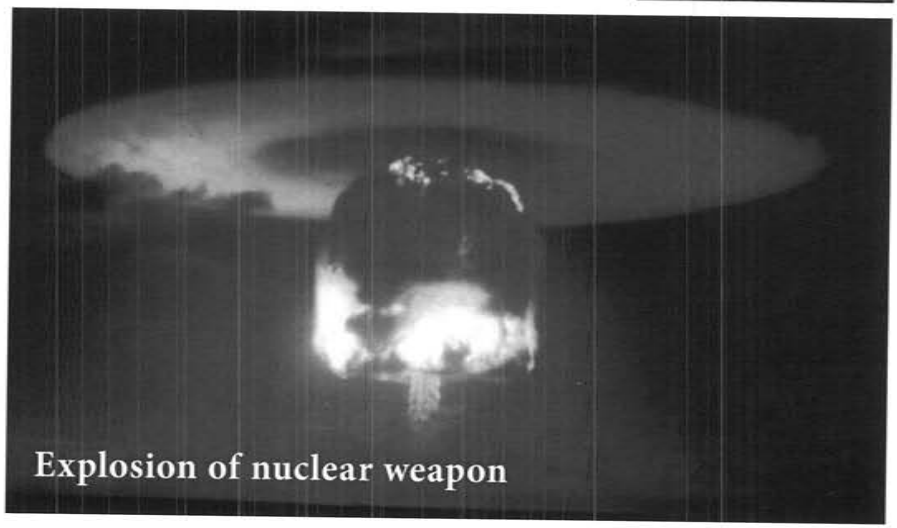
"When I was in the Navy during World War II, after the Enola Gay dropped the first atomic bomb on Hiroshima and before Japan surrendered, we would fly off the aircraft carrier inland over Japan. When we found prisoner of war camps we dropped food, clothing, cigarettes, candy, anything we thought they might need. They called these flights "angel of mercy" flights. I never will forget those flights. The POWs knew they soon would be liberated. I never dreamed that one day I would be working at a place that had something to do with atomic bombs, enriching uranium."

Adrian (BB) Freels
Retired
Paducah, Kentucky

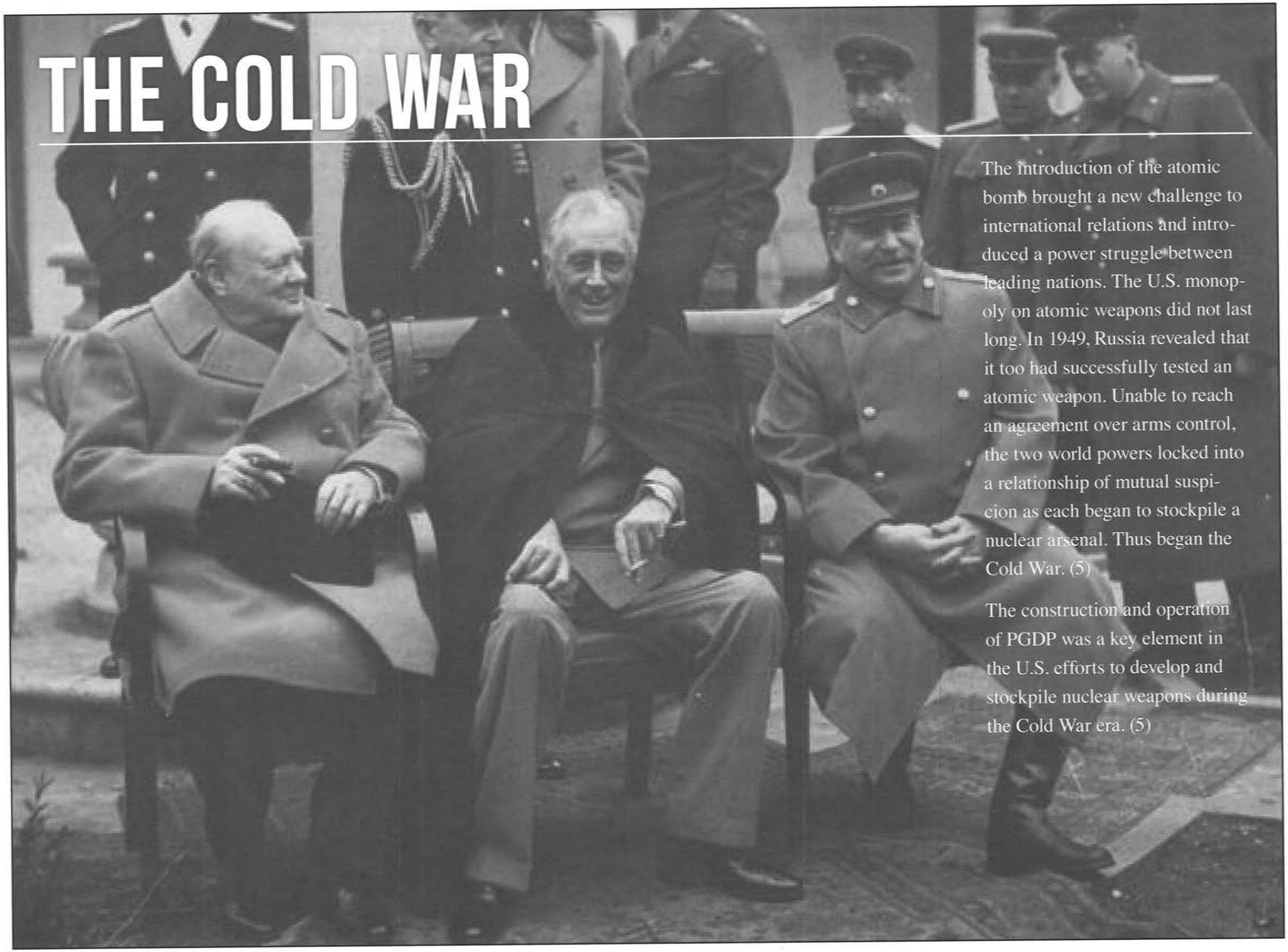

The U.S. Nuclear Weapons Complex
Nuclear weapons production occurred from World War II until the late 1980s
Hanford Site
Fuel Fabrication, Irradiation, and Chemical Separation; Component Fabrication
Idaho National Engineering Laboratory
Chemical Separation
Lawrence Livermore National Laboratory
Weapons Research and Design
Nevada Test Site
Rocky Flats Plant
Warhead Triggers
Los Alamos National Laboratory
Weapons Research and Design
Sandia National Laboratories
Weapons Engineering
Waste Isolation Pilot Plant
Pantex Plant
High-Explosives Fabrication and Final Warhead Assembly and Disassembly
Burlington Assembly Plant
Kansas City Plant
Electronic, Mechanical, and Plastic Components
Weldon Spring
Uranium Refinery, and Metal Foundry
Fernald Plant
Uranium Refinery, Metal Foundry and Machining Plants
Mound Plant
Actuators, Igniters and Detonators
Portsmouth Plant
Uranium Enrichment
Paducah Plant
Uranium Enrichment
Oak Ridge Reservation
Components of Highly Enriched Uranium, Depleted Uranium and Lithium Deuteride and Uranium Enrichment
Savannah River Site
Fuel and Target Fabrication, Irradiation, and Chemical Separation; Tritium Production
Pinellas Plant
Neutron Generators
Amchitka Island
Bikini and Eniwetok Atolls
Weapons Design
Testing
Nuclear Weapons Production

"I was stationed in Belgium when the war was over in Germany on May 8, 1945. They dropped the first bomb, and then the second, and the war was over August 15 in Japan. I was sailing for Japan on the 28th from Europe if the war hadn't been over; we were headed to Manila. They told us they expected to lose 40,000 men trying to establish a beach head. The bomb probably saved me."

Fred Buckley
Retired
Kevil, Kentucky

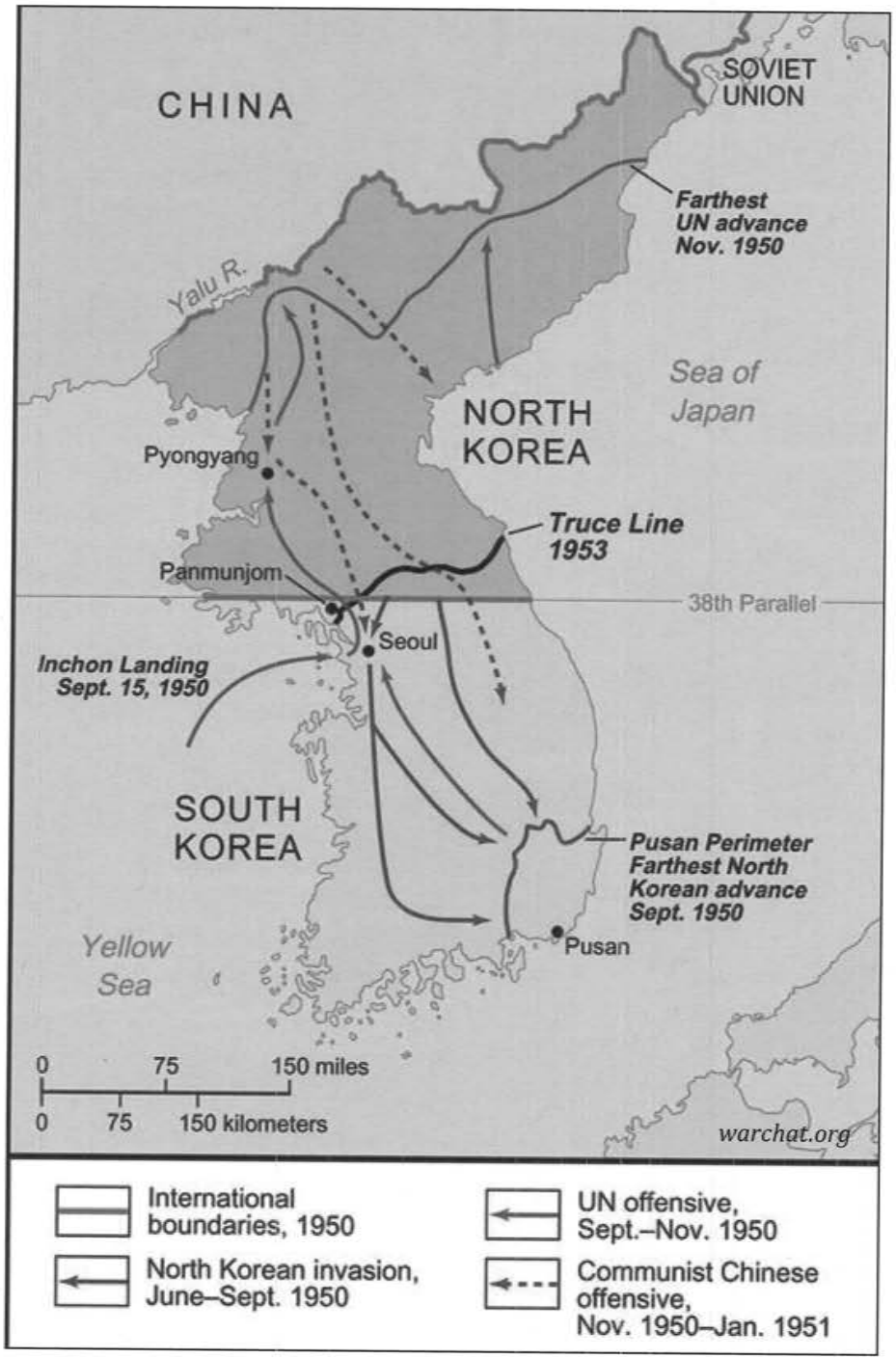

Explosion of nuclear weapon

THE COLD WAR



The introduction of the atomic bomb brought a new challenge to international relations and introduced a power struggle between leading nations. The U.S. monopoly on atomic weapons did not last long. In 1949, Russia revealed that it too had successfully tested an atomic weapon. Unable to reach an agreement over arms control, the two world powers locked into a relationship of mutual suspicion as each began to stockpile a nuclear arsenal. Thus began the Cold War. (5)

The construction and operation of PGDP was a key element in the U.S. efforts to develop and stockpile nuclear weapons during the Cold War era. (5)



The world powers of the day would soon face each other in Korea. On June 25, 1950, North Korean troops crossed the nation's 38th parallel and began pushing their way toward the sea, easily overcoming the Republic of Korea forces. The United States, along with assistance from 20 other countries, came to the aid of South Korean forces and repelled the North Korean attacks, driving the North Korean forces well north of the 38th parallel. China entered the conflict by coming to the aid of North Korea, and Russia provided material aid, pushing the international forces aiding South Korea south of the 38th parallel. Fighting ended July 27, 1953. (8)

With world tensions rising, President Harry Truman decided to increase research and development of nuclear weapons. In the fall of 1950, a vast expansion program to meet national security needs was developed. In the end, it was decided that a second gaseous diffusion plant would be built. (5)

As part of the effort to double the Nation's enrichment capacity, the National Security Resources Board was instructed to designate power areas within a strategically safe area of the United States. Leaders decided that it was in the best interest of national security if the locations for its enrichment capabilities were dispersed across the country. The National Security Resources Board compiled a list of eight areas that would be strategically suited to the creation of a new plant, based upon security and electric and water supplies. Of the eight potential sites, four were in Kentucky. The other potential sites were located in Louisiana and Arkansas. (5)

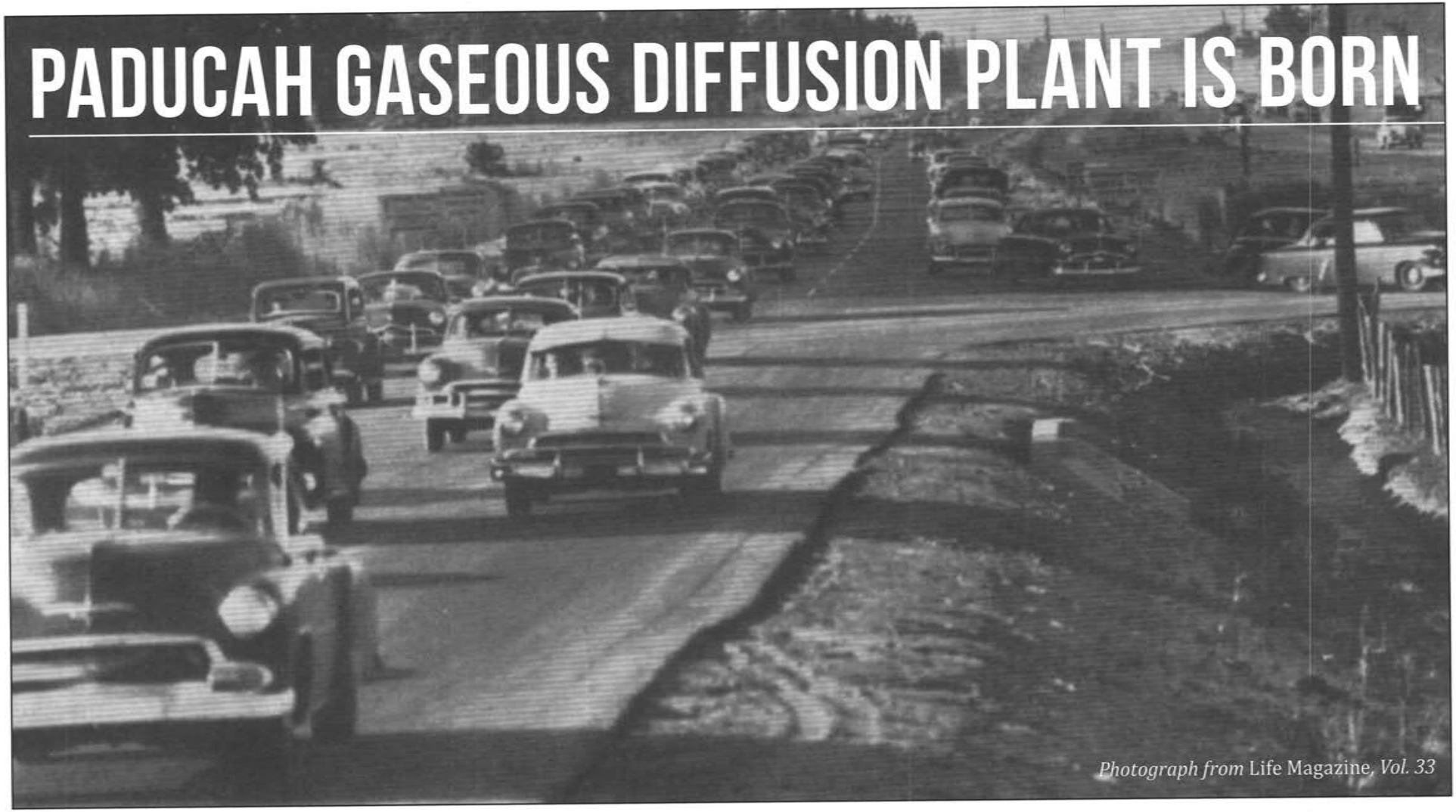
Potential sites had to meet very specific criteria. The need for secrecy and a wish to avoid purchasing further land meant that only existing federal government-owned properties were considered. A readily available supply of coal or oil would be necessary to meet the plant's vast energy consumption. Nearby urban centers could provide a workforce, and transportation facilities, able to deal with the influx of materials, must be close by. (9)

Vice-President Alben Barkley, a Paducah native, did his best to promote the closed KOW site in McCracken County. Experts visited each site before making their decision. Impressed by the strategic location and geographic advantages of McCracken County, they recommended the site immediately after visiting it in October. (9)

On October 18, 1950, the Atomic Energy Commission (AEC) approved the Paducah site for uranium enrichment operations, formally requesting that the Department of the Army transfer the site from the General Services Administration to the AEC. The Paducah Gaseous Diffusion Plant would produce low enriched uranium which would be further enriched at other AEC facilities at Oak Ridge, Tennessee, and Portsmouth, Ohio. (9)

Flyover of site under consideration. Notice the airplane wing in the lower right portion of the picture.

PADUCAH GASEOUS DIFFUSION PLANT IS BORN



Photograph from Life Magazine, *Vol. 33*

Paducah is a town whose name was formed out of Chickasaw Indian culture. It is a town where more people have passed by than have stayed. It is also a great place to live.

Paducah is nestled on the Ohio River and is influenced by the Tennessee, Cumberland, and Mississippi Rivers. The town has grown and thrived as a transportation center for raw products and agriculture goods due to the river and rail traffic and rural farm lands of Western Kentucky, Southern Illinois, and Southeast Missouri.

The town has suffered fires, floods, and wars, along with several economic depressions, but in December 1950 the people of the Paducah area somehow laid their thoughts and memories of the past away and thought of the future with an unknown and hard to conceive job opportunity. What happens to a community when an atomic plant moves in?

The Paducah Sun-Democrat

Paducah, Ky., Friday Evening, December 15, 1950

4 Editions Daily—2 Sunday

AEC To Build A-Plant At KOW Site

Chinese Reds Drive Into UN Beachhead

Activity Expected On Northwest Front

Building Force Of 10,000 May Be Required

Cost Set At $500,000,000; 1,600 Permanent Jobs Expected

The Atomic Energy Commission officially announced today that it will build a huge new plant at Kentucky Ordnance Works near Paducah.

The House appropriations committee disclosed at about the same time that the project is expected to cost $500,000,000. The committee has been considering funds for a $1,050,000,000 expansion program for atomic production facilities, of which the Paducah plant will be a part.

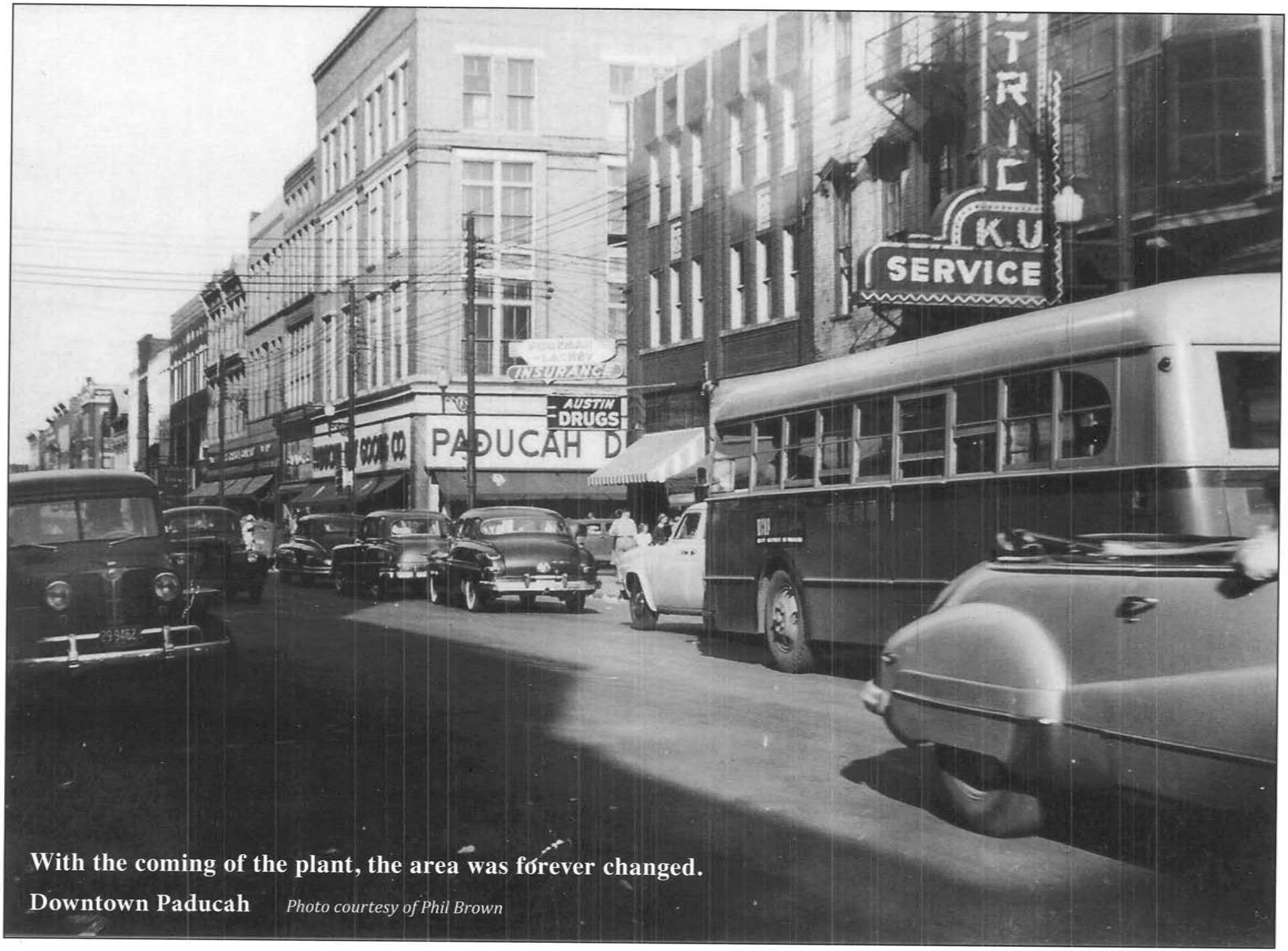
The AEC said the Kentucky site will cover about 5,000 acres, "a considerable part of which will be obtained through purchase," around the present Kentucky Ordnance Works, 16 miles west of Paducah.

Headlines of Western Kentucky newspapers all shared the same news on December 15, 1950: "AEC to Build A-Plant at KOW Site". The House Appropriations Committee announced that a huge new gaseous diffusion plant would stand on 5,000 acres of land near Paducah, on the site of the former Kentucky Ordnance Works and adjacent purchased land. The facilities already in place, as well as the hydroelectric plant at the Kentucky Dam and the proximity of transportation hubs, made it an ideal location. Area residents had no way of anticipating the change to come to the region following the announcement. The boom was on! The threat to the United Nations forces in Korea and the United States derived from the entry of China into the war in Korea had to be countered. The chosen deterrent was to increase production of atomic bombs, and to assure North Korea, China, and Russia that the United States was prepared to use them. As in the past, the local citizens of Paducah and the region rose to the challenge.

Downtown Paducah *Photo courtesy of Phil Brown*

After the announcement was made, Dr. Ray Mofield of Murray State University wrote that "the year 1950 ended with feverish activity" in Paducah. All over town, empty rooms began to fill. Locals noted that they encountered more strangers on the streets. The Christmas shopping season was one of the most profitable in memory. An increasing number of house trailers came rolling in, mostly with license plates from Tennessee, Oklahoma, and Texas. (10)

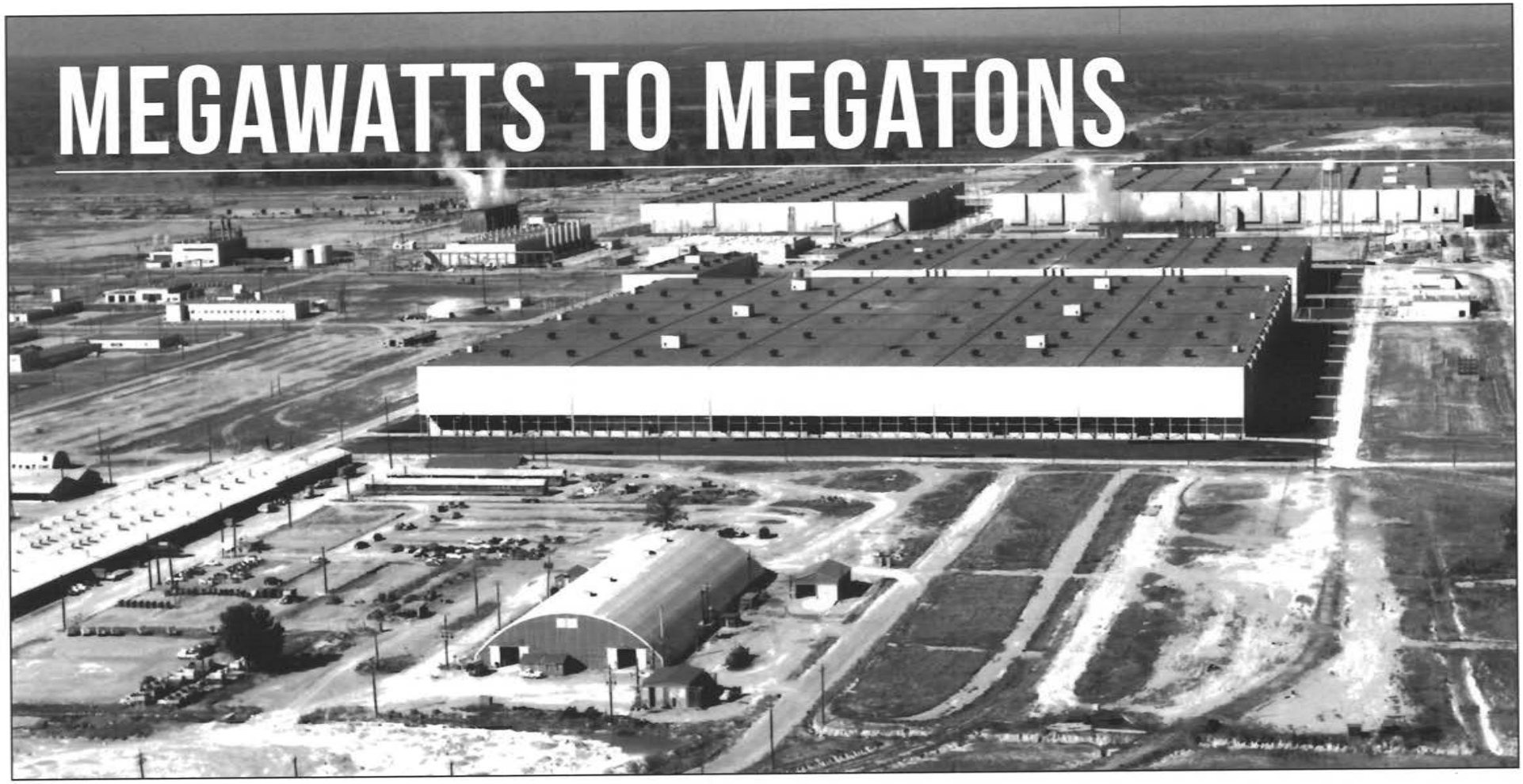
Three days prior to Christmas, AEC announced that the prime contractor for the big project would be F. H. McGraw and Company of Hartford, Connecticut, and that Kenneth Dunbar, who later supervised the construction of the Portsmouth Gaseous Diffusion Plant in Ohio, would be Paducah general manager. A major subcontractor to the AEC during the 1940s and 1950s, Giffels and Vallet, Inc., of Detroit, Michigan, was assigned the responsibility of designing the larger process buildings. The firm was also responsible for the design and construction supervision of several buildings and facilities associated with the Manhattan Project site in Hanford, Washington. (10)



With the coming of the plant, the area was forever changed.

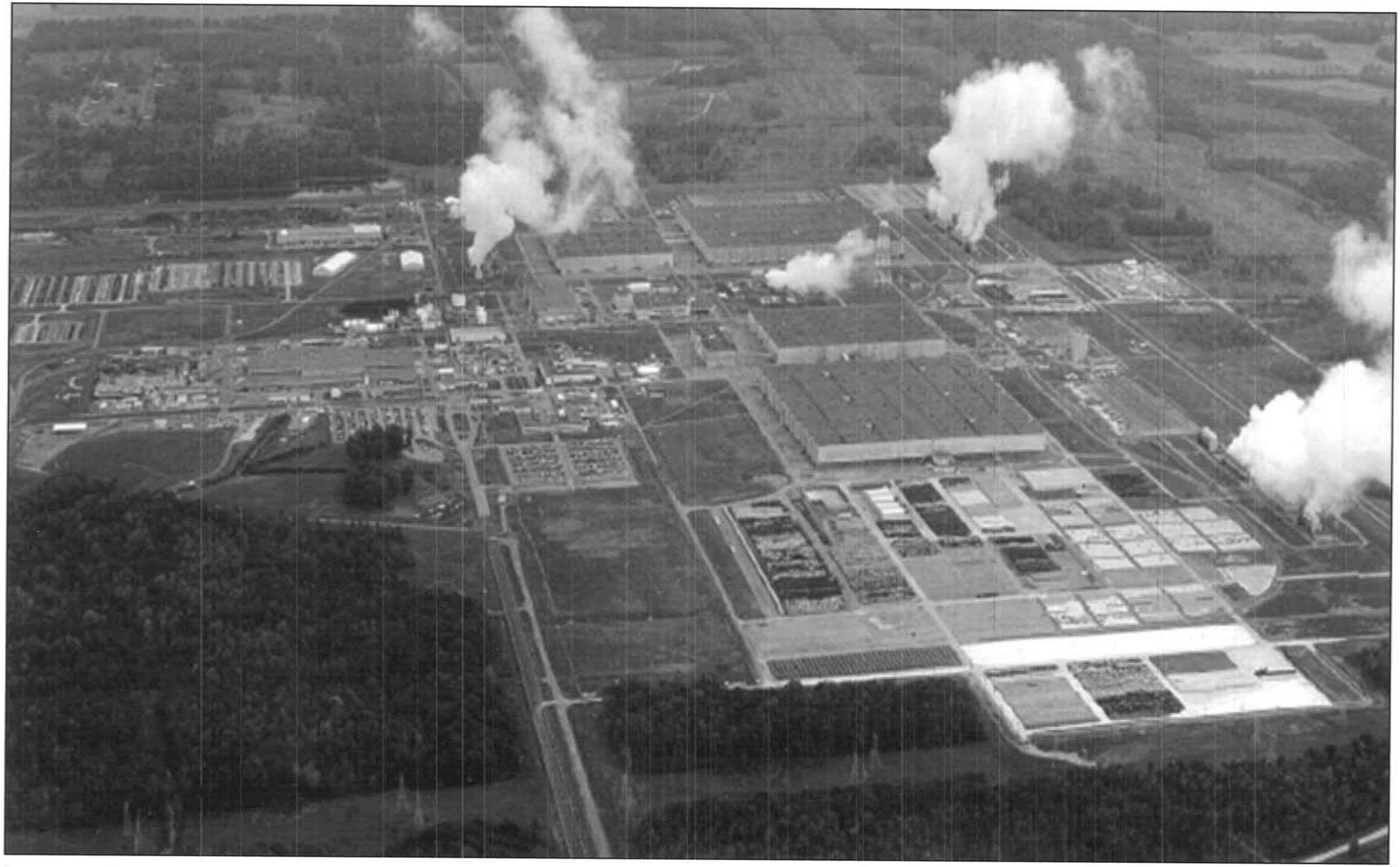
Downtown Paducah *Photo courtesy of Phil Brown*

MEGAWATTS TO MEGATONS



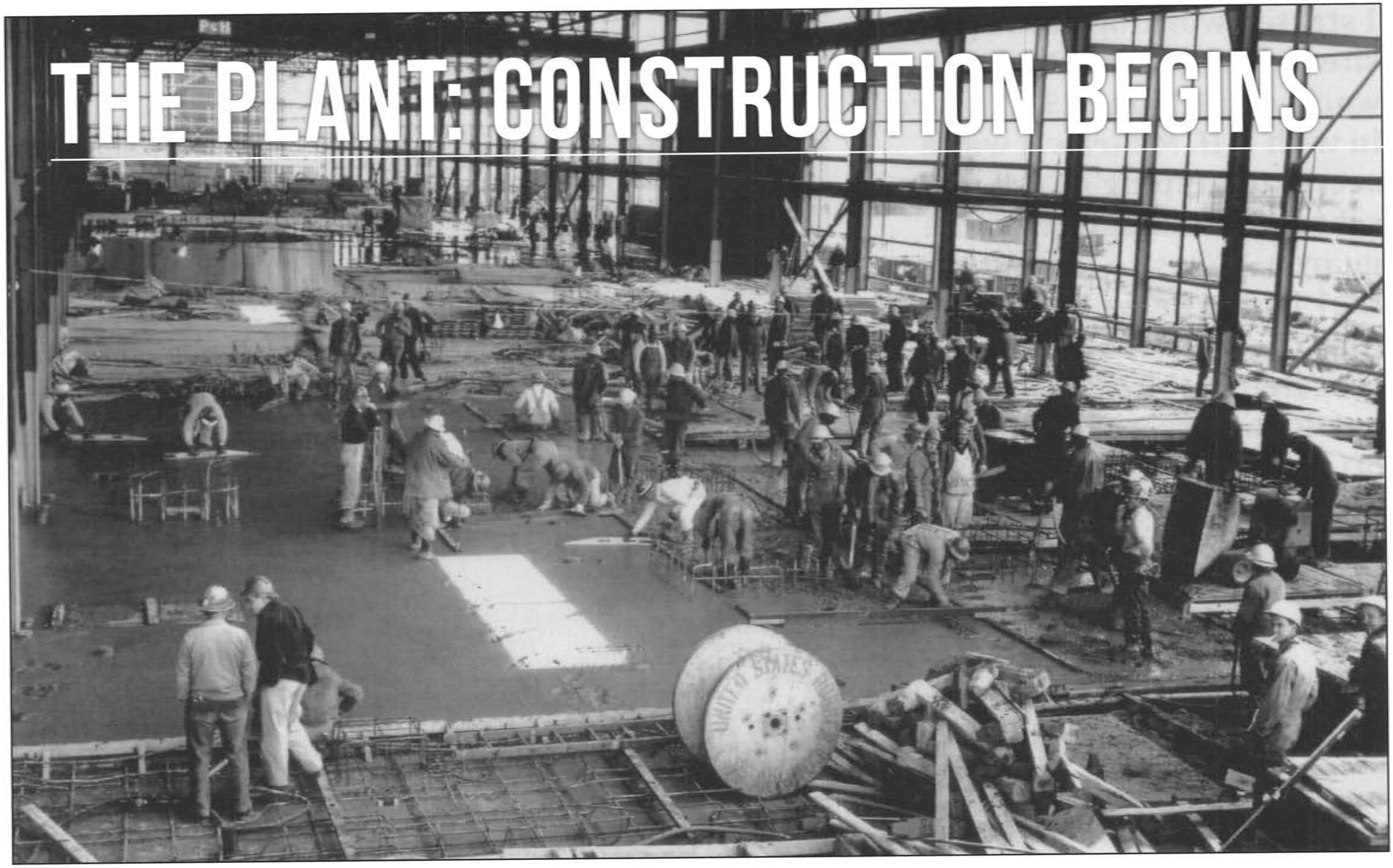
"We reached a point where C-331 was ready to start up a cell. A lot of managers came down to C-532 Relay House for this event. They were in contact with the power supplier, Electric Energy, Inc., I believe it was EEI that put in the first power. It was quite a momentous occasion."

C. O. Hays
Retired
Paducah, Kentucky



The new plant would require enormous amounts of electricity to keep the huge motors and other equipment running. Once operational, the equipment would turn megawatts of electricity into megatons of enriched uranium. The low enriched uranium would be further enriched at other government facilities for use in nuclear reactors and nuclear weapons. Enriched uranium produced by the plant continued to be used primarily for nuclear weapons until the 1960s. Thereafter, the enriched uranium produced at the plant shifted to commercial nuclear plants as nuclear energy emerged as an important power source in the United States. (5)

THE PLANT: CONSTRUCTION BEGINS



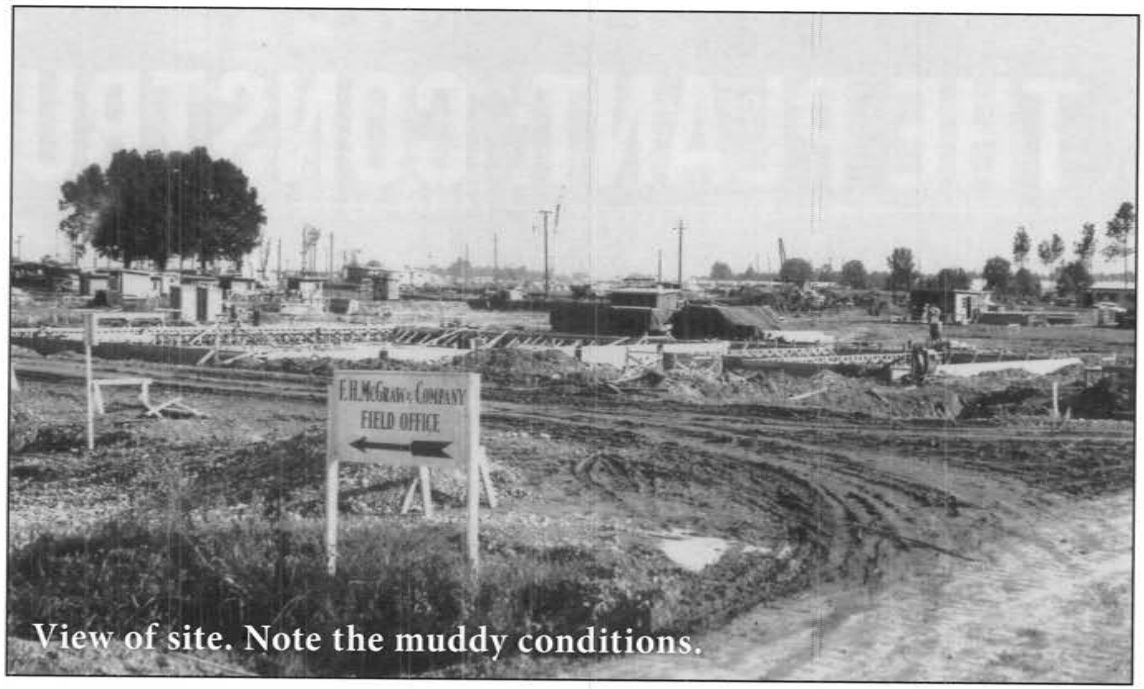
Construction at the site began January 2, 1951, with the demolition of KOW buildings and the repair of the abandoned KOW railroad line. Already owning the 4,000-acre KOW site, the AEC purchased an additional 3,335 acres for the construction of the gaseous diffusion plant. The first phase of the mammoth construction project was completed in 1952.

Each building in the complex was identified with the letter "C" followed by a distinct identification number. The letter 'C' was originally employed by the Atomic Energy Commission to distinguish the Paducah Plant from the many other projects that it was managing, and the building prefix continues to the present day.

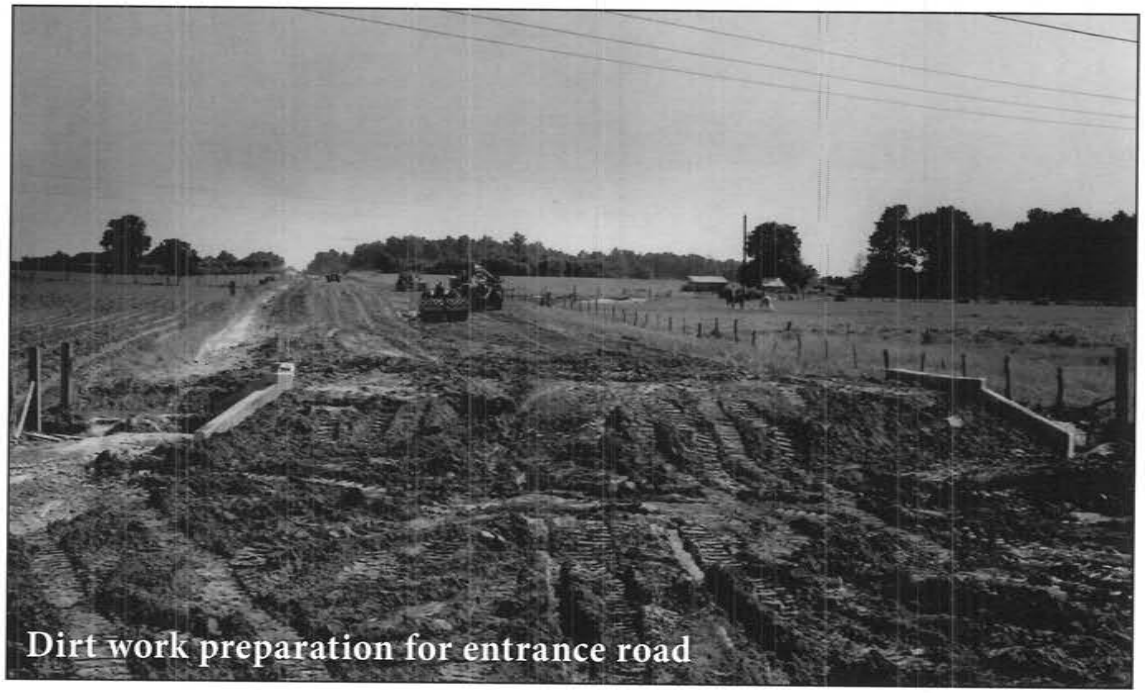
"I started working at the plant site on January 8, 1951, and worked until June 1952. I hired in with F. H. McGraw. I was a secretary, typing all the shift schedules and duties for the guards. It was so low out there they had to bring in tons and tons of dirt to fill in. The bottom step of the new Guard headquarters was about 3 feet off the ground. They really had to build that ground up."

Marie Johnson
Retired
Paducah, Kentucky

Surveying C-535



View of site. Note the muddy conditions.

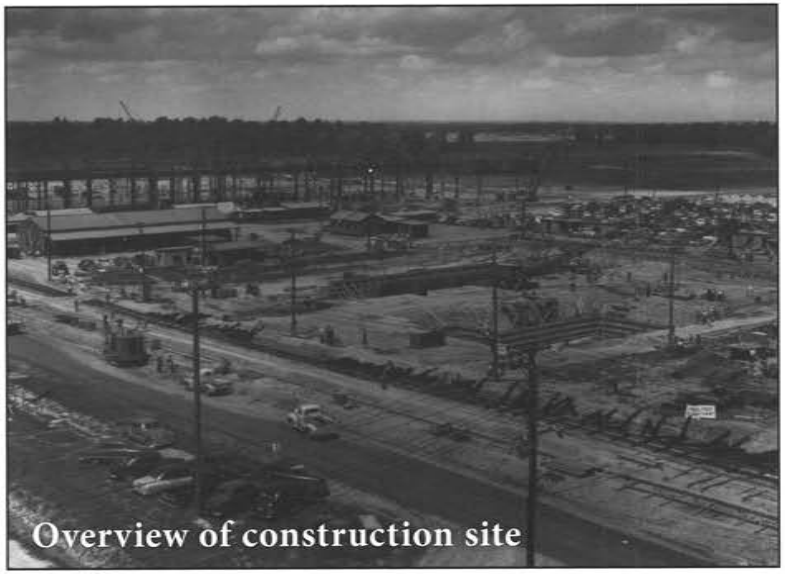


Dirt work preparation for entrance road

The number of construction workers employed to build the plant was 23,000 representing 19 crafts. An additional 6,000 were employed at TVA's Shawnee Steam Plant and Electric Energy, Inc. plant sites.

"Every yard had 1 or 2 trailers in the front yard at LaCenter, and the American Legion Fair Grounds turned into a trailer park. Trailers were parked so close that people could barely open their doors."

Neil Lawler
Former LaCenter Student
Paducah, Kentucky



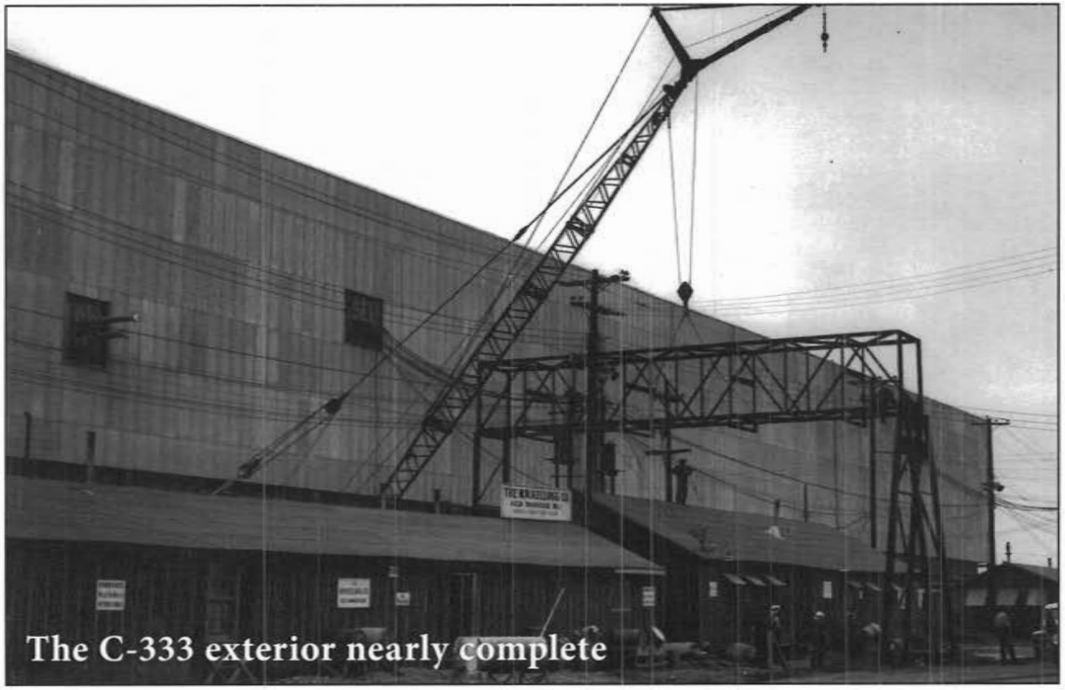
Overview of construction site

Quitting time, Paducah Gaseous Diffusion Plant

TVA workers

Photograph from Life Magazine, *Vol. 33*

The C-333 building steel is being set in place.



The C-333 exterior nearly complete

"When shipments arrived at the Kevil rail depot, goods destined for the Plant were addressed: AEC Kevil Plant. It didn't take long for that to be changed to the AEC Paducah Plant."

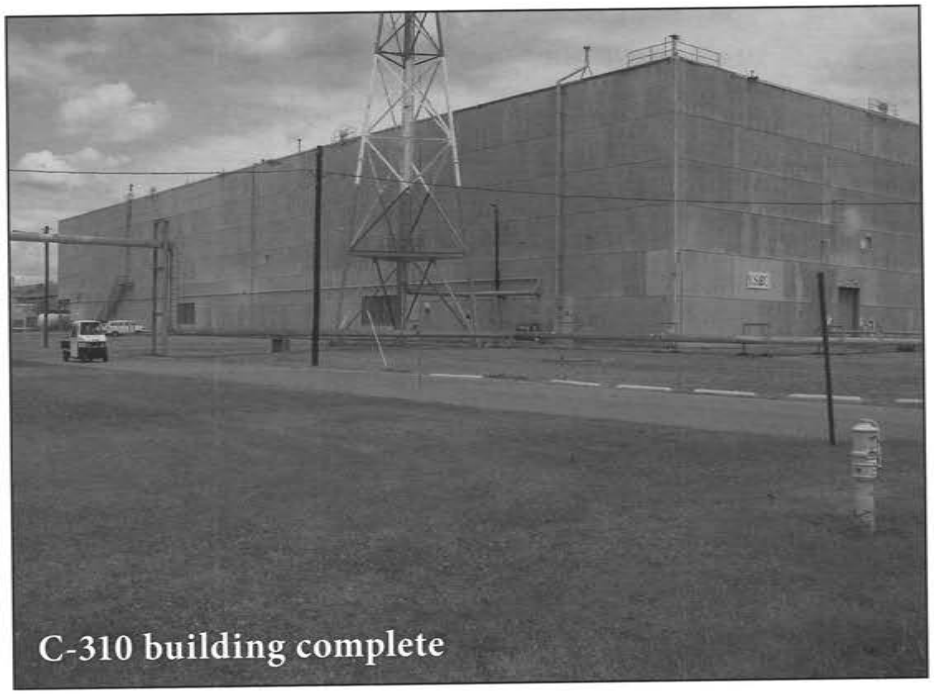
Clyde Elrod
Retired
Kevil, Kentucky

The main uranium enrichment process is accomplished in the four large diffusion buildings, know as cascades. Built during the first phase of construction were the C-333 and C-331 Gaseous Diffusion Process Buildings, the C-310 Purge and Product Withdrawal Building, the C-315 Surge and Waste Building, the C-300 Central Control Building, and the C-410 and C-420 Uranium Hexafluoride (UF6) Feed Plant. (11)

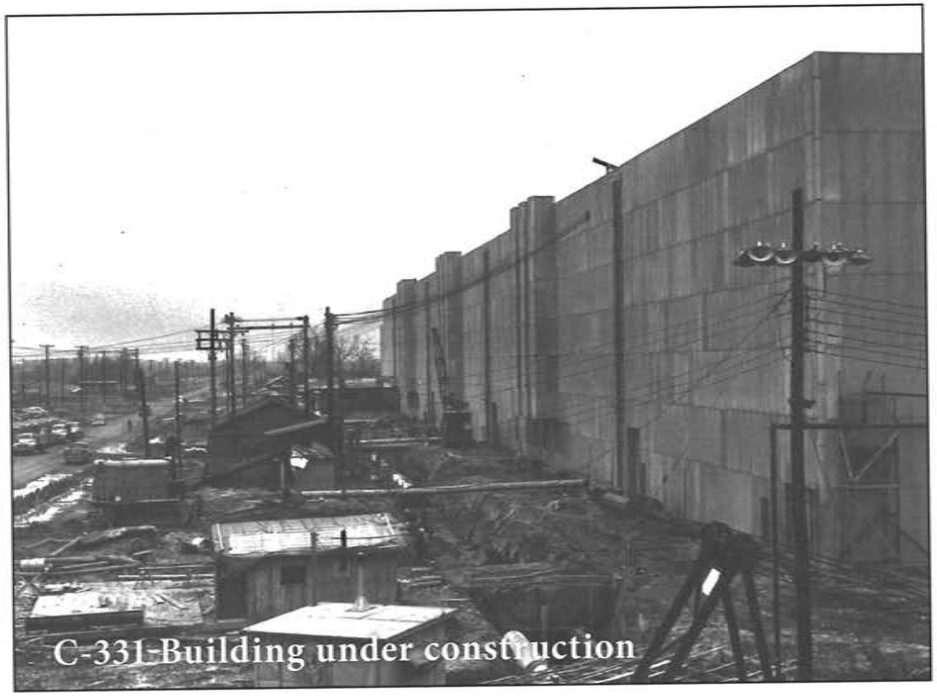
The C-333 building covers 1,065,060 square feet, or approximately 24.5 acres and contains 480 diffusion stages. The C-331 building covers 514,560 square feet, or approximately 11.8 acres and contains 400 diffusion stages. (11)

Under the operating contractor, Carbide and Carbon Chemicals Company, operations began in September 1952. The first cell, located in C-331, was put on stream in October 1952 and the first product was withdrawn in November of that same year. (11) The 2.5-ton product cylinder was shipped to Oak Ridge, Tennessee, for further enrichment. (1)

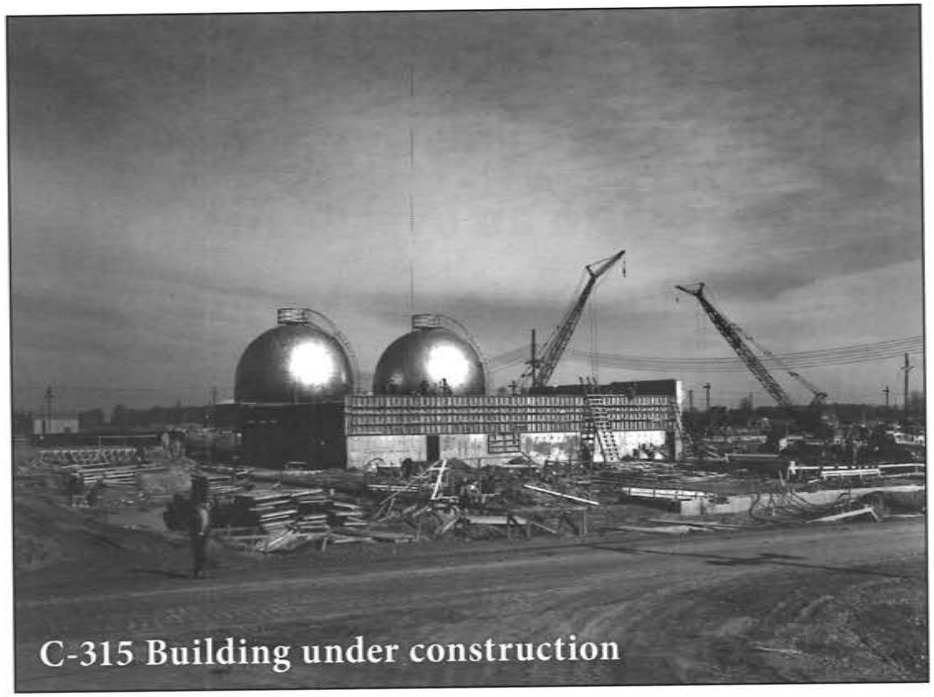
C-333 Building exterior nearly complete



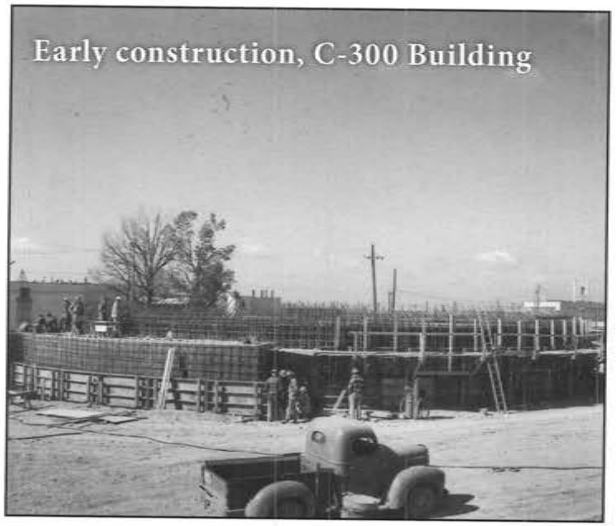
C-310 building complete

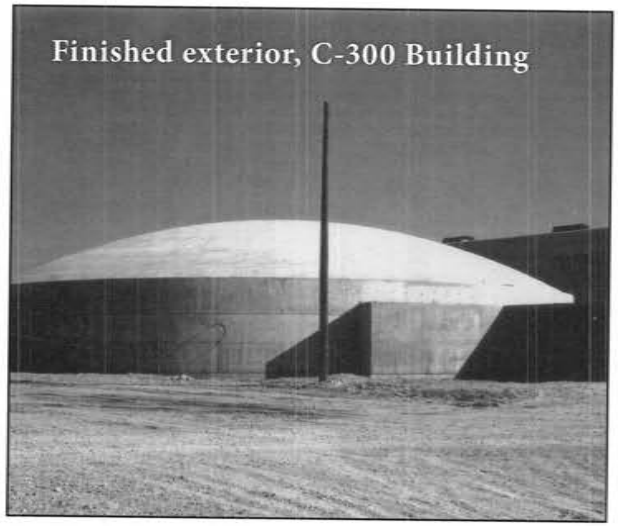


C-331 Building under construction



C-315 Building under construction


Early construction, C-300 Building


Finished exterior, C-300 Building


Interior ground floor, C-300 Building

At the time of its construction, the C-300 Central Control Facility was one of the most sophisticated buildings of its kind. The building itself is unique in its construction. Around the clock, C-300 operators monitor and control conditions in all of the process buildings. A power operations control center is also located in this facility. Operators manage the purchase and distribution of all electrical power used throughout the facility.

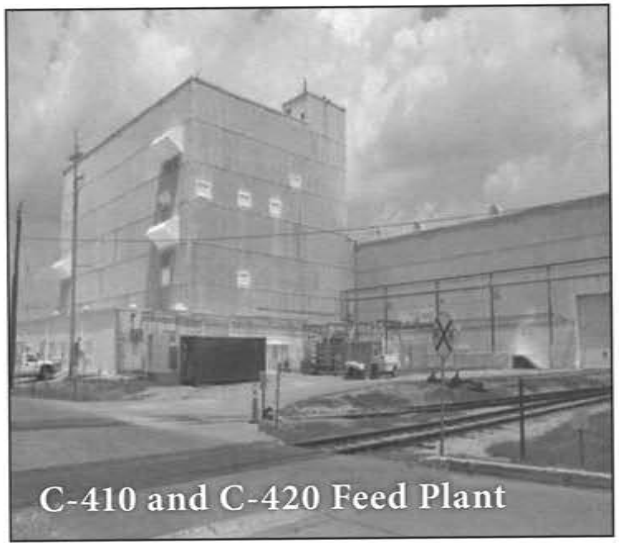
"I was the first C-300 operator at the Plant. C-300 was still under construction and so was mostly empty, but there was a wooden desk and a crank telephone with an overhead wire in the power pit. That was the contact with the C-532 Relay House. My job was to contact the Relay House every half hour. They had a printout of how much power we were taking and I started a log on how much power we were using every half hour."

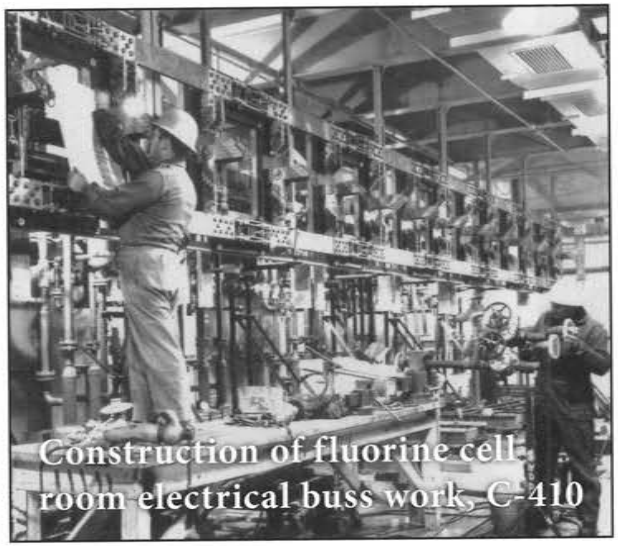
C.O. Hays
Retired
Paducah, Kentucky

Feed material was produced at C-410 and C-420 from the beginning of plant operations until 1977 when the Feed Plant was shut down. After this time, all feed came from Oak Ridge, Portsmouth, or Allied Chemical (later to become Honeywell) near Metropolis, Illinois. The C-410 Fluorine Plant had the capacity to produce over 10 tons of fluorine per day. (11)

In the early years, the PGDP also included a uranium metals plant in the C-340 Building. In the late 1960s and early 1970s PGDP produced uranium metal in C-340 for weapons uses. During the shutdown period, which lasted until the mid-1980s, C-340 Building was used as a valve rebuilding shop and routine maintenance facility. (11)


C-410 Feed Plant under construction


C-410 and C-420 Feed Plant

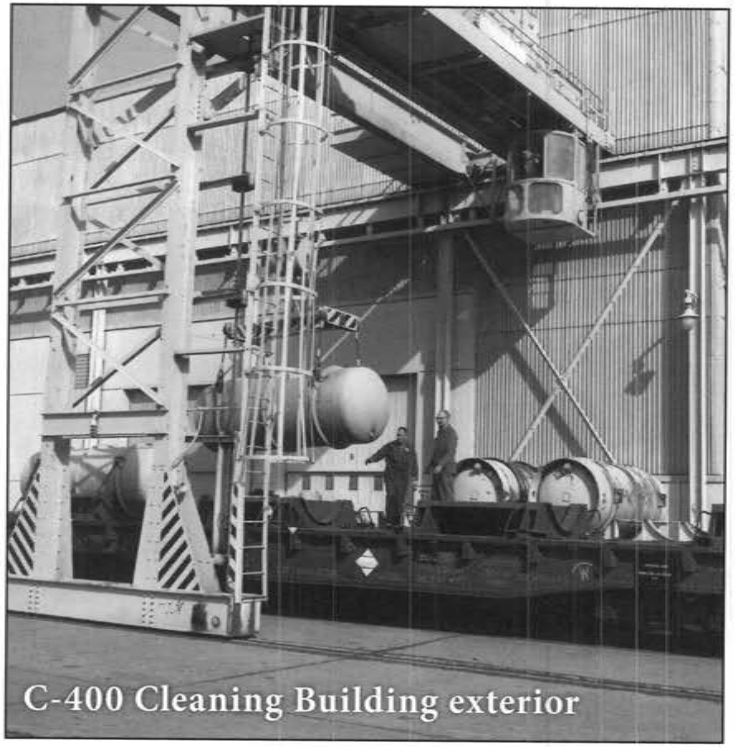

Construction of fluorine cell room electrical buss work, C-410


C-340 Uranium Metals Plant

C-400 Cleaning Building under construction

Tons of steel were used to frame the many buildings. Here workers are constructing the C-400 Cleaning Building. The C-400 Building was constructed in 1951 to provide resources for cleaning process equipment and subsequent recovery of uranium and other important chemical compounds. It covers approximately 116,140 square feet.

This building also houses the plant's laundry services. Plant employees are provided with clothing to wear during duty hours. Laundry personnel clean and mend more than 3,000 pairs of coveralls each week. This clothing is then returned to employees' change house facilities. (12)

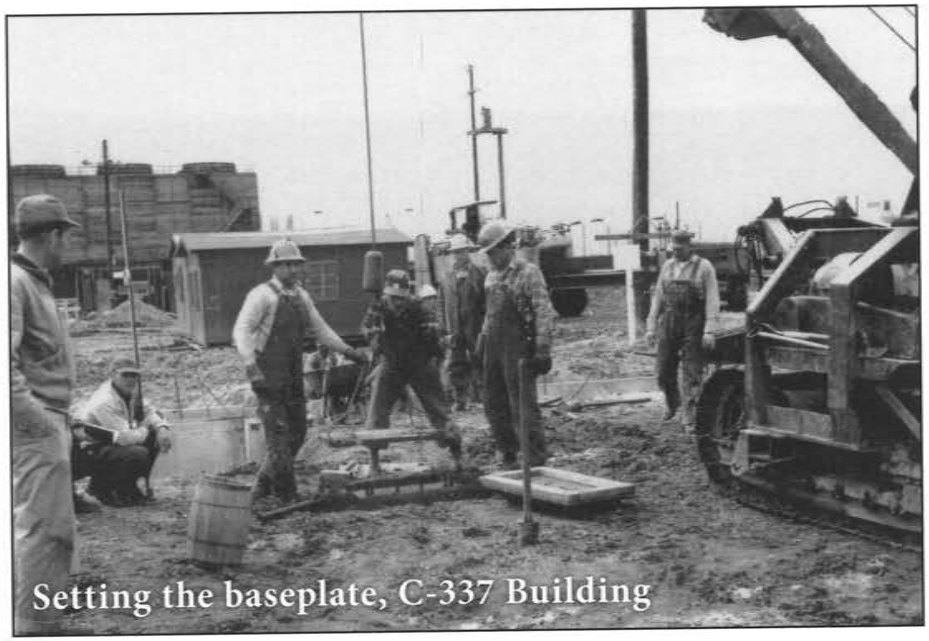


C-400 Cleaning Building exterior

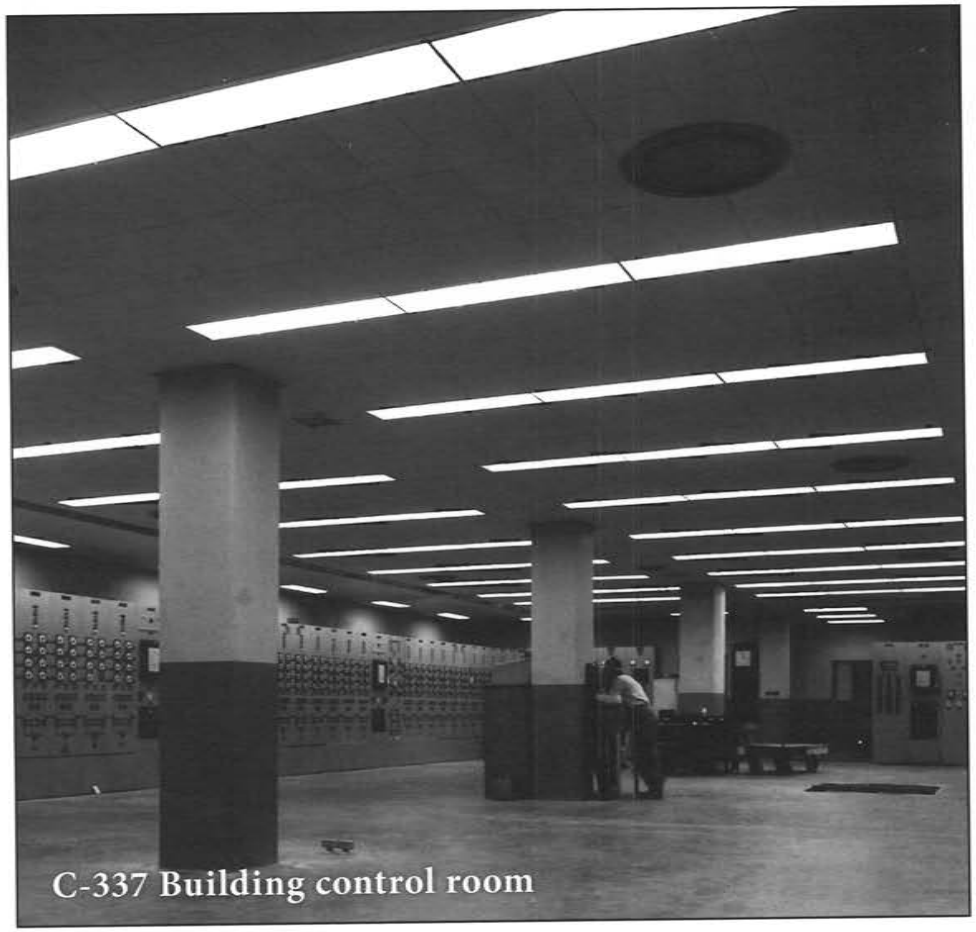
C-400 Cleaning Building interior

On July 15, 1952, the Atomic Energy Commission announced it would enlarge the plant. Two additional enrichment facilities, C-337 and C-335 were added. The C-337 and C-335 Buildings were built with identical plans as the original C-333 an C-331 Buildings respectively, thereby doubling the production capacity of the plant. When completed, all four buildings had a total footprint of approximately 74 acres. (5)

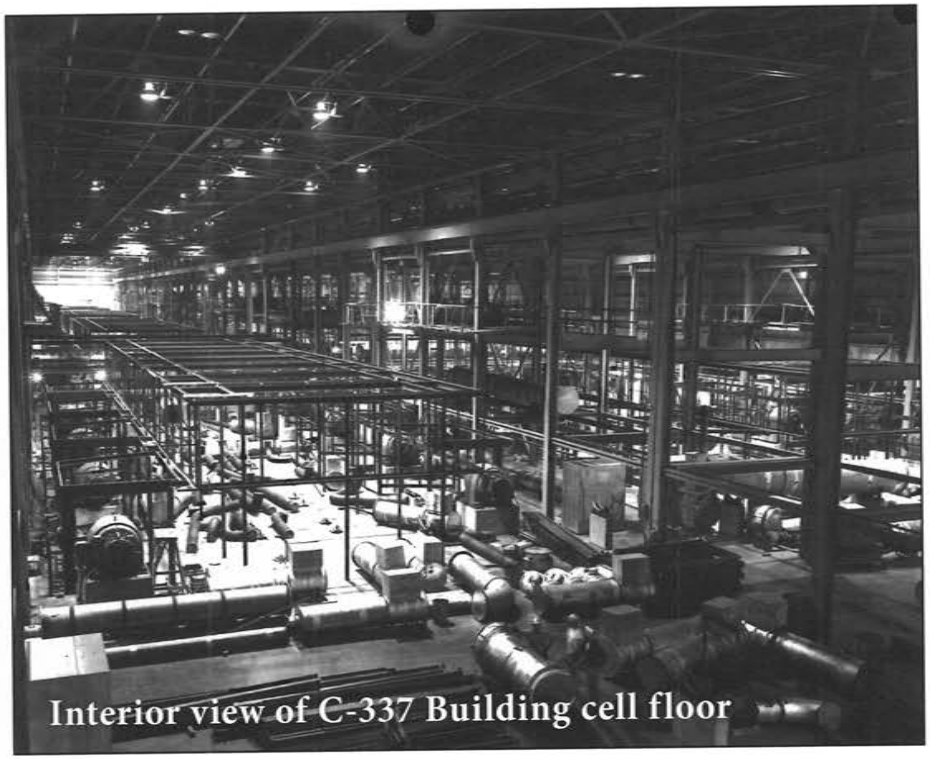
All of the 1,820 stages of the cascade had been started by the end of 1955. Construction was completed in 1956, resulting in a total project cost of $800 million. (5)



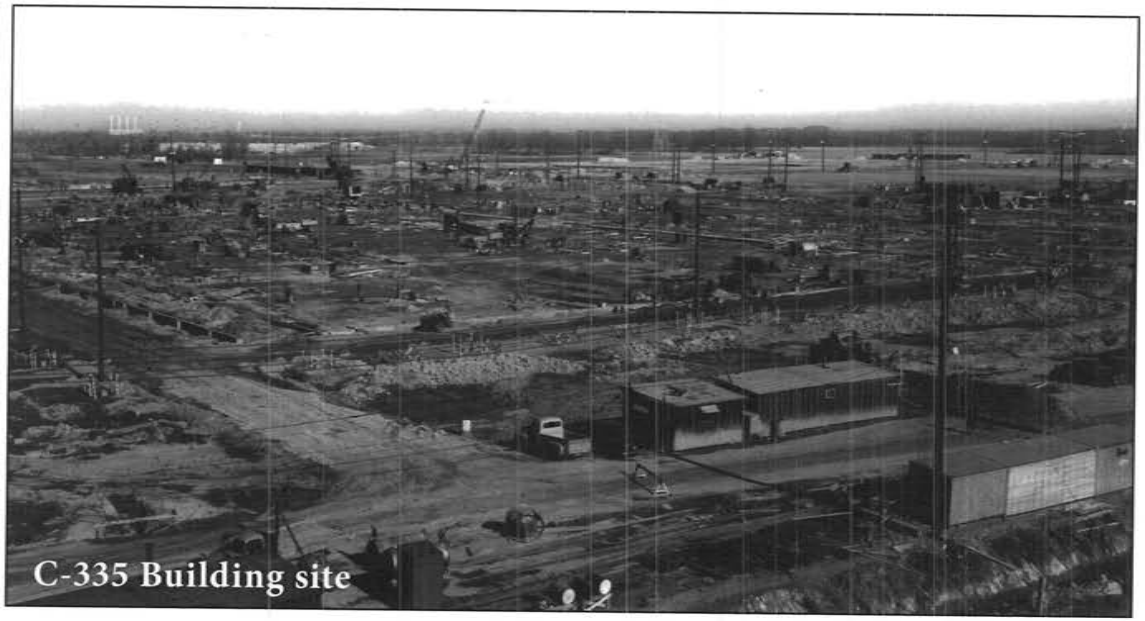
Setting the baseplate, C-337 Building



C-337 Building control room



Interior view of C-337 Building cell floor

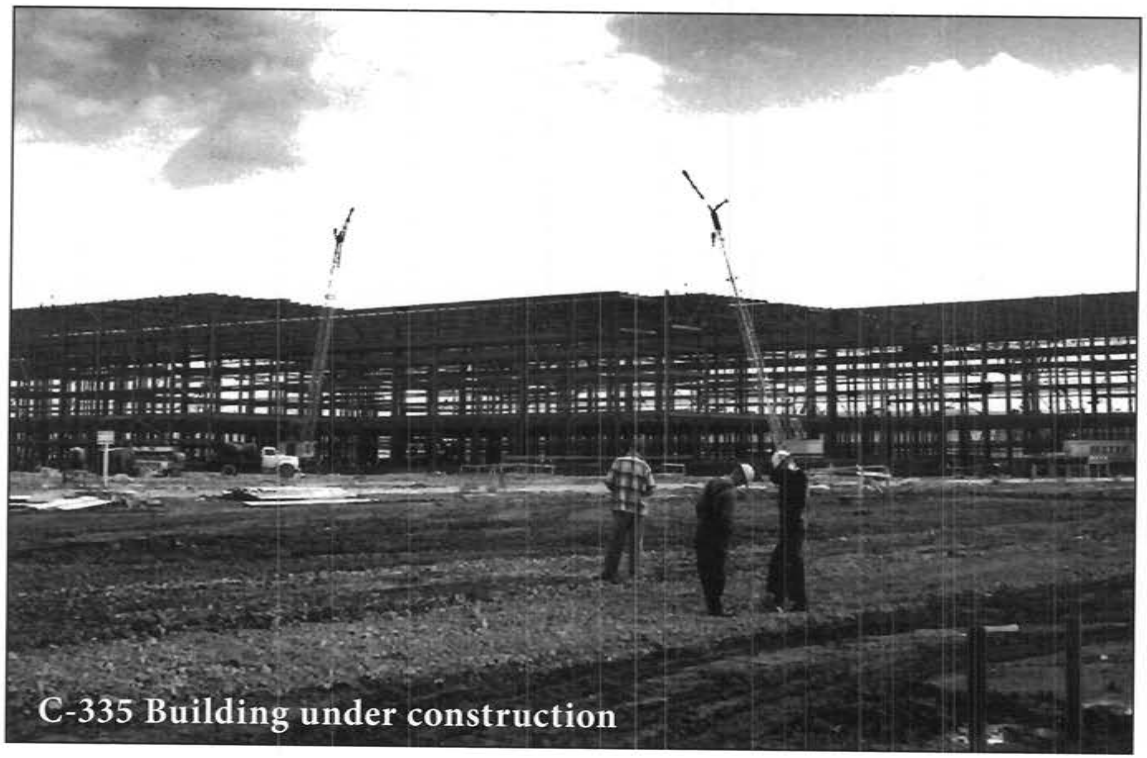


C-335 Building site

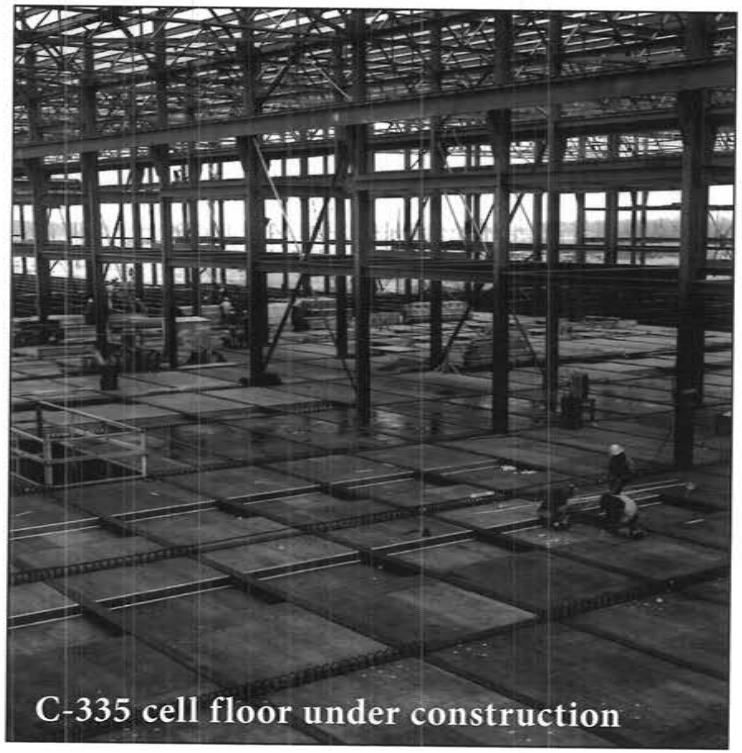
The first Cascade Improvement Program/Cascade Uprating Program at Paducah began in 1954, before the plant was completed. Major components were replaced to increase diffusion process reliability. (11)

Considering that gaseous diffusion was cutting-edge technology at the time of construction, the plant is surprisingly flexible. It can be idled down to a very low capacity and be brought back on stream in a matter of days.

Unlike centrifuge technology, any assay feed material can be added to the cascade at a "matchpoint", thus making the processing of uranium more efficient than running it through the entire gaseous diffusion process.



C-335 Building under construction



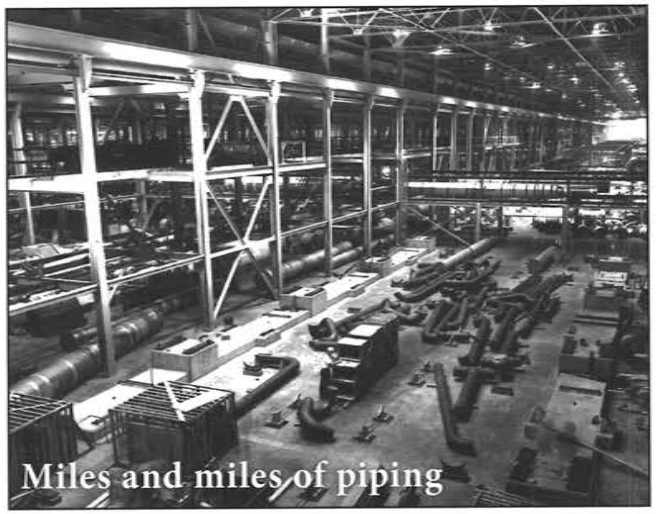
C-335 cell floor under construction

Converters were delivered to the production buildings by flat rail car and lifted to the cell floors through opened hatches. Cranes which had already been installed were employed to lift each process component and place it into position.

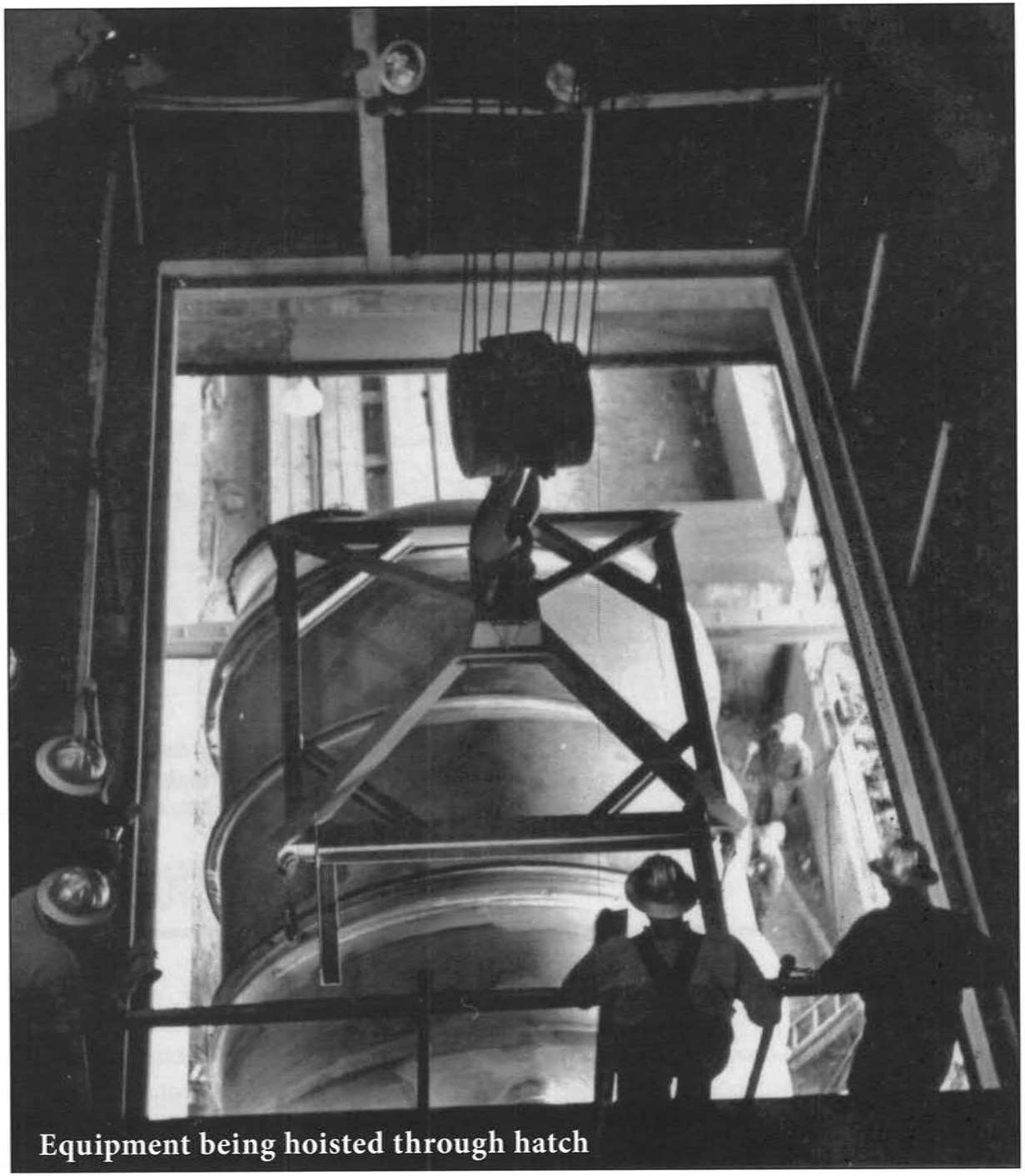
The main working part of the enrichment process is the individual converters. Here one can gain an appreciation for the size of these massive units.

Once put in place, each converter was hooked up in series to form a massive cascade. Ultimately, the Paducah Plant would employ 1,820 of such converters. Four hundred miles of pipe were used to connect converters with other process components.

The PGDP has been in continuous operation since the day it began producing enriched uranium in the fall of 1952. Although areas have been taken off stream for maintenance, or events such as loss of power have caused temporary outages, the entire plant has never been idle.



Miles and miles of piping



Equipment being hoisted through hatch

Gaseous Diffusion Plants

> Paducah GDP

Overview

Key Facts

Management

History

Emergency Preparedness

> Portsmouth GDP

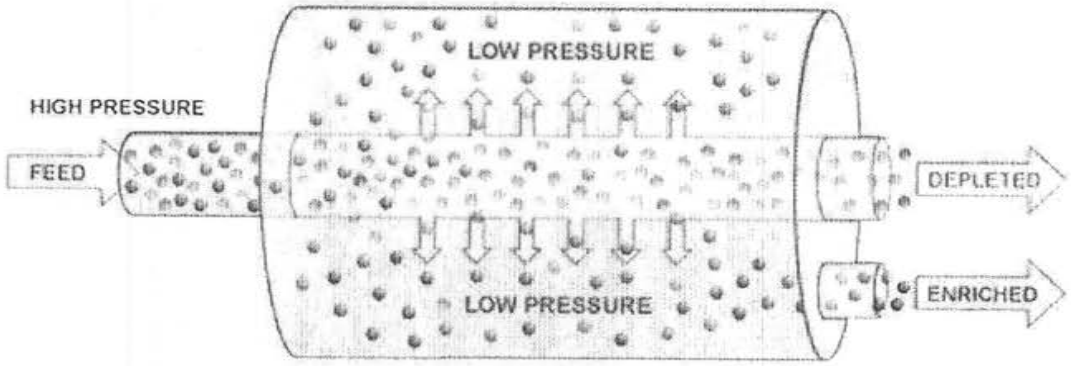
Overview

History

The Gaseous Diffusion Process

USEC uses the gaseous diffusion process to enrich uranium at its Paducah, Kentucky, plant. This process uses uranium hexafluoride (UF_6) as a feed material. UF_6 is a solid at room temperature but becomes a gas when heated above 135 degrees Fahrenheit. Once heated to a gaseous state, the UF_6 is fed into the plant's cascades to be enriched.

Gaseous Diffusion Stage



The process separates the lighter U^{235} isotopes from the heavier U^{238}. The gas is forced through a series of porous membranes with microscopic openings. Because the U^{235} is lighter, it moves through the barriers more easily.

As the gas moves, the two isotopes are separated, increasing the U^{235} concentration and decreasing the concentration of U^{238}.

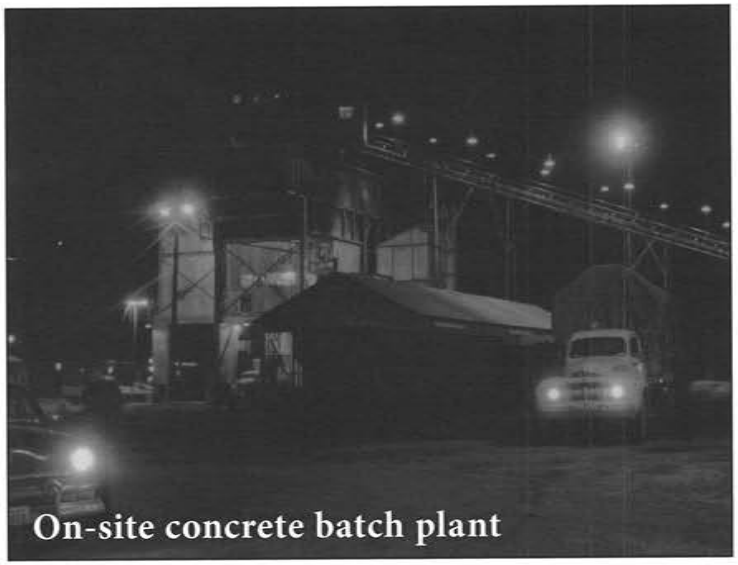
Digital Master from USEC

The gaseous diffusion process is designed to separate the needed U-235 from the U-238, which becomes what is often referred to as "tails". The enrichment process involves heating cylinders containing solid UF6 until it gasifies, then forcing the gas through a miles-long enrichment cascade, a series of converters separated by jet-engine-like compressors.

In each converter, uranium molecules pass through a porous material, which gradually separates the lighter U-235 from the heavier U-238 molecules, creating an enriched stream with a higher concentration of U-235. The enriched stream is eventually withdrawn and cooled to a solid state in 14-ton cylinders. (13)

"We poured concrete until about 8 or 9 o'clock at night. Then we spent the rest of the night cleaning the equipment and preparing it for the next day. We poured columns from the top down until a man fell to his death, then we engineered a way to fill from the bottom up."

Clyde Elrod
Retired
Kevil, Kentucky



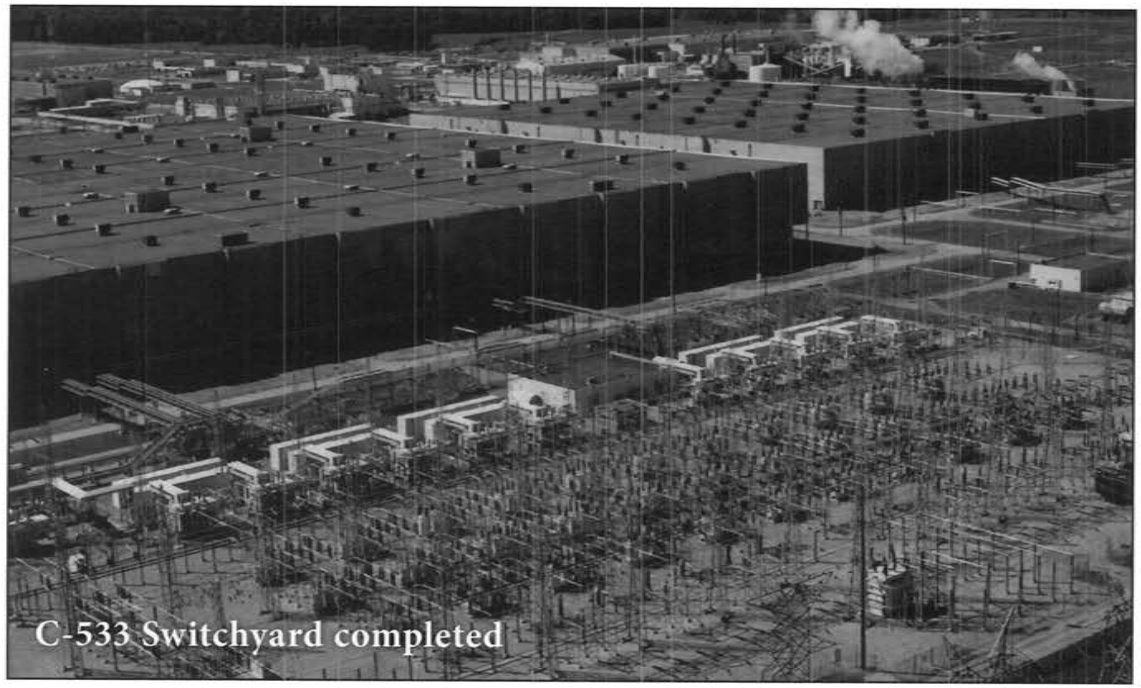
On-site concrete batch plant

C-537 Switchyard under construction

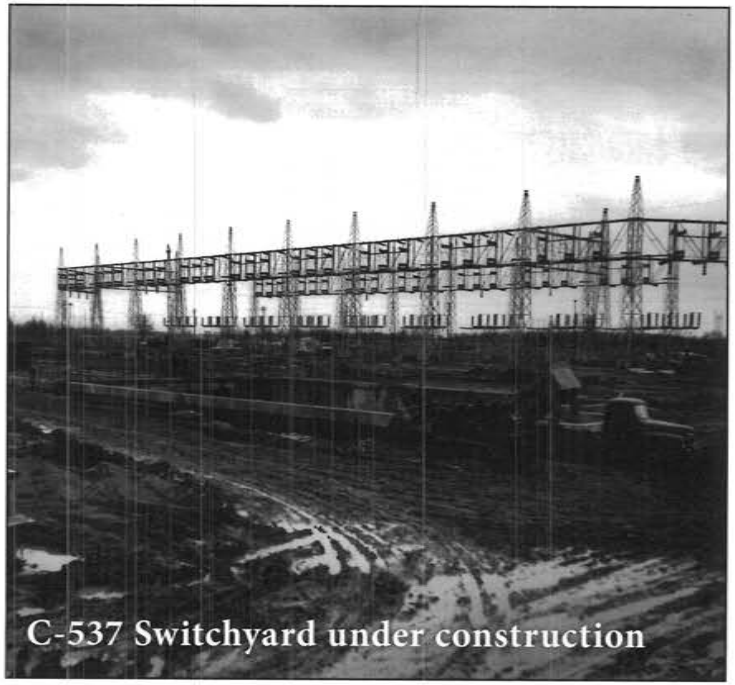
At full capacity, the Paducah Plant requires daily use of approximately 2,000 megawatts of electrical energy per hour. However, the enriched uranium it produces will ultimately produce 30 times more electricity than consumed in the diffusion process.

In 1953, PGDP used a reported 9,772,912 megawatt hours of electricity and spent over $49.5 million for its power supply. (14)

C-533 is one of four large electrical switchyards which controls and distributes power from TVA's Shawnee Steam Plant and the Electric Energy, Inc. (EEI) plant near Joppa, Illinois, to the large process buildings and to other locations throughout the plant.



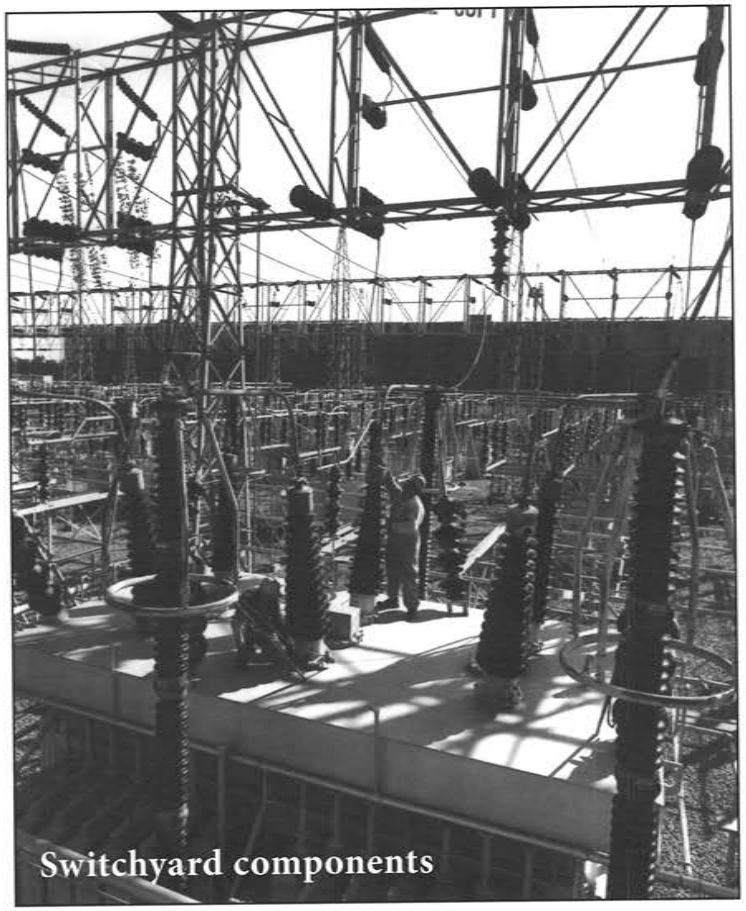
C-533 Switchyard completed



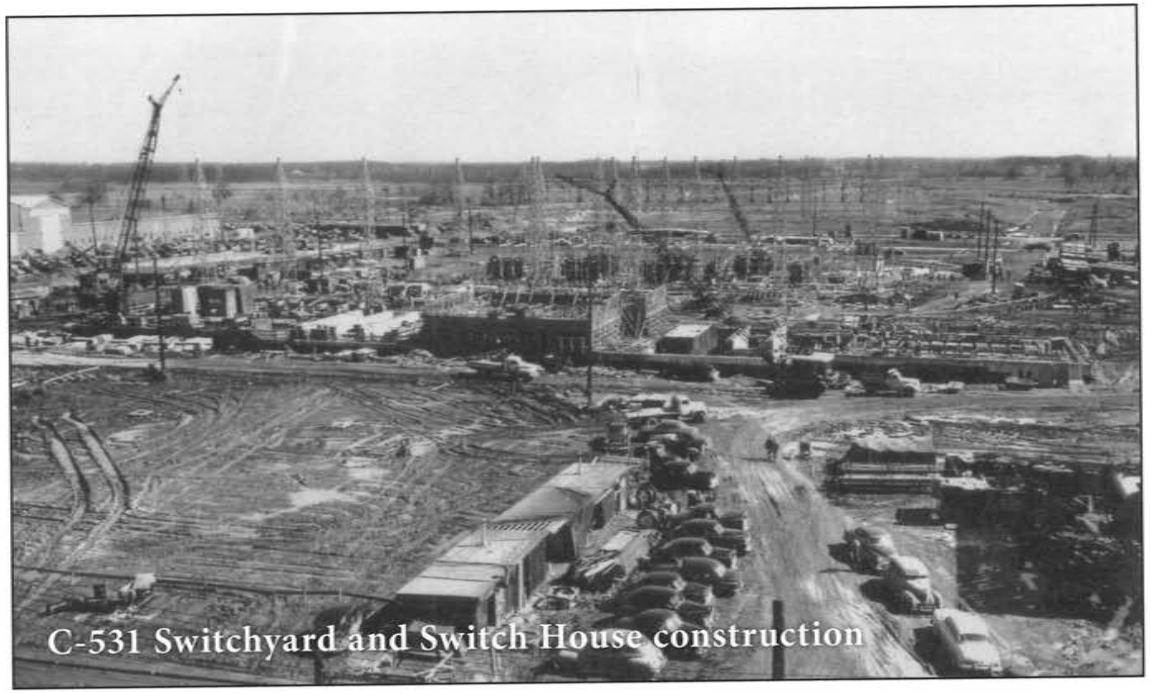
C-537 Switchyard under construction

C-532 and C-536 Relay Houses were built to support the four switchyards. Electricity received from Shawnee Steam Plant and EEI is controlled and distributed to the switchyards and ultimately to process buildings through these relay houses.

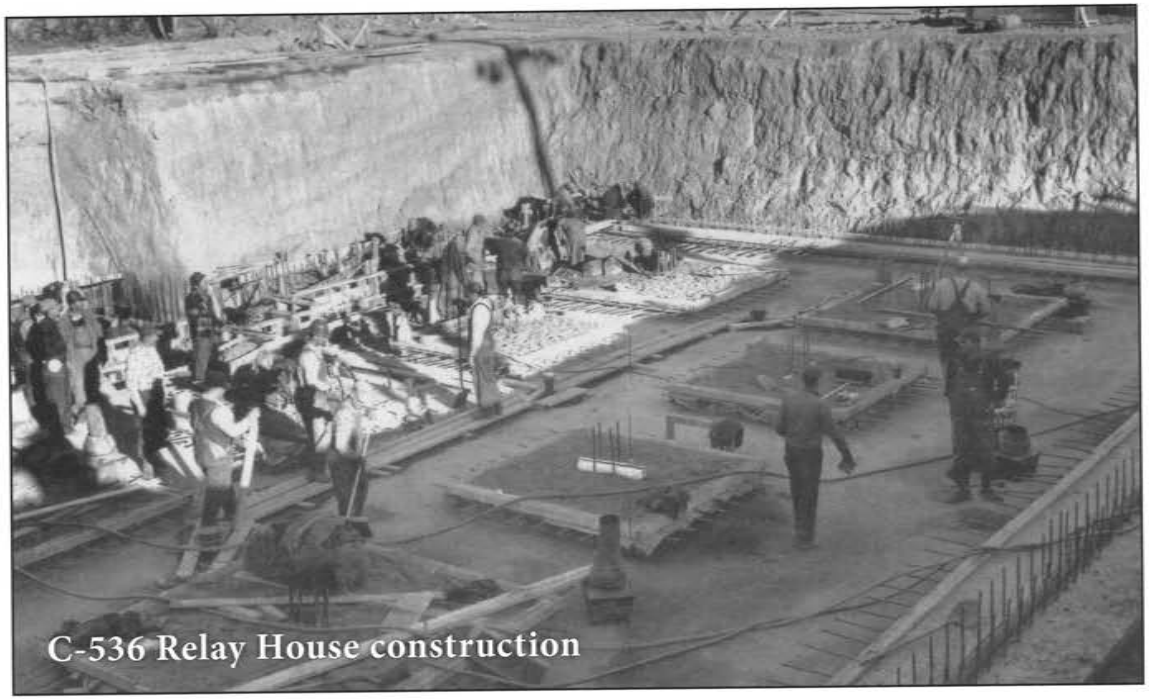
Massive components in switchyards are needed to handle huge amounts of electricity which are provided by Shawnee Steam Plant and EEI. To get a perspective of the size of the equipment, notice the man working on an insulator in the lower left picture.



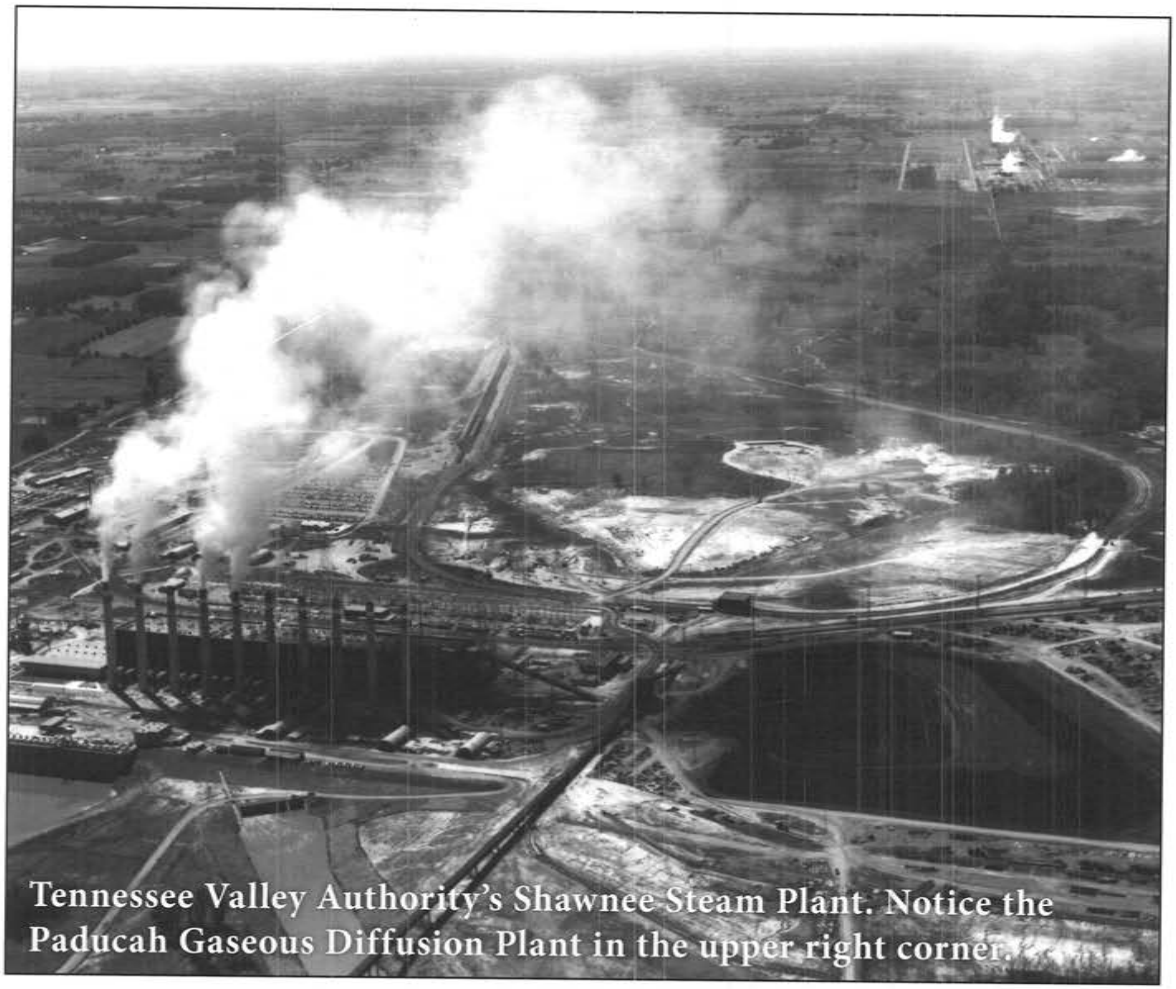
Switchyard components



C-531 Switchyard and Switch House construction



C-536 Relay House construction



Tennessee Valley Authority's Shawnee Steam Plant. Notice the Paducah Gaseous Diffusion Plant in the upper right corner.

"When we had an equipment failure which caused an emergency outage, we worked to make the necessary repairs as quickly as possible. Emergency outages had the potential to impact operations at the PGDP."

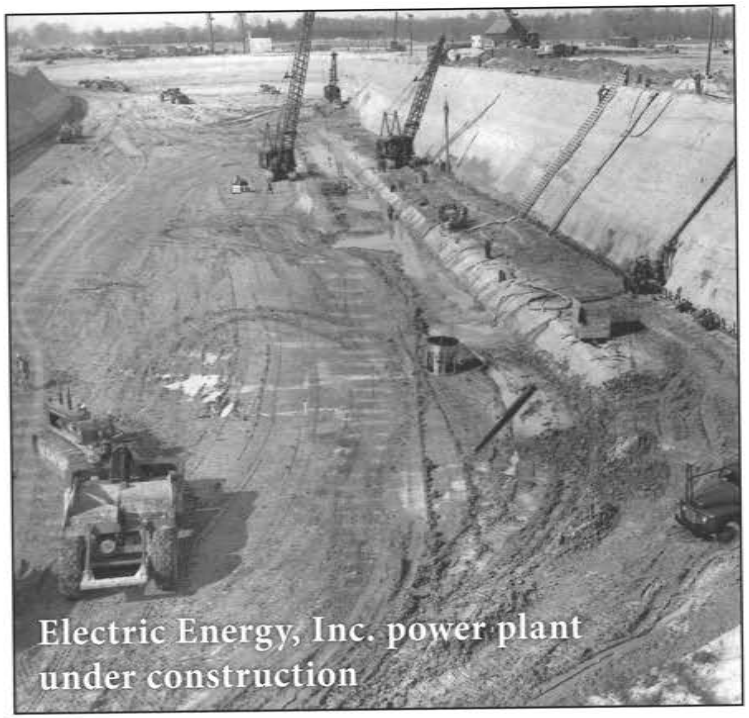
James Morgan
Retired
Shawnee Steam Plant

Although there was available power from the Kentucky Dam's hydro-electric plant, which was built to control flooding after the 1937 flood, daily demand of the new plant would require new generating sources. In November 1950 the AEC determined that TVA should be responsible for supplying electric power to the new plant and that funds be appropriated to the agency for this purpose. TVA worked with five energy companies to provide interim power requirements while the new plant was under construction. On December 16, 1950, TVA officially announced that it would build a four-unit steam plant near Grahamville, Kentucky, to supply electrical demand. Named the Shawnee Steam Plant, this new plant was estimated to cost $184 million. Official construction of the plant began on January 6, 1951. (5)

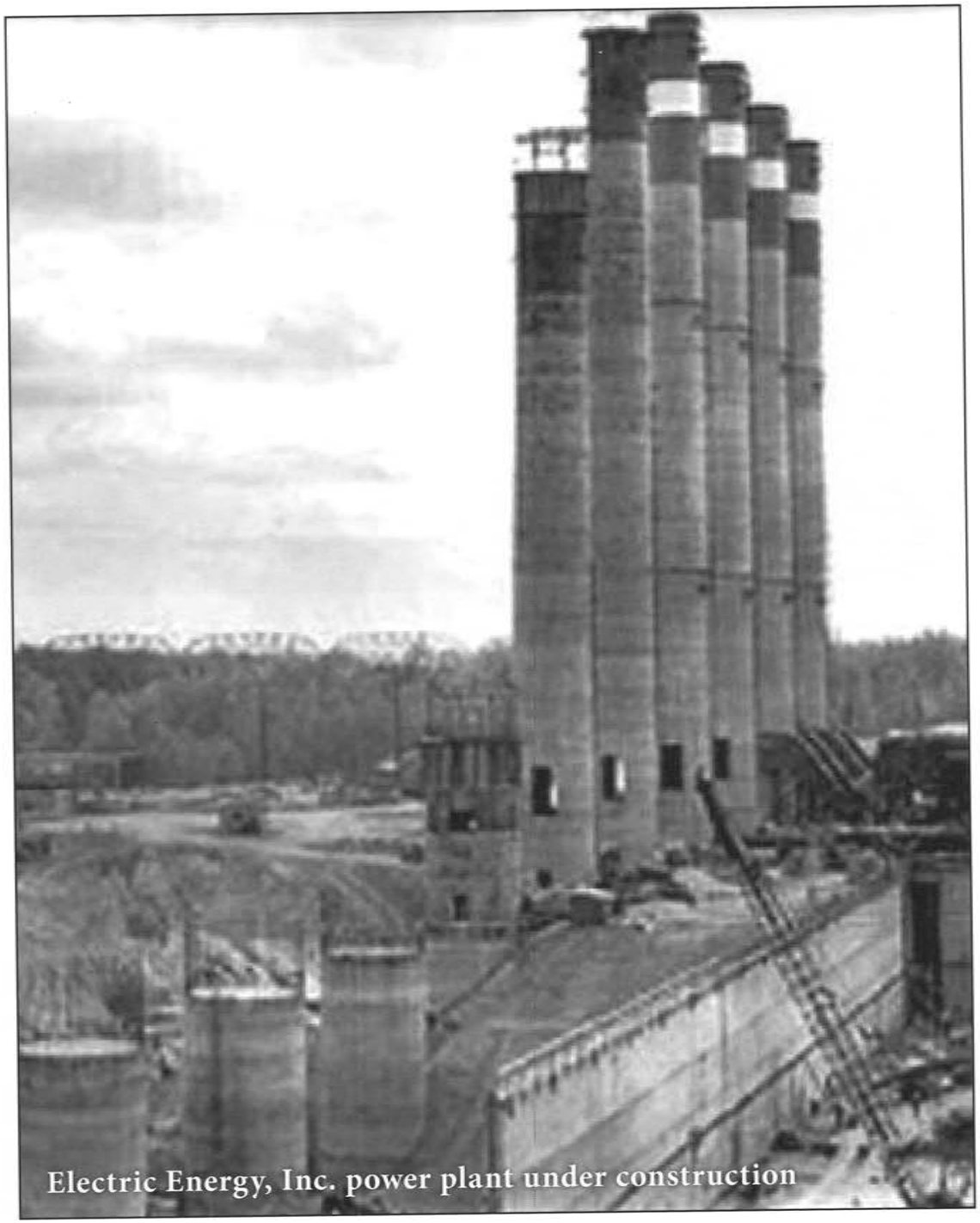
In addition to TVA's Shawnee Steam Plant, Electric Energy, Inc. constructed the Joppa Steam Plant along the banks of Ohio River at Joppa, Illinois, to meet the high electrical demand of the new enrichment facility. (14)

Both Shawnee Steam Plant and Electric Energy, Inc., were constructed in step with the PGDP so that they could provided the electrical needs of the enormous equipment. In order to supply power, huge transmission lines were run from the Shawnee Steam Plant and Electric Energy, Inc.

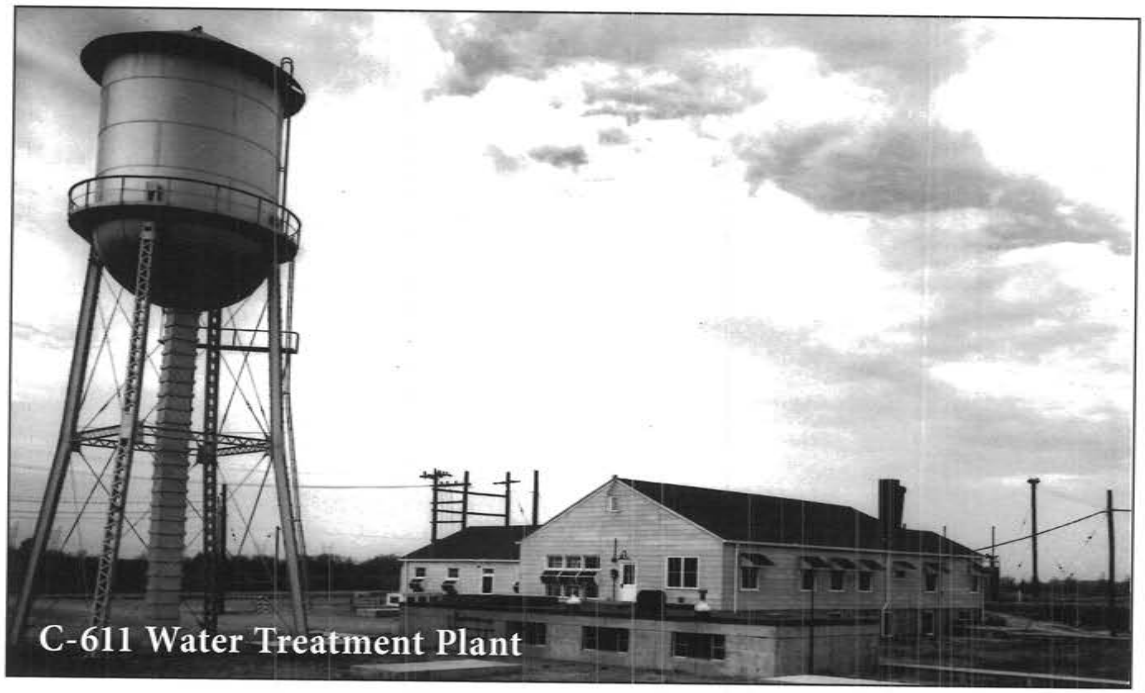
When the PGDP was doubled in capacity, it needed more electricity to meet the demand of the two added process buildings. The new electric generating stations were also doubled in capacity, making a total of 2,700,000KW of power available. (15)



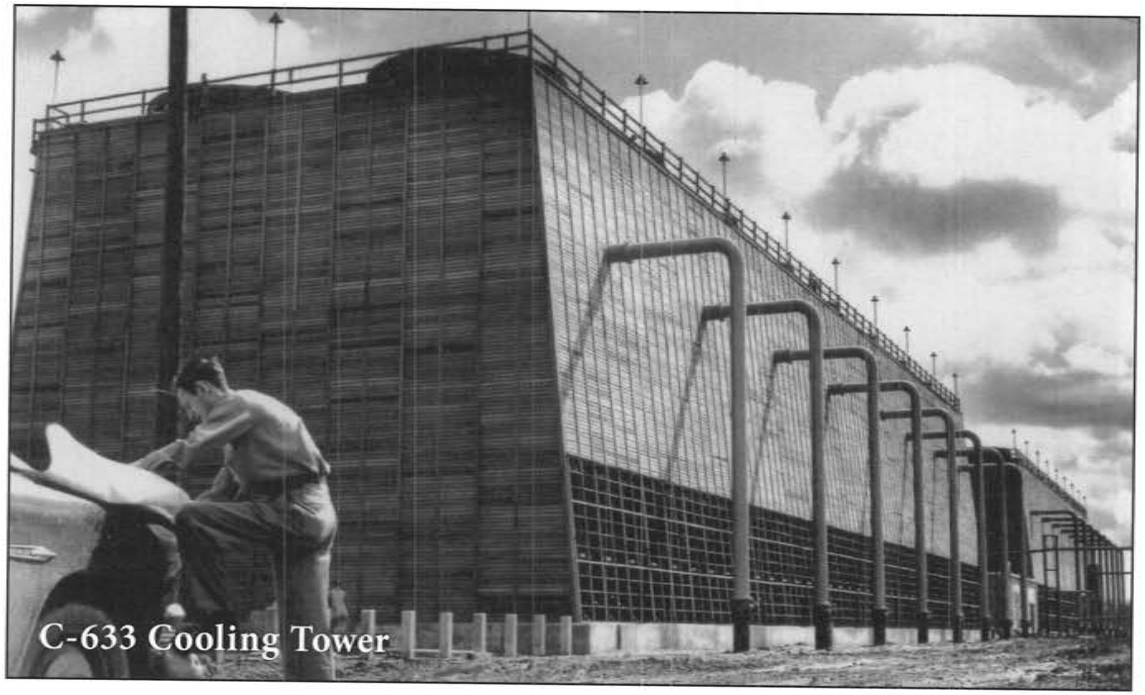
Electric Energy, Inc. power plant under construction



Electric Energy, Inc. power plant under construction



C-611 Water Treatment Plant



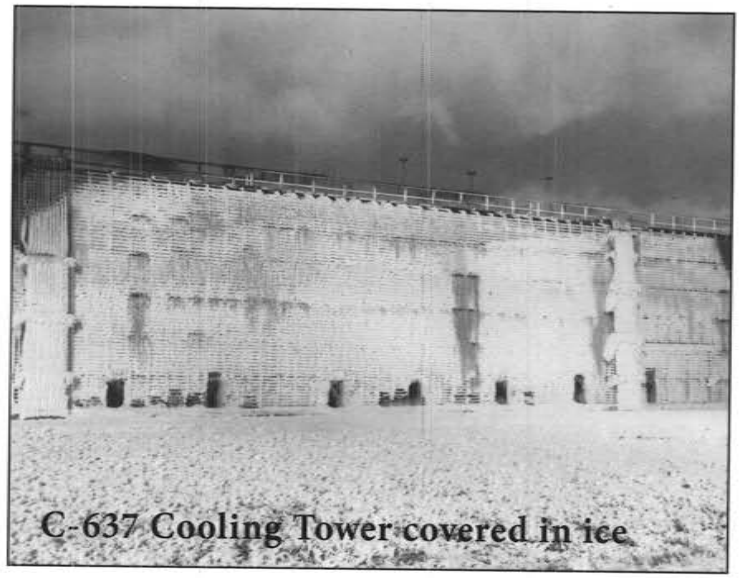
C-633 Cooling Tower

The C-611 Water Treatment Plant supplies all the water requirements for the facility. An average of 26 million gallons per day is required. Much of this water evaporates as steam off the cooling towers. (12)

Some of the water is used in the recirculating water system. This water is used to remove heat generated during the diffusion process. Heated water flows to cooling towers where it is cooled before being pumped back into the system. The plant recirculates over 400 million gallons of water every 24 hours.

All systems, including electrical and water, must be dependable in order to support production. Lower right picture is an ice-covered cooling tower. In winter, cooling towers are stressed with the ice buildup on their exteriors.

During the 2009 ice storm, power was interrupted when power lines from TVA were compromised. Dedicated plant employees worked feverishly to return plant equipment back to service once power was restored.

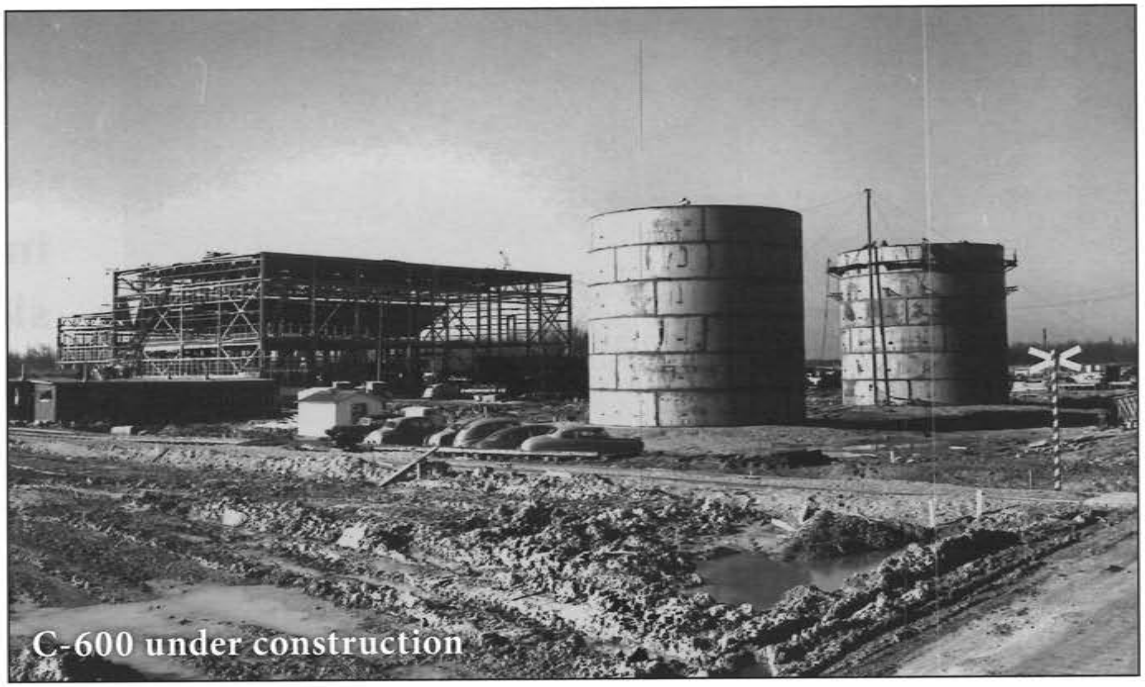


C-637 Cooling Tower covered in ice

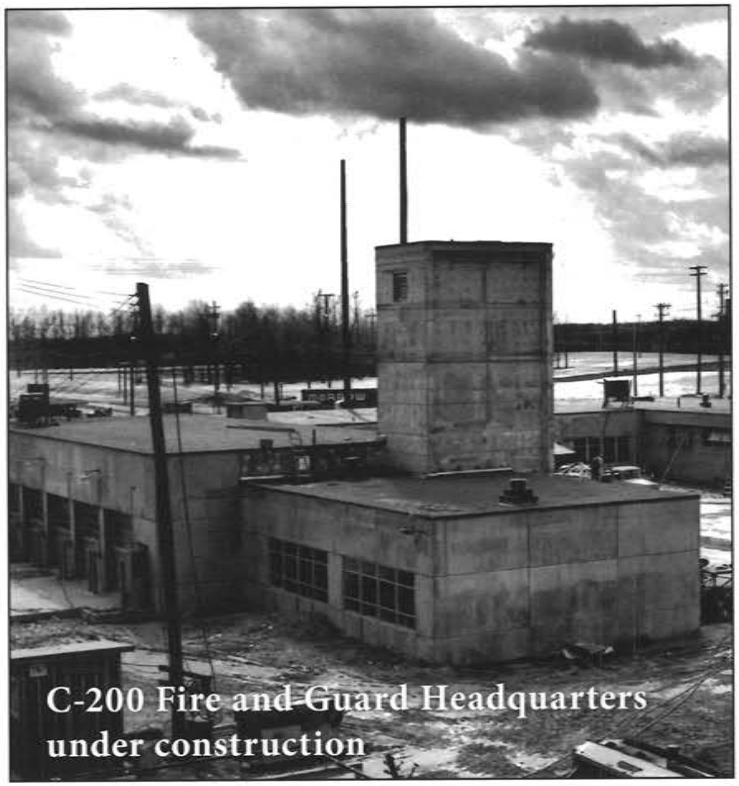
Still more water is used in the production of steam for plant use. The plant's two steam generators can make 20,000 pounds of steam each hour, which is distributed throughout the plant via miles of insulated piping.

The C-200 Building houses the Guard and Fire Departments. Guard facilities include office areas, training room, an indoor firing range, and break areas. All the emergency response vehicles, including ambulances, pumper, ladder truck, and hazmat truck are kept in a ready condition by the Fire Department.

The C-320 Telephone Building houses switching for telephone services. There are hundreds of telephones located throughout the plant.



C-600 under construction



C-200 Fire and Guard Headquarters under construction

C-320 Telephone Building interior

C-100 Administration Building under construction

C-100 Administration Building completed

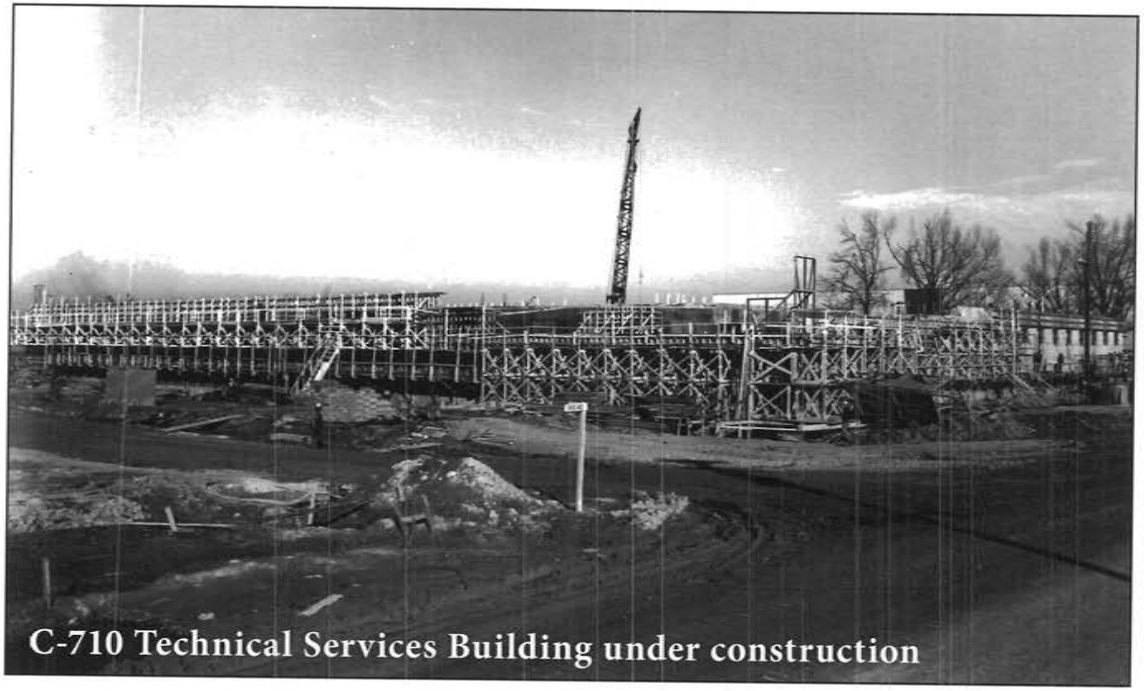
The C-100 Administration Building is home to the Medical Department, Cafeteria, and administrative offices.

"July 7, 1952, I hired in with Carbide into the Finance and Material Division. I was in the Accounting and Budget Department. I assisted in preparing the budget we submitted to Congress to get appropriations to get funds to operate the plant. I handled top secret, secret, confidential, and restricted matters in preparing the budget for Congress as well as the reports in Finance and Budget submitted each month. We had a large department and we were sort of like family. I worked with some wonderful people."

Marie Johnson
Retired
Paducah, Kentucky

"We had a cafeteria. We only had 30 minutes for lunch, so we had to walk to the cafeteria, eat, and get back in 30 minutes. The Coreys (John and Eleanor) operated the Cafeteria and they had really good food."

Wanda Holliman
Retired
Salem, Kentucky



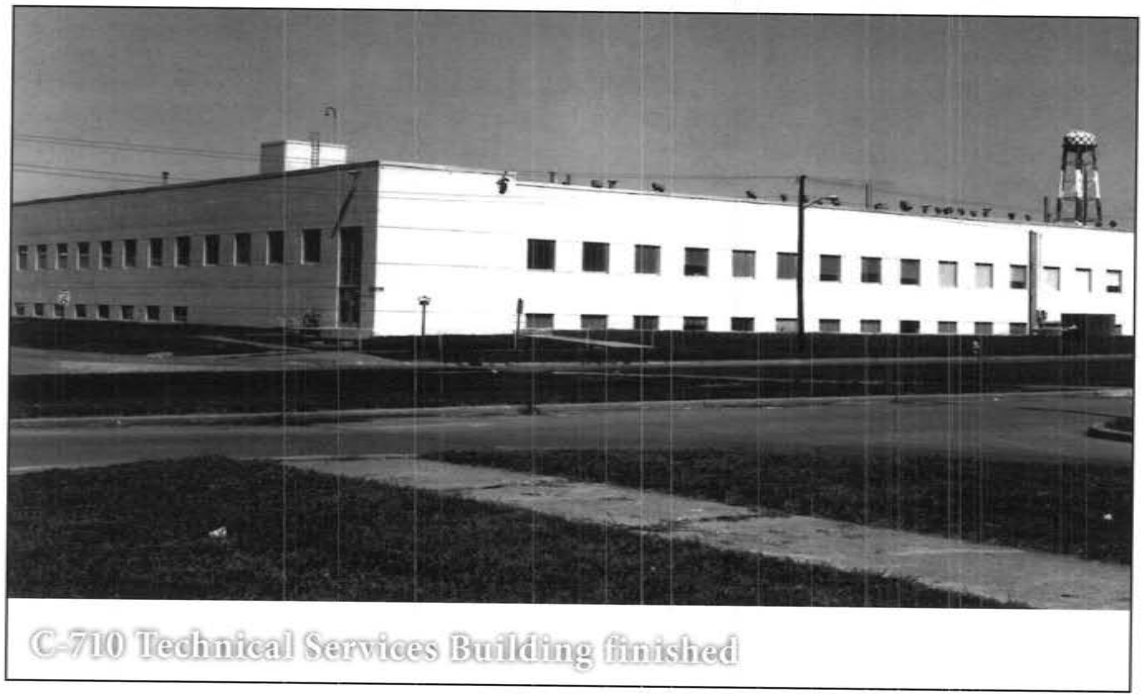
C-710 Technical Services Building under construction

Early in the life of the plant it was recognized that a Laboratory would be needed.

The C-710 Technical Services Building and the C-709 Plant Laboratory Annex house laboratories with an array of modern analyzers and test equipment, offices, a conference room, and vault for records retention and storage. (12)

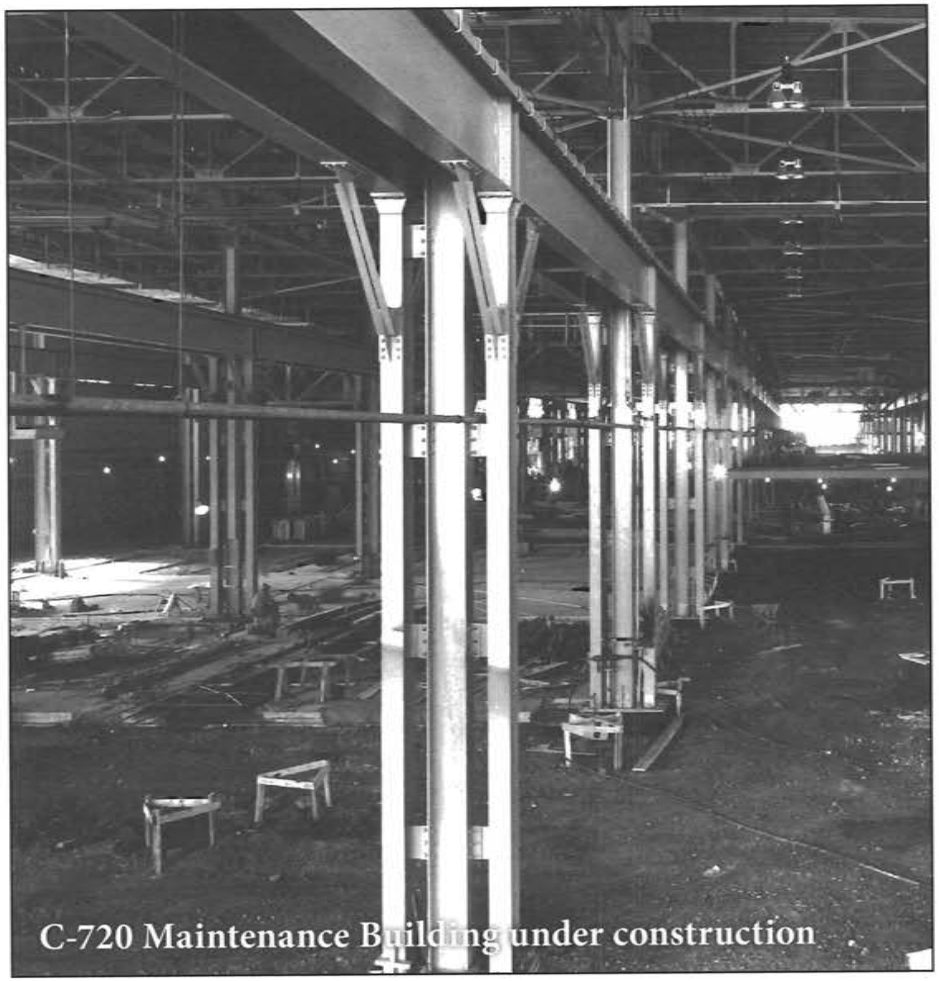
The laboratory facilities analyze over 100,000 various types of analytical tests per year, such as analyzing for metals, radiological, organics, inorganics, volatiles, and semi volatiles. (12)

Media types such as groundwater, concrete, soil, air, waste waters are processed through the laboratory, also supporting the environmental cleanup programs. (12)

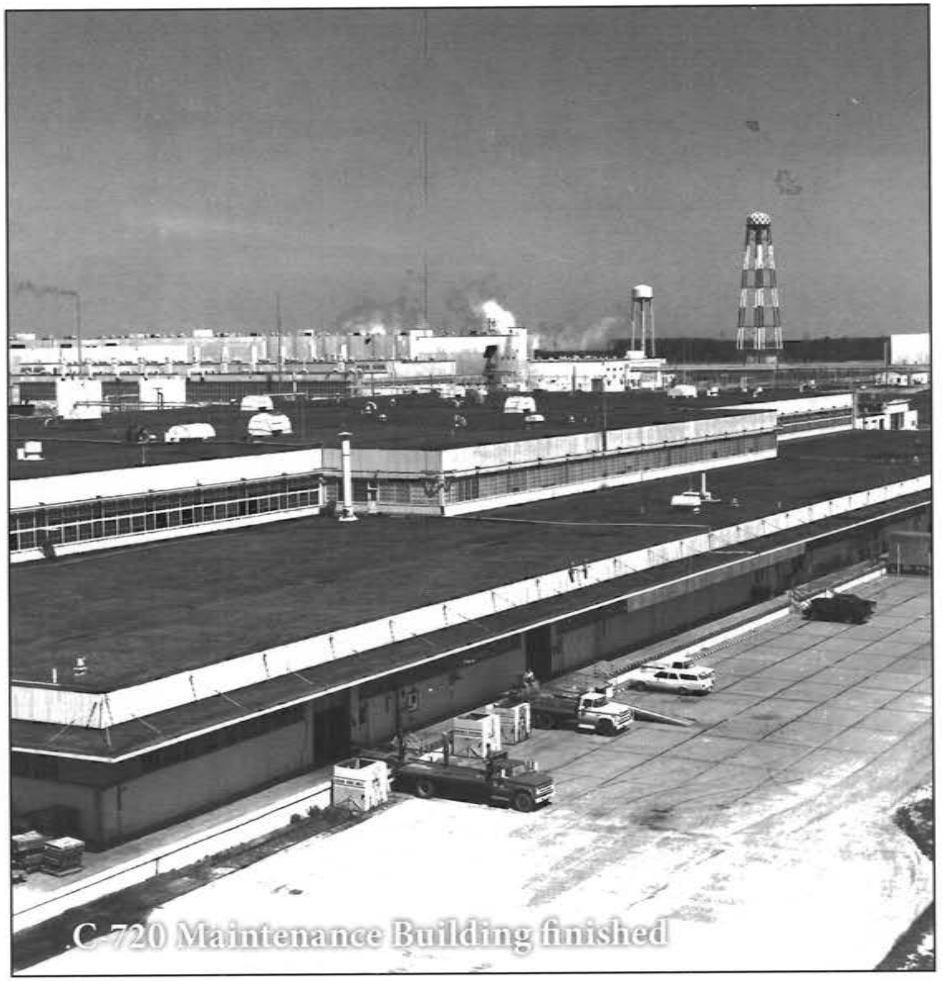


C-710 Technical Services Building finished

C-710 Technical Services Building interior



C-720 Maintenance Building under construction

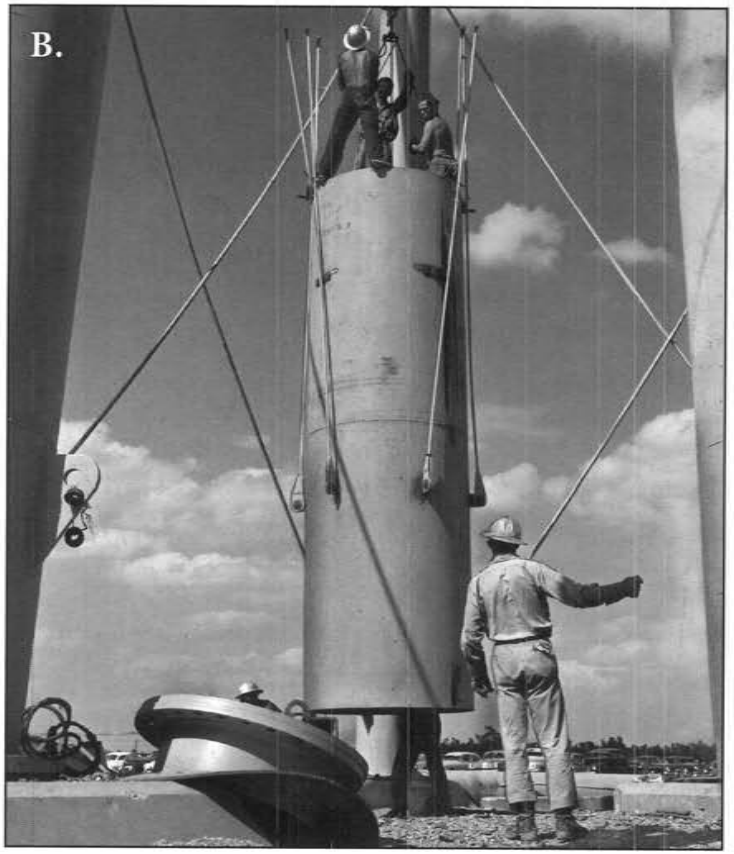


C-720 Maintenance Building finished

In addition to Giffels and Vallet, Inc. designing the large process buildings, three architect-engineering firms would provide engineering services: Sargent and Lundy of Chicago, power facilities; Smith, Hinchman and Grylls of Detroit, design of water and sewer plant; and M. W. Kellogg and Company, piping. Later Schulman Electric handled the electrical work.

The C-720 Maintenance Building is essential to sustained operations of the Plant. It contains the compressor, converter, and machine shops. (16) Specialized crafts housed in this building have the capability to fabricate, repair, maintain, and calibrate almost every piece of equipment essential to the operation of the plant. (12)

Machinists, maintenance mechanics, instrument mechanics, sheet metal workers, electricians, and inspection workers perform the following functions: Disassembly of compressors, converter maintenance, disassembly of block valves, machining fabrication, welding and grinding. In addition, stores workers and janitors are assigned to the building. Supervisory offices are in the middle of the building. (16).

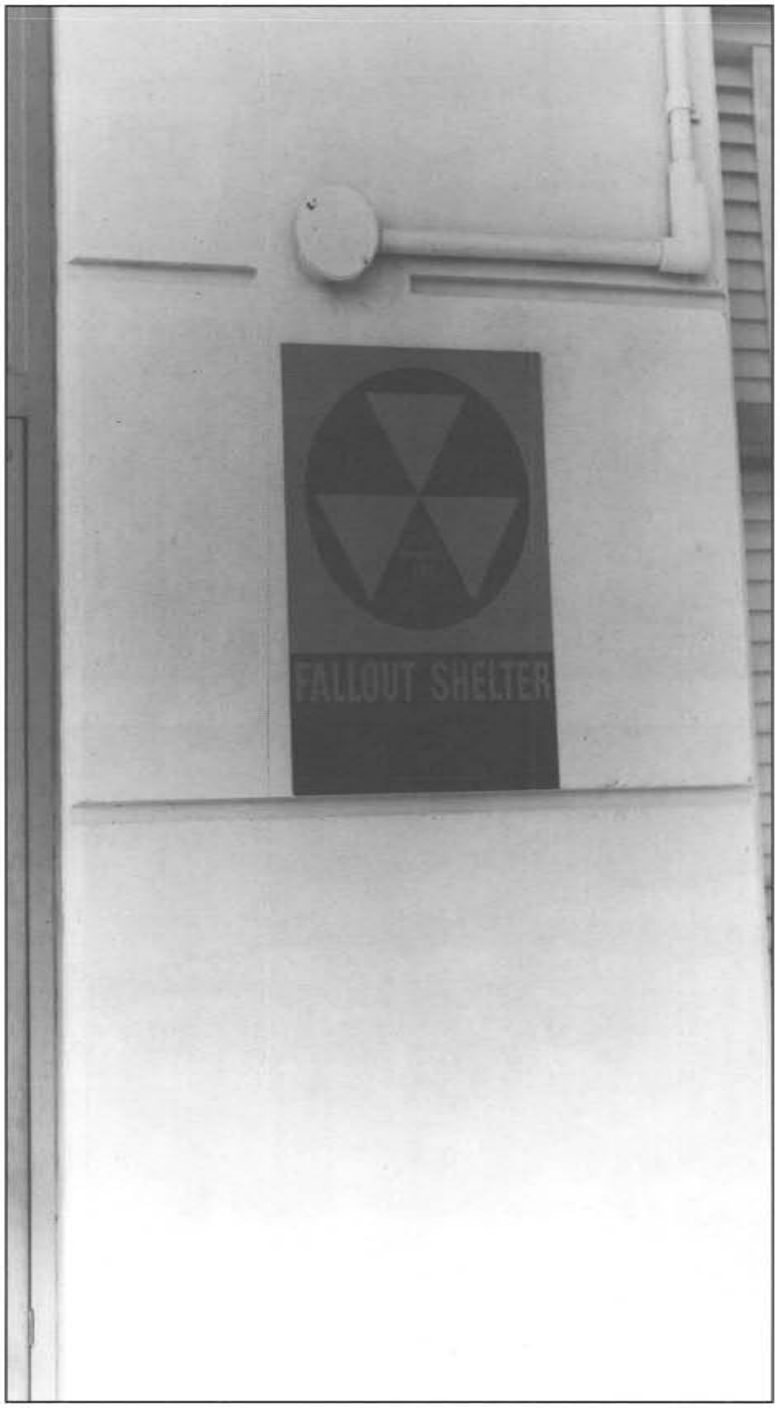


A. Massive amounts of rebar were used during construction of many of the buildings. Here, workers prepare rebar for walls made of poured concrete.

B. Workers are setting a section of one of the legs which will eventually hold up the sanitary water tower. Note the workers standing on the edge of the pipe. This method could not be employed today.

C. Everything built was on a enormous scale. Work activities at the plant involve a wide variety of physical hazards, including electrical work, working at elevated heights, material handling, welding, vehicle operations, and machining parts. (11)

D. Finished, the sanitary water tower stands 176 feet tall and holds 250,000 gallons of water. It services the entire plant's sanitary water needs. Later a second, taller water tower was built to support non-potable demands of the plant. This high pressure water tower stands 311 feet and holds 325,000 gallons of water.



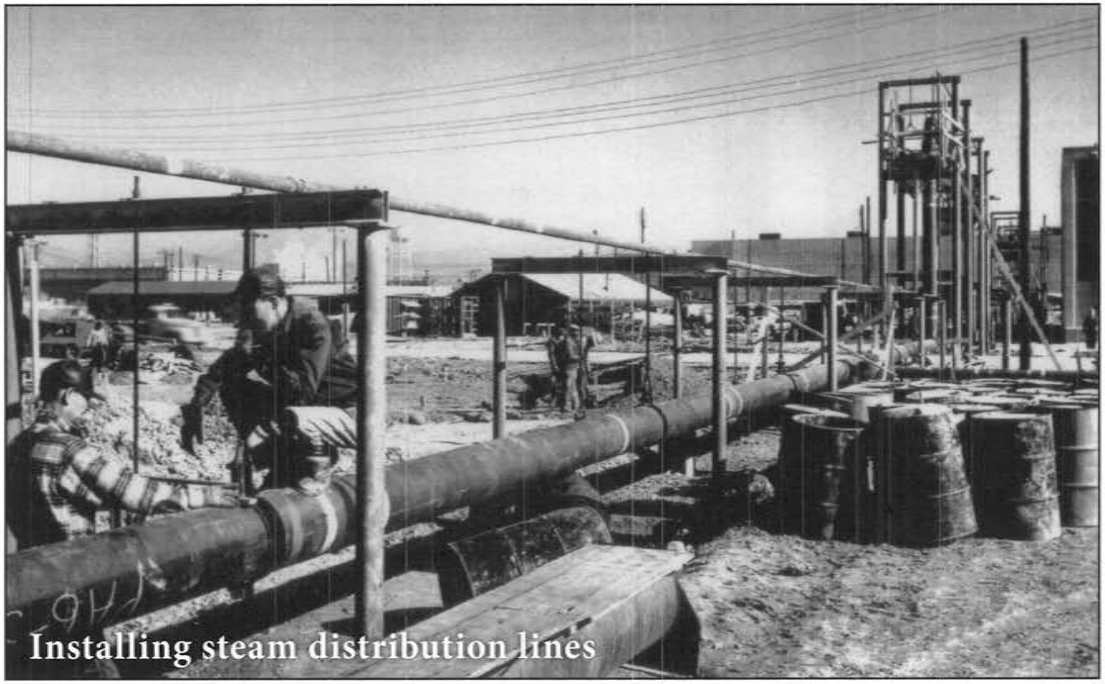
Buildings were constructed with the Cold War in mind. Many were built so that in addition to their intended purpose they could be utilized as fallout shelters. These designated areas were stocked with food and other necessities should it become necessary to utilize them. Paducah was considered a target for foreign aggression during the Cold War, as the Paducah Gaseous Diffusion Plant was high on a list of possible strike targets.

When the second phase of the construction was completed in 1956, the enrichment complex covered nearly 750 acres of land and involved over 160 structures. (1)

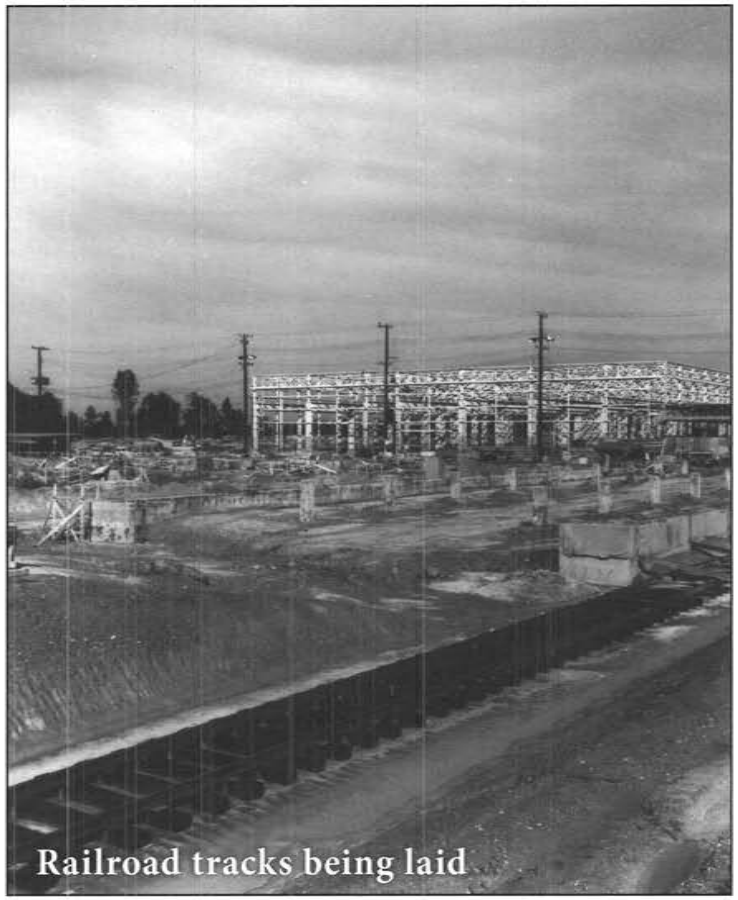
Nineteen miles of road were paved and nine miles of railroad track were laid. (1)

Thousands of feet of piping were laid to provide conduits for water and steam. Ten thousand miles of control cable provides instant communications about plant conditions and allows for monitoring and control of plant systems. (1)

Concrete finishing a road inside the plant.

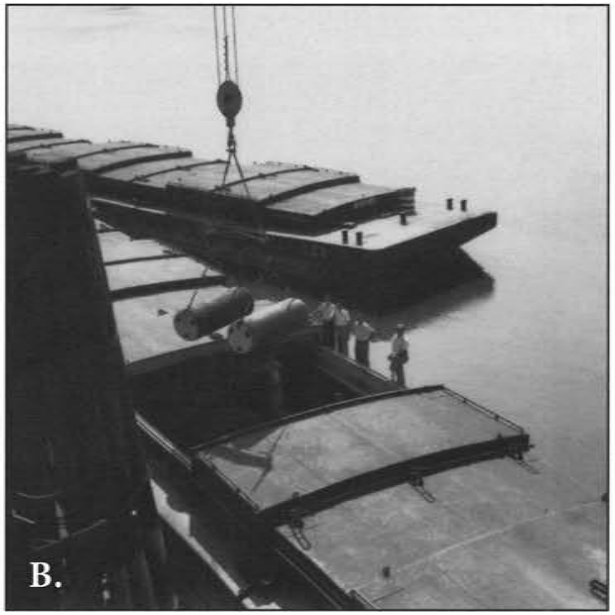


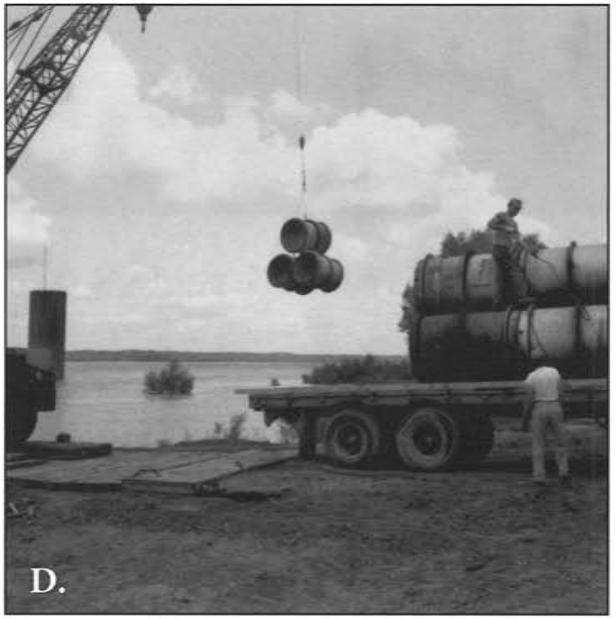
Installing steam distribution lines

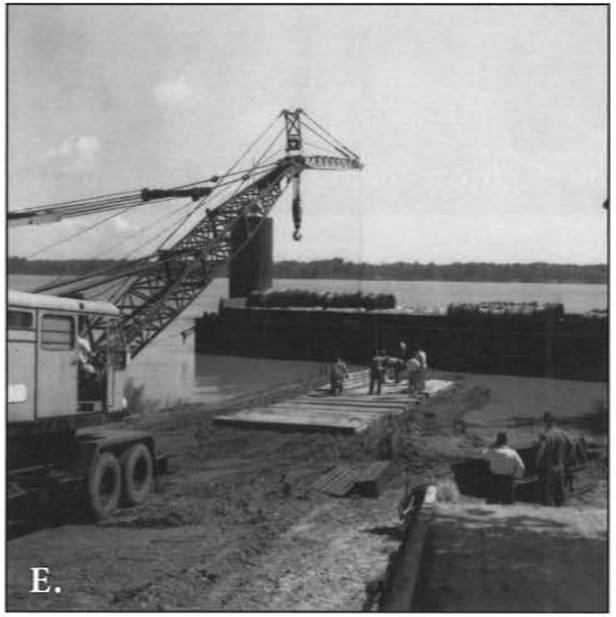


Railroad tracks being laid

The PGDP had its own river ports on the Ohio River, at Paducah and at Metropolis Ferry Landing near Grahamville. Many prefabricated process components arrived by barge. They were loaded onto trucks for the final leg of their journey to the plant.







A. The Paducah port employed river pylons and a stiff leg derrick for unloading barges.

B. River port at Paducah, Kentucky.

C. Metropolis Ferry Landing river port.

D. Metropolis Ferry Landing river port.

E. A truck-mounted crane was used for unloading barges at the Metropolis Ferry Landing port.

Ashland and Sinclair service stations at Highway 60 and plant entrance

Operating contractor Carbide and Carbon Chemicals Company (which became Union Carbide Corporation-Nuclear Division) was named as the original site contractor based on the company's experience with gaseous diffusion operations at Oak Ridge. Carbide operated the plant until April 1984, when Martin Marietta Energy Systems assumed responsibility for operations.

The AEC provided regulatory oversight for the plant until the Energy Research and Development Administration assumed the function of the AEC in 1975. In 1977 regulatory oversight transferred to the Department of Energy. In 1997 regulatory oversight transferred to the Nuclear Regulatory Commission.

Many local businesses profited from business brought by plant employees. The Ashland and Sinclair service stations were located on Highway 60 at the plant entrance intersection. Each sold gasoline and provided mechanical services for automobiles and light trucks. It is estimated that one payroll dollar turns over seven times in the community, thus benefitting the community over and over.

THE PEOPLE: OPERATION BEGINS

A ceremony dedicating the Paducah Gaseous Diffusion Plant was held in front of the new Administration Building where the American flag is raised for the first time. Plant Superintendent Johnny Murray and a Naval contingent were on hand for the dedication. Fred Buckley, a retired guard, was present that day and can be seen at the extreme left saluting as the Plant Manager raised the flag.

"People are always concerned about something they are not aware of completely. They think it is a "bomb plant" and that things could explode. There is no chance for a nuclear explosion there. There are problems, as any industrial plant would have."

Chuck Turok
Retired
Paducah, Kentucky

"When I went to work for Carbide in July 1952, I spent the first year at the Fergerson Building. I worked in Finance and Budget. They did not have air conditioning, and we were upstairs. It was so hot. I was sitting there typing and sweat was running off me."

Marie Johnson
Retired
Paducah, Kentucky

The flood of employment applications began in March, 1951 at Paducah's Fergerson Building as operating contractor Carbide and Carbon Chemicals Company began hiring approximately 1,800 permanent plant employees. Thousands of people began their journey into the plant there. Carbide housed its operations at the Fergerson Building until they could move to the actual plant. Initial training was also held at this facility. Many workers and their families displaced to northern cities such as Detroit, Chicago, Akron, St. Louis, and Peoria during the Great Depression years had the opportunity to return to their beloved hometown when this employment opportunity presented itself.

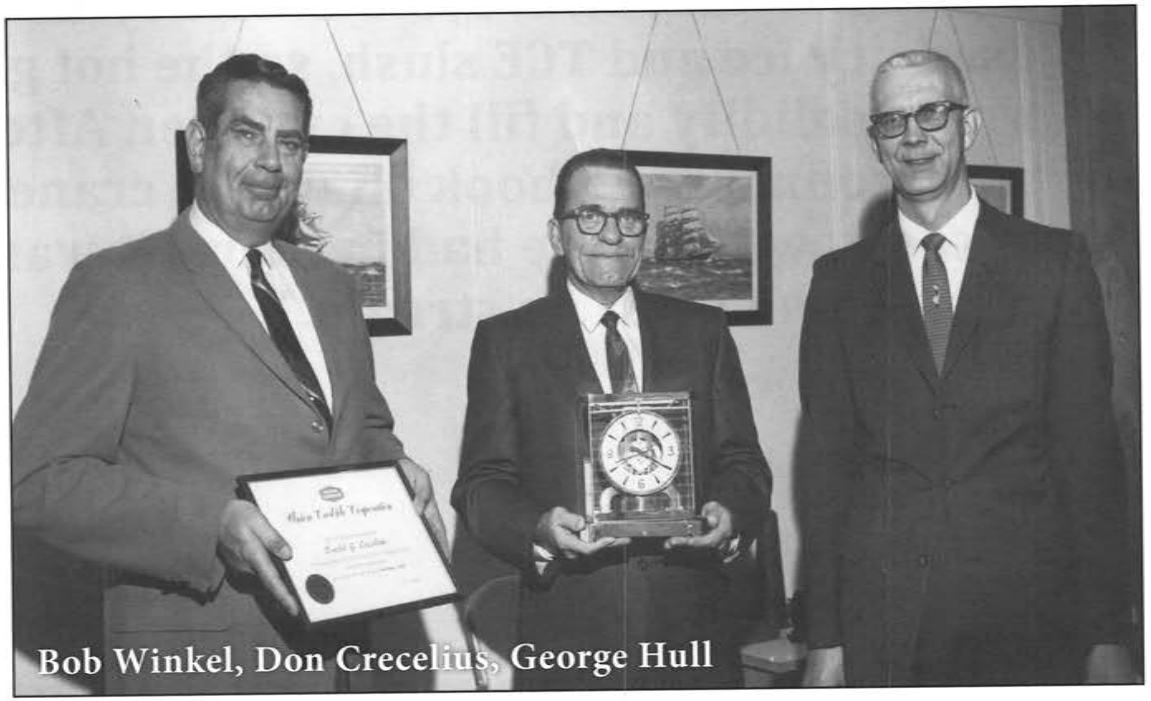
"When I first went to work at the plant, I worked in an office with several former Manhattan Project people. They never discussed their work on the world's first atomic bomb. Don Crecelius was my plant shift superintendent when I worked C-shift. I remember him well. He was a kind man with a great sense of humor."

Judy Clayton
Employee
West Paducah, Kentucky

Some of the first people employed at the site had worked on the Manhattan Project and knew the value of what the Paducah Plant was designed to produce. They had devoted themselves to developing the atomic bomb, then came to the PGDP to assist in getting the plant on line.

Don Crecelius was one such person. He received a citation for his "work essential to the production of the Atomic Bomb, thereby contributing to the successful conclusion of World War II."

Don Crecelius receiving a citation for 25 years of service to Union Carbide. *Photos courtesy of Cathy Crecelius*



Bob Winkel, Don Crecelius, George Hull

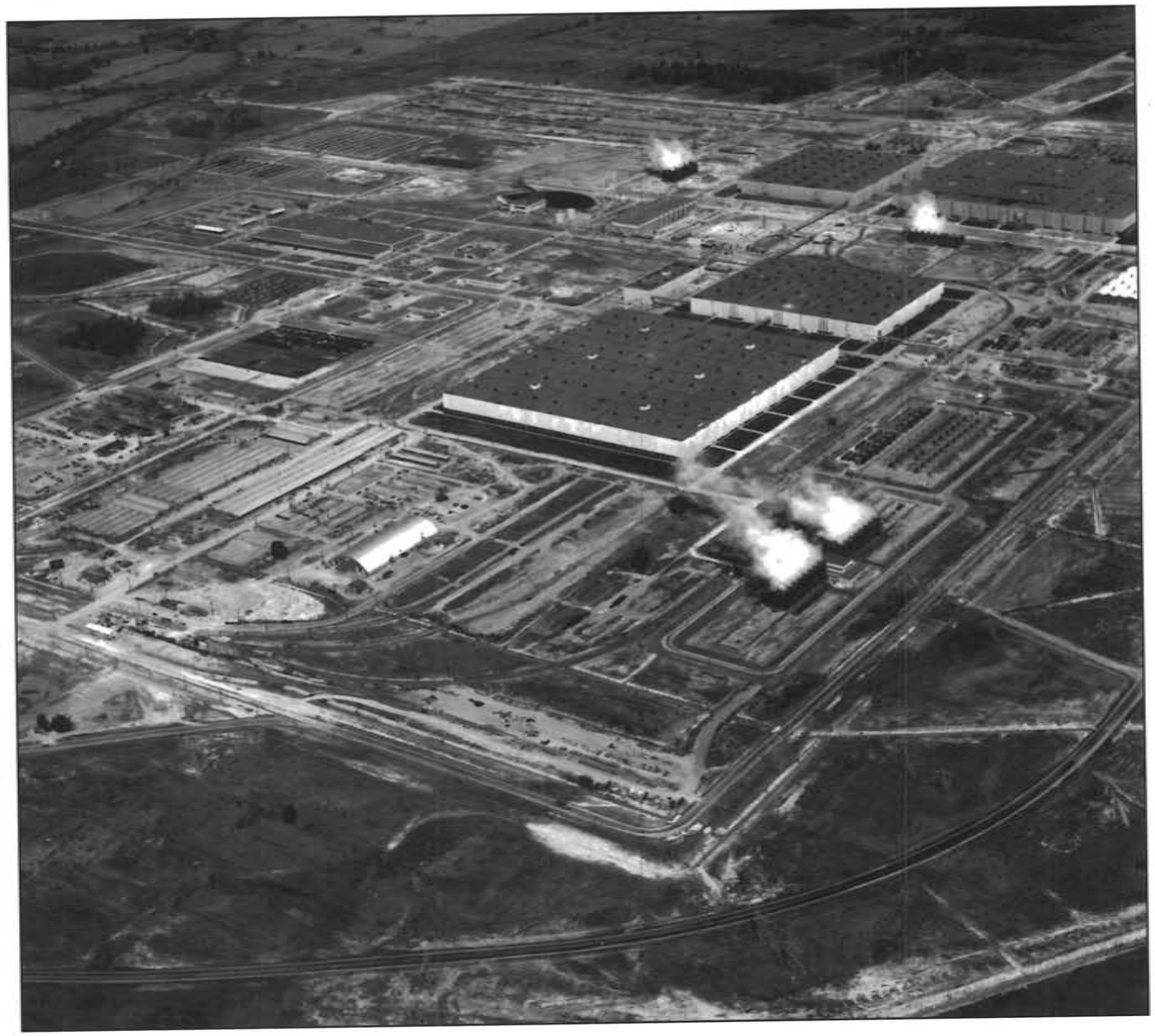
"We got one cell operating and the first UF6 charged into that cell was out of a 2 1/2-ton cylinder. We had it set up on a rack with heat lamps on it. Unit 4, cell 2. Quite a momentous occasion, all levels of corporate and government people were in attendance.

We all had gas masks on because we didn't know what to expect. As I turned the valve we were monitoring everything so closely, watching pressure gauges, then we could see pressure rising in the cell, we knew we had put some UF6 into it. We got that cell going, then a couple more, then we set up a little temporary product withdrawal system. The cylinders were upright. We used dry ice and TCE slush, so the hot gas going into the cylinder would solidify and fill the cylinder. After so long we would have to disconnect and hook on with a crane and weigh the cylinder to see how much we had in there. It was always a big affair when we put a new cell on stream."

Ocie Rodgers
Retired
Paducah, KY

After the PDGP was opened, newspaper reporters with The Paducah Sun-Democrat were allowed to visit and describe the plant and its operations. "After becoming operational, the plant had 25 acres of switchyards, which was the largest assemblage of such equipment in the world. An estimated 161,000 volts entering the switchyards were reduced to 14,000 volts, and this electricity was transferred to the plant buildings via 100 miles of underground cables. The electrical system contained 25,000 tons of steel and 10,000 tons of copper. The plant was reported to use 4% of all of the electrical power produced in the U.S. An estimated 10,000 miles of control cables ran through the plant. About 340 million gallons of water were circulated through the system every day to remove excess heat generated from the diffusion process." (5) (17)

When the plant was fully operational, it was described as operating as its own "city." A 1956 newspaper article stated, "The 'mayor' is the plant superintendent. The legislative council includes seven department heads. The 1800 employees...are the municipal workers. The atomic city maintains a central administrative force, a police force, fire department, hospital, library, laboratory, and newspaper." (5) (18)



"The PGDP is like a city. It has a medical facility, guards, and water plant. The guards knew all the people's names and badge numbers. The plant had a taxi service, Y-99, which transported people from building to building."

Wanda Holliman
Retired
Salem, Kentucky

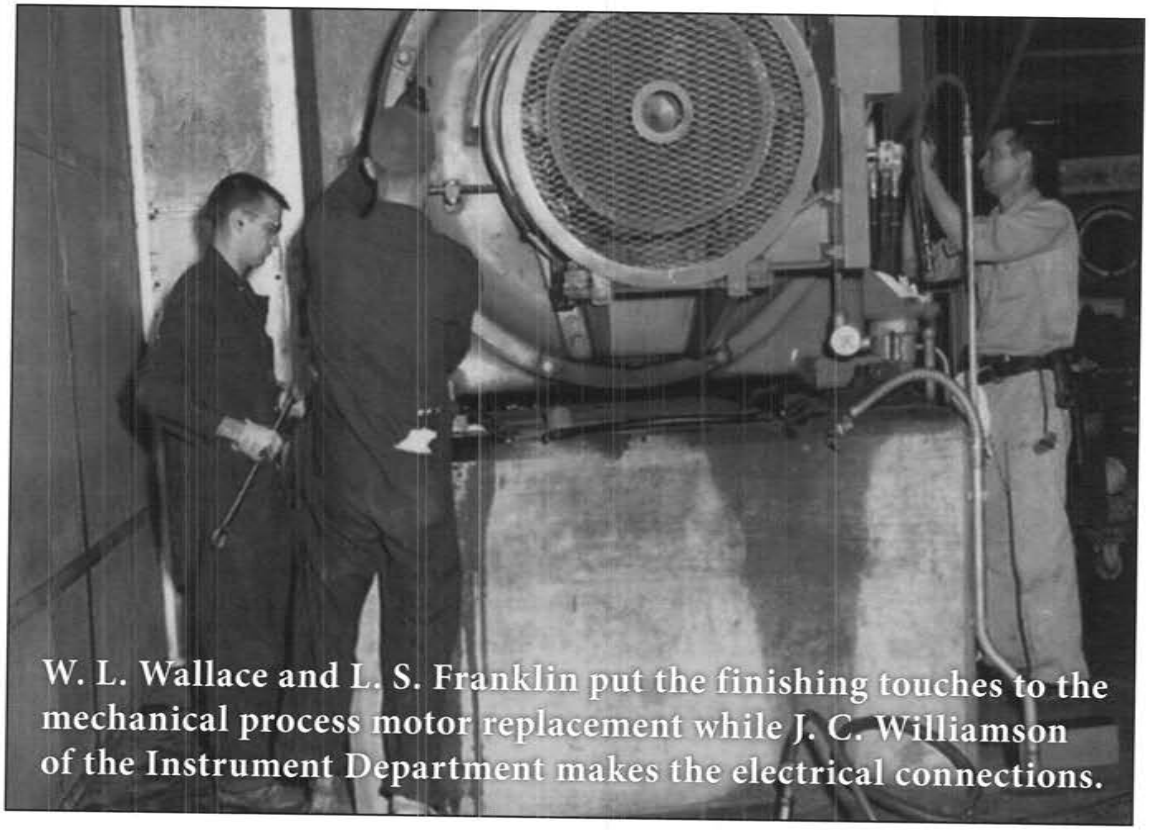
A facility of this complexity requires a large number of highly skilled people in many disciplines. Among the plant's employees are engineers, draftsmen, chemists, administrative personnel, clerical workers, mechanics, operators, welders, carpenters, painters, medical staff, security specialists, janitors, roads and grounds, and many more. The plant operated around the clock, so many employees worked 7-day swing shift and later 12-hour swing shift.

"I enjoyed working out there 34 years. There a lot of good people out there. I actually had a lot of fun. I didn't particularly like putting up coal. I didn't particularly like having fire training; I didn't particularly like coming in at midnight and working the power foreman job and finding myself on the emergency squad, but overall it was a good place to work and I appreciate very much the opportunity of having done so."

C. O. Hays
Retired
Paducah, Kentucky

"It was a big day when Dan could go on straight days. It was a treat to have a daddy and husband in the home at night. It was a good time for our family despite the fact that daddy was gone so much. We have a lot of good memories."

Virginia Garrott
Wife of Dan Garrott, Retired
Mayfield, Kentucky

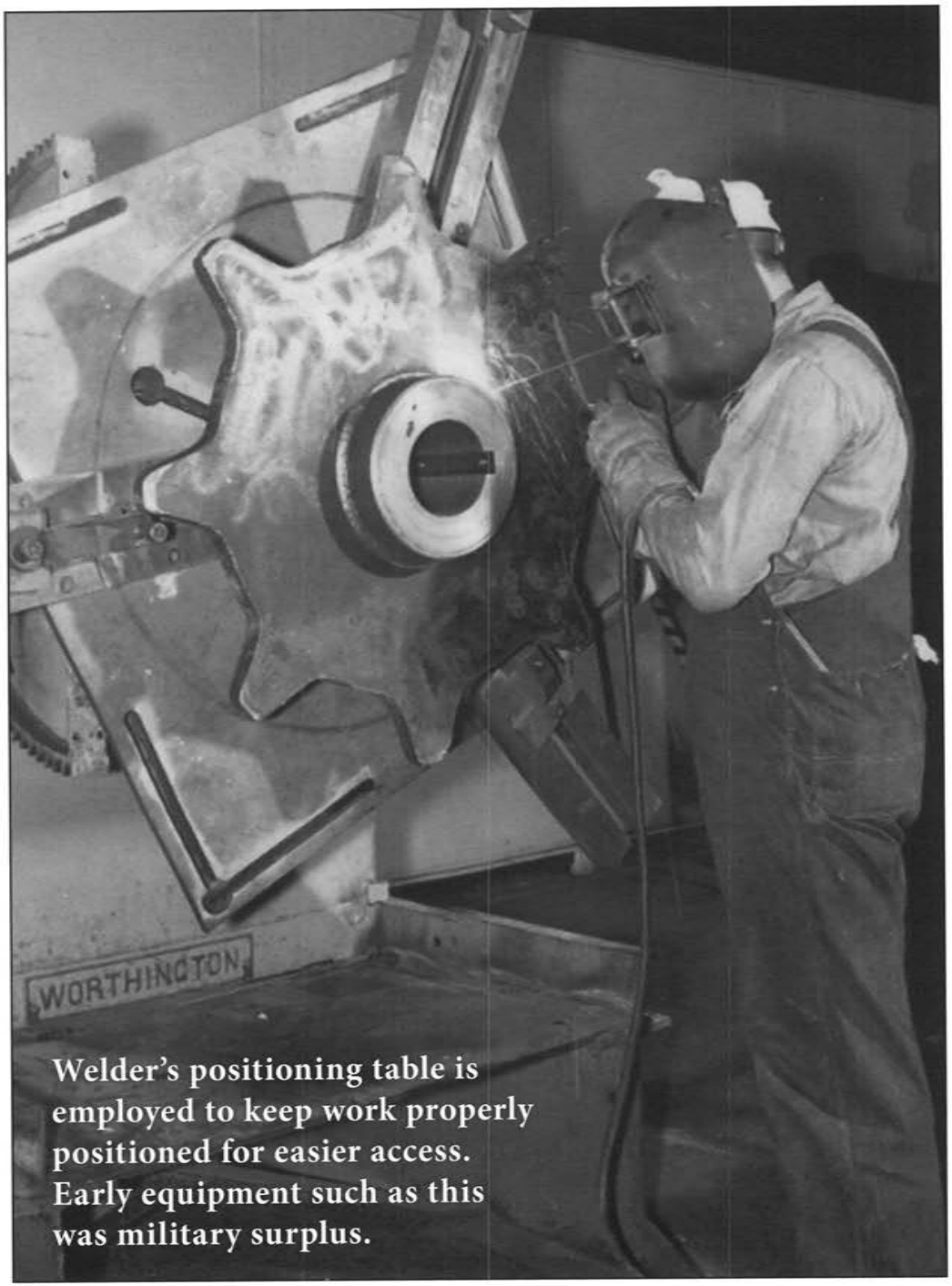


W. L. Wallace and L. S. Franklin put the finishing touches to the mechanical process motor replacement while J. C. Williamson of the Instrument Department makes the electrical connections.

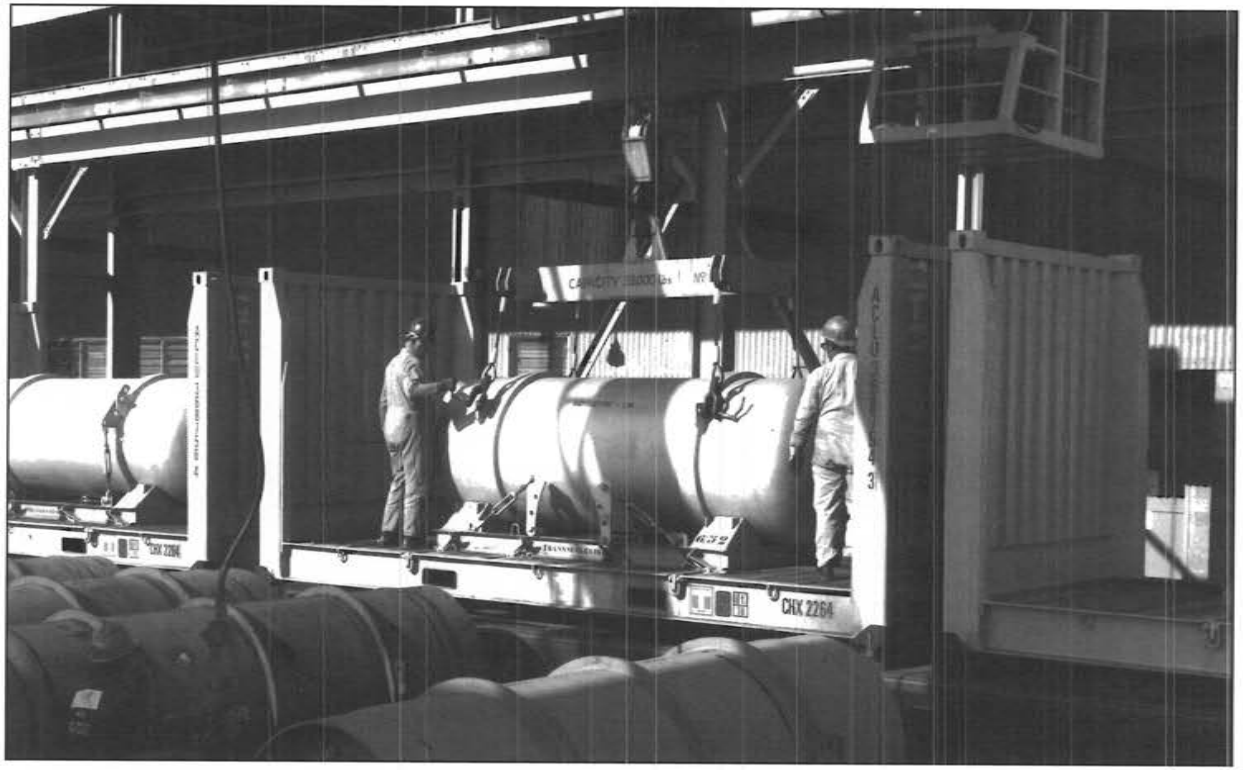
In the early 1950s, the plant provided some of the better paying jobs in the area, if not the region. Workers believed that the mission of the plant was important to national security, and they worked hard to meet expectations. Accordingly, being an employee of the plant engendered respect and there was civic pride in the fact that Paducah was the location of a facility that played a role that was important to the nation. Many of the plant's original operators and workers were military veterans and viewed the opportunity to work at PGDP as a way to continue their service to the country. This notion of service is reflected in the fact that a significant proportion of workers at PGDP would become long-term plant employees, transcending changes in Federal oversight organizations and transitions in contractors. (11)

"When I lived in Carterville, Illinois, I worked first in a coal mine then took a job as a school teacher for $200 a month. I came down here for $365 a month. I loved school teaching, but that was my primary reason for coming to work here. That was a tremendous raise, it almost doubled my salary."

Chuck Turok
Retired
Paducah, Kentucky



Welder's positioning table is employed to keep work properly positioned for easier access. Early equipment such as this was military surplus.

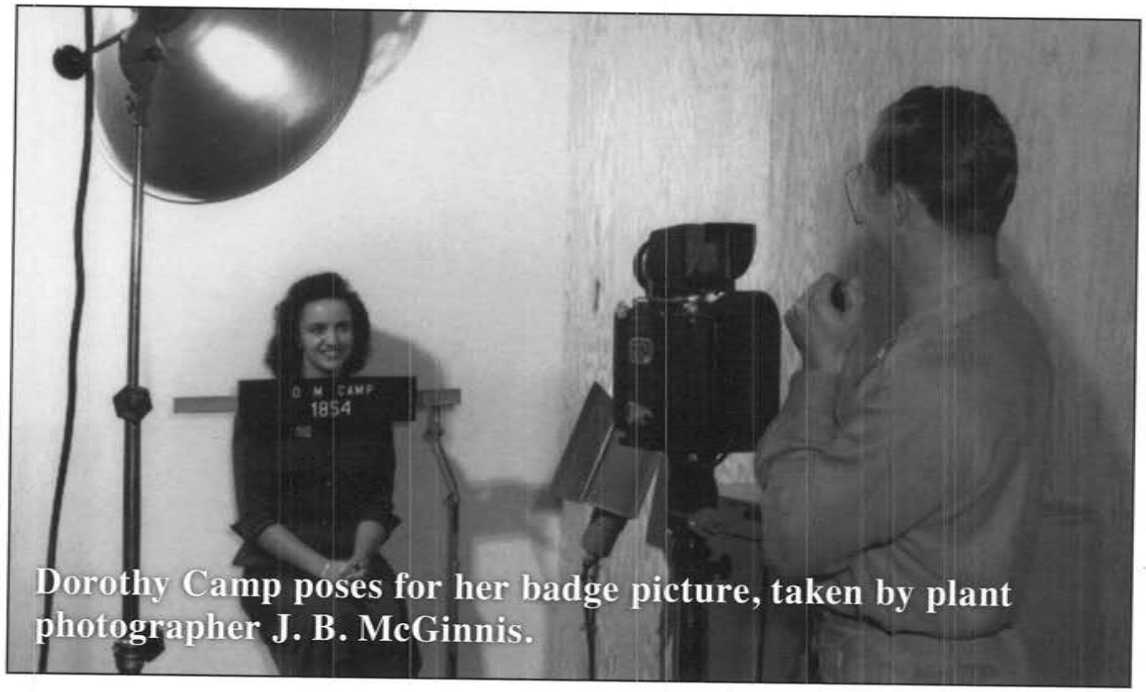


Demands on the plant and the workers were high, given the requirements of the Cold War. Work was difficult, production schedules were challenging, and the work environment was often hot, loud, dirty, and laden with noxious fumes. The security demands of the Cold War affected worker awareness of hazards in that, prior to 1989, documents discussing many aspects of operations were classified and, at the direction of line management and AEC security, detailed knowledge of work activities was based on a strict "need to know". The workers sense of loyalty and service would also translate into acceptance of these security policies and the expectation that they would be told everything that they needed to know. (11)

"I had two little boys, and Christmas was always a chore when I was working shift. When I was on days, we had Christmas before I left for work, but when I was on midnights, it was Virginia's job to keep them away from the tree until I got home at 9:00 in the morning. When I was on afternoons, by the time I got things done and laid down for a little while, the boys were waking me up telling me Santa Claus had come. It was a short night."

Dan Garrott
Retired
Mayfield, Kentucky

Security was tight. No one gained access to the plant without authorization and being properly identified by security personnel.



Dorothy Camp poses for her badge picture, taken by plant photographer J. B. McGinnis.

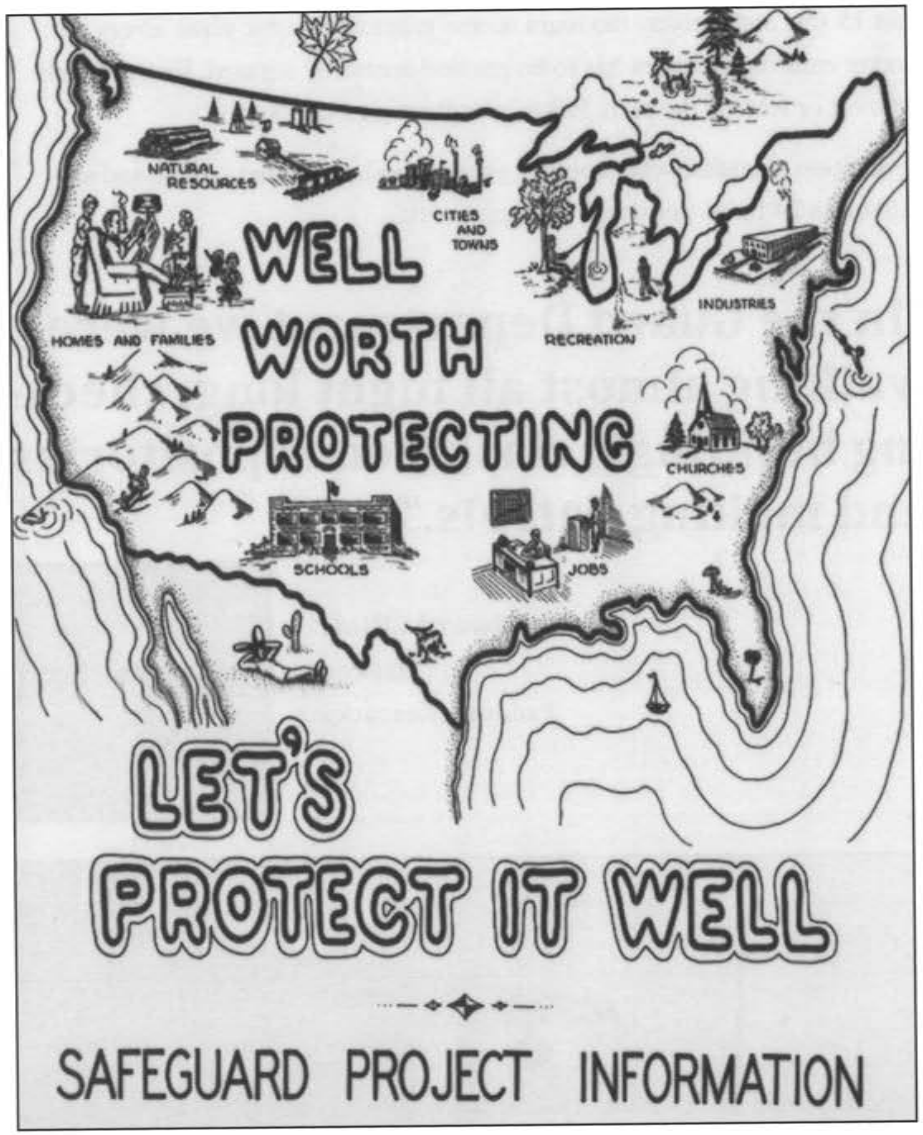
Sue Hendricks of Security laminating pictures to be used on security badges.

Personnel were granted security clearances only after extensive background checks were conducted by the government. Once granted a clearance, personnel were given identification badges which were to be worn at all times while within the security fence. Badges were made in-house by Security. Employees not only obtained but maintained a security clearance as a condition of employment. Background checks were repeated every five years. Excessive debt, traffic citations, and other brushes with the law caused concern that an employee was not trustworthy with government secrets.

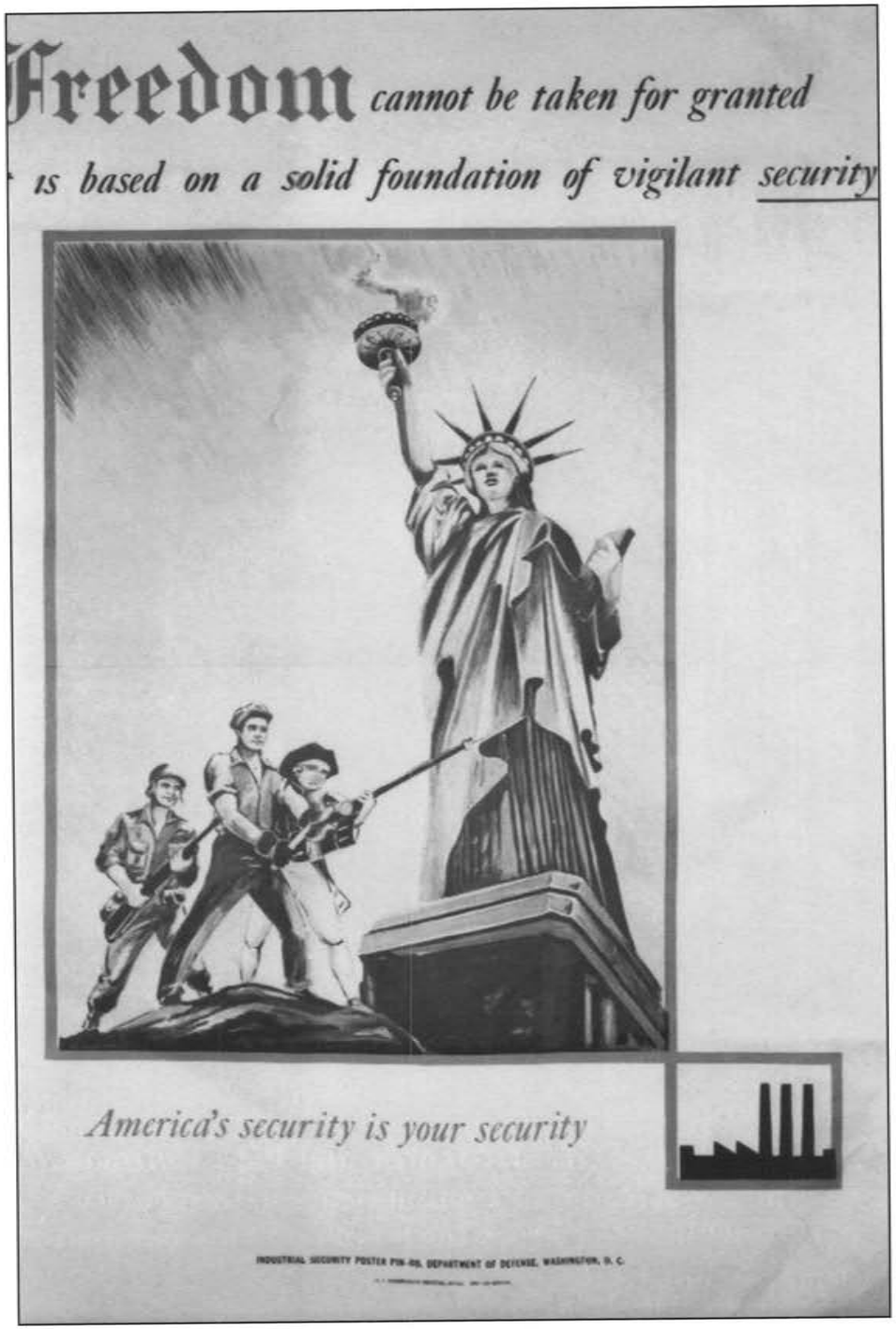
Employees could not talk about their job, even with other plant personnel, except on a need-to-know basis. Posters, such as the one which can be seen in the picture below, titled "Tongue Looseners" were displayed throughout the plant to reminded employees of this obligation.

"I never talked about my job too much. Back then in the early days we were working under code names and code numbers. They stressed to us not to talk."

Charlie Baker
Retired
Paducah, Kentucky



Protecting national secrets was of upmost concern as the nation was engaged in the Cold War. Employees were constantly reminded of the need to safeguard the knowledge and information entrusted to them. Posters reminding employees of their responsibility and potential national repercussions were posted throughout the plant.



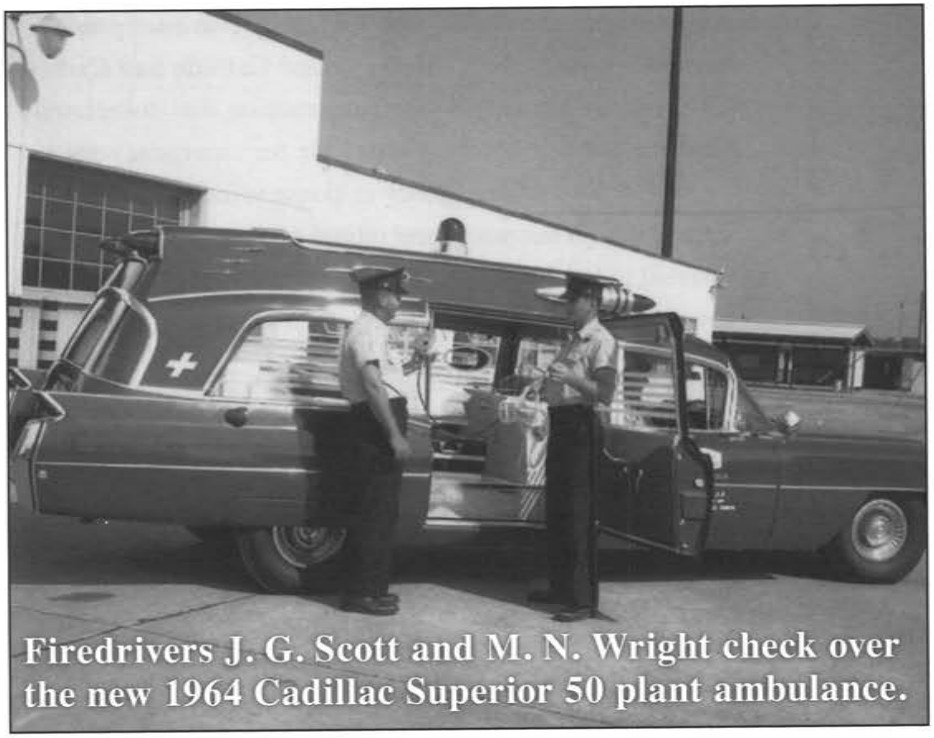
While on patrol, H. M. Monroe and F. L. Hoffman use the 2-way radio to communicate with security personnel in other areas in the plant. This picture was taken in 1952.

Post 15 was and is today the main access gateway into the plant. Every worker entering the plant has to be granted access by a guard. Every vehicle entering or leaving the plant has to pass through a checkpoint.

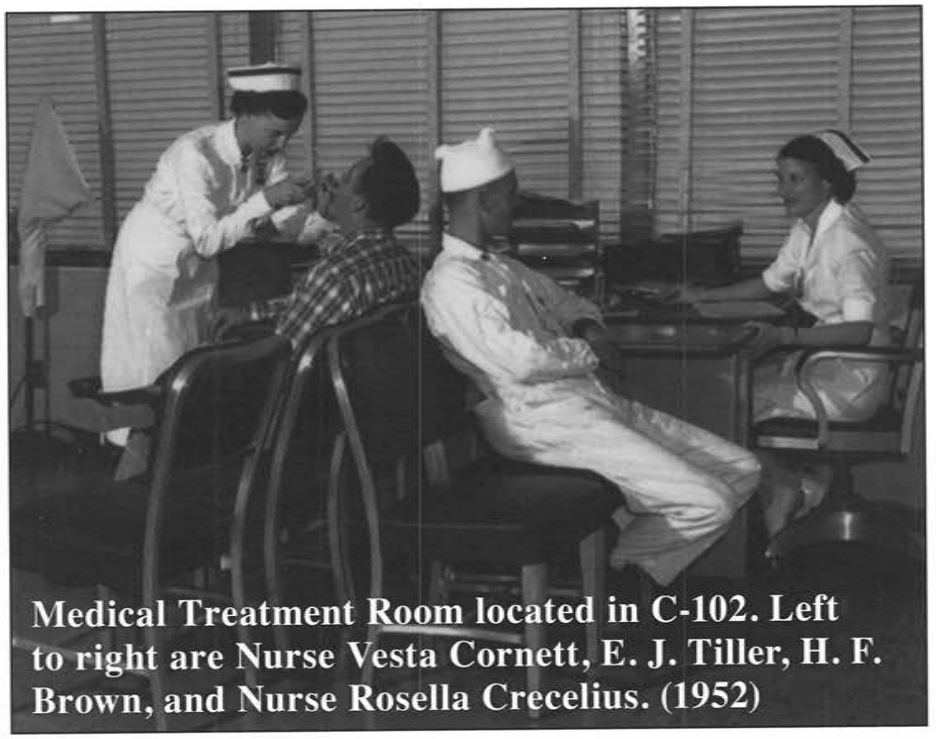
In addition to staffing checkpoints, guards conduct routine patrols and surveillances 24 hours per day, 7 days per week.

"In the Guard Department we were walking almost all night long, checking buildings, classified repositories, and making patrols."

Edward Elliott
Retired
Paducah, Kentucky



Firedrivers J. G. Scott and M. N. Wright check over the new 1964 Cadillac Superior 50 plant ambulance.



Medical Treatment Room located in C-102. Left to right are Nurse Vesta Cornett, E. J. Tiller, H. F. Brown, and Nurse Rosella Crecelius. (1952)

"We went to the plant doctor if we had an illness. We didn't have a personal physician like people have today."

Charlie Baker
Retired
Paducah, Kentucky

The plant and plant personnel have been served by the Medical Department, the Fire Department, and the Emergency Squad.

A medical facility, staffed by a doctor, physicians assistant, and nurses, has provided medical services to plant employees since the plant was built. The services have included physicals, first aid, and general "walk-in" examinations and evaluations, in addition to treating injuries.

Additionally, Fire Department employees provide 24-hour coverage for any medical or process emergency which might arise.

The Fire Department, along with the Emergency Squad, responds to all plant emergencies. The Fire Department is equipped to handle virtually any kind of emergency, whether medical, hazardous materials, or natural disaster.

Military surplus emergency response vehicles

At the beginning PGDP was served by two emergency response groups: F. H. McGraw and Carbide and Carbon Chemicals Company. Once construction was completed, Carbide became solely responsible for emergency services. The fleet of emergency response vehicles has been upgraded over the years, and retired equipment has been donated to local volunteer fire departments. The 1964 snorkel, lower left, is one such example.

When put into service, the giant snorkel was the most advanced piece of fire fighting equipment in operation. No other fire department in Kentucky operated this type of equipment. The closest snorkel in operation was at Memphis, Tennessee. Due to its size it had to be housed in the C-400 Cleaning Building while an additional equipment bay was constructed at the Fire and Guard Building.

The snorkel truck was put into service at the Paducah Plant in 1964.

Fleet of emergency vehicles in 2013

Although the plant has a general manager and operations manager, the Plant Shift Superintendent is in charge of all plant activities on the off-shift. He is knowledgeable of plant systems. In the case of an emergency, he is the incident commander, leading response efforts by emergency response personnel.

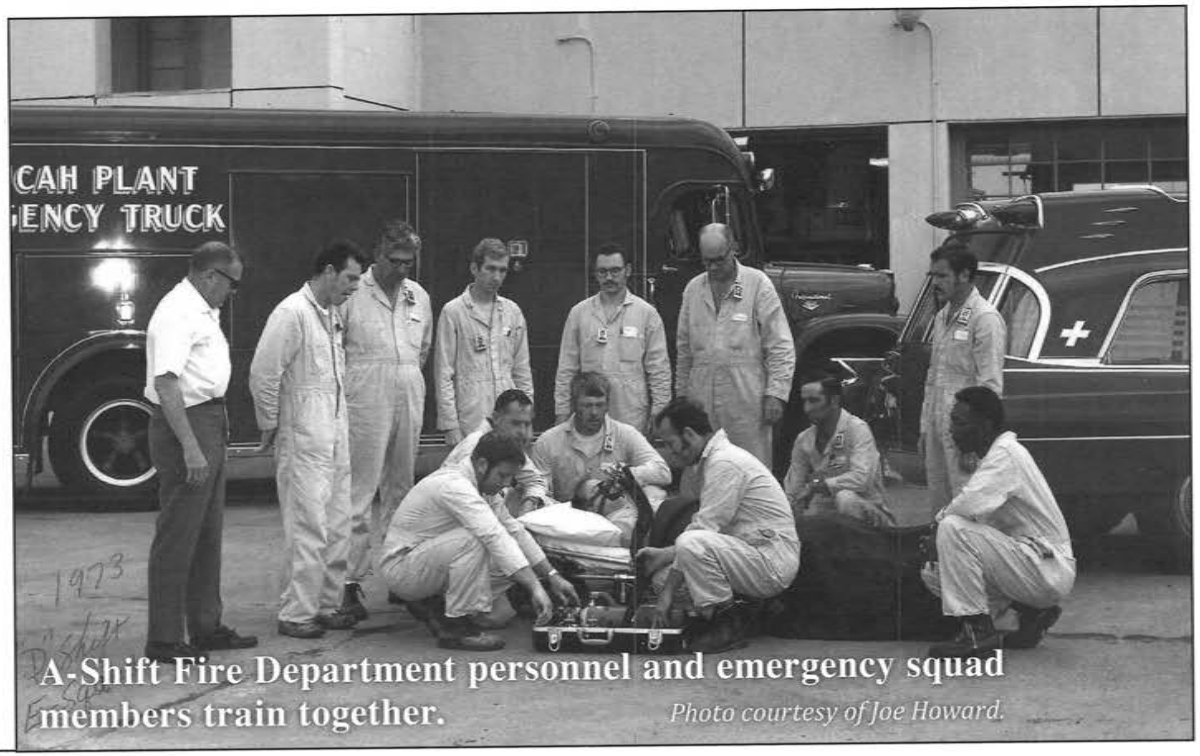
The plant has dedicated, trained emergency squad members in addition to Fire Department personnel. These personnel work in various areas of the plant.

In addition to their normal duty assignments, these volunteers attend monthly training sessions and respond with the Fire Department to all types of plant emergencies.

Training with equipment for hazardous materials response
Photo courtesy of Joe Howard.

"The emergency squad is an integral part of emergency response at the plant. Those personnel are intimately familiar with the process buildings because they work in them."

Joe Howard
Retired
Grahamville, Kentucky



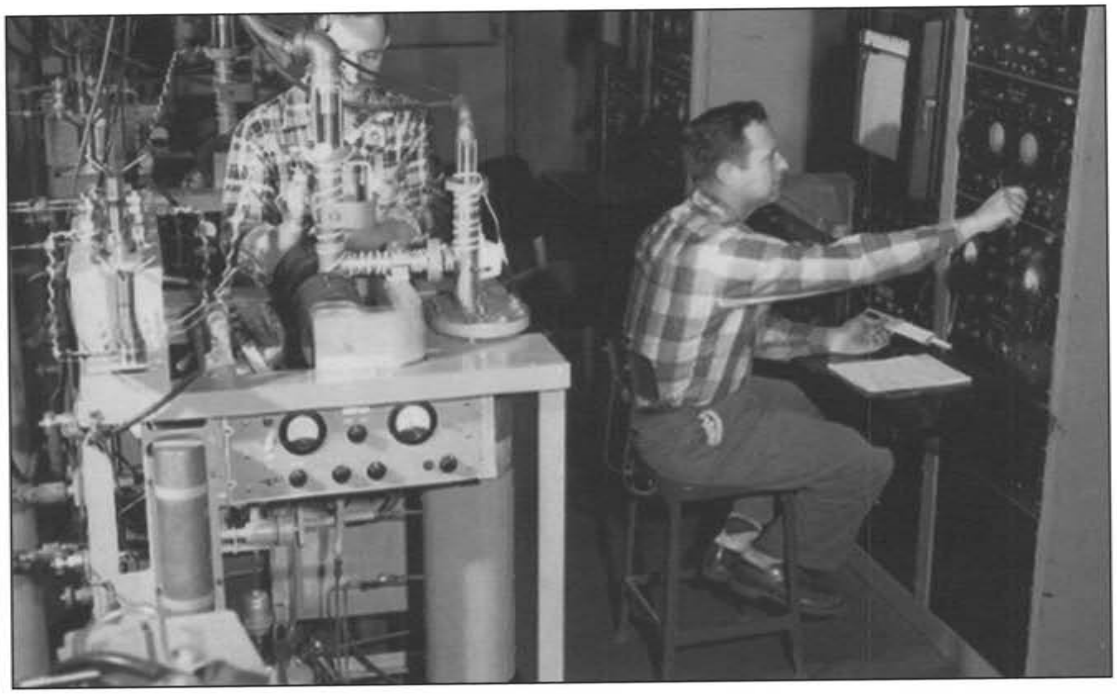
A-Shift Fire Department personnel and emergency squad members train together.
Photo courtesy of Joe Howard.

Plant laboratory personnel located in C-710 have played an important part in providing analytical and technical support activities for the safe operation of the plant. As early as 1953, feed made from recycled reactor fuel processed through the Paducah enrichment cascade contained trace quantities of plutonium and neptunium-137. Laboratory personnel were instrumental in developing a process for trapping these transuranic elements out of the product.

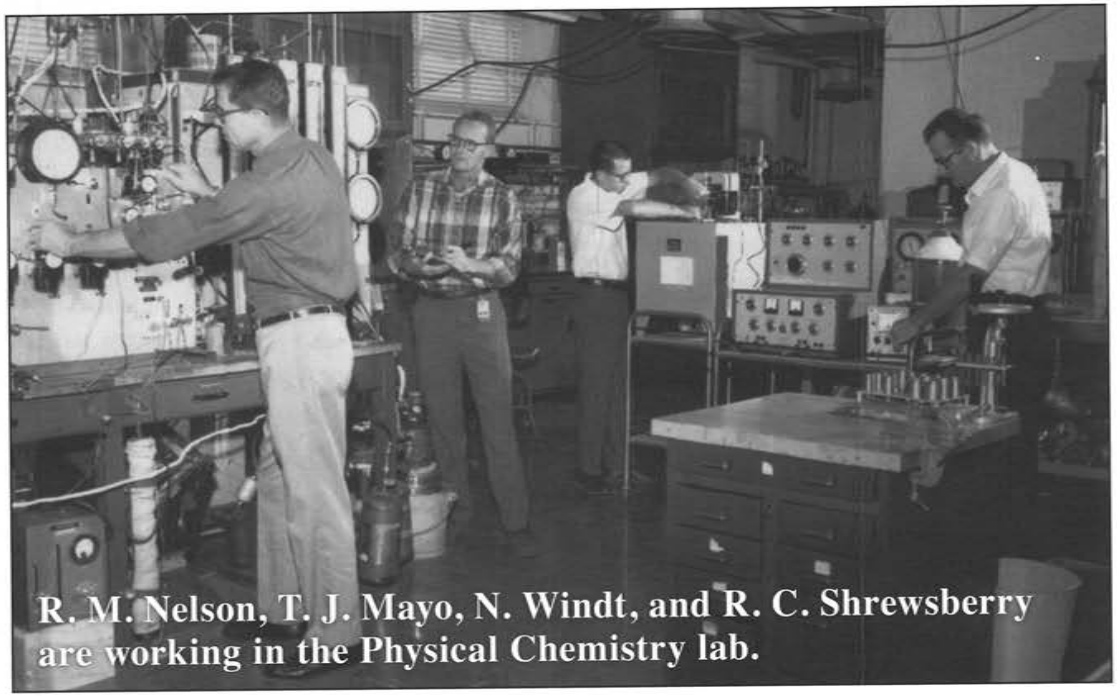
Calibrating a line recorder is just one of the functions of an Instrument Mechanic. Upper right, G. C. Cooley (seated) takes data while C. F. Broach makes minor adjustments.

Continuous improvement requires not only laboratory research and development but also field testing and application of new techniques which allows jobs to be done more safely and efficiently.

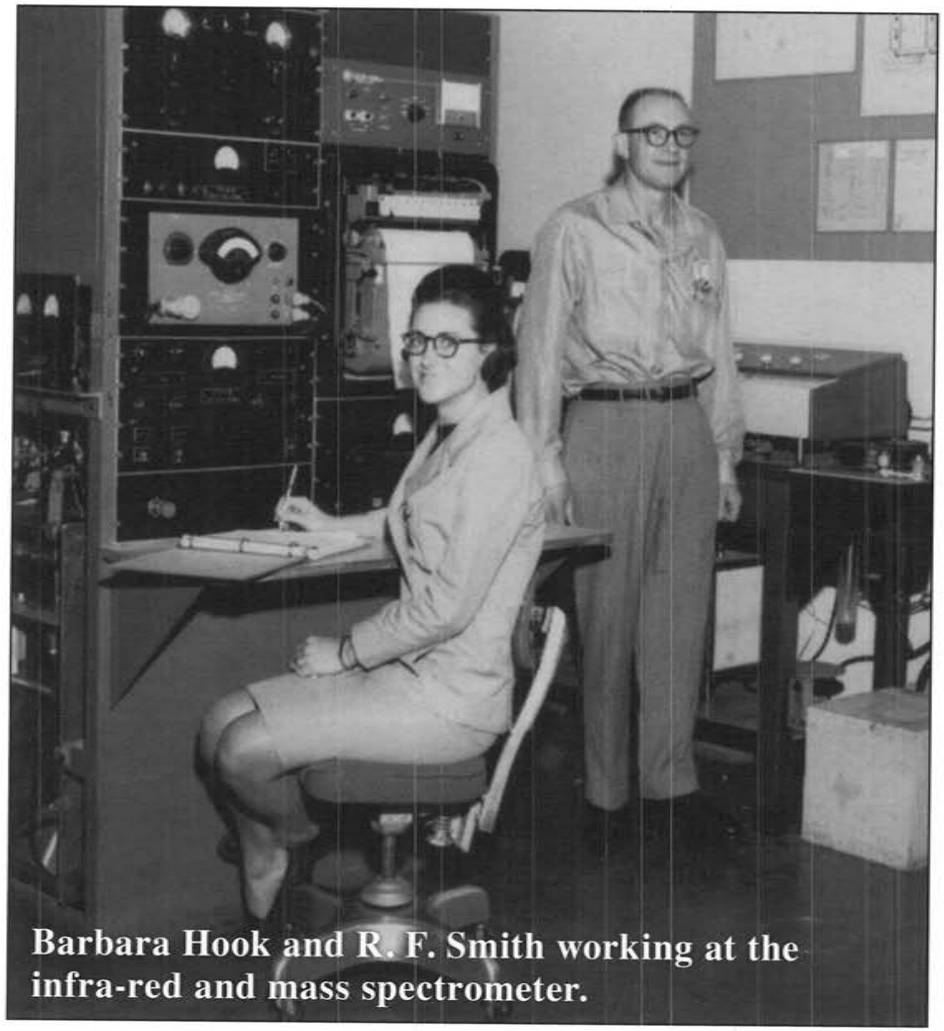
Bottom left and right, employees can be seen conducting experiments in the C-710 Laboratory in support of cascade operations.



Ruth Biggerstaff is using a pair of long tongs to retrieve a crucible from a 1,400 degree F Muffle furnace.



R. M. Nelson, T. J. Mayo, N. Windt, and R. C. Shrewsberry are working in the Physical Chemistry lab.



Barbara Hook and R. F. Smith working at the infra-red and mass spectrometer.

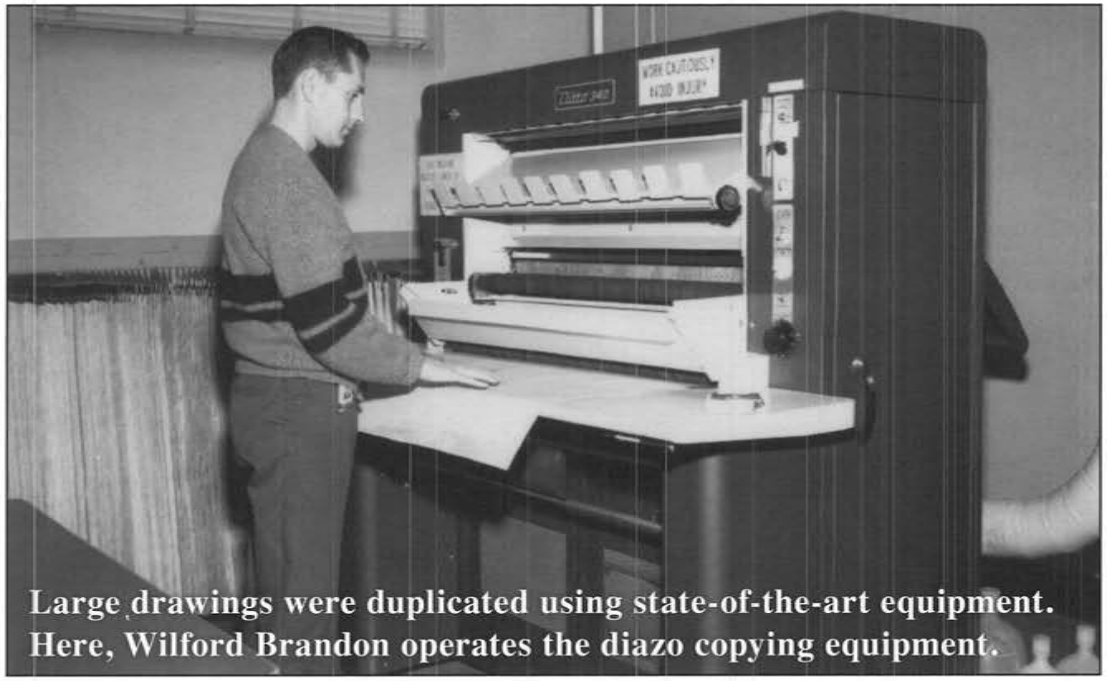
Dale Bewley, center, received payment for his contribution to a patent.

Routine services provided by the Laboratory include analysis of process gases and environmental samples, metallurgical testing, and radio-analysis. Other services include testing of materials purchased in accordance with established specifications. Included are oils, coolants, chemicals, and metals. The Lab is also involved in finding solutions to specific plant problems and providing consultation, theoretical solutions, and experimental work of an original nature. In addition, the Lab is involved in the development and improvement of existing Lab and plant instrumentation, analytical methods, and techniques.

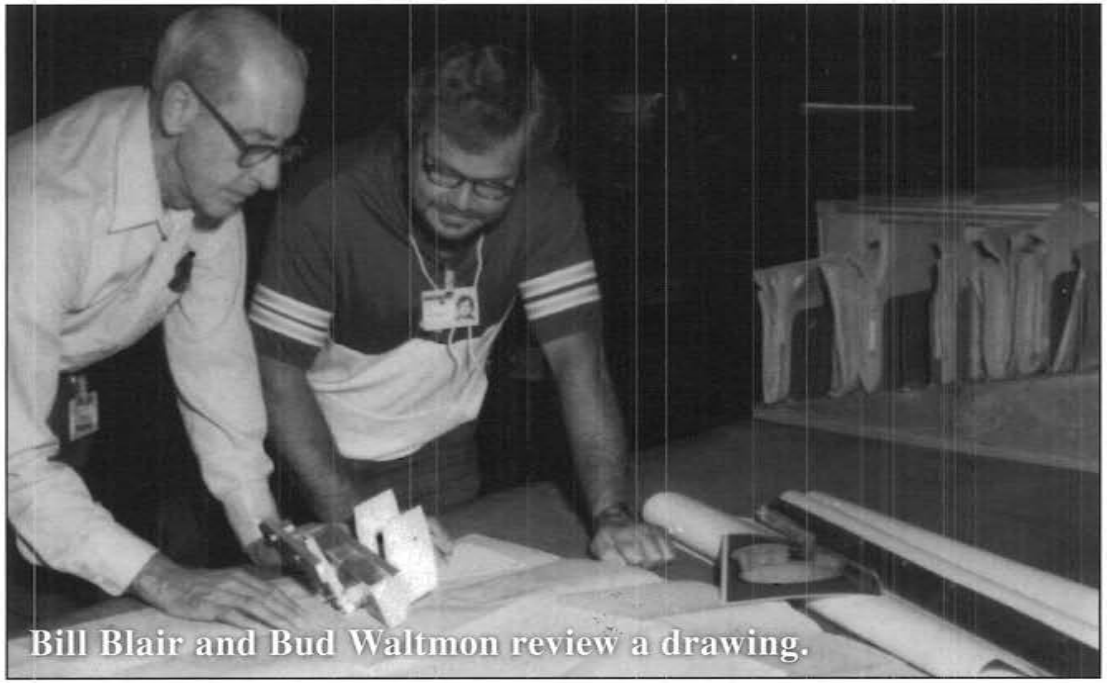
Other services provided by the Laboratory include technical support for various process operations, research in environmental control methods and design experiments to reduce effluents from various chemical processes.

Several patents have been received during research work to support the Portsmouth, Oak Ridge, and Paducah operations. Because employees were working for the company when inventions were made, patents belonged to the company, and employees were paid $1 for their patents.

It takes a whole array of people to operate the plant.
From engineering to maintaining the grounds, there is a place for everyone.



Large drawings were duplicated using state-of-the-art equipment. Here, Wilford Brandon operates the diazo copying equipment.



Bill Blair and Bud Waltmon review a drawing.

The plant employs engineers in many fields, including architecture, civil, electrical, instrument, computer applications, machine tool, mechanical, and structural. They are responsible for designing, developing, building, and maintaining vital components of the plant.

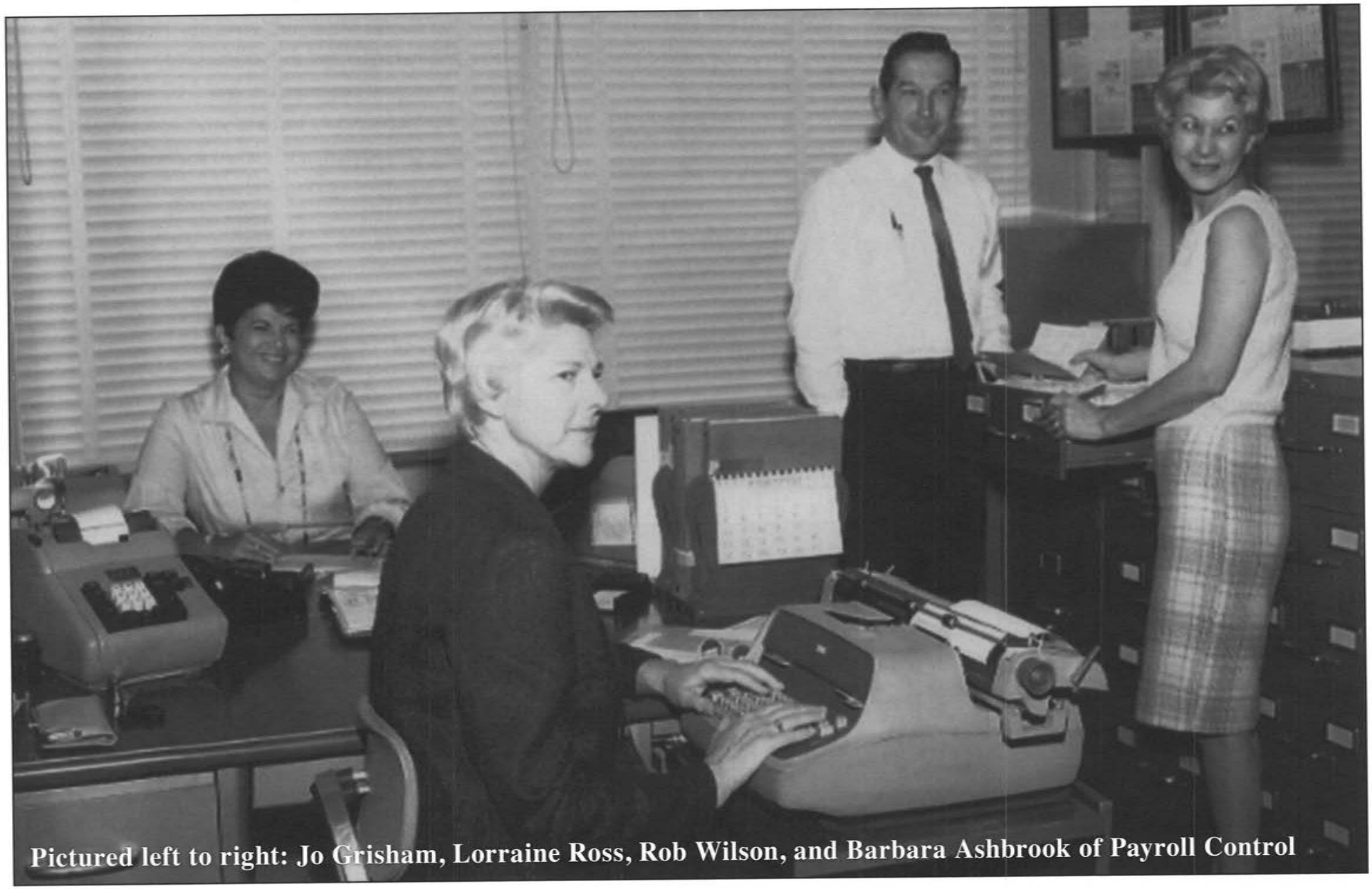
Before the age of computers, draftsmen produced thousands of drawings by hand. They were then copied for field work by employing large machines such as the one at the right.

Craftsmen took the drawings and converted them to goods which were needed in the plant.

Today, draftsmen use computer aided design software to generate drawings, and nearly every employee in the plant uses computers. As a result, the Computer Maintenance group was added so that computers, printers, etc. could be maintained in-house.

"I was fascinated that a person could take measurements, convert them to drawings on paper, from which needed parts or goods could be fabricated."

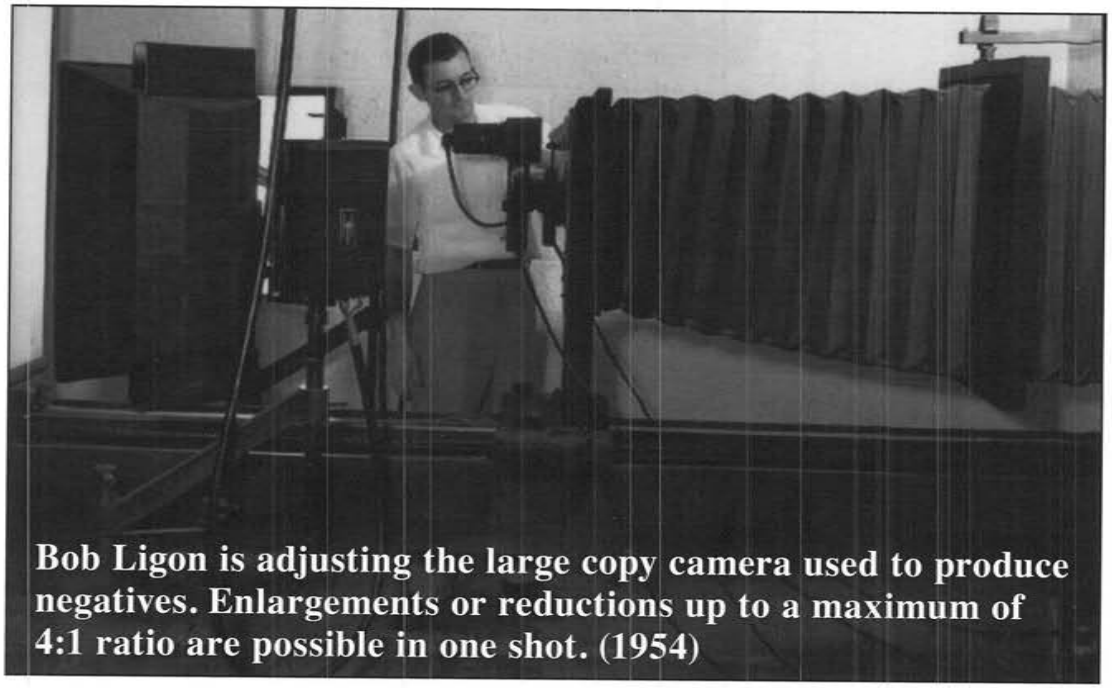
Betty Owens
Former Employee
Paducah, Kentucky



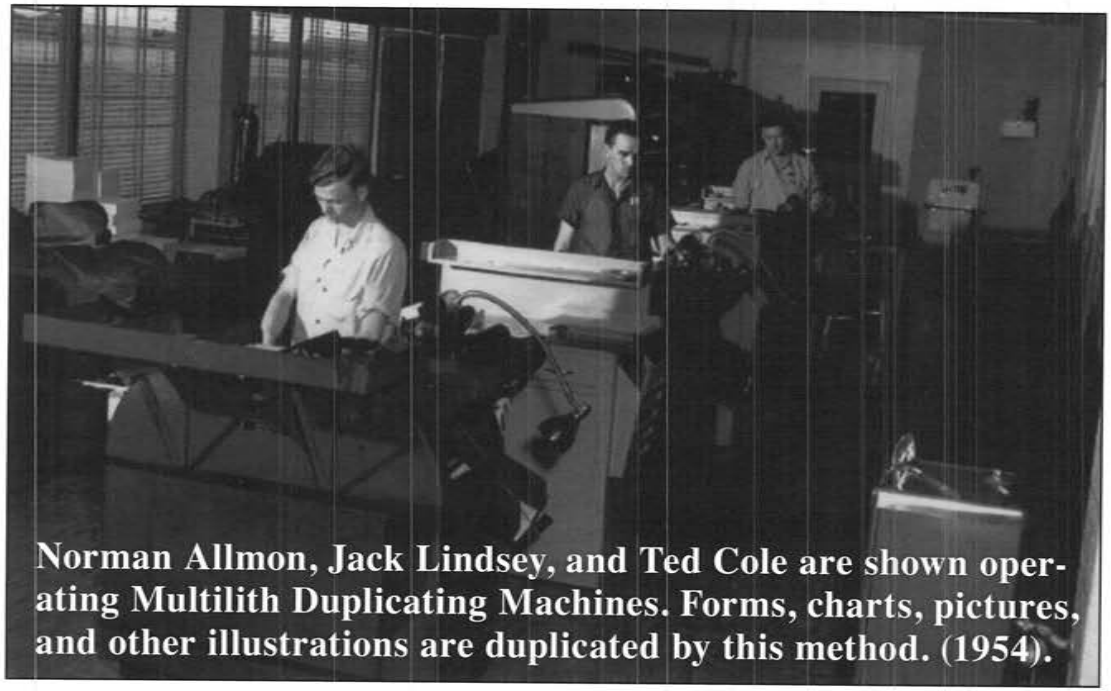
Pictured left to right: Jo Grisham, Lorraine Ross, Rob Wilson, and Barbara Ashbrook of Payroll Control

Many women found opportunities in clerical positions at the plant. These jobs were better paying than those in which they were employed and benefits such as insurance and vacation time were available to them.

As seen in this picture, salaried women and men were expected to dress in business attire, regardless of where they worked in the plant. Neither blue jeans nor tennis shoes were considered proper apparel.



Bob Ligon is adjusting the large copy camera used to produce negatives. Enlargements or reductions up to a maximum of 4:1 ratio are possible in one shot. (1954)



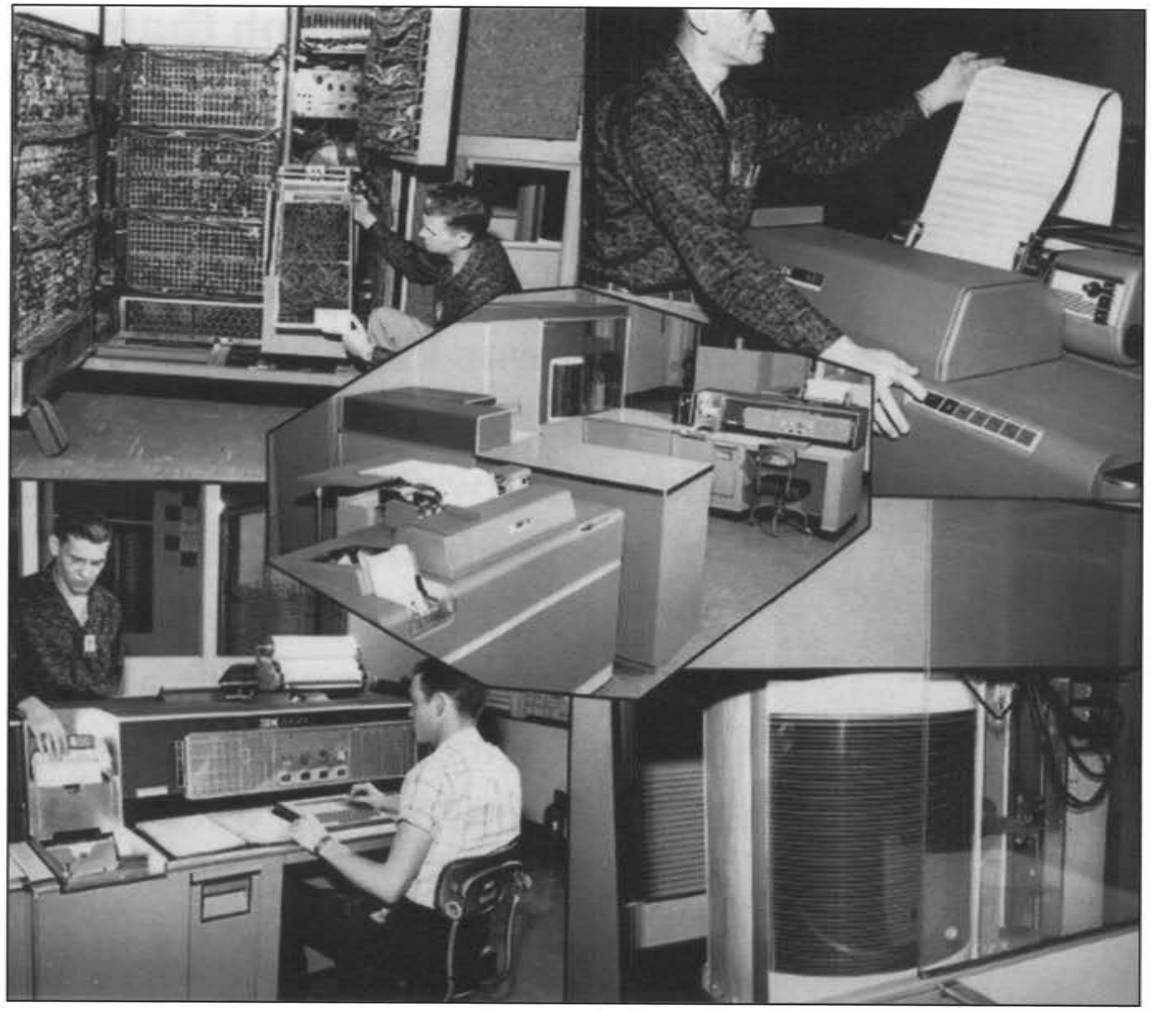
Norman Allmon, Jack Lindsey, and Ted Cole are shown operating Multilith Duplicating Machines. Forms, charts, pictures, and other illustrations are duplicated by this method. (1954).

Important groups supporting plant operations were an in-house photographer and film developing service, a facility to reproduce printed materials, and mail service. This proved advantageous as much of what needed to be photographed, reproduced, and mailed within the plant was classified in nature and strict control could be maintained with in-house services.

Many documents originated at the plant. Some were unclassified, and some were confidential or secret documents as they contained classified information. The Reproduction Department was responsible for reproducing all these documents and strict accountability for tracking classified documents was necessary to safeguard classified information. The Reproduction Department also reproduced all of the correspondence and newsprint generated in-house. A monthly newspaper, the *Carbide Kentuckian*, was written and edited by plant employees, and reproduced by the Reproduction Department.

"When copier-printers were introduced it really revolutionized office work."

Velva Blayney Yeomans
Retired
Paducah, Kentucky



Management has made every effort to provide state-of-the-art equipment for employees, regardless of where they worked. Pictured above is the new electronic brain installed in 1960. Called "RAMAC", acronym for Random Access Method of Accounting and Control, the new computer processor was state-of-the-art when installed. Center is pictured the overview of the system; top right is the heart of the system, the processor consisting of hundreds of miles of wires, hundreds of tubes, transistors, and other electrical parts. Top left is the integrated printer, bottom left, employees A. A. Strache and George Parker are at the input station, and bottom right is disk storage consisting of 50 rotating metal disks.

"For my first job they gave me an electric typewriter. I had never seen an electric typewriter before, much less typed on one. My first job assignment was a 48-page vehicle report to type, legal size, nothing but columns of figures. And me on an electric typewriter which I had never seen or used before! I really had a struggle. Thank goodness before I left the plant I was trained on and used the computer for 5 years."

Marie Johnson
Retired
Paducah, Kentucky

The PGDP also had its own switchboard controlling two independent telephone systems, the Bell system and the PAX system. The Bell system was used primarily for outgoing calls, while the PAX system was used internally. Though management made great efforts to use the latest equipment, it was not until 1981 that the switchboard was replaced with more modern equipment. Seen in this picture, taken in 1955, are switchboard operators Nancy Everett who transferred to the plant from the Fergerson Building, and new hires Johnnie Gibbs and June Murphy.

"It was a different job than I was used to. I worked downtown, able to go to restaurants for lunch, or shopping. When I went to the plant, I was kind of locked in and it was scary because you didn't know what was going on in the outside world, you were just there. The offices were different, not like a law office. I was a single woman, not use to working with a lot of men, so that was different. But everyone was really nice to me, treating me like a sister or daughter. I enjoyed being there."

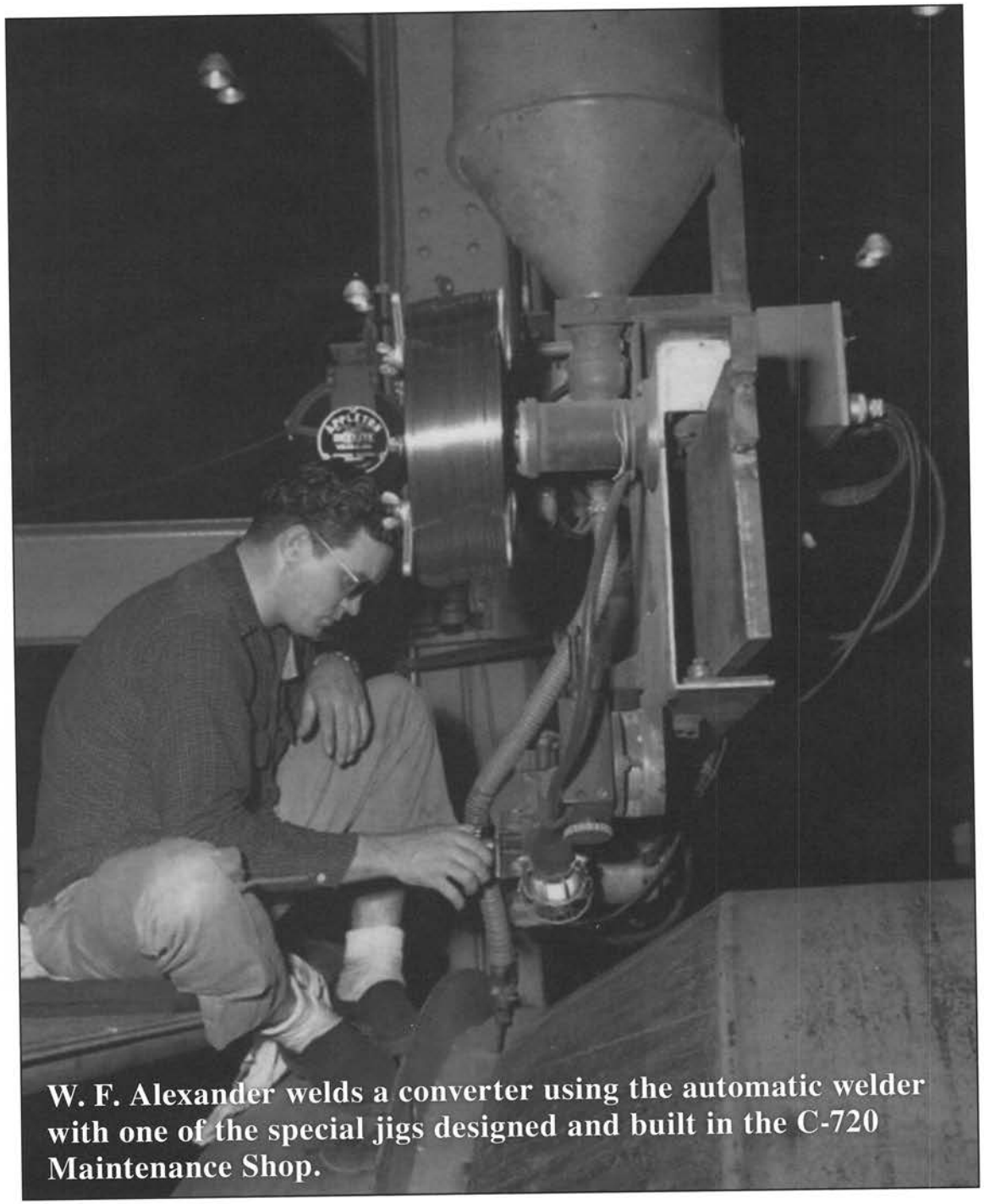
Wanda Holliman
Retired
Salem, Kentucky

By employing a wide range of industrial crafts and skills, personnel at the plant are capable of maintaining and calibrating every piece of equipment essential to the plant's operation.

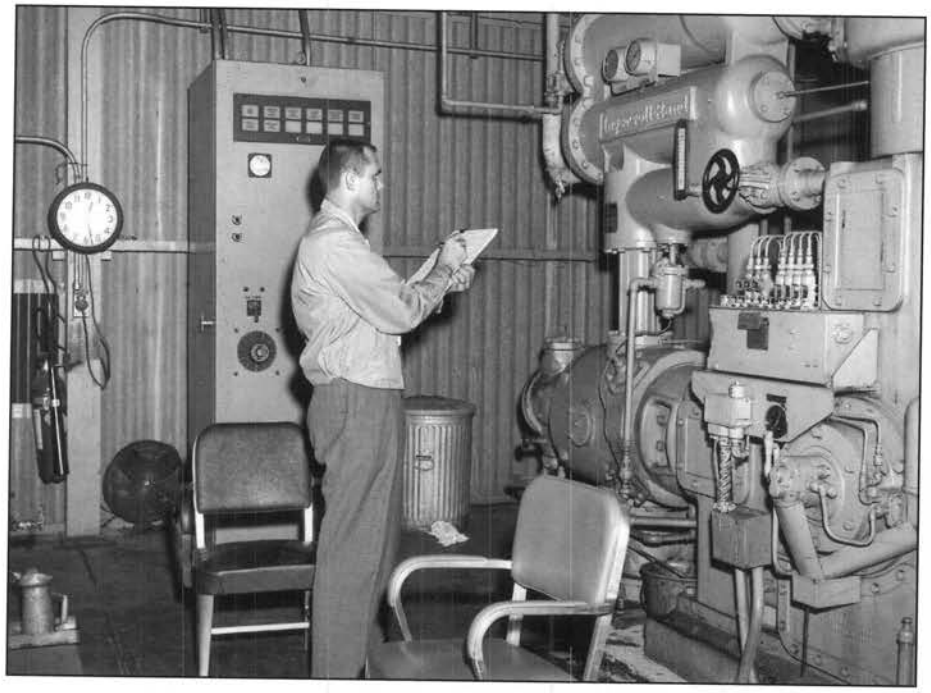
Demand for skilled craftsmen such as electricians, welders, and instrument technicians, was so high that the plant developed its own jobs training program. New hires were trained and certified through this program.

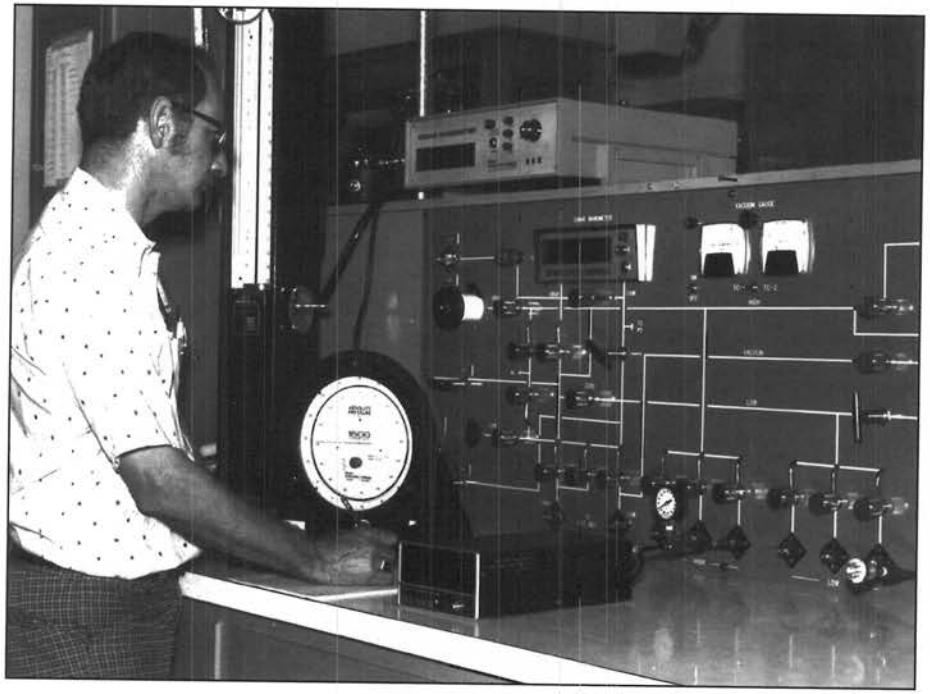
"I hired in with Carbide and Carbon Chemicals Company in 1951. They couldn't hire instrument people for maintenance because nobody educated people for instrument maintenance, so we went to school on site for one full year. Instructors from Oak Ridge who had worked for the Manhattan Project came up here as foremen. They were real good teachers."

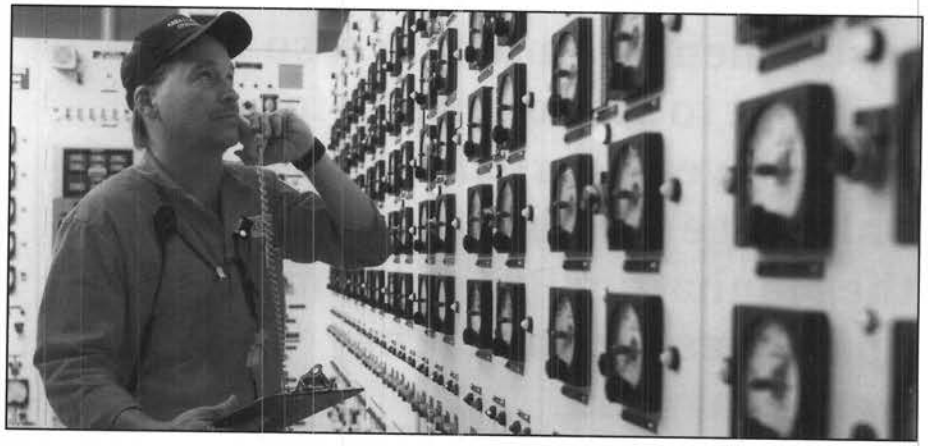
Rodney Smith
Retired
Paducah, Kentucky



W. F. Alexander welds a converter using the automatic welder with one of the special jigs designed and built in the C-720 Maintenance Shop.





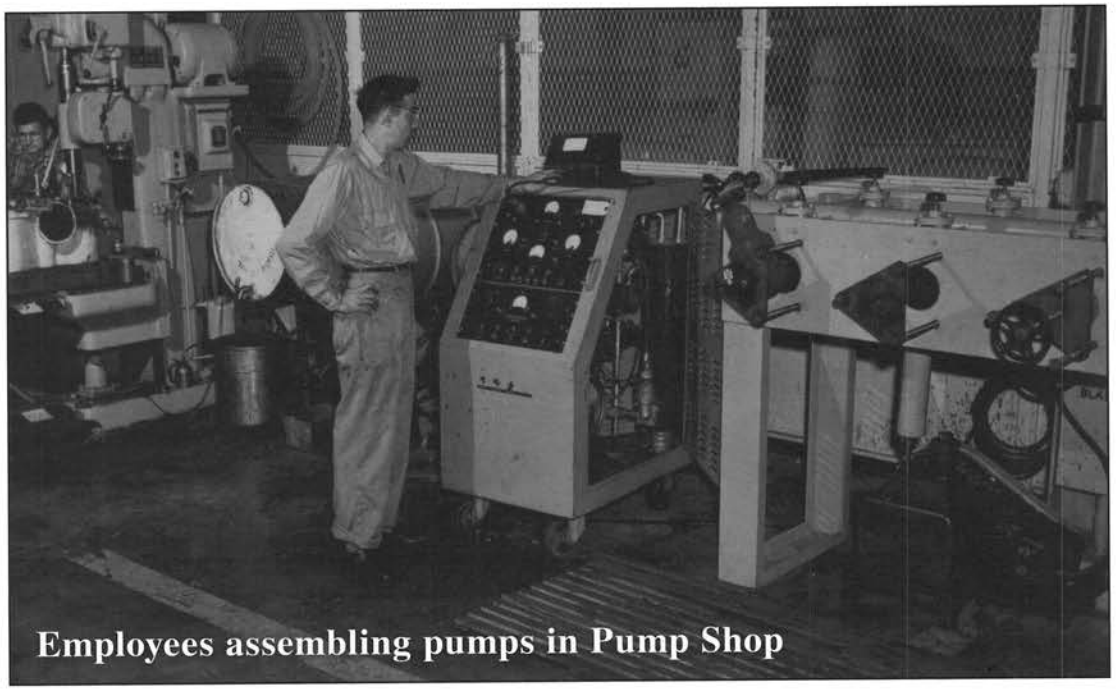


Quality control is of upmost importance. Welds are x-rayed. Every instrument, all 85,000 of them, must be routinely calibrated. Support groups which provide testing, installation and maintenance of instruments, are employed at the site. Many of the instruments used at the Paducah Plant are special-purpose and must be designed and fabricated by plant personnel.

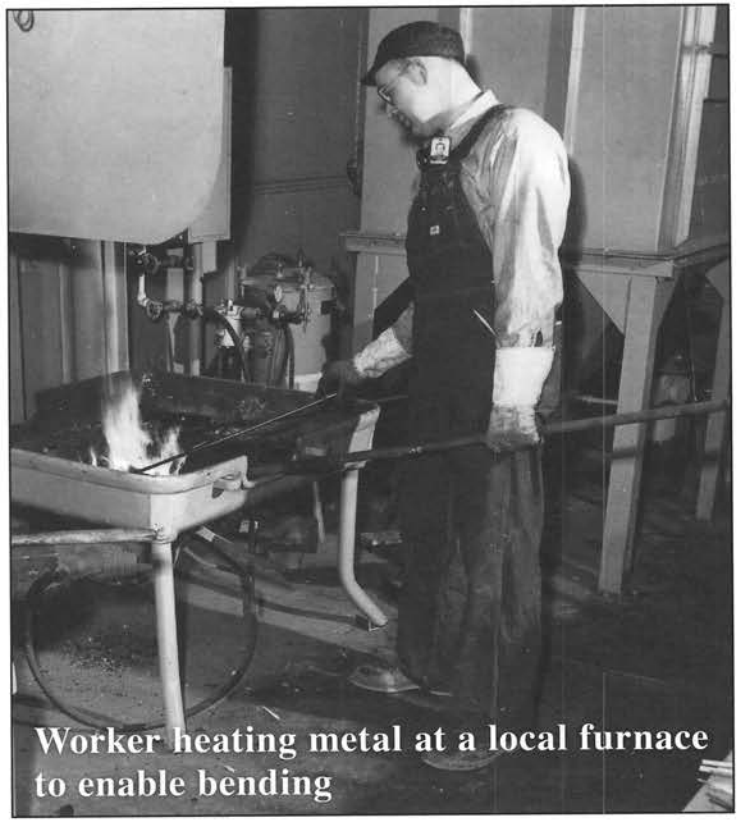
To improve technology and exchange or replace aging equipment, original cell components were disassembled, cleaned, modified, refurbished, reassembled, conditioned, and pre-positioned for another cell change-out, even as the original cell was being repopulated. (11)

The amount and complexity of equipment in continuous operation at high speeds, temperatures, and pressures resulted in frequent intrusions into piping systems to repair valves, compressors, motors, feed pulverizes and conveyors, and supporting piping and components. (11)

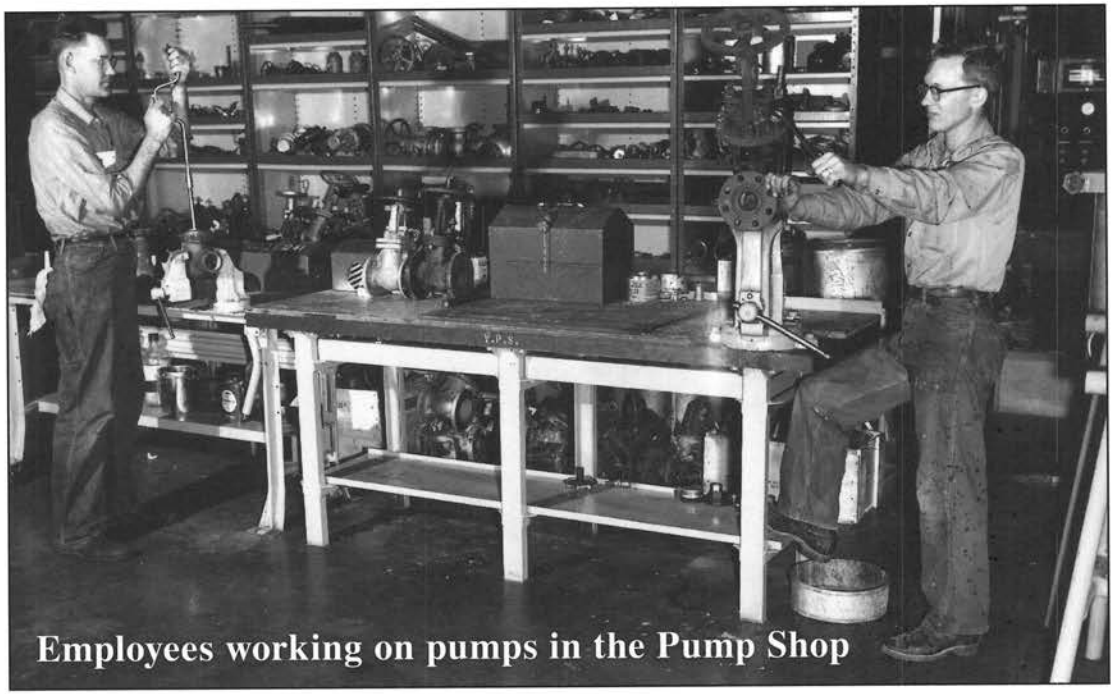
The Pump Shop maintains all the pumps used at the Paducah Plant.



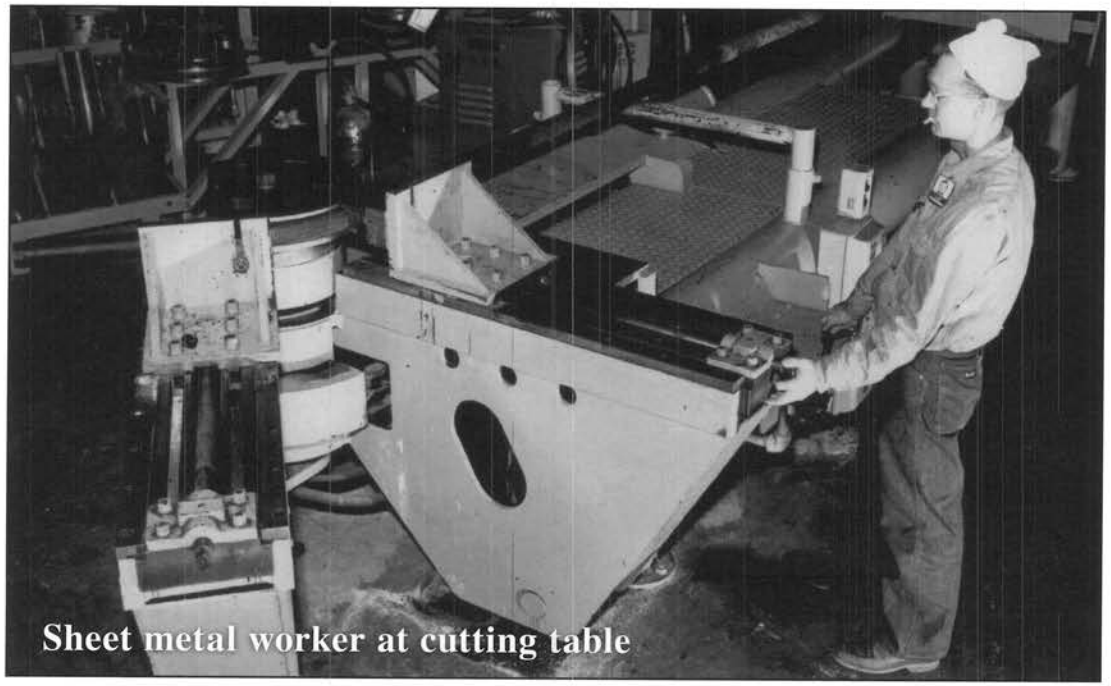
Employees assembling pumps in Pump Shop



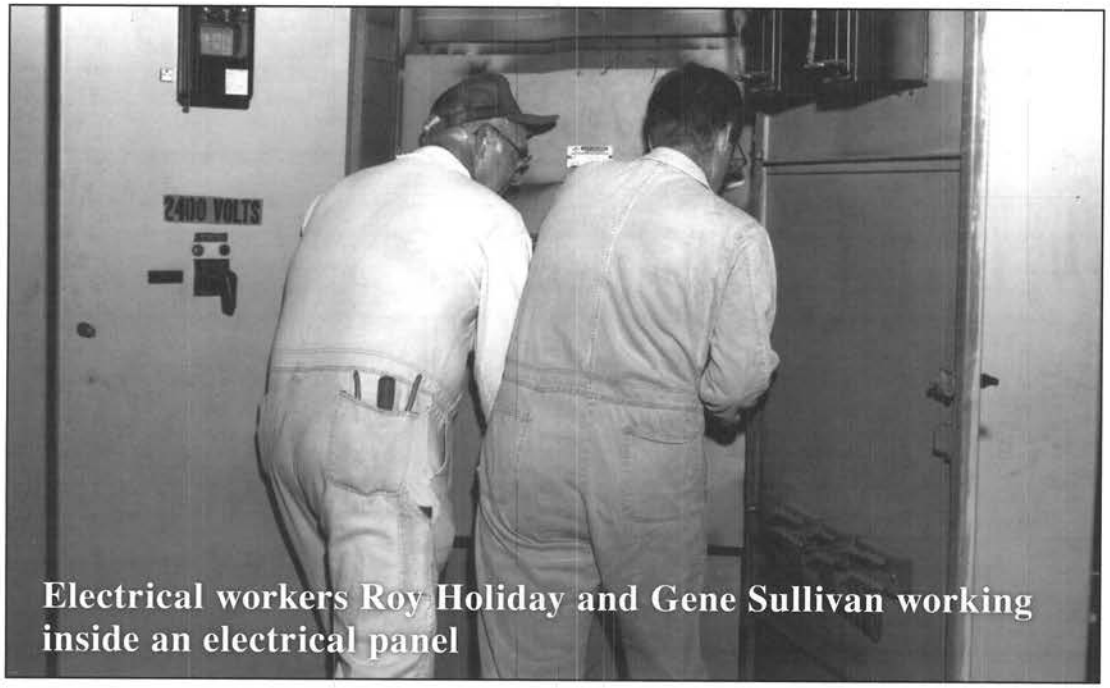
Worker heating metal at a local furnace to enable bending



Employees working on pumps in the Pump Shop



Sheet metal worker at cutting table



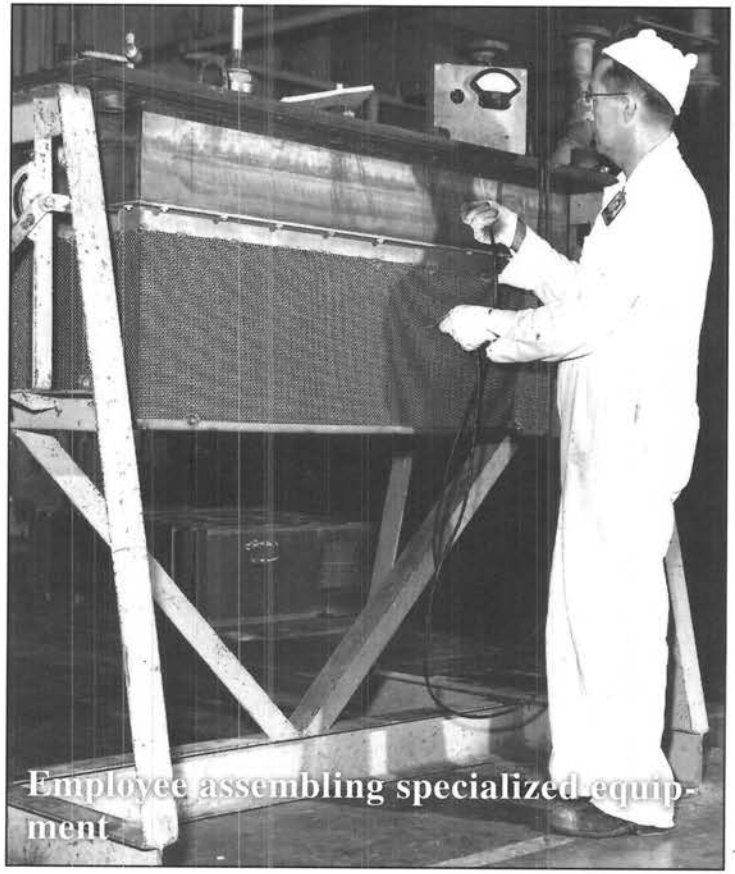
Electrical workers Roy Holiday and Gene Sullivan working inside an electrical panel

The Machine Shop is a general purpose shop which deals in the fabrication and maintenance of all equipment that requires precision work.

The Sheet Metal Shop bends, cuts, and fabricates all types of thin metals, primarily steel, aluminum, stainless steel, monel, and copper to exact specifications.

The Weld Shop deals with the fabrication and maintenance of plant equipment.

Highly skilled electricians are needed to handle high voltage power.



Employee assembling specialized equipment

Operator in C-300 Control Room

C-300 Control Room

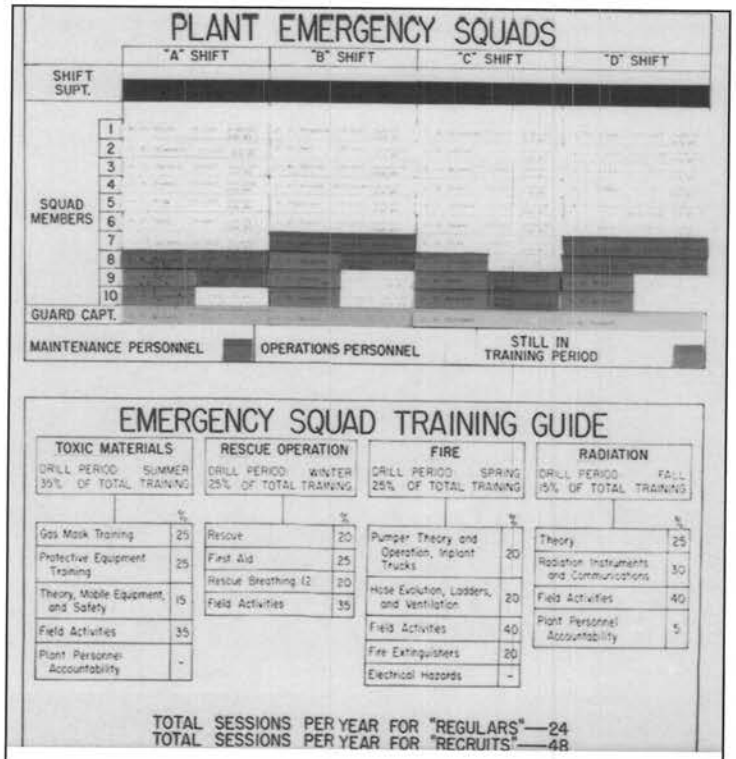
"In the early days it was strictly a man's job. Women were not allowed to be operators."

Dan Garrott
Retired
Mayfield, Kentucky

The plant employs cascade operators to oversee and control process operations, power operators to take care of the incoming and distribution of electrical energy, and utilities operators to take care of such utilities as heat, steam, water, and sewage. C-400 operators clean various process equipment before maintenance personnel work on it.

Instrument mechanics are employed to install, calibrate, and maintain various gauges, graphs, and other monitoring equipment throughout the plant.

Computer Maintenance personnel maintain all of the computers and station printers in the plant.



Safety sign designed and built by plant employees

Sign Shop employee making sign by hand

Signs used throughout the plant were built by Carpenter Shop employees.

The C-724 Plant Services Building contains a rigging loft, a Paint Shop, a Sign Shop, and a Carpenter Shop.

Paint Shop personnel are responsible for painting inside and out all structures in the plant. Sign Shop personnel make all the signs, postings, and component tags, as well as hand paint numbers on all doorways. Carpenter Shop personnel modify office spaces, build wood casements, forms, and other items made of wood, as well as make repairs to structures.

The C-750 Garage was constructed as a support facility to maintain the fleet of vehicles which are used to move employees and material from point to point within the facility. Some mechanics are specially trained to work on larger and more complex equipment such as large trucks, cylinder haulers, forklifts, tow motors, and various other motorized equipment.

When vehicle washing meant hand washing, plant employees built their own car wash in the C-750 Garage. Plant vehicles were cleaned on a rotating basis and each time they were scheduled to leave the plant.

For many years a taxi service with the radio number "Y-99" has been utilized in addition to other vehicles for employee transport within the plant.

C-750 Garage

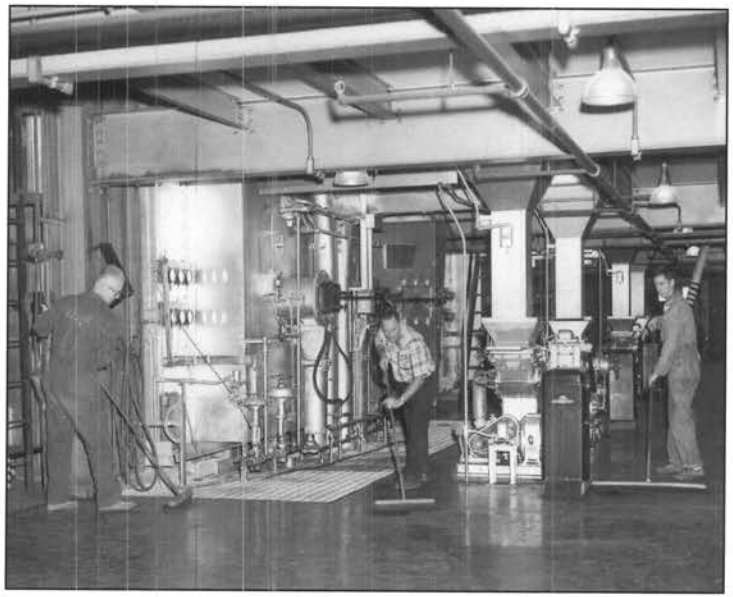
In the background David Isaac Pride can be seen operating the valve which turns the car wash sprayer on and off.

Mechanic Bob Frazer conducts a truck inspection.

The plant has always employed its own janitors and roads and grounds personnel. There are hundreds of trash cans to empty, bathrooms and showers to clean, roads to maintain, and acres of grass to mow. Laundry personnel maintain company issued clothing. Railroad track was maintained by a rail crew.

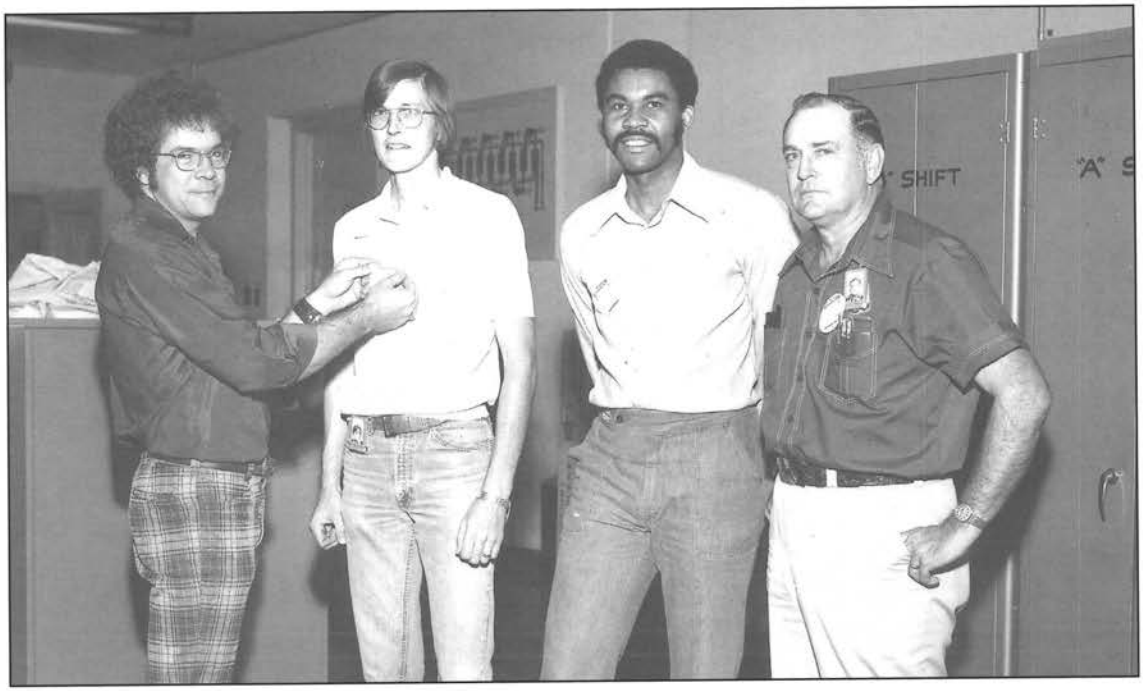
"I remember the snow storm of 1978; we were still expected to report to work. Most of the people made it in."

Roy Lipscomb
Employee
Paducah, Kentucky

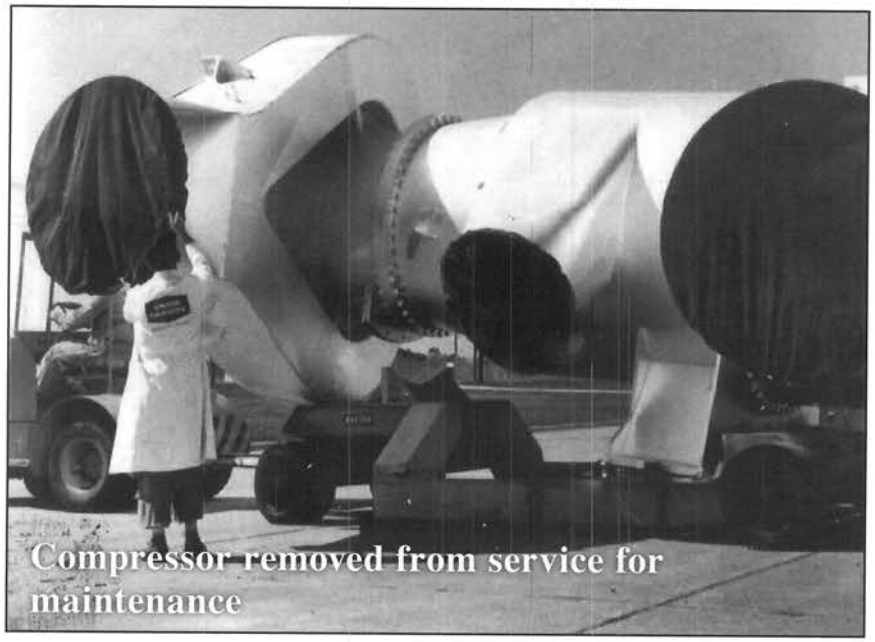


Teamwork is defined as people working together toward a common goal and achieving uncommon results. From the beginning, Carbide management fostered a culture of teamwork. It was felt that teamwork would help reduce human errors and improve safety. Team of the Month awards were presented each month for outstanding team performance. Additionally, excellent work performance by individuals was recognized as a hallmark of plant employees. Awards of Excellence were presented to individuals.

Successive contractors have continued this practice.



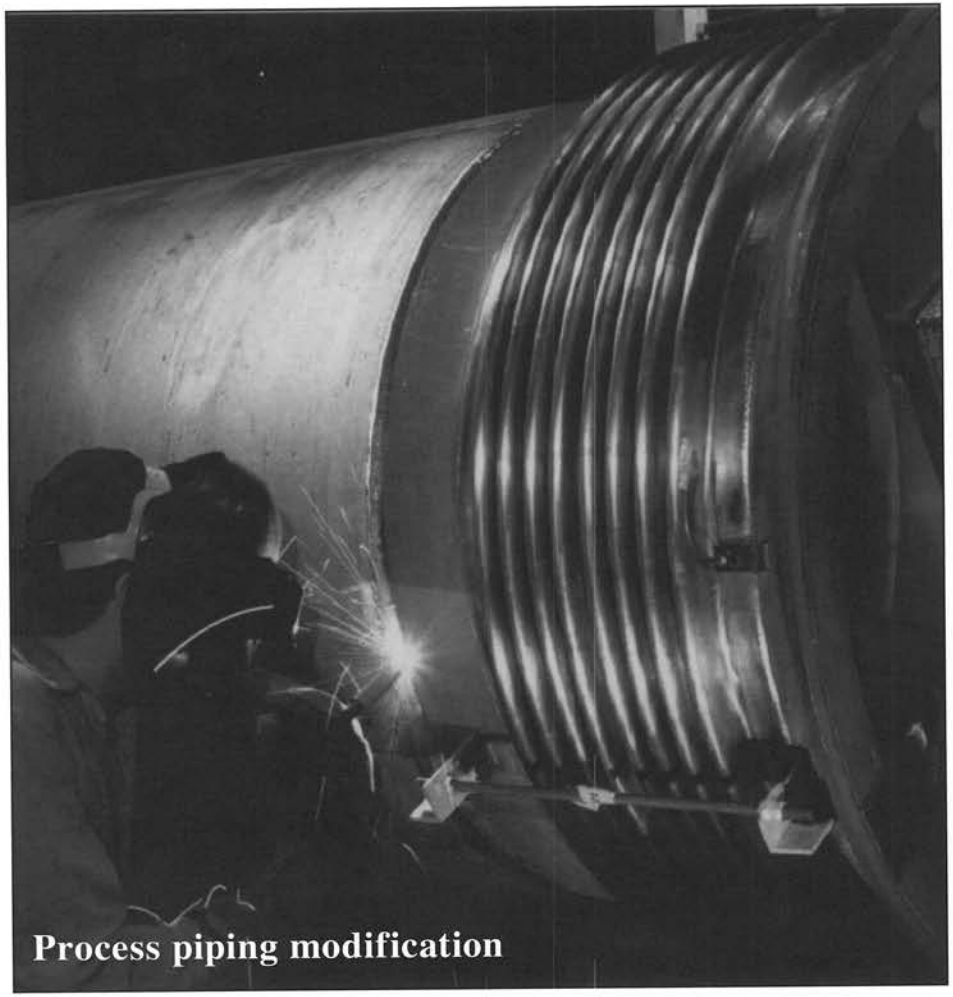
Last converter to be modified during the uprating program


Compressor removed from service for maintenance

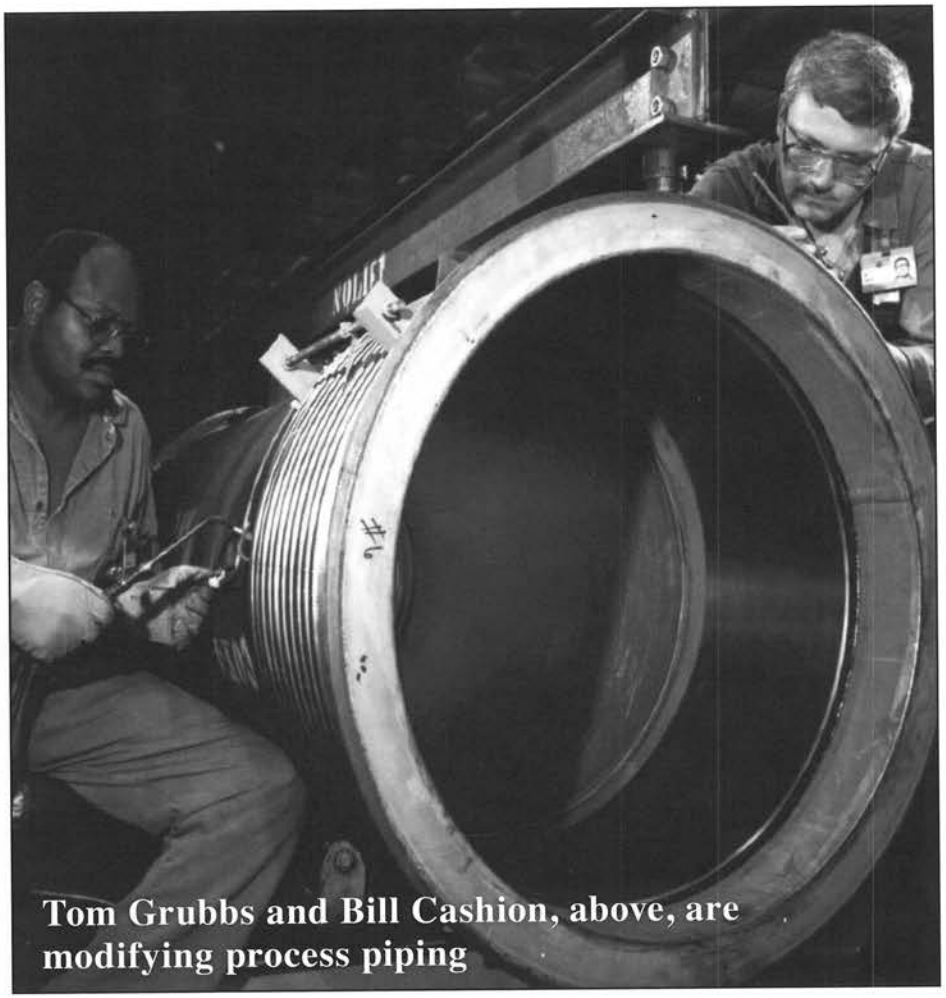
During its 60 years of operation, the plant has processed approximately one million tons of uranium, which has required two total uprating projects. The first formal cascade improvement program (CIP) and cascade uprating program (CUP) involving replacement of major components to increase diffusion process reliability, capacity, and efficiency began as early as 1954. (11)

The second major CIP/CUP program, started in 1973 and continued until 1981, costing $550 million. This uprating involved cell by cell removal of compressors and converters, process piping, and support system components while the remainder of the cascades remained in operation. After removal, compressors and converters were taken to C-400 for disassembly, cleaning, and decontamination, and then to C-720, where they were modified and reassembled prior to reinstallation. (11)

These projects, along with normal wear and equipment failures, have required millions of pounds of equipment to be lifted, transported set in place, either cut out or welded in place, conditioned, cleaned, and tested.



Process piping modification



Tom Grubbs and Bill Cashion, above, are modifying process piping

During the late 1980s modifications were made in the major process buildings to make them more reliable in the event of a tremor. Buildings and piping were retrofitted with structural steel bracing and components were fitted with expansion joints to make them more flexible. When finished, the seismic upgrade cost $72 million.

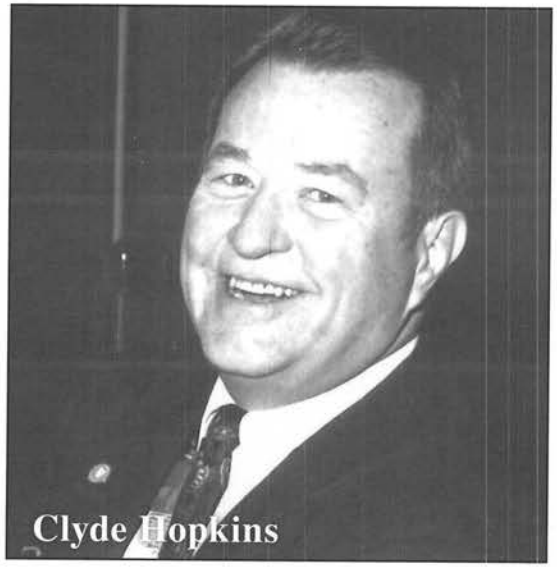
Modifications and improvements increase the probability that equipment deemed critical to the operation of the plant would withstand a seismic event of 0.18g and increases the likelihood that the plant would remain operable following a seismic event. The Paducah Plant is equipped throughout with seismic detection systems.

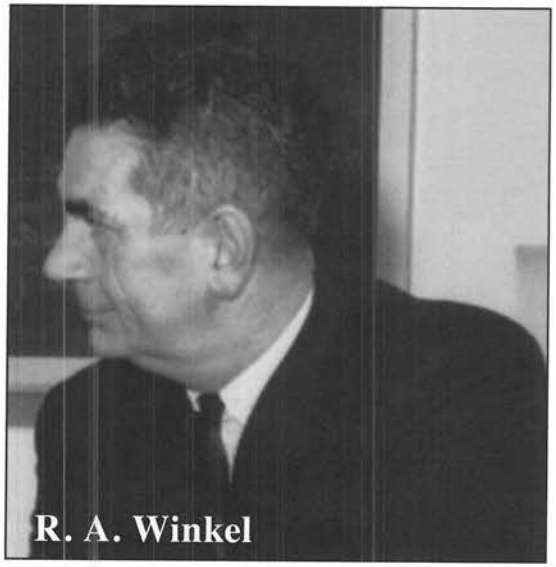
The ventilation systems for the process buildings have also been improved in an effort to reduce costs and gain efficiency.

In March 2001, Paducah completed another upgrade program, enabling the plant to enrich uranium at levels up to 5.5 percent assay.

The Plant has had 14 plant managers in its 60 years of operation. They are:

- Paul Huber,
  manager during construction.
- Johnny Murray,
  July 1951 to February 1954
- R. G. Jordan,
  February 1954 to March 1961
- R. A. Winkel,
  April 1961 to May 1972
- Clyde Hopkins,
  June 1972 to May 1978
- Clay Zerby,
  May 1978 to April 1984
- Ralph Donnelly,
  April 1984 to October 1986
- Jeff Bostock,
  November 1986 to January 1991
- Steve Polston,
  January 1991 to January 1998
- Howard Pulley,
  April 1998 to February 2001
- Russ Starkey,
  February 2001 to February 2005
- Steve Penrod,
  February 2005 to August 2011
- Jim Lewis,
  August 2011 to October 2012
- Mike Buckner, Acting General Manager,
  November 2012 to Present


Clyde Hopkins


R. A. Winkel

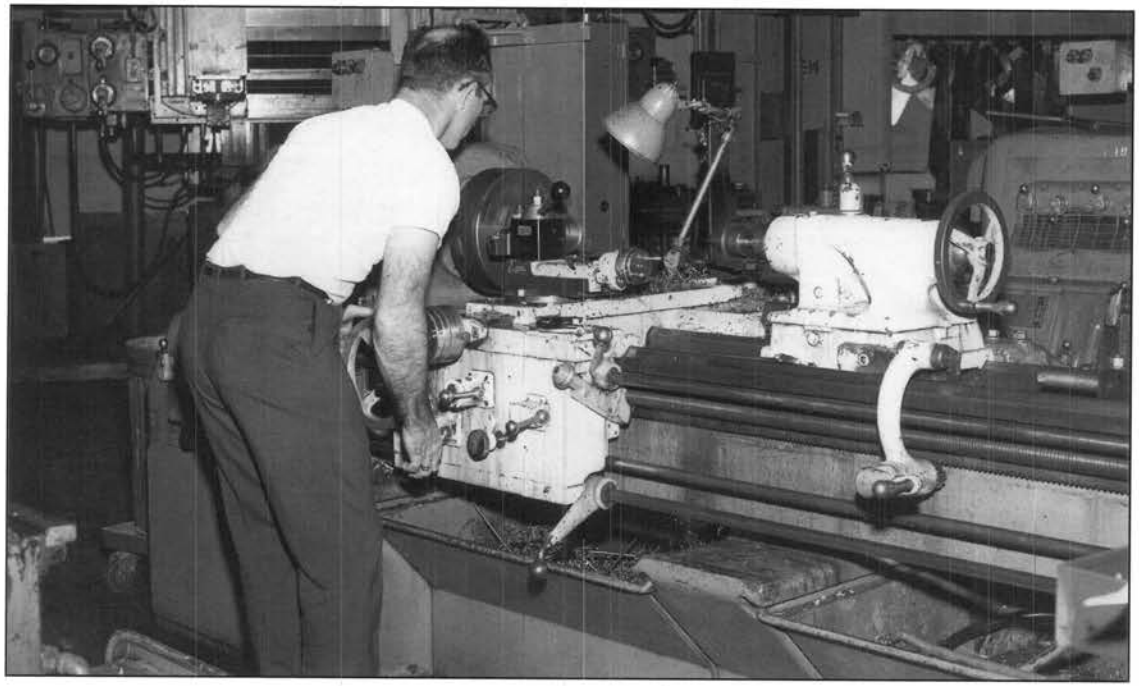

Ralph Donnelly pictured with Mitch McConnell

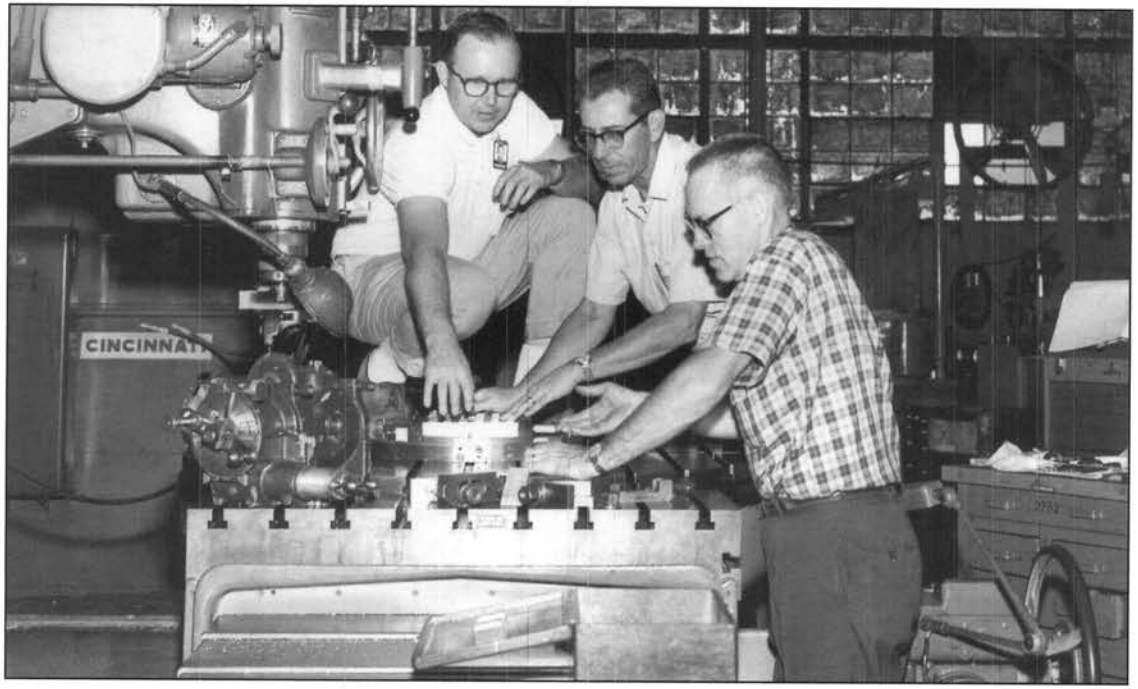
WORK FOR OTHERS

Craftsmen with specialized skills fabricated one-of-a-kind components for customers such as: NASA, Lewis Research Center, Oak Ridge National Laboratory, Ames Research Center, Argonne National Laboratory, and Sandia National Laboratory. The work had to be high quality, precision work using space-age specifications and techniques.

"The Machine Shop did a lot of outside work for Sandia and others and they were working three shifts at the time and still were behind."

Adrian (BB) Freels
Retired
Paducah, Kentucky



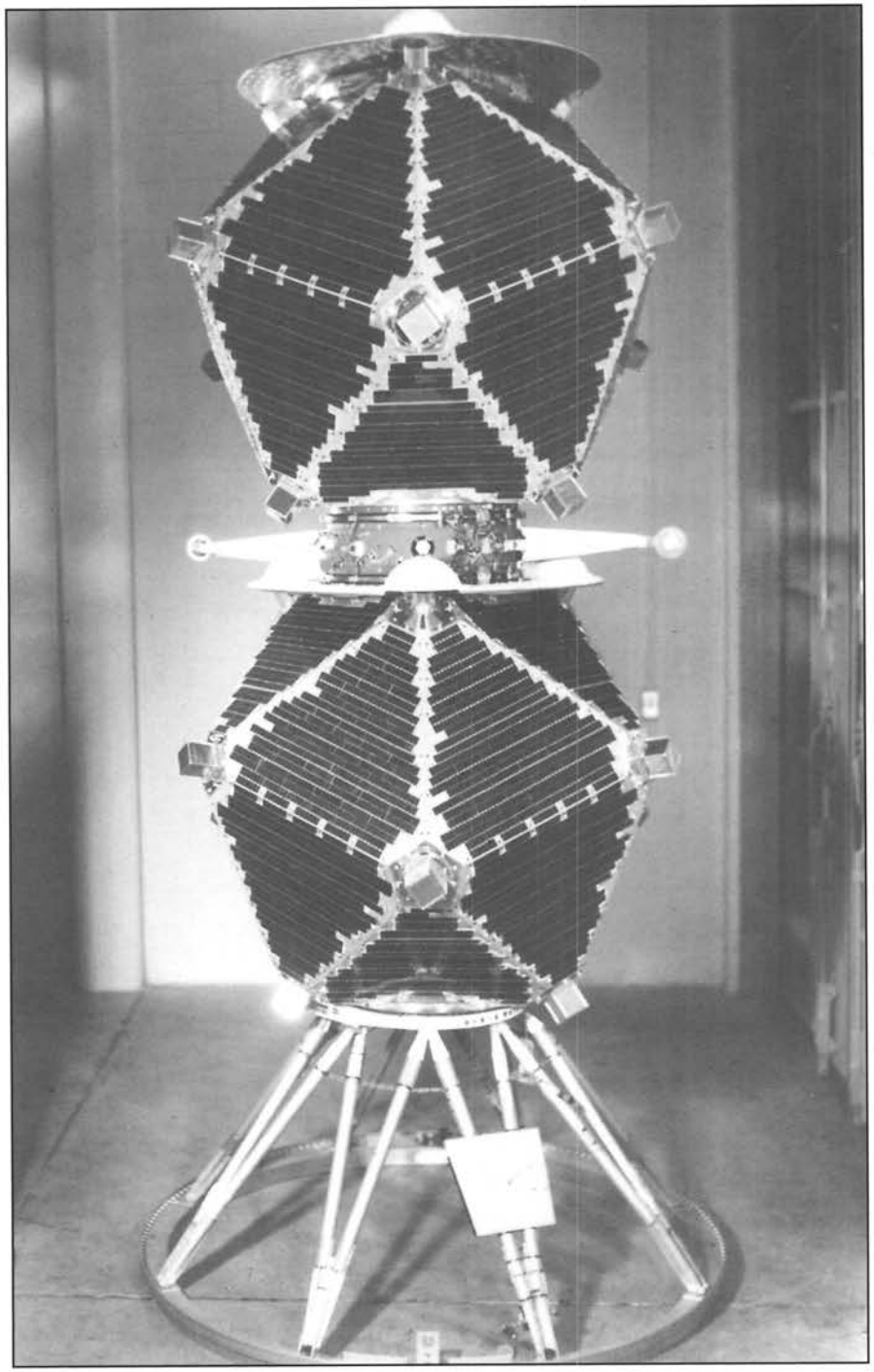


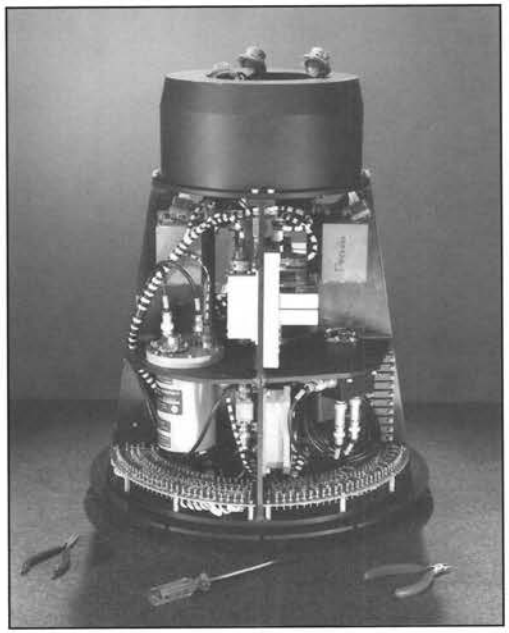
During the 1950s and 1960s, in order to retain certain skills and to maintain local employment levels after initial construction, a variety of non enrichment work for other Federal agencies was performed. These activities included manufacturing missile components, superconducting electromagnets, and fuel shipping casks. (11) Named "work for others", skilled craftsmen fabricated lunar lander parts for NASA, fabricated research reactor components, and assembly of electronics and parts for missile systems. (19) Many projects completed for these agencies are still classified.

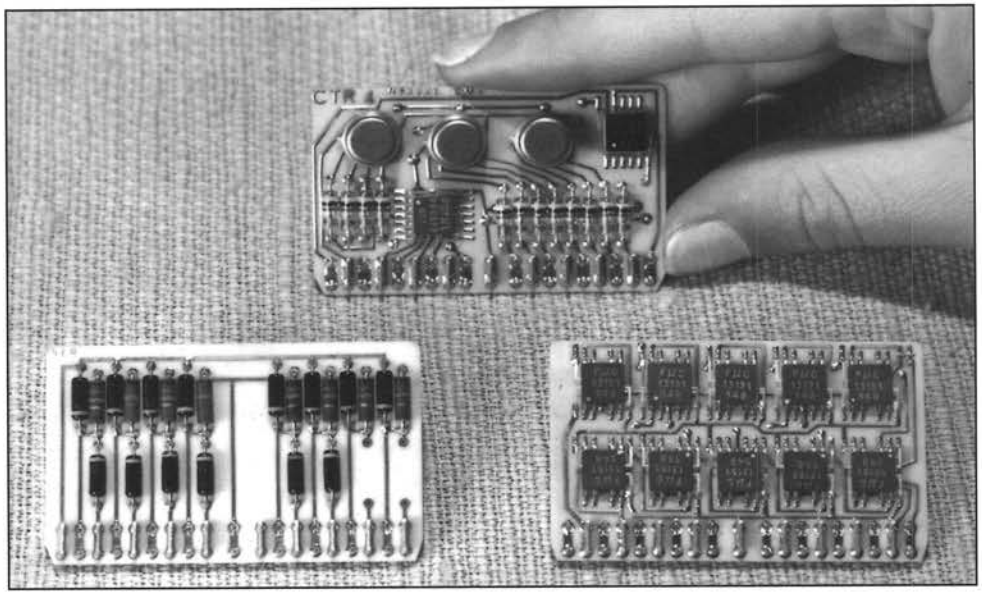
The Paducah Plant's Maintenance Shops contained the largest and most sophisticated machine shop east of the Mississippi River. Accomplished metal workers at the Paducah Plant fabricated components for America's early space program. Under the tightest security, workers built a special component for the Jupiter missile which lifted into space on May 28, 1959. (20)

"The plant employed some of the most skilled craftspeople in the world, capable of making anything, big or small."

Velva Blayney Yeomans
Retired
Paducah, Kentucky



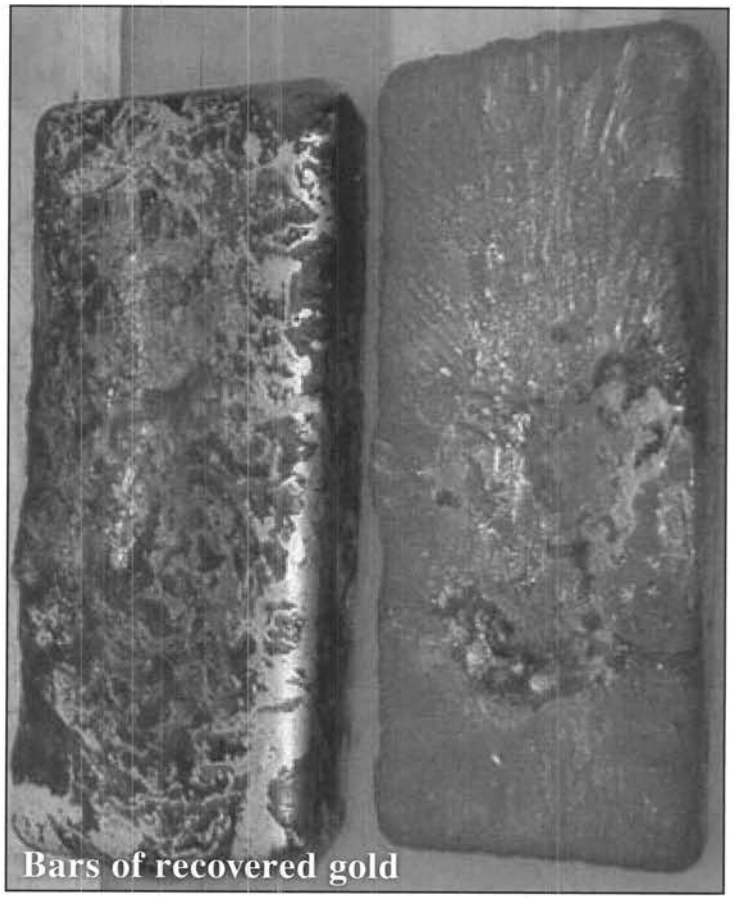




Because of the vast array of specialized equipment and capabilities of highly skilled craftsmen, PGDP contributed significantly to technological advances in the early days of America's scientific advancements.

Recovered gold scrap

Gold smelting furnace



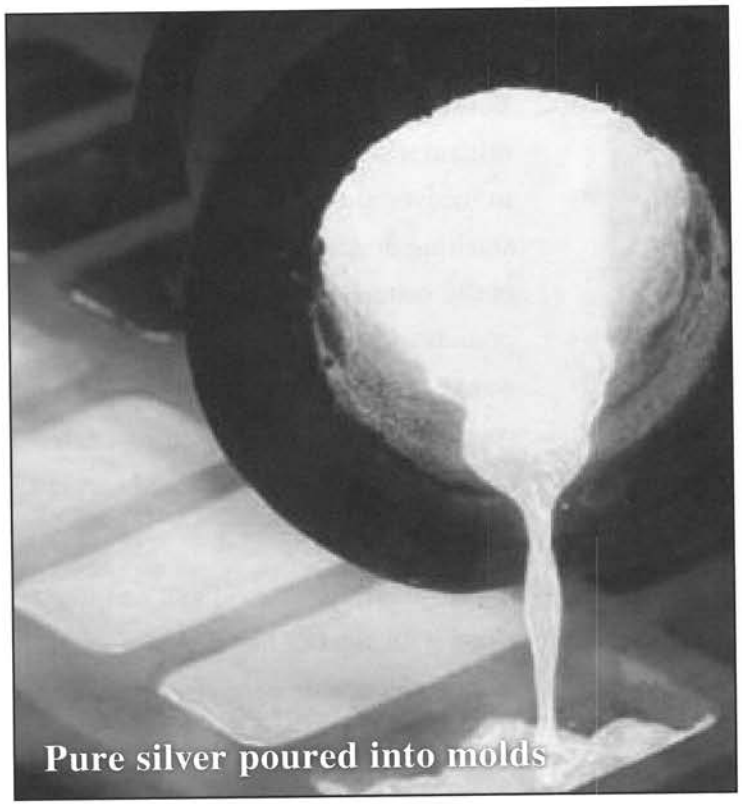
Bars of recovered gold

Work for Others activities also included recovery of precious metals from damaged and retired nuclear weapons. Explosives and fissile materials were removed from the weapons, primarily at a plant in Texas, prior to shipment to the PGDP. Between 1964 and 1985, gold recovery occurred principally in the C-746A disassembly room, and in C-400, where gold was separated by hand from scrap metals, then smelted in a special furnace. When pure, it was cast into bars. According to Gold Processing Records, 77,299.92 troy ounces of gold was recovered and returned to the United States Treasury. (21)

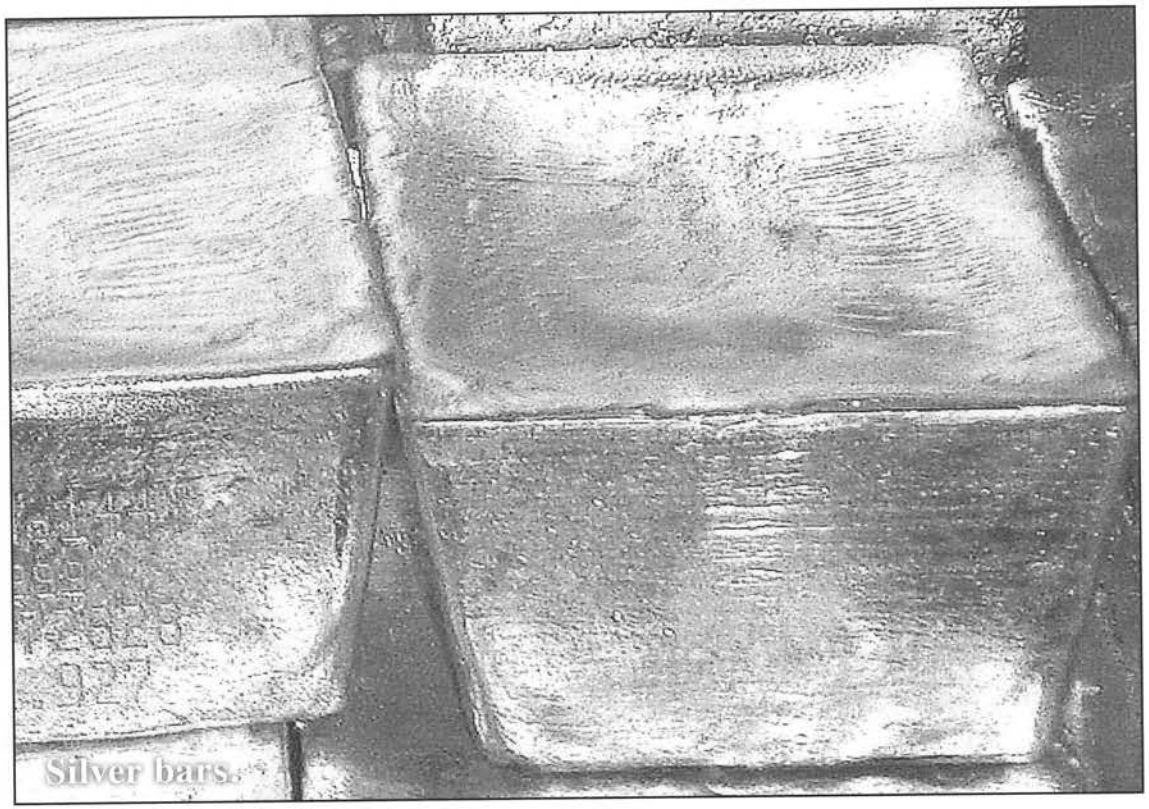
Between 1952 and 1986, the PGDP also operated several secondary smelters to recycle scrap metals.

As part of DOE's Metals Recover Program, 102 silver bars, or approximately 7,650 pounds of silver were reclaimed from the reprocessing of classified x-ray film from 1966 to 1974. Silver-bearing film from such places as Rockwell at Rocky Flats, Colorado, Bendix, General Electric, Pantex, Portsmouth, and miscellaneous reproduction and photo labs, as well as Paducah was processed at Paducah. The film was burned in the C-405 Incinerator and the ash was smelted and poured into silver bars in the C-727 Foundry. The resulting silver bars were sold. (21)

C-727 Foundry.

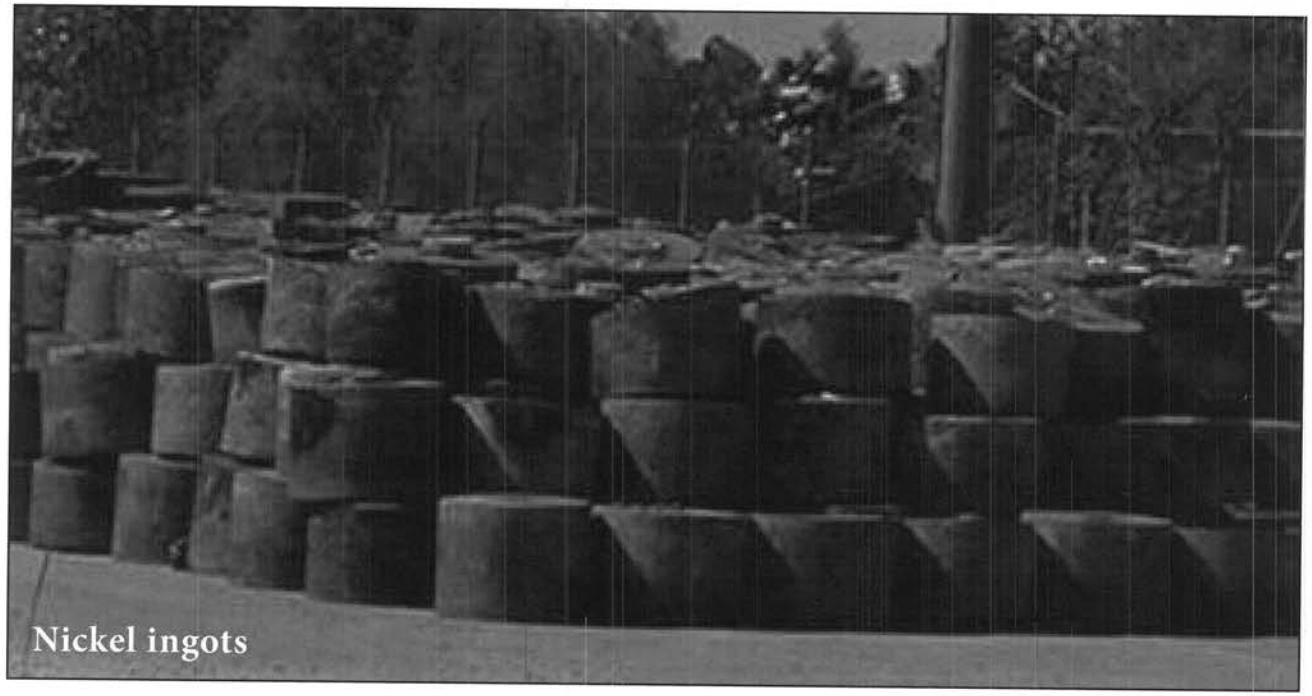


Pure silver poured into molds



Silver bars.

Aluminum ingots



Nickel ingots

Nickel and aluminum recovery was performed in three smelters in C-746A. (21)

Operation and maintenance of the gaseous diffusion plant generated scrap nickel. Smelting was the preferred method of processing nickel since smelting destroyed its classified properties. Approximately 19.6 million pounds of slightly radioactive nickel was recovered and is stored as ingots at the PGDP. Additionally, 17 million pounds of clean nickel was recovered and sold to private industry. Recovery of nickel was executed in the C-746A Smelter. (21)

Between 1967 and 1986, C-746A aluminum melting furnaces were used to recover aluminum. As with nickel, smelting destroyed the classified nature of the materials. About 4.5 million pounds of non-radioactive aluminum was recovered at Paducah and sold into commerce. Some aluminum was determined to be contaminated and was not sold.

Large quantities of steel and copper, along with smaller quantities of lead, monel, and cobalt were also recovered at Paducah. (21)

PLANT SAFETY

The plant has set many safety records for man-hours worked without disabling injuries. In the 1990s the plant received National Recognition for Safety.

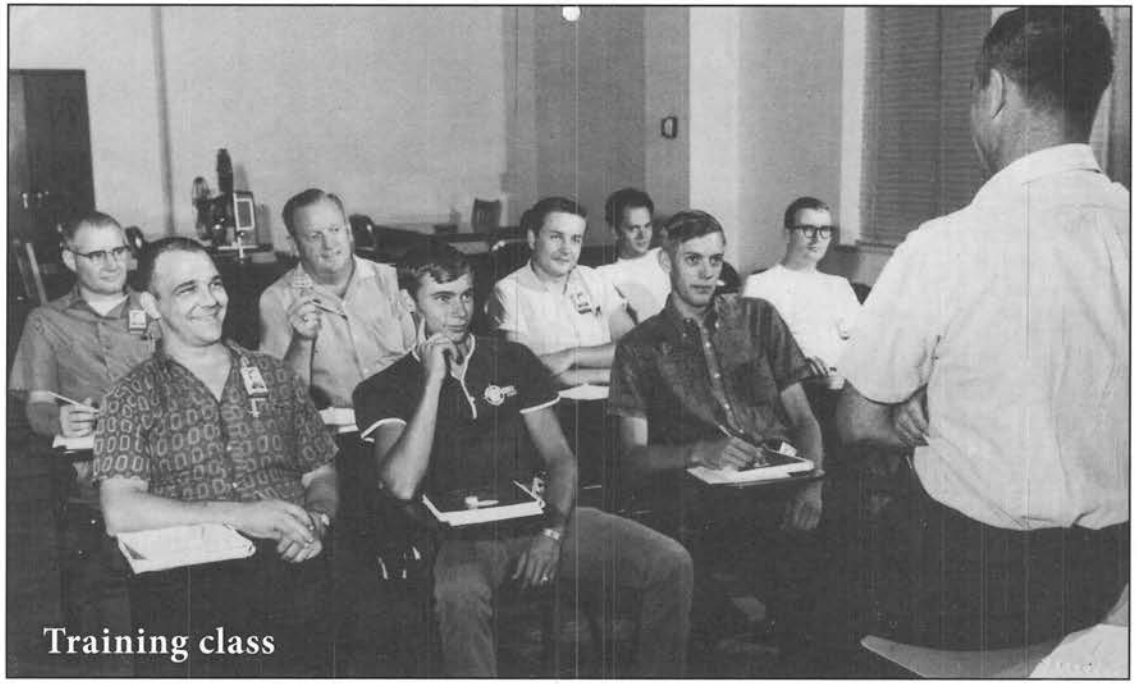
Plant management makes safety a high priority at the plant. Safety is promoted both on and off the job.

Employees are recognized for their contributions to a safe work environment.

"I thought they had a good safety program. They'd stop a job in a minute if it was unsafe."

Roy Lipscomb
Employee
Paducah, Kentucky

Distribution of Safety Awards


Training class

From the beginning there has been a conscientious effort by management to identify and quantify industrial worker hazards at the PGDP, commensurate with the science and understanding of those hazards for that period of time. Employees were provided with personal protection equipment which was industry standard of the day.

Health and safety programs at PGDP were established at the beginning of operations and continue to the present day.

Safety meetings were held once a month, a safety sign, see page 99, greeted employees as they entered the plant grounds and as they departed the plant. Cartoons such as those on page 103 were frequently handed out, and safety awards were given to each employee each year.

"Everyone used to complain about safety meetings. They didn't want to go. But I'm glad I attended. I carried the safety culture home with me. They pushed safety and I'm thankful they did. If they hadn't we could have had many more accidents."

Charlie Baker
Retired
Paducah, Kentucky

Employees often use many types of hazardous chemicals in the daily performance of their jobs in order to keep the plant operating. Safe use of the chemicals is continuously emphasized through training, safety meetings, bulletins, and review of lessons learned throughout industry.

Plant health and safety groups continually work to ensure that the proper degree of protection is provided to every employee. As a result, the plant's safety record exceeds the national average for the entire chemical industry.

Many safety signs, such as the one above, were strategically placed throughout the plant.

Don Spencer in the Lab's Flammable Liquids Storage Room.

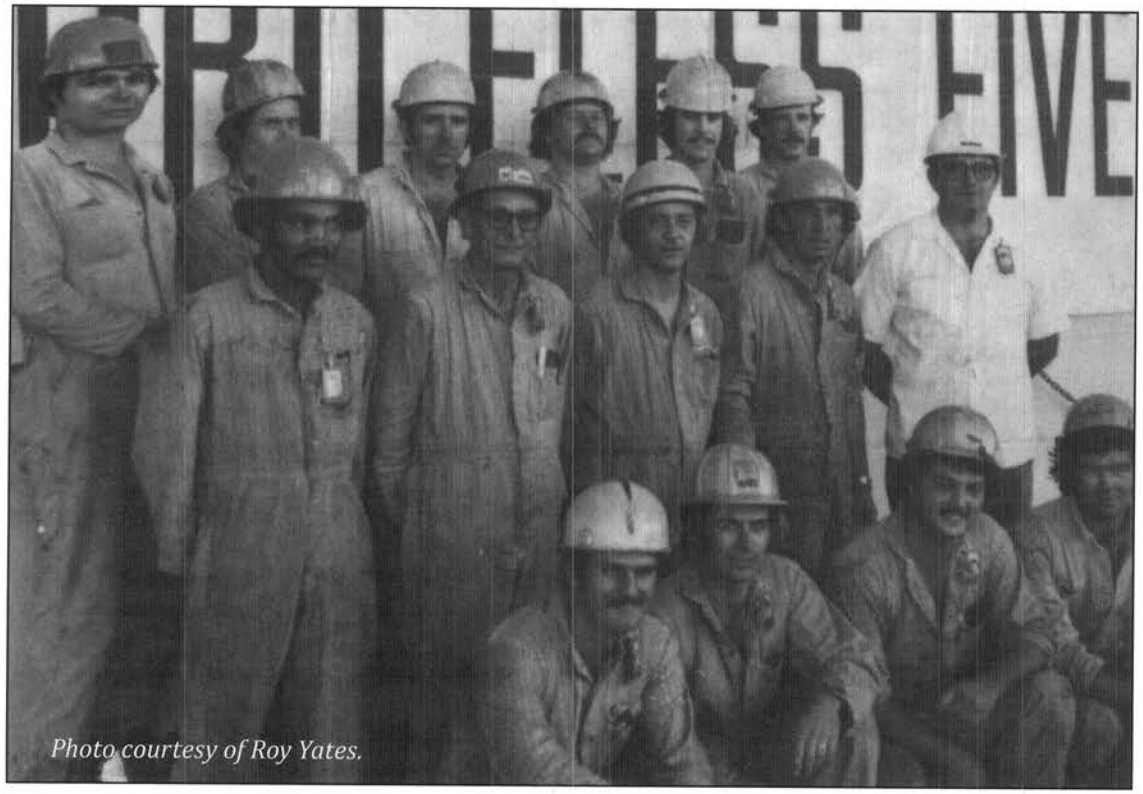
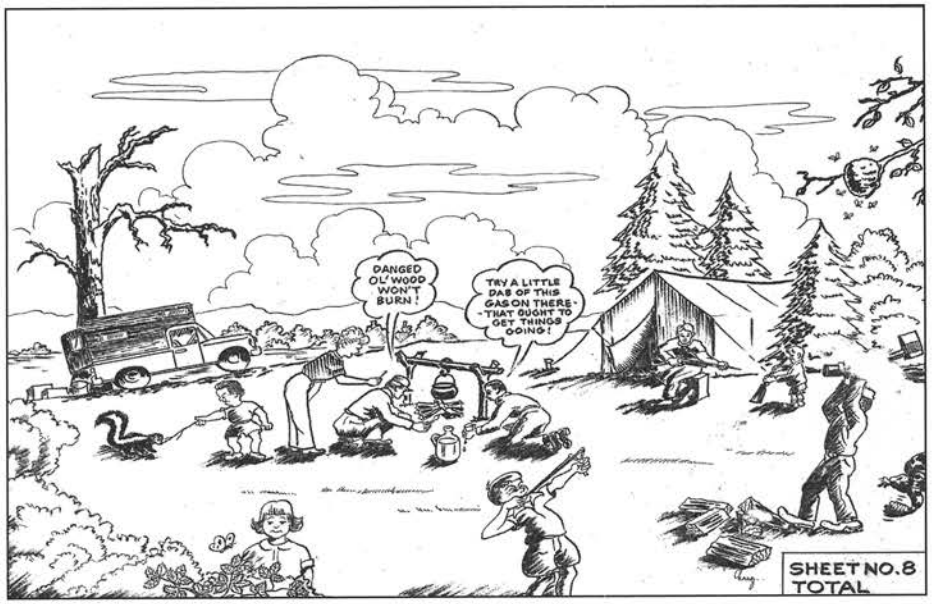


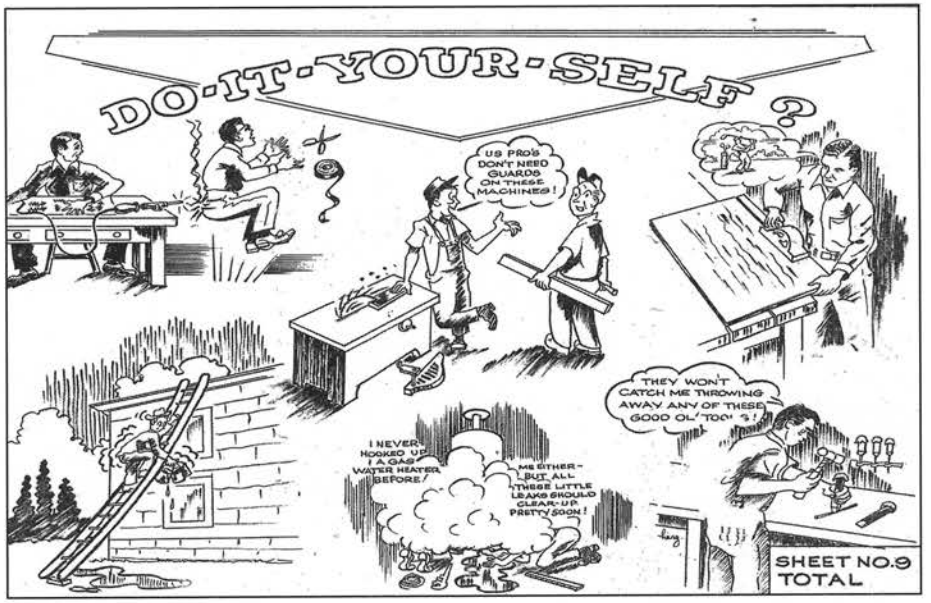
Photo courtesy of Roy Yates.

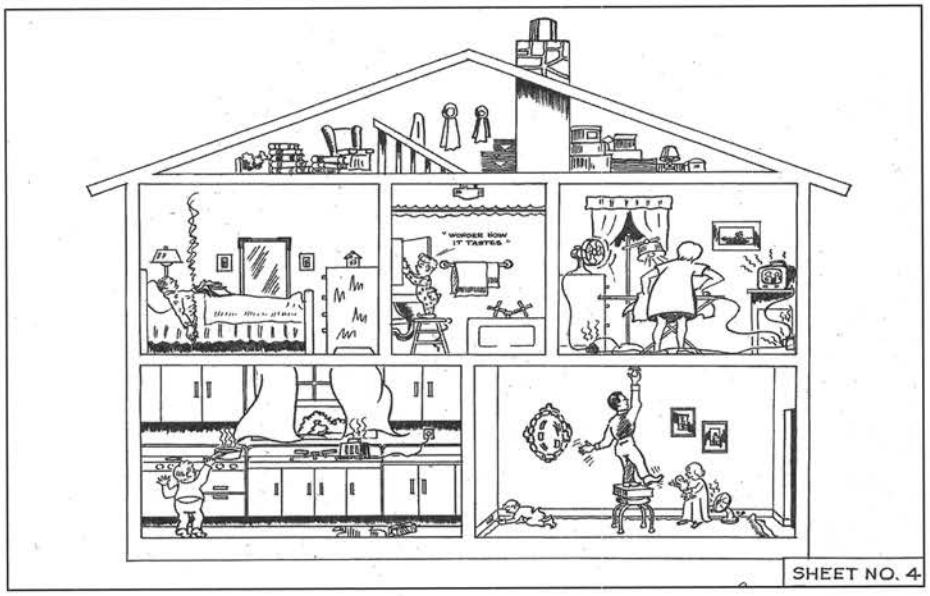
Hundreds of people were added to the payroll as the plant underwent a major upgrade beginning in the 1970s and finished in 1981 at a cost of $550 million. Components in the production buildings were removed, cleaned in the C-400 Building, and upgraded in the C-720 Building. Once improvements were complete, components were reinstalled. Crews which worked in the process buildings removing and reinstalling equipment called themselves "cell rats". Some were budding artists in addition to their normal jobs, and left artwork which endures to this day. At left one cell crew is recognized for working one year without an injury. Considering the amount of heavy work a crew completed, this was a major accomplishment.

Electrical systems were also upgraded so that the plant could run at a peak load of 3,040 megawatts.

Artwork on cell housings.





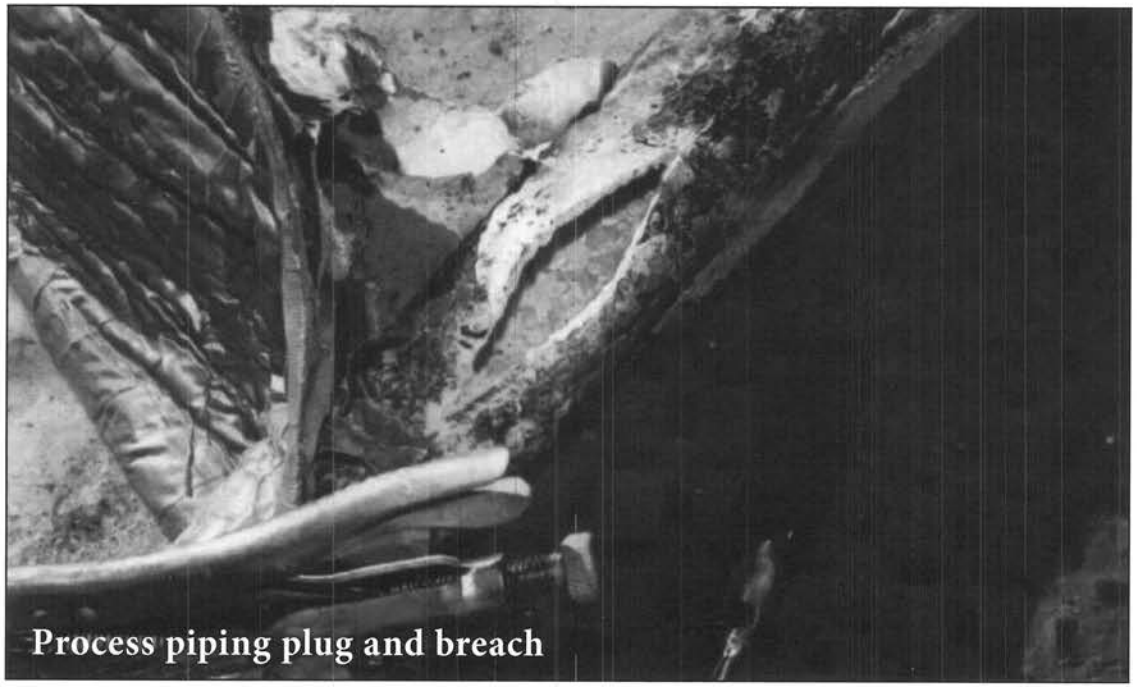


Safety, on and off the job, was stressed by plant management as part of the plant culture. Cartoons were developed in house and distributed to the plant population reminding them of common hazards. Cartoons courtesy of Jack Peebles.

Explosion and fire, December 1962

Despite the focus on safety, sometimes things went wrong. Other significant plant events included a major fire in Building C-310 in 1956, overexposure of two maintenance mechanics to beta radiation, and an explosion and fire in C-315 in 1978. Major releases affecting groundwater included a spill of 17,000 gallons of diesel oil migrating as far as 2 miles from the site boundary via surface water and the identification of significant volumes of TCE leakage from C-400 to the site sewer system, discovered in June 1986.

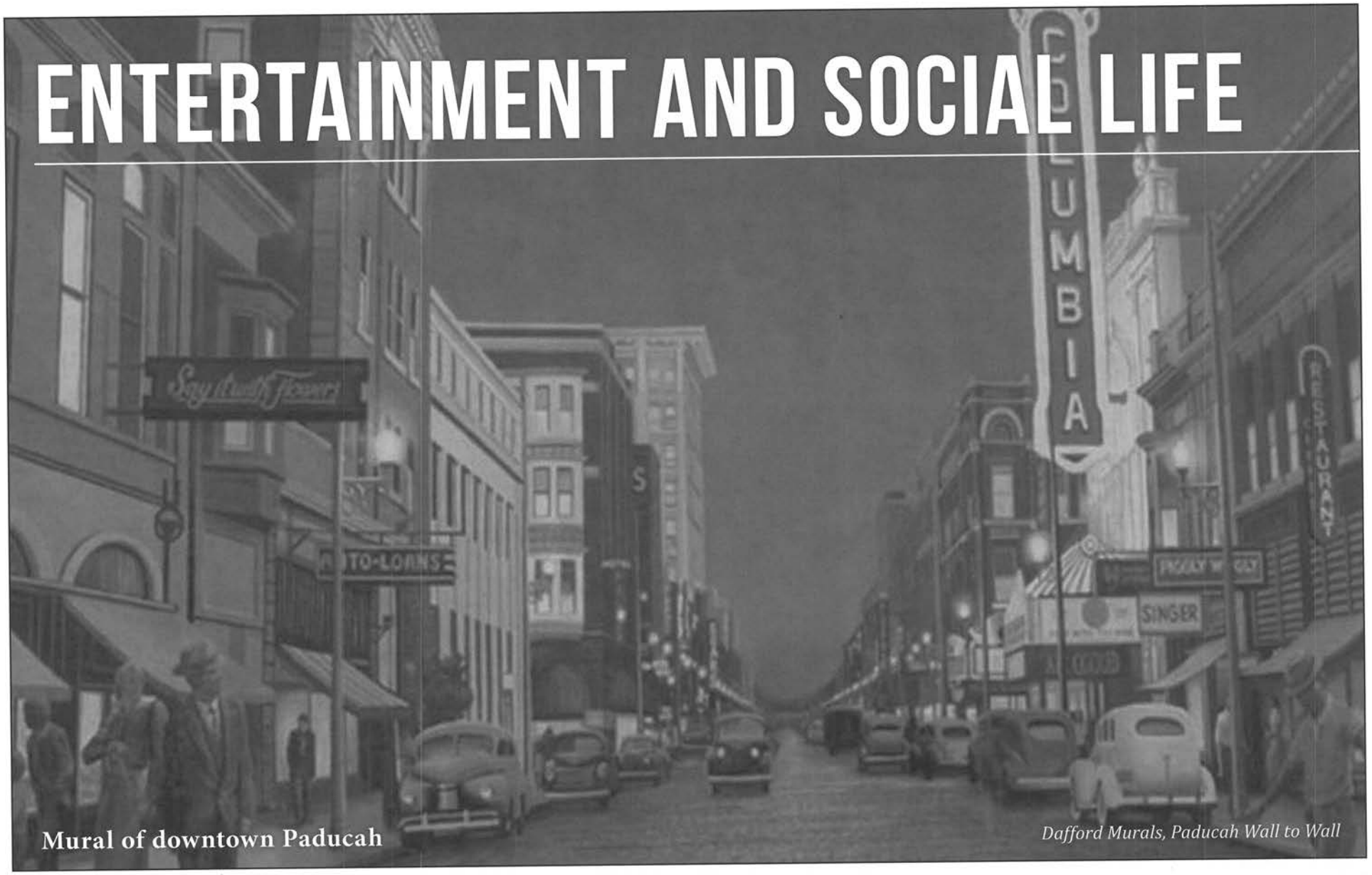
Three fatalities have occurred as a result of plant events: An explosion and fire in C-340 in 1962, electrocution of an electrical maintenance trainee in 1977, and the suffocation of an operator in the collapse of a coal bridge at the steam plant in the 1970s. In addition, in June 1958, a release of HF severely burned a worker who did not return to work. (11)



Process piping plug and breach

Electrical transformer explosion

ENTERTAINMENT AND SOCIAL LIFE



Mural of downtown Paducah

Dafford Murals, Paducah Wall to Wall

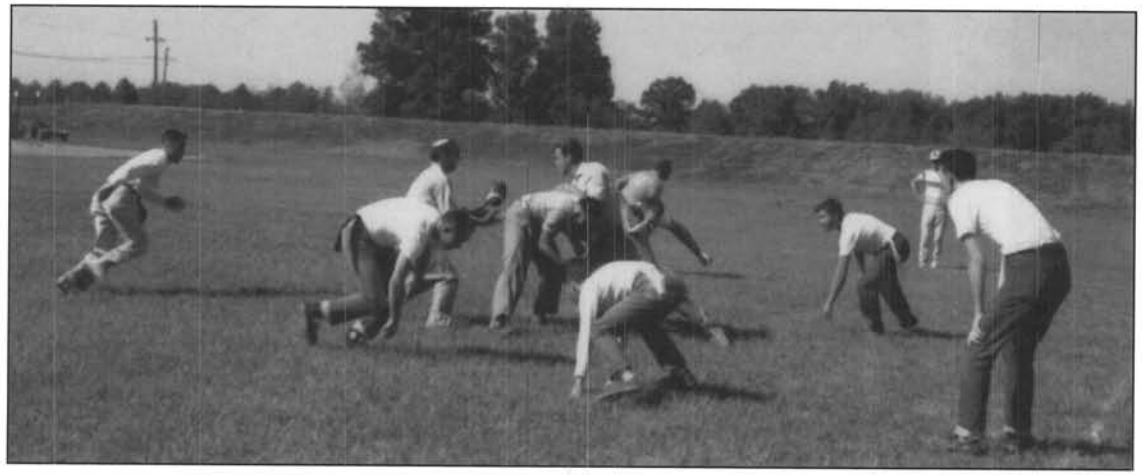
To provide more activity areas for families, city parks were updated; new tennis courts, baseball diamonds, and swimming pools were added. Many social activities developed around the plant employees and their families. After all, they lived, worked, and attended school together; it made sense that they also should play together. Bowling leagues and team sports proved popular. Carbide organized regular social events throughout the year — dances, parties, and such. The annual Christmas Party was a splendid event with Santa making an appearance.

Carbide was interested in its employees and their families, both on and off the job. Management coordinated recreational and seasonal activities for entertainment, stress relief, and team building. Leaders felt that strong families contributed to a strong plant and the wellbeing of employees.

"The plant sponsored dances and picnics. The plant was very good about including families in activities."

Virginia Garrott
Wife of Dan Garrott, Retired
Mayfield, Kentucky

In addition to Christmas festivities, Halloween parties were held. Employees appreciated the opportunity to socialize with coworkers outside of the plant.



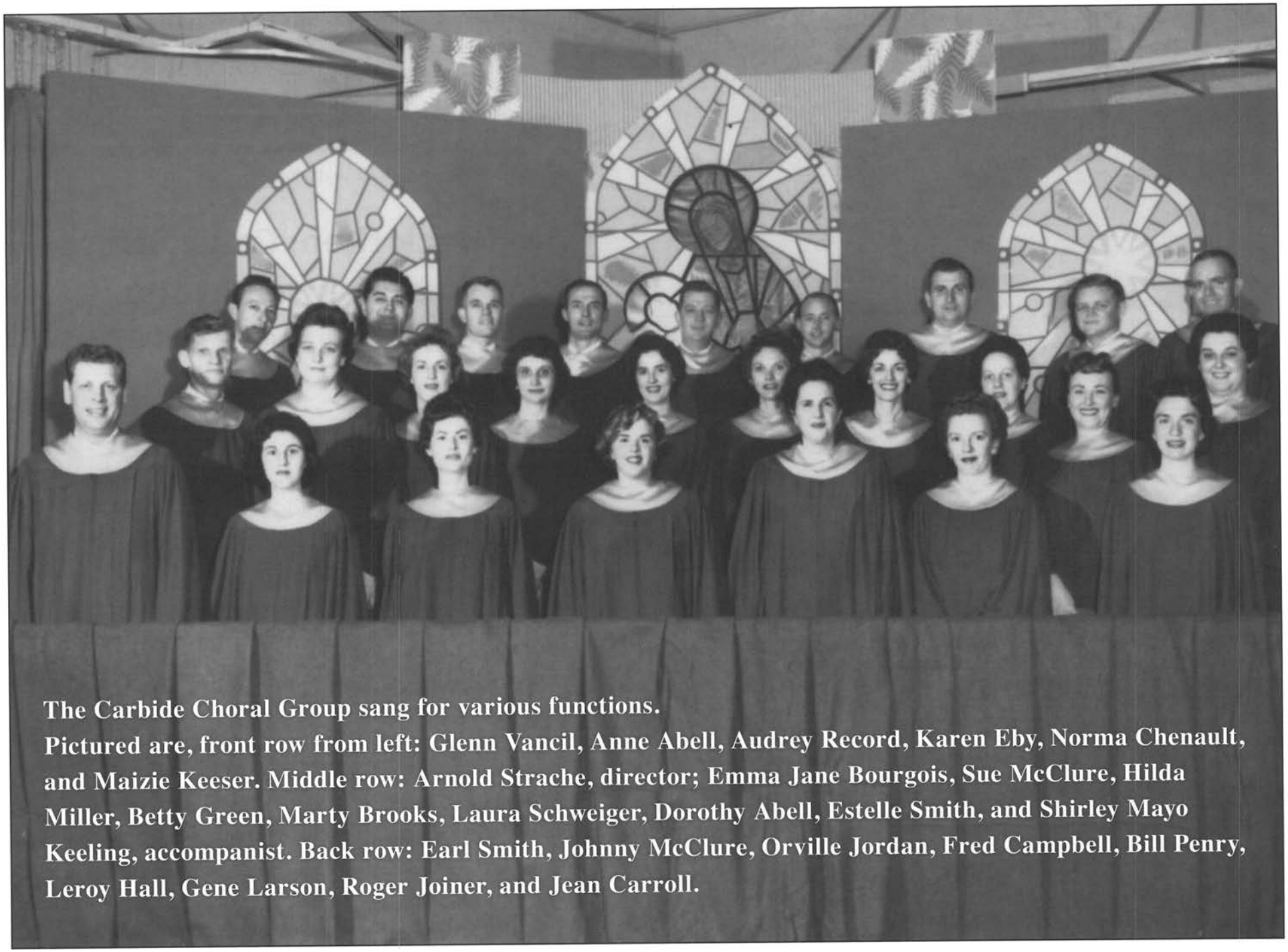
Management felt that if employees could play together they could work together. To that end, Carbide developed a Recreation Department. Sponsored sports included bowling, softball, golf, volleyball, among others. Leagues included men's, women's, and couples.

"They had people who kept us doing things together, and that bound us together."

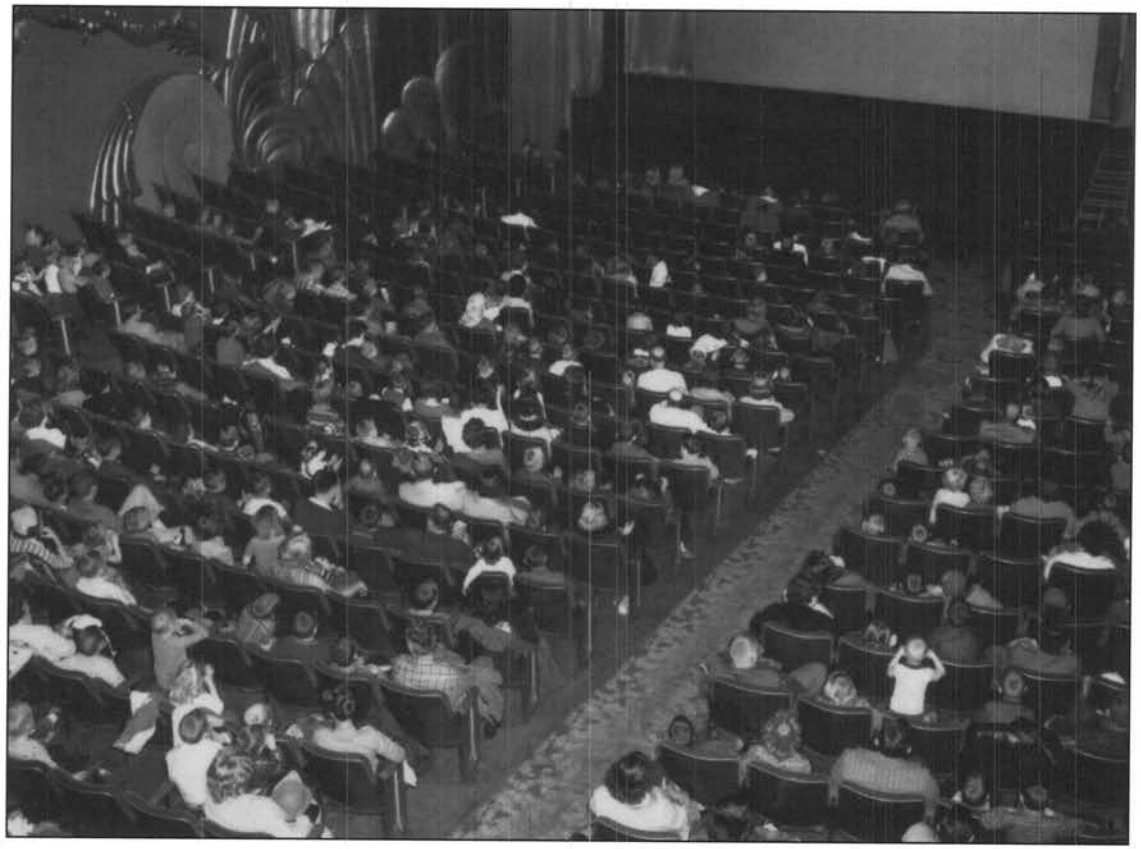
Charlie Baker
Retired
Paducah, Kentucky

"Many employees and their families learned to swim on Saturday mornings when Carbide reserved the Noble Park swimming pool for their use. Certified lifeguards were also plant employees."

Velva Blayney Yeomans
Retired
Paducah, Kentucky



The Carbide Choral Group sang for various functions.
Pictured are, front row from left: Glenn Vancil, Anne Abell, Audrey Record, Karen Eby, Norma Chenault, and Maizie Keeser. Middle row: Arnold Strache, director; Emma Jane Bourgois, Sue McClure, Hilda Miller, Betty Green, Marty Brooks, Laura Schweiger, Dorothy Abell, Estelle Smith, and Shirley Mayo Keeling, accompanist. Back row: Earl Smith, Johnny McClure, Orville Jordan, Fred Campbell, Bill Penry, Leroy Hall, Gene Larson, Roger Joiner, and Jean Carroll.



Five new drive-in theaters were built in the area, and four downtown theaters were jammed day and night. Most towns also had an indoor theater.

Those who wanted more lively entertainment were compelled to go to Cairo, Illinois, just across the Ohio River, where there were nightclubs.

"Back then, Cairo offered nightly entertainment which rivaled that in any big city."

Clyde Elrod
Former Employee
Kevil, Kentucky

In 1951, Paducah stores and shops elected to stay open until 8:30 p.m. rather than the normal 5:00 p.m., one night a week. Throngs of people mobbed area stores, and customers often had to stand in line an hour to get waited on. Several new businesses opened as well. An eight-store, million-dollar shopping center was constructed at Cardinal Point. Several individuals opened used car lots, many on the front lawn of their home. (26)

More than 12 new churches were built in McCracken County alone. Newcomers to the community added to the congregations of existing churches. Attendance rose 22 percent during 1951-1953. Tithes and offerings increased 35 percent. (17)

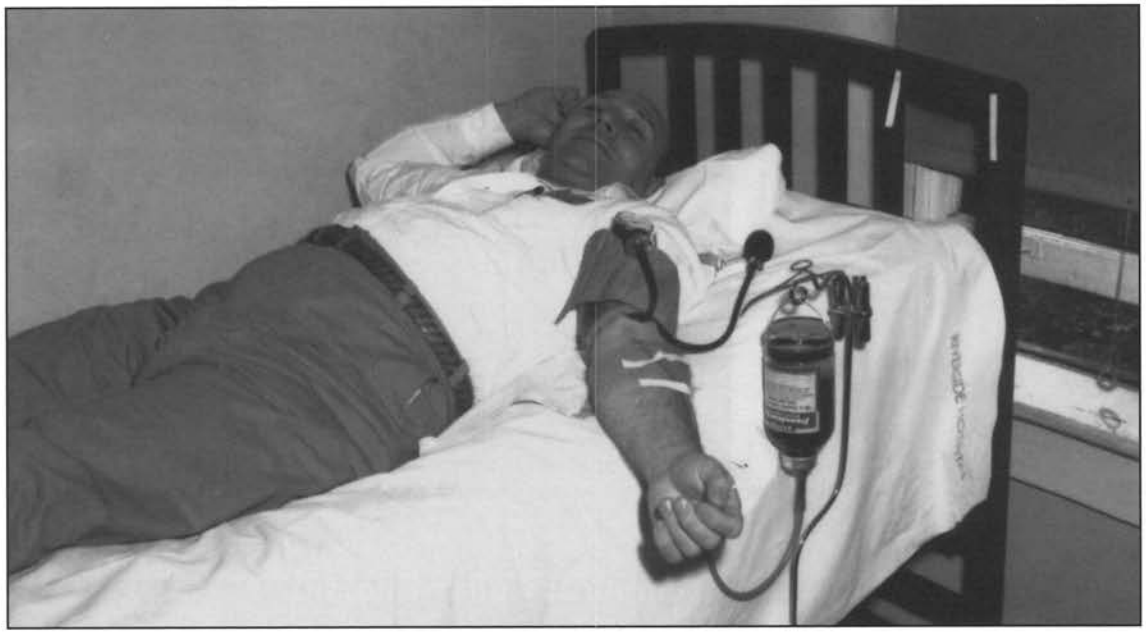
COMMUNITY INVOLVEMENT

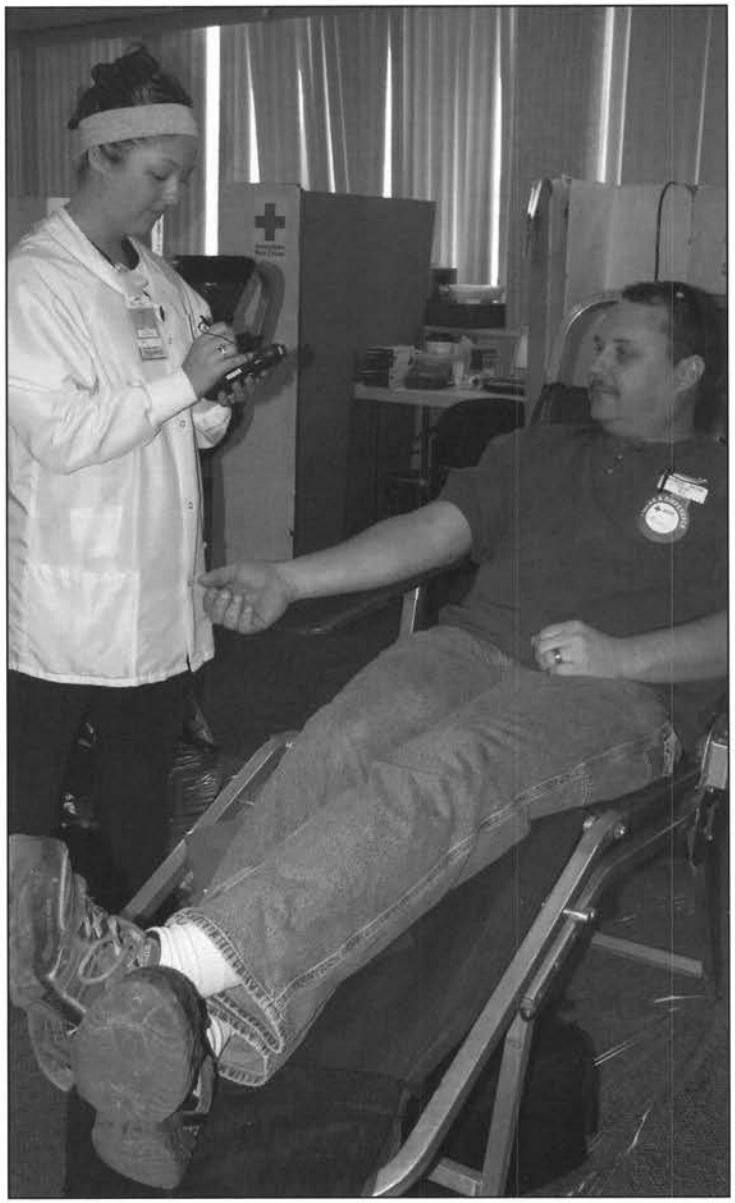
From the beginning, plant management has actively supported local communities. Many charities and non-profit programs have directly benefited from plant monetary donations. Excess equipment has been donated to local fire departments.

Plant management has encouraged participation in the Savings Bond program, and actively supports employees who are also military reservists.

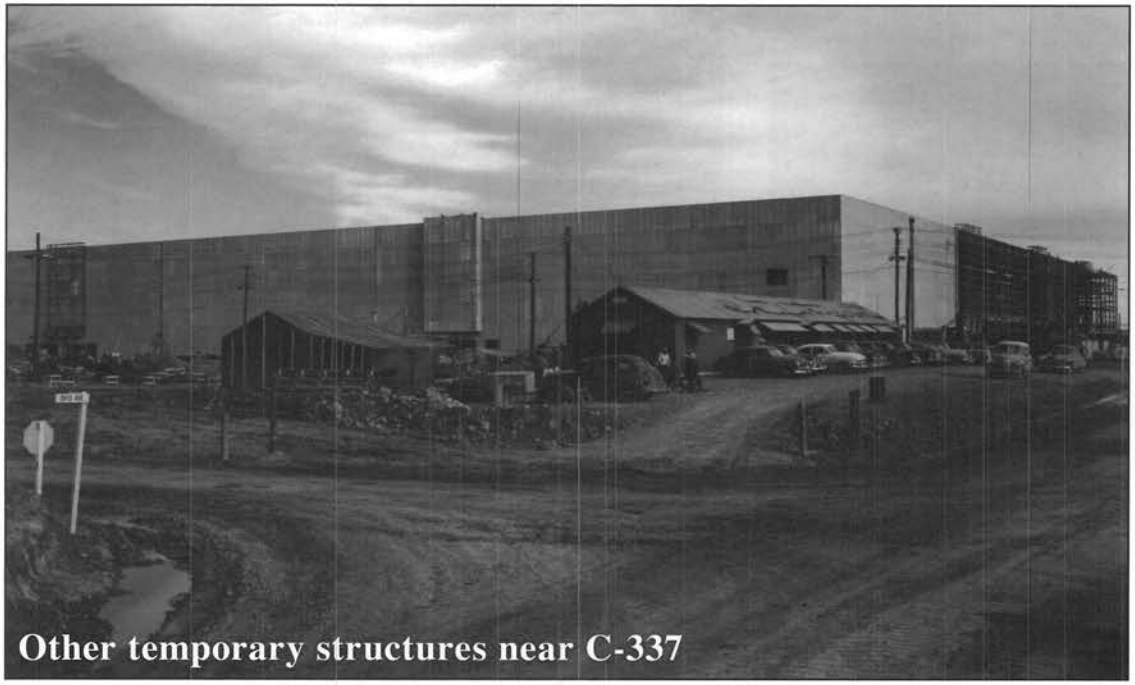
During the recent tsunami in Japan, USEC matched funds contributed by plant employees to assist in humanitarian aid.

Plant employees have given generously to their communities. Blood drives have produced gallons of blood for the local blood bank, and the United Way fund activities held throughout the year have generated thousands of dollars for local charities. Employees have donated their time and expertise to perform good deeds through such programs as Habitat for Humanity.





Temporary Administration Buildings



Other temporary structures near C-337

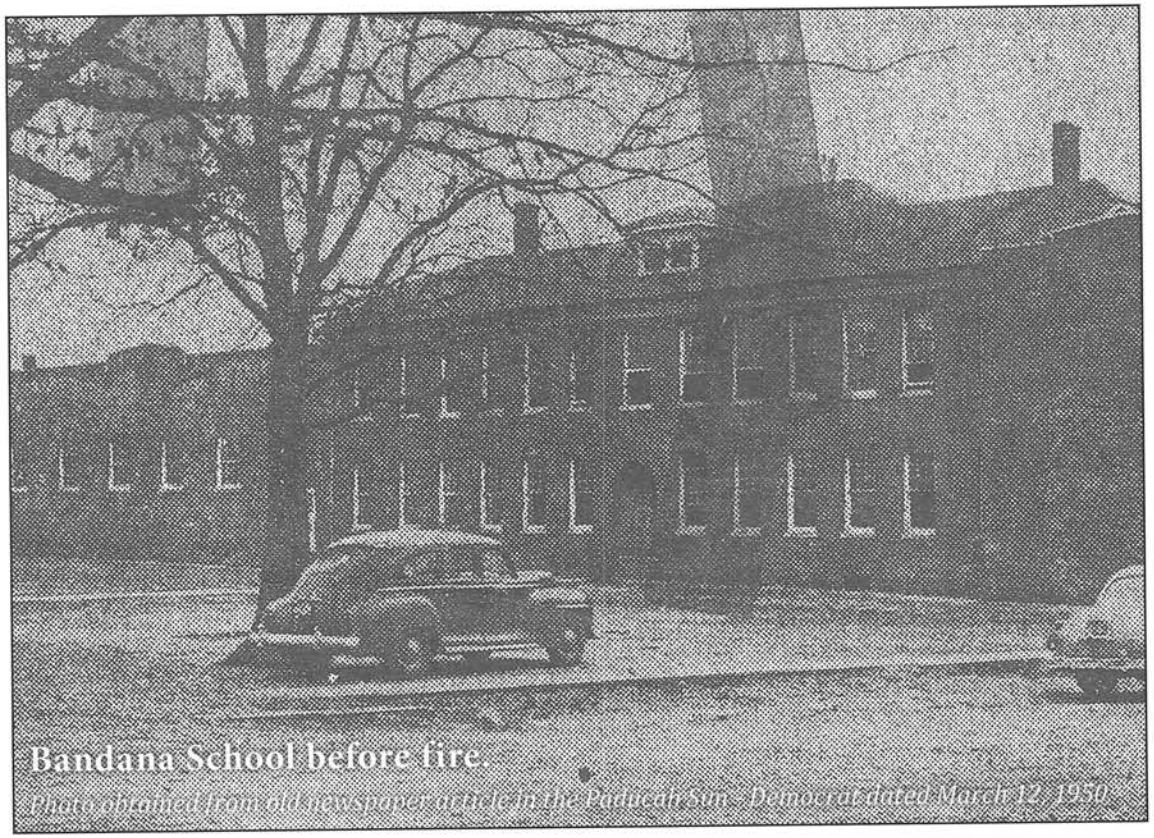
During construction, temporary guard shacks popped up everywhere as employees working in one area were not authorized to enter other area of the plant for security reasons.

When no longer needed, these and other temporary structures were dismantled and wood, along with other salvaged materials, were sold to local citizens for $1.00 per car or truck load. Many nearby homes, garages, and outbuildings were constructed from these salvaged materials.

"I remember people being lined up on Saturday morning to get wood and other salvaged materials so they could build out buildings and barns."

Dennis Stokes
Employee
Kevil, Kentucky

Temporary guard portal



Bandana School before fire.
Photo obtained from old newspaper article in the Paducah Sun-Democrat dated March 12, 1950

From the beginning, the AEC was involved in area communities. When the opportunity presented itself, plant management generously provided funds or goods to aid communities.

On one such occasion, the AEC provided temporary school rooms and a gymnasium for students after a fire destroyed their school. On October 28, 1953, just as students were arriving for the day, a fire broke out in the Bandana School, destroying the building. Like other schools near the plant, the Bandana School was bulging with students. There were 13 teachers and 315 students.

The AEC came to their rescue and provided tool sheds for temporary school rooms and a 100' by 40' Quonset hut which was used for a gymnasium. Area farmers finished flooring the buildings and the Paducah iron workers provided labor in erecting the Quonset hut without charge. The buildings were used for two school years while a new school was constructed.

"I was just out of college and had been principal of Bandana School for one month when the fire broke out. The buildings provided by the AEC and labor provided by local farmers and the Paducah iron workers helped us get through a challenging time."

Tot Waldon
Past Principal
Bandana School

Photo courtesy of Joe Howard.

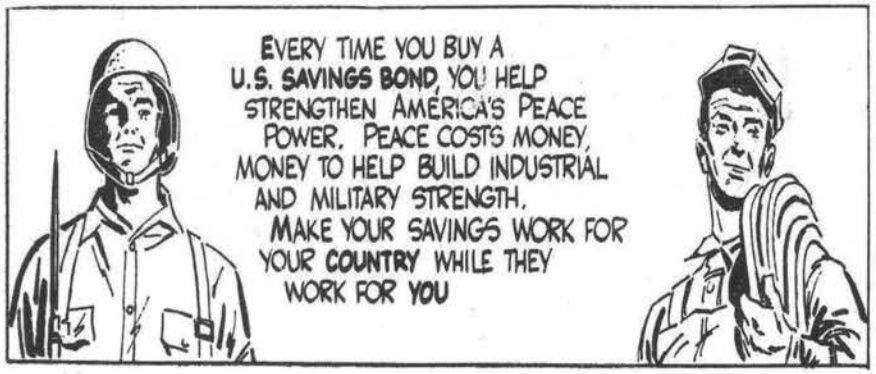
The Department of Energy, Carbide, and successive contractors, along with USEC have a long history of supporting the local communities. In 1983, the 1964 snorkel truck was retired from PGDP Fire Department service and donated to West McCracken County Fire and Rescue Squad.

"The old snorkel truck served the West McCracken community another 20 years and remained operation until it was replaced by a new ladder truck in 2004."

Donald Elrod
Chief, West McCracken
Fire Protection District
Retired PGDP Employee
Grahamville, Kentucky

Courtesy of Joe Howard.

Employees were encouraged to buy U. S. Savings Bonds. Issues of the *Carbide Kentuckian*, the plant newspaper produced in-house, ran cartoons such as this one reminding employees of the contribution they were making to the nation by buying savings bonds.



From the beginning employees, including construction workers, have donated to local charitable organizations. A total of $2,305.75 was donated by McGraw employees to the Community Chest in 1951. In 1958 Union Carbide employees donated $17,000 to United Appeal, and in 1959 donations reached $18,500. Dollar amounts from other years are unavailable. From 1999 to 2012 the plant contributed $1,595,306 to the United Way through employee payroll deductions, corporate contributions, and fund raising proceeds.

HELPED BY PGDP EMPLOYEES—Troy Bean, second from right, an employee of West Kentucky Vocational School, was given artificial respiration by Paducah employees (from left) Joe Howard, Richard Wainscott and Jim Adkins after "blacking out" at a recent public meeting. Bean, who suffered a ruptured ulcer and severe hemorrhaging, has since returned to work.

The community has benefitted in many ways from the plant being in the neighborhood. Just a few are mentioned.

The plant provides EMT and CPR training for many of its personnel. Pictured below, Troy Bean was attending a DOE public meeting when he collapsed. PGDP employees were also in attendance and were able, because of their training, to render CPR until an ambulance arrived. Within a month he was back at work.

On another occasion, Roy Collins' life was saved under similar circumstances.

The plant actively supports its neighbors in emergency situations. The Squad has responded to numerous vehicle accidents on the plant access road. In the fall of 1997 tragedy struck at Heath High School when several students were mortally wounded. The plant dispatched an ambulance and attendants, along with the plant's physicians assistant to the scene to assist the local ambulance service in transporting the wounded to local hospitals.

New community members have made a significant contribution to Paducah's civic and cultural life.

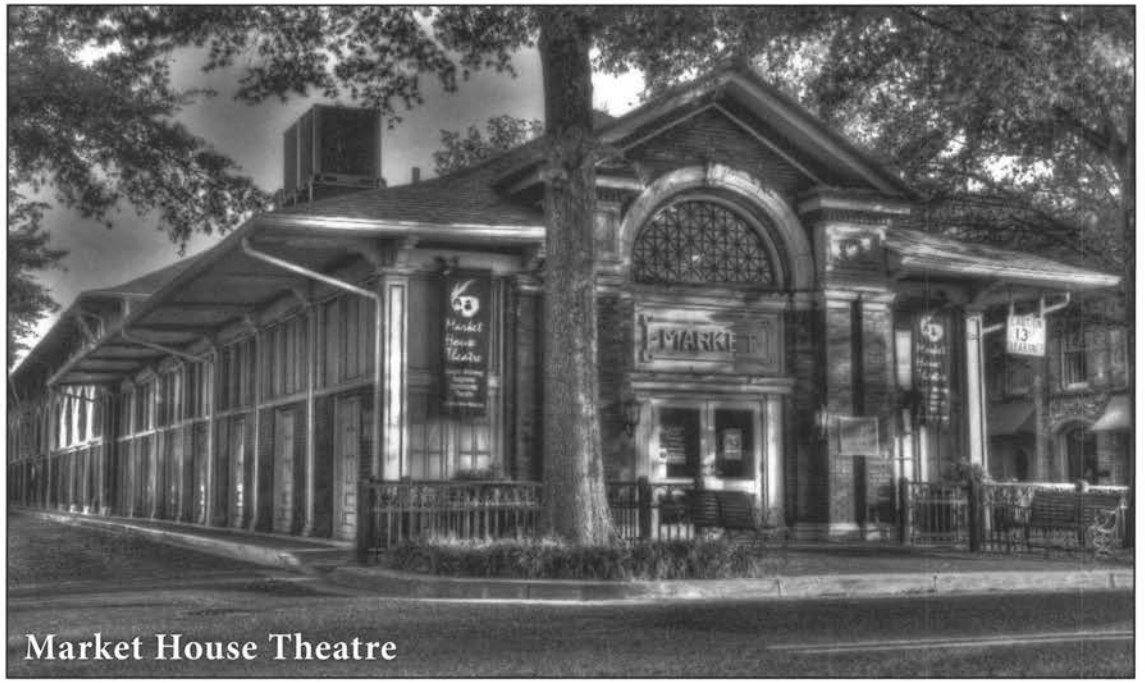
They served on community boards, volunteered at schools and helped organize the Market House Theatre and the Paducah Art Guild. The Paducah Symphony was also formed. (22)

"Those people have been the plant's greatest benefit to the community."

Gerry Montgomery
Past Mayor
Paducah, Kentucky
"Fond Memories", *The Paducah Sun*, November 4, 1992

"I've never seen anywhere else anything like how this plant, the people, and the community work together."

Steve Polston
Retired
Tilene, Kentucky
"Fond Memories", *The Paducah Sun*, November 4, 1992



Market House Theatre

Yeiser Art Center

Plant management has always supported the Nation's military reservists and has been recognized by the Department of Defense for that cooperation.

The PGDP employs more military veterans than any other employer in Western Kentucky.

At left, Plant Superintendent R. G. Jordan accepts the Reserve Award Certificate, pictured below, from United States Army General Ralph W. Zwicker.

The Department of Defense

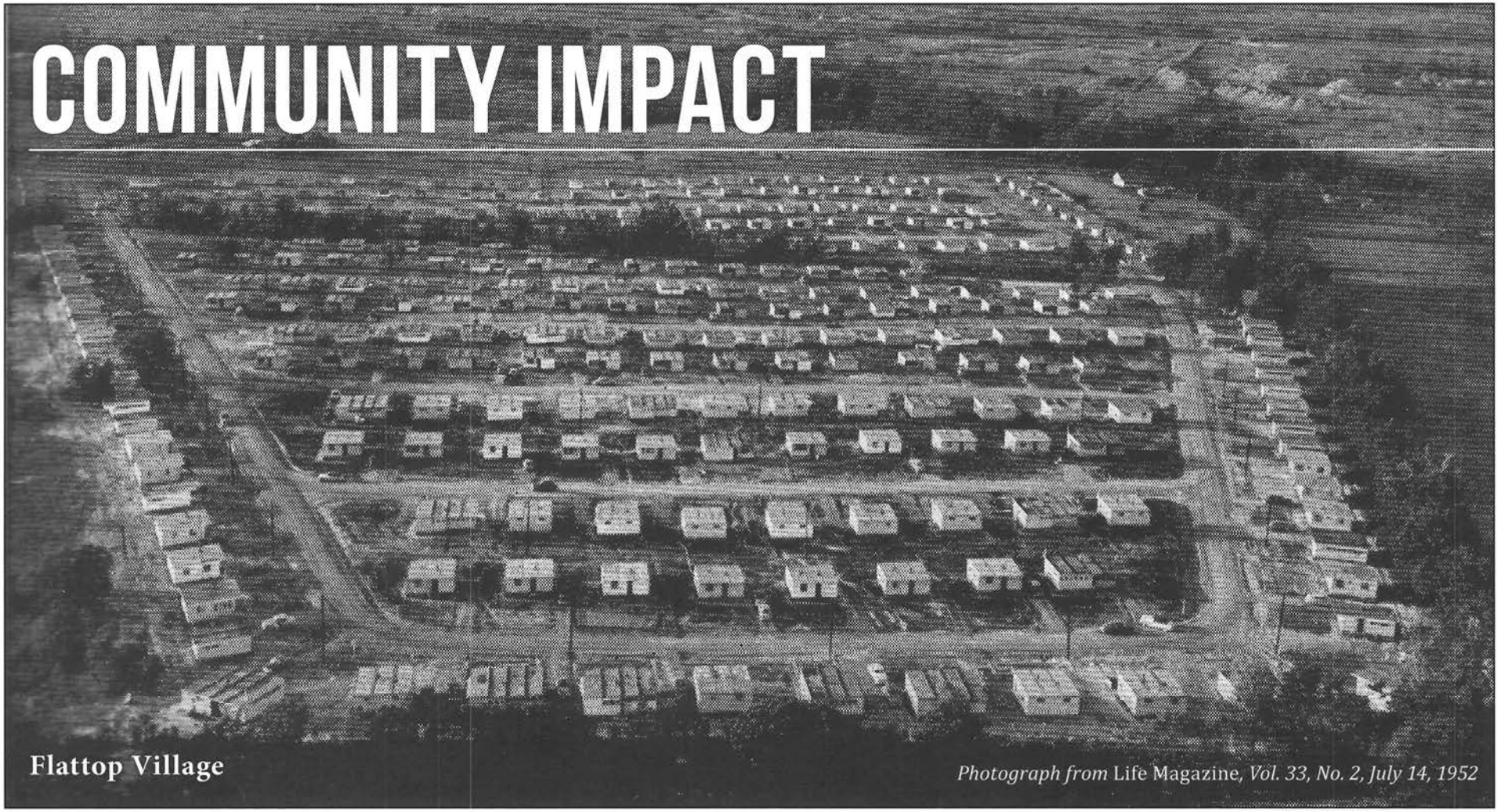
Reserve Award Certificate

for Outstanding Cooperation with the Armed Forces Reserve

UNION CARBIDE NUCLEAR COMPANY
PADUCAH, KENTUCKY

Citation presented this 16th day of JULY 1958

COMMUNITY IMPACT



Flattop Village

Photograph from Life Magazine, *Vol. 33, No. 2, July 14, 1952*

The region has been changed forever with the coming of the uranium enrichment plant. The area's private citizens were impacted, for better or worse, in many ways. Housing, schools, churches, groceries, clothiers, and general merchandise shopping centers were inadequate to handle the personal needs of workers and their families. Hospitals, banks, hotels, restaurants, and amusements were in short supply. Streets, highways, airport, water, sewer services, police protection, and fire services needed improvement and expansion to serve the new community members.

In response to the need, new housing was built, schools were expanded and new schools added in the region, grocery stores were built, Riverside Hospital was expanded and Western Baptist Hospital was built, roadways were built or improved, water services were improved, and spin-off companies were born. The whole area grew as a result of PGDP coming to town.

C & O Barracks at Grahamville, Kentucky. *Photo courtesy of Larry Adams.*

Photograph from Life Magazine, *Vol. 33, No. 2, July 14, 1952*

It was much easier for construction workers to find a room than a house. Emergency housing was provided by local citizens who opened their homes to boarders, converted chicken coops, smoke houses, and coal sheds to provide lodging. Almost every farm in the plant area had a few house trailers in the yard. Some people were forced to live in tents.

C & O Barracks at Grahamville, just outside the construction zone, was one of many structures erected to house the influx of men. The building still stands and houses Davis Clothing. In Ballard County, just down the road from the plant, La-Center had a population increase of over 250 percent, and 75 new homes were built; Barlow added 600 new residents, and Kevil added 700 residents. (24)

Additionally, many construction workers opted to commute, some driving more than a hundred miles one way.

"There were people lined up all the time for a haircut. The LaCenter barber shops were so busy they stayed open until 9 or 10 o'clock at night to accommodate plant workers."

Neil Lawler
Former LaCenter Student
Paducah, Kentucky

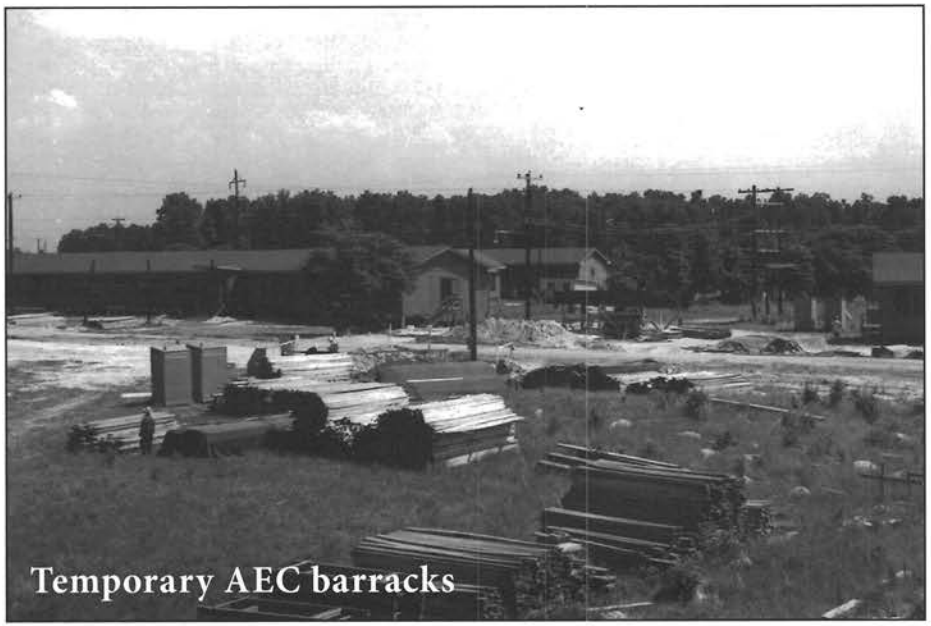
The AEC built a 1,000-room temporary barracks at the plant site in 1951 to accommodate workers, and the government provided funding for hundreds of apartment buildings and at least 175 houses.

Once adequate housing for construction workers was provided, attention turned to housing for the hundreds of people who would be needed to operate the plant. The AEC financially backed 300 apartment units at Elmwood Court and 100 units at Anderson Court as well as 162 houses in the River Oaks subdivision. The Federal Housing Authority (FHA) provided funding for 500 units at Forest Hills, 128 at Fair Oaks, 76 units at California Court, and 76 units at Paducah Apartments. (25) Indian Hills subdivision in Lone Oak, Black Oaks Apartments, the Cornell Development, and Brookhaven neighborhood were also constructed during this time.

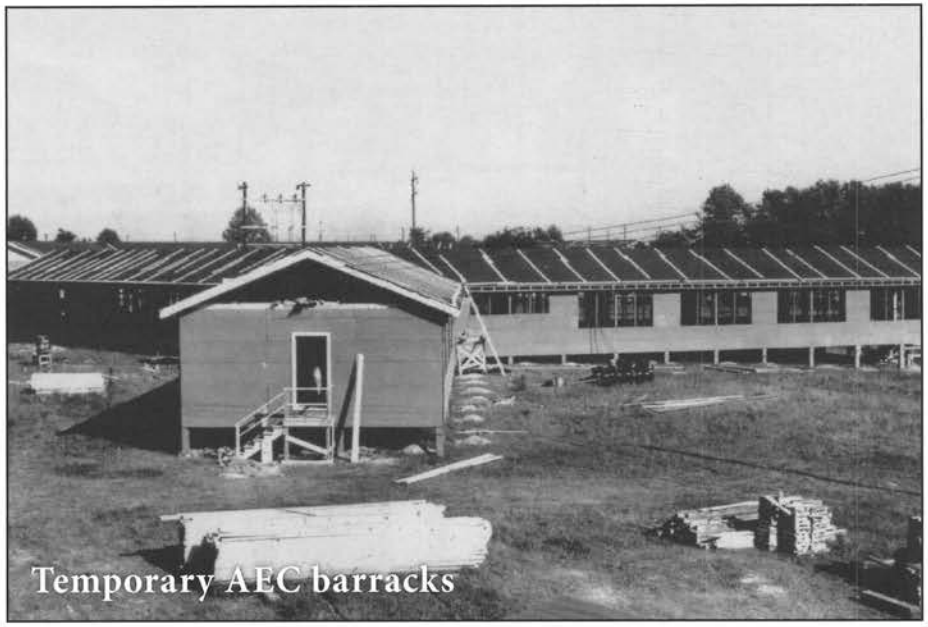
A large portion of this housing was built using prefabricated components. Prefabricated manufacturing facilities were located in close proximity to the area. The Sears factory in Cairo, Illinois, Gunnison Homes in New Albany, Indiana, and National Homes in Lafayette, Indiana, provided prefabricated parts for many of the single and multiple dwelling units. (25) Rent skyrocketed as arriving workers competed for housing, until the government mandated rent control.

"There was so much mail in those days that they opened a post office at the AEC barracks, and one at Forrestdale."

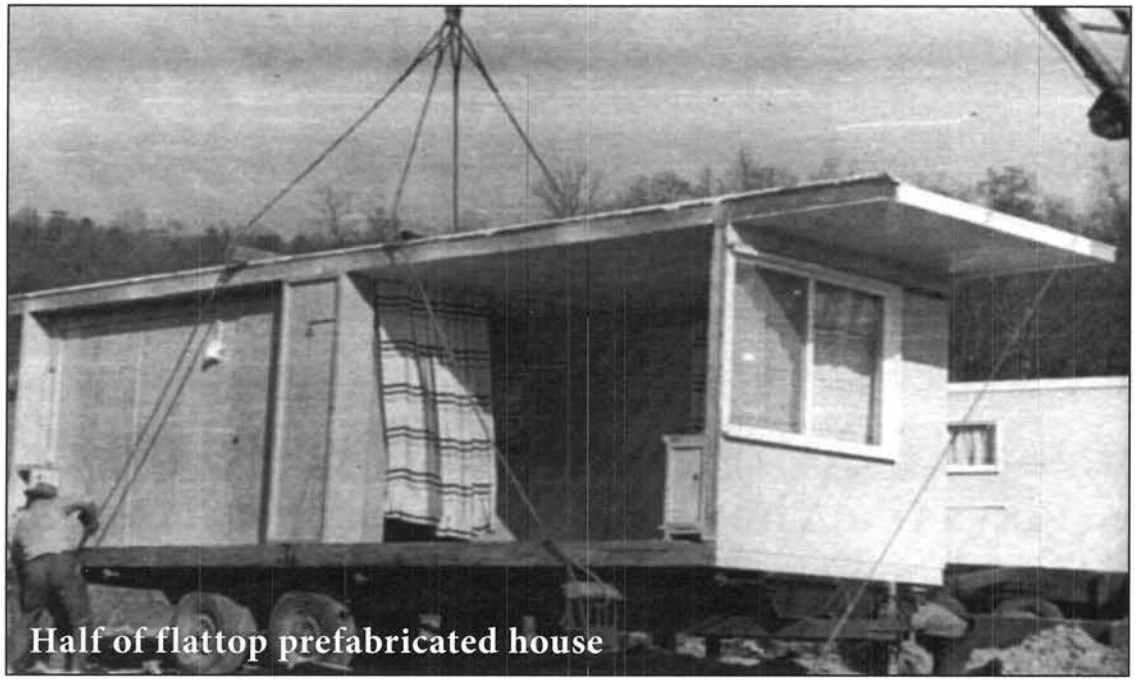
Richard Burnley
Postmaster
Kevil, Kentucky



Temporary AEC barracks



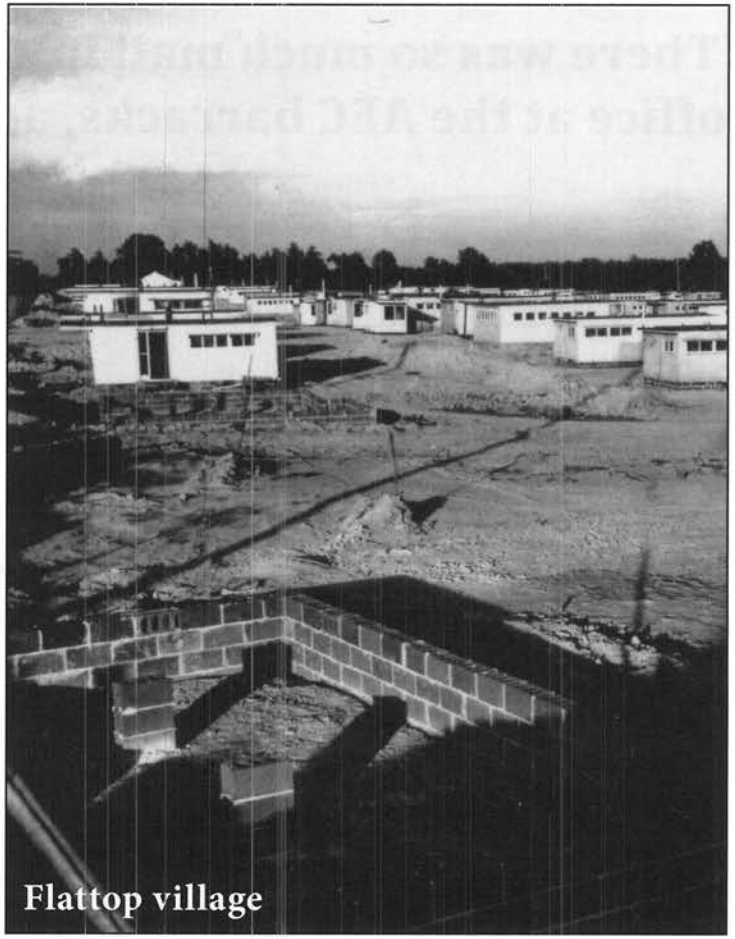
Temporary AEC barracks



Half of flattop prefabricated house

Flattop village construction

Hundreds of other houses were constructed by private companies. Local entrepreneur, Forrest Harman, purchased 250 portable flattop houses that had originally been used at Oak Ridge, Tennessee, during the construction of the city during World War II. Harman had the buildings shipped to Paducah and situated them on land near the plant site. The village was first known as Flattop and later Forrestdale. At its peak, Forrestdale had a population of 1,500 residents. (10)



Flattop village

Heath High School

Photo courtesy of Wilma Bivin.

Paducah and McCracken County schools, which were already overcrowded, had to accommodate an additional 4,000 students. Citizens approved a bond issue for school expansion, and a large new high school was constructed in 1953. The AEC established two temporary school buildings in the plant area, both of which were prefabricated metal structures, but the county paid for staff and supplies. The city finally received federal financial aid in 1953, and expansions and improvements were made to several area schools. (24)

Schools within a 60-mile radius of Paducah experienced heavy enrollment. Storage rooms were turned into classrooms. Many schools had to build an additional building to accommodate the new students.

"Kevil Grade School had to expand. A building was built across the street from the grade school and some grades were moved in there."

Richard Burnley
Past Postmaster
Kevil, Kentucky

"I was in grade school at La-Center. Before the boom there was only a single classroom for each grade, but when all the children came the schools had to double each grade."

Neil Lawler
Former LaCenter Student
Paducah, Kentucky

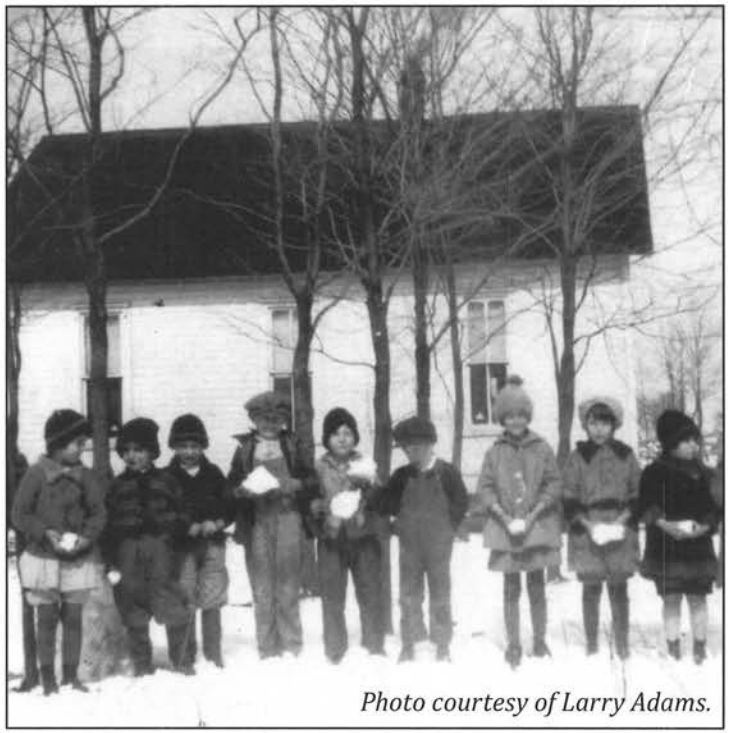


Photo courtesy of Larry Adams.

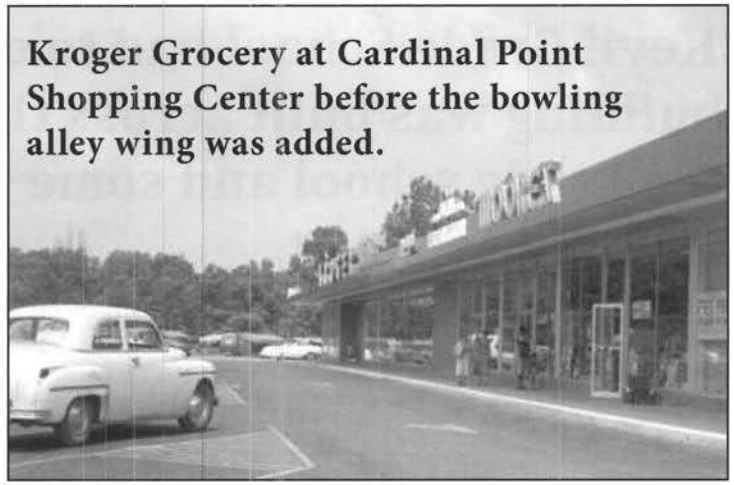
Anderson Grocery, Grahamville, Kentucky.
Photo courtesy of Larry Adams.

Kroger Grocery was later located at Hannan Plaza in a newly-constructed building.

Initially, communities in West McCracken County and other areas were not equipped to handle all the people and automobiles. Business in the area boomed to accommodate the growing population. Retail sales soared, rising from $44 million in 1950 to $94 million in 1953. Businesses expanded and had to hire extra help to meet the growing demand. (26) Simultaneously, retail employees sought better pay and benefits at the new plant, leaving businesses short handed. Lines of customers grew long with the shortage of retail clerks.

"Neighborhood groceries really flourished during the construction phase."

Velva Blayney Yeomans
Retired
Paducah, Kentucky



Kroger Grocery at Cardinal Point Shopping Center before the bowling alley wing was added.

It was not long before hospitals became overcrowded and the need for new facilities was evident. Money for a new hospital was raised by the public, investors, and matched by federal funds.

Construction of Western Baptist Hospital began in November of 1951 and doors were opened on October 15, 1953. The $1.4 million facility contained 120 beds. Today, it is the largest employer in Paducah.

Paducah's only public hospital, Riverside, became taxed after a baby boom occurred in 1952. The 110-bed facility overflowed as its patient-count rose to nearly 175 per day. Patients were sent home as early as possible, and beds and cots were arranged in hallways and sun porches. A small expansion in late 1952 provided room for ten additional beds. (26)

Newly constructed Western Baptist Hospital

Riverside Hospital

In midsummer of 1952 , 23,000 construction workers were employed at the site. Traffic in and out of the plant, particularly at shift changes, was phenomenal. An estimated 12,000 cars came to and from the plant every 24 hours. The busiest time was in the afternoon when around 8,000 cars poured out of the plant at the end of the day shift. (27)

Plant traffic was controlled by guards in traffic control towers. The towers were equipped with radios for guard-to-guard communications, loudspeakers, and manually operated traffic lights. For the most part, traffic into the plant was orderly, but traffic departing the plant, three abreast, was another story. (26)

While no one was hurt within the plant area roads, at least 20 deaths resulted from the atomic traffic jumble.

"When I went to work at the plant, I carpooled with a man and two women who were friends of mine. For some reason the man decided he wasn't carpooling anymore, so we three women had to find another ride. The other two women found a carpool but there was not enough room for me. One day, December 17, 1952, when my friends were travelling home from work, they had a wreck and both were killed. They had a 28-vehicle accident that day and many people were injured in addition to those two deaths."

Marie Johnson
Retired
Paducah, Kentucky

"Traffic was bumper to bumper from the plant to Mayfield at shift change. The narrow, two-lane winding roads made for a long trip home. There were usually four or five in a carpool. Imagine what the traffic would have been like without carpools."

Dan Garrott
Retired
Mayfield, Kentucky

Work at the plant drew people from across the country and many drove long distances daily to come in for a shift. F. H. McGraw, the contractor for the plant, published a map detailing driving distances. The longest of these was a 222-mile round-trip from Illinois, which people traveled in a car pool to work a ten-hour shift. (26) The influx of people also created an enormous traffic problem. Cars along U.S. Highway 60, the main road through the area, were bumper-to-bumper most of the time. Many secondary roads were still gravel or dirt when construction on the plant began, and dust and mud commonly covered cars and houses. Road improvements came by 1952 as the main access road to the plant and other nearby roads were paved and new arteries were constructed from U.S. Highway 60. (27)

Photo courtesy of Larry Adams.

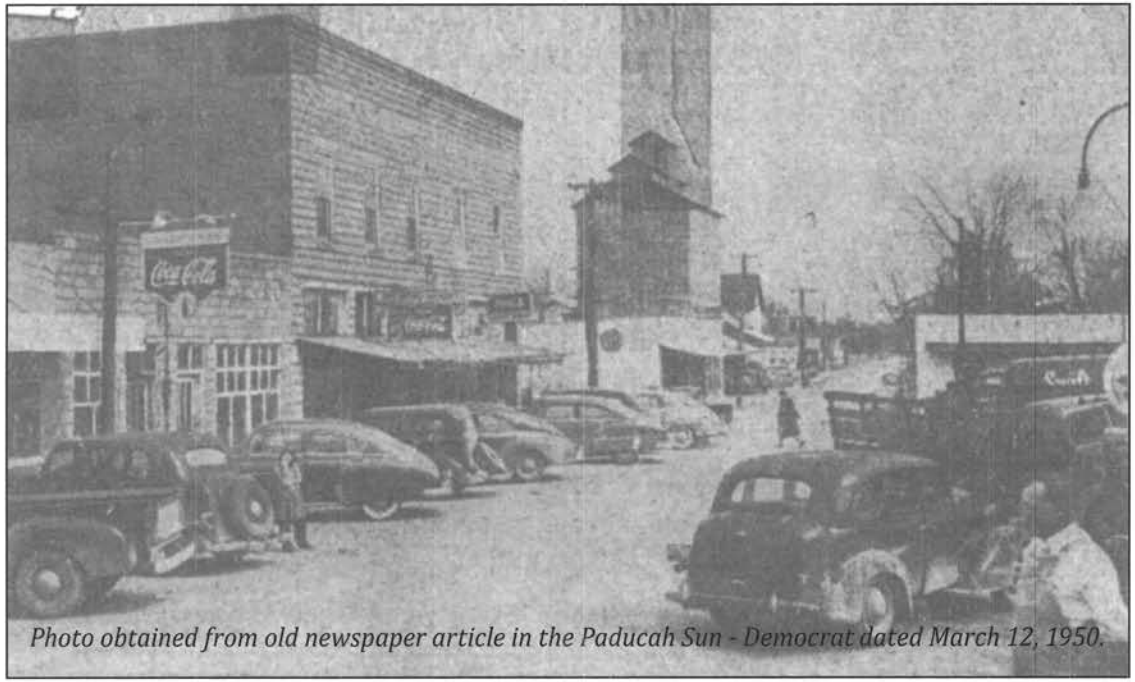


Photo obtained from old newspaper article in the Paducah Sun - Democrat dated March 12, 1950.

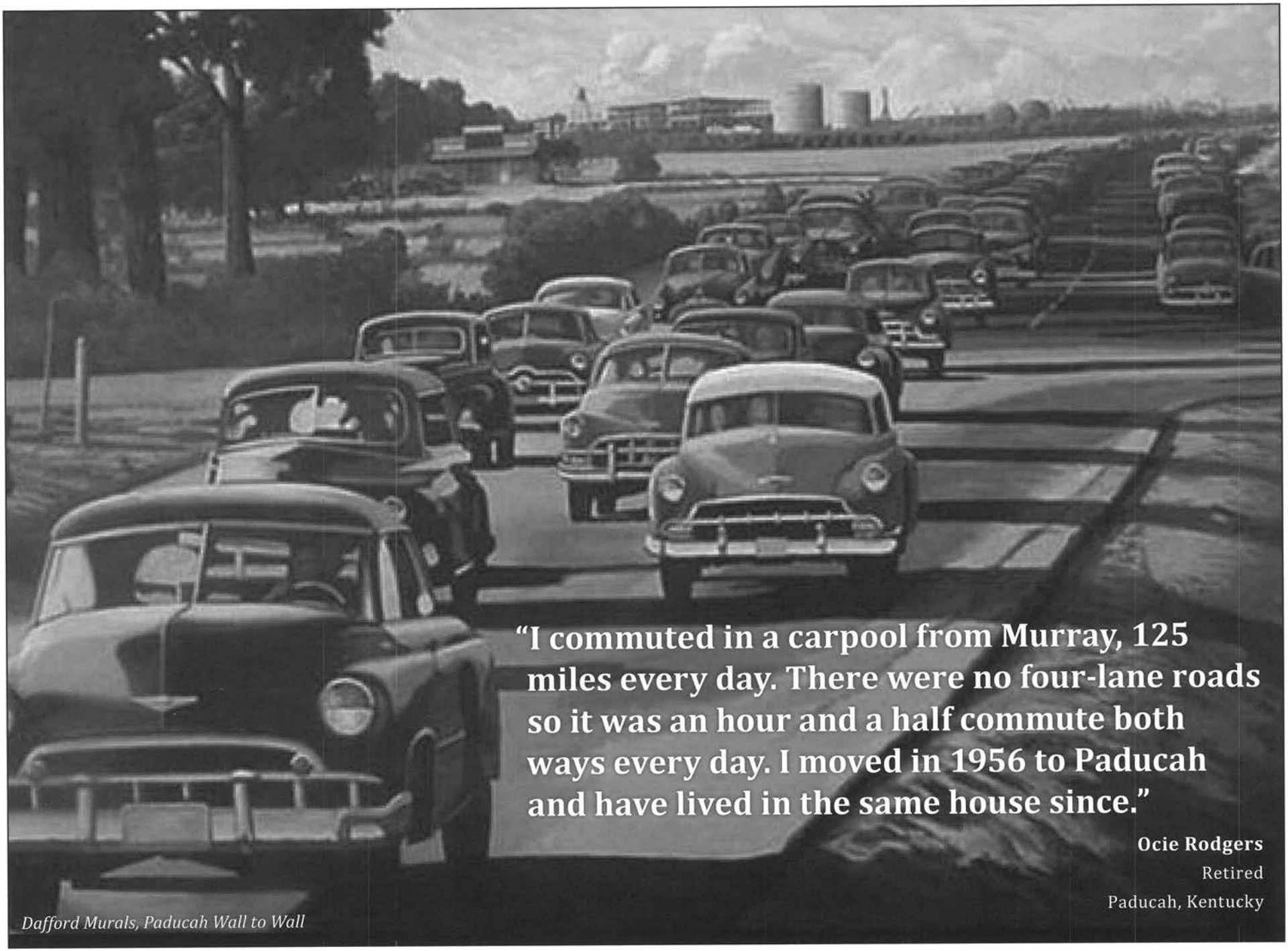
Homes along the main plant routes experienced clouds of dust which settled inside and outside of homes. It was common for porches and roofs to be piled an inch thick with dust from traffic. (17)

"Laundry still hanging on the clothes line at shift change would be covered in dust from plant traffic on dirt and gravel roads."

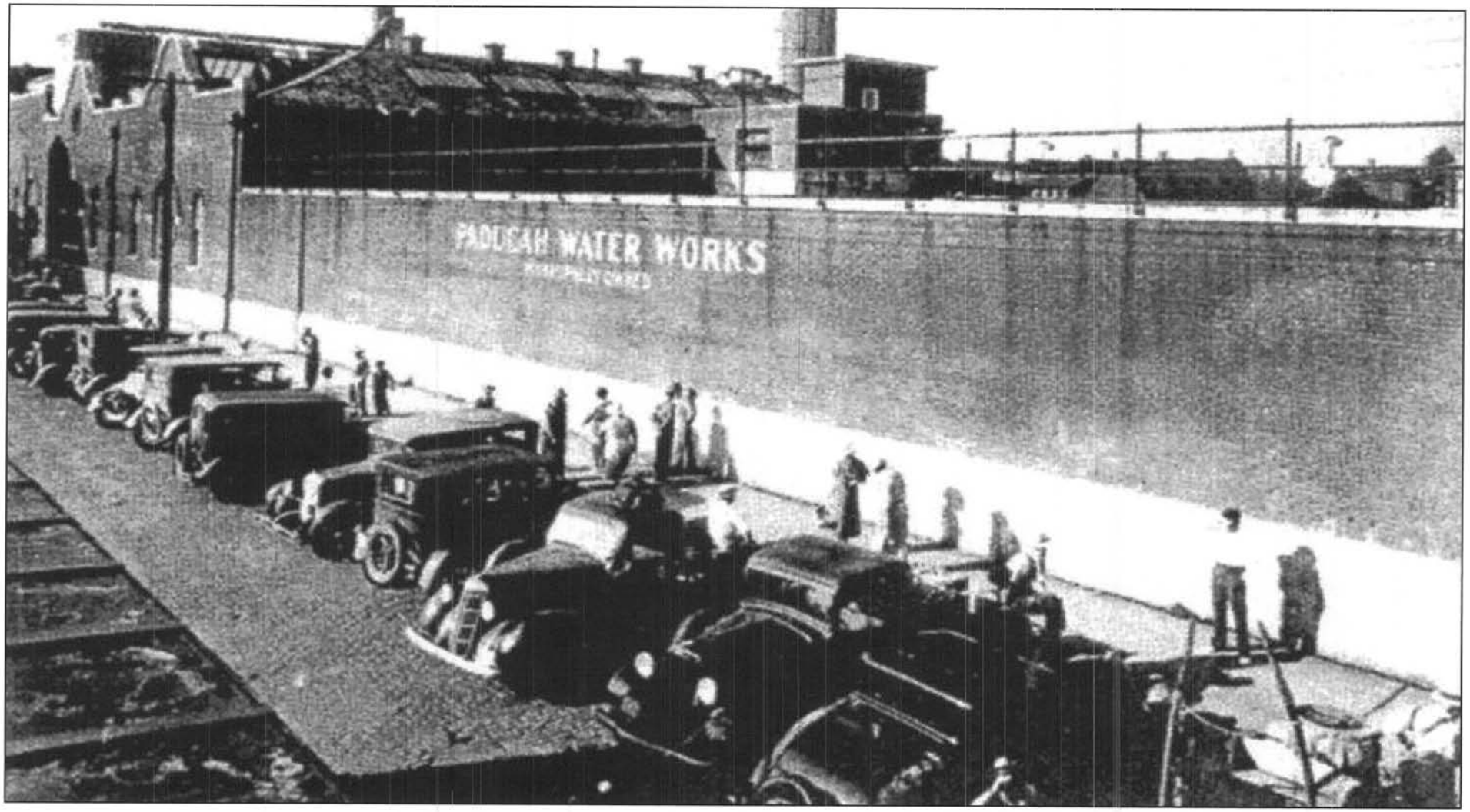
JoAnne Howard
Wife of Joe Howard, Retired
Grahamville, Kentucky

"The LaCenter Fair Grounds were made into a trailer court. Trailers didn't have bathrooms in them. We were living about a block from the Fair Grounds so several people used our bathroom facilities and washhouse."

Brad Burklow
Retired
Paducah, Kentucky



Dafford Murals, Paducah Wall to Wall



Public services, such as, mail delivery, water and sewer systems, and electric utility systems were strained and had to be expanded to accommodate the growing population. Paducah's city government paid for a new water treatment plant through a bond issue resulting in a doubling of the city's water system in 1953. The telephone system was enlarged to handle the high volume of telephone calls.

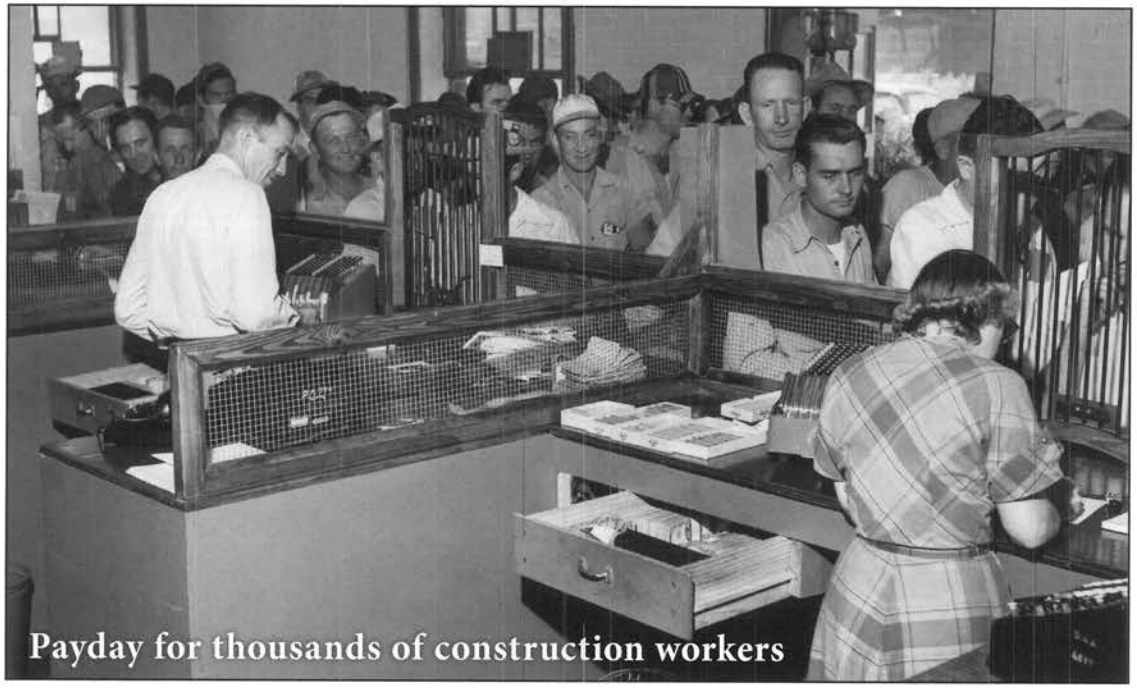
Local police and fire departments were also enlarged. Air traffic demands quadrupled at Paducah, thus, improvements were made at Barkley Field Airport. (15)

After a water shortage, $500,000 in revenue bonds were issued in April 1952, and work soon began on the new water treatment facility. Sewage treatment was also needed. Due to the unavailability of federal funding, an additional bond issue was settled. "They did so and the new plant was formally dedicated on November 3, 1957." The cost, according to the November 4 Paducah Sun-Democrat on page 1, was $1,280,000.

"When I was young I worked at Banks Grocery across from the Fergerson Building. I delivered orders across the street and they would tip me 25 or 50 cents. I thought, if those people could afford to tip like that I want to go to work for that place some day. Little did I know that I would later be employed at the plant for 26 years."

Joe Howard
Retired
Grahamville, Kentucky

People's National Bank building on site


Payday for thousands of construction workers

Banks hired extra clerks in order to process the thousands of payroll checks, as workers lined up for blocks. At the Kevil Bank, the volume of business grew so much during the building of the AEC plant that the bank had to enlarge its quarters. It has been reported that checks amounting to $75,000 were cashed in one day.

The second branch of the People's National Bank, located on the Atomic Plant grounds, started full scale operations on July 27, 1951. (5) The C-Plant Federal Credit Union was established on site in 1953.

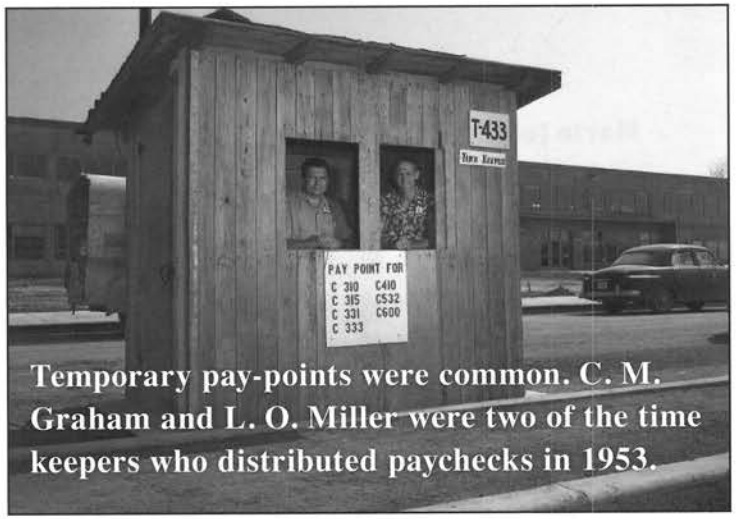
"The plant savings plan paid off every two years. The plant matched dollar for dollar. The boys went to college on that money. They didn't have to borrow any money to go to college. We lived for that extra money and when it didn't have to go for college any more we traveled."

Dan Garrott
Retired
Mayfield, Kentucky

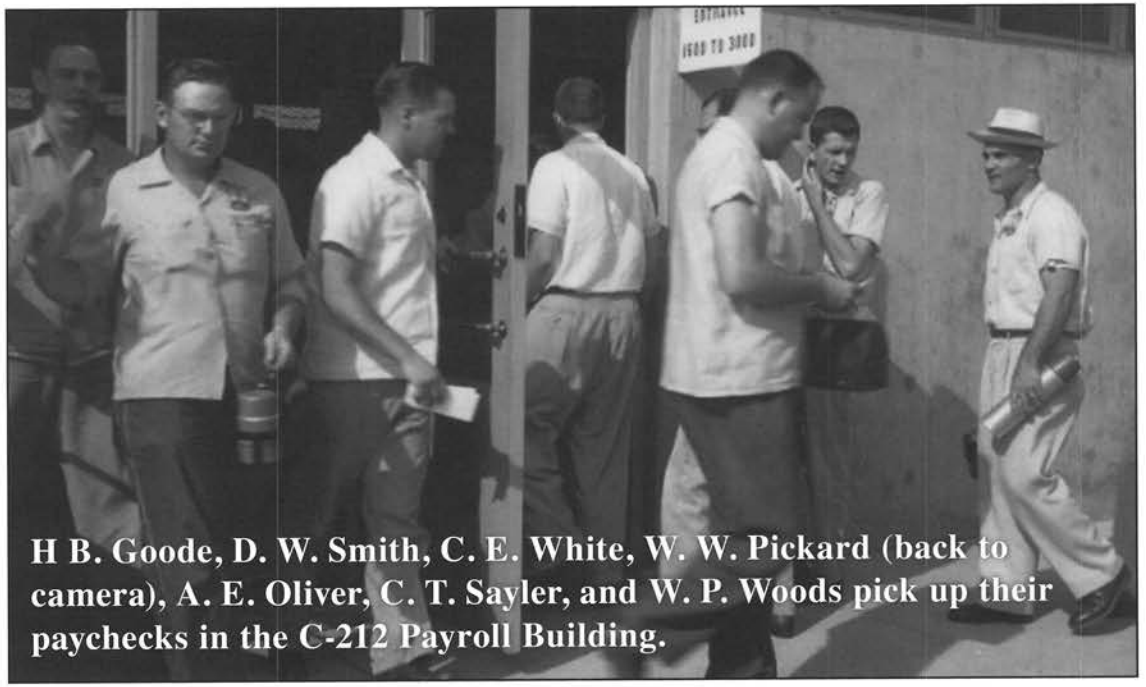
It has been estimated that since its beginning, the plant has helped funnel an estimated $5 billion in the form of labor and benefits into the regional economy, with local purchases totaling $500 million. Several local businesses were begun or expanded to support the plant. Thousands of members of the local community have been employed by the plant and received highly competitive wages and benefits.

"When I went to work out there in 1975, I started at $4.40, which was twice what I had been making."

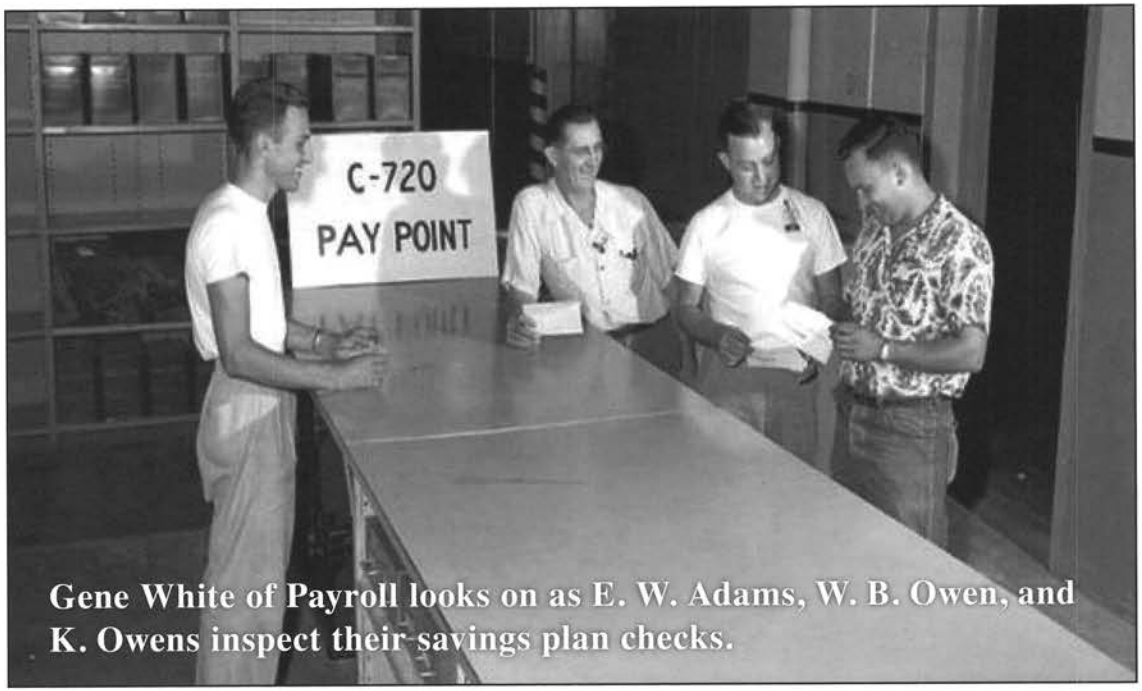
Edward Elliott
Retired
Paducah, Kentucky



Temporary pay-points were common. C. M. Graham and L. O. Miller were two of the time keepers who distributed paychecks in 1953.



H B. Goode, D. W. Smith, C. E. White, W. W. Pickard (back to camera), A. E. Oliver, C. T. Sayler, and W. P. Woods pick up their paychecks in the C-212 Payroll Building.

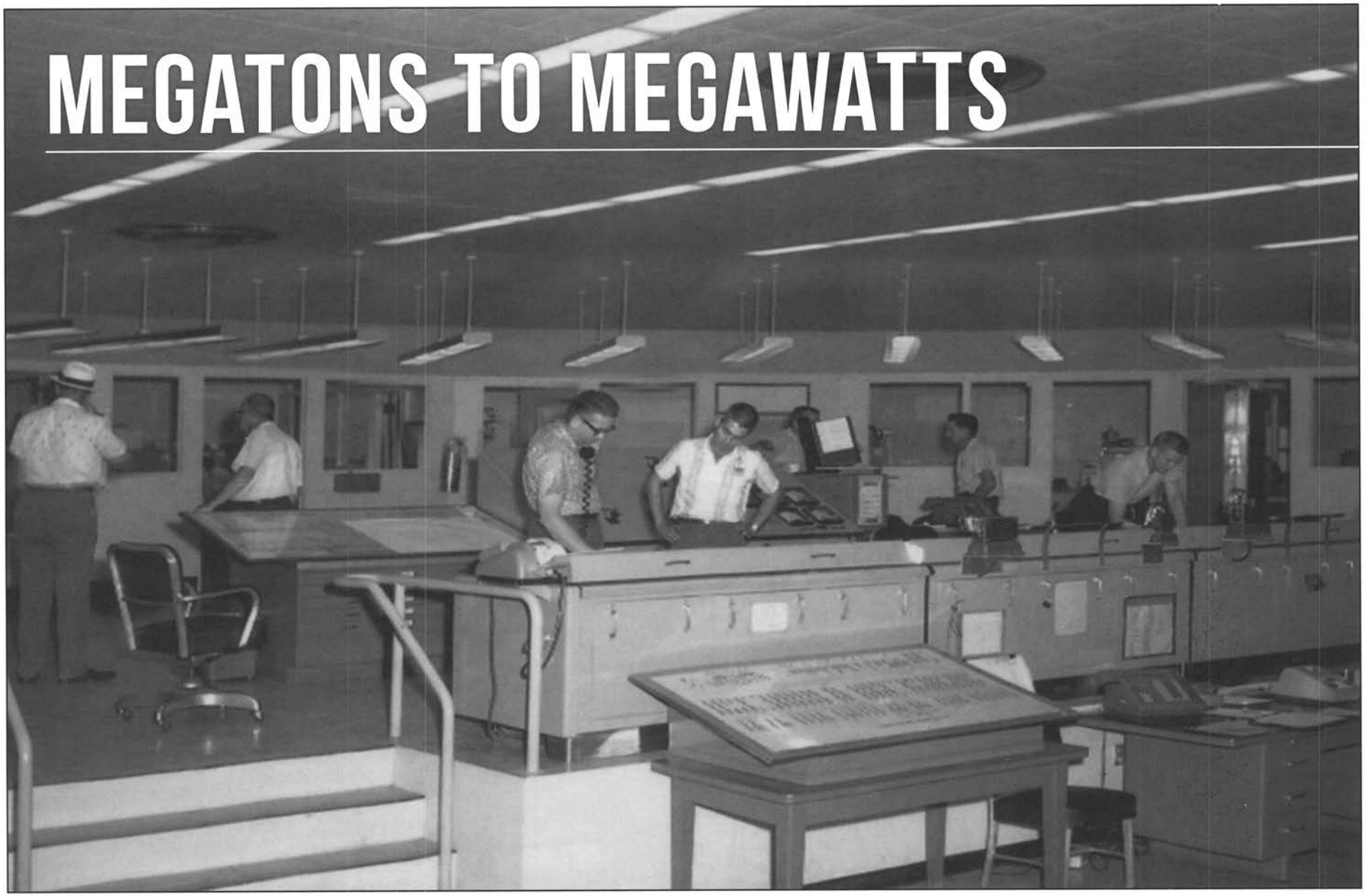


Gene White of Payroll looks on as E. W. Adams, W. B. Owen, and K. Owens inspect their savings plan checks.

"Of course, with me going to work, we had more income, and we could have a better living. We had never had any health insurance until I went to work out there, and of course, my husband and Marietta, my daughter, were included in my health insurance. We did not have a vehicle until I started working out there, and I financed it through the new C-Plant Federal Credit Union. It helped us have a better standard of living."

Marie Johnson
Retired
Paducah, Kentucky

MEGATONS TO MEGAWATTS



In 1994 the Megatons to Megawatts Program was initiated between the United States and Russia. This program has significantly enhanced world security by steadily reducing stockpiles of nuclear bomb-grade materials while creating a valuable resource for use in nuclear fuel. As of December 31, 2012, 18,899 Russian nuclear warheads have been eliminated and recycled into low enriched uranium for use as fuel in American nuclear power plants.

The Department of Energy is responsible for monitoring transparency activities to ensure the fuel is derived from nuclear weapons dismantled in Russia. Product received from Russia must meet acceptable purity specifications.

In the early years of the Program, USEC employed the Portsmouth, Ohio plant to process the uranium received from Russia. Because of flexibility built into the design of the PGDP, USEC was able to move the operation to the PGDP in later years.

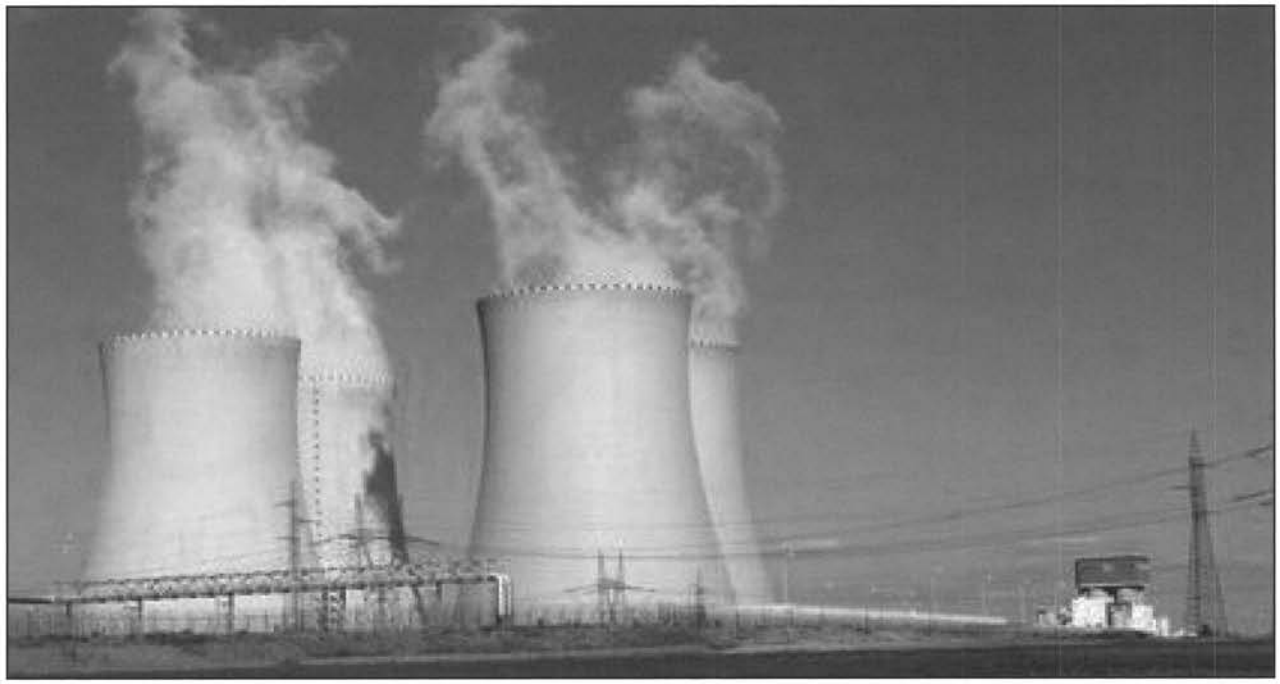
On average, one in ten American homes, businesses, schools, and hospitals receive electricity generated by fuel fabricated using fuel from the Megatons to Megawatts Program.

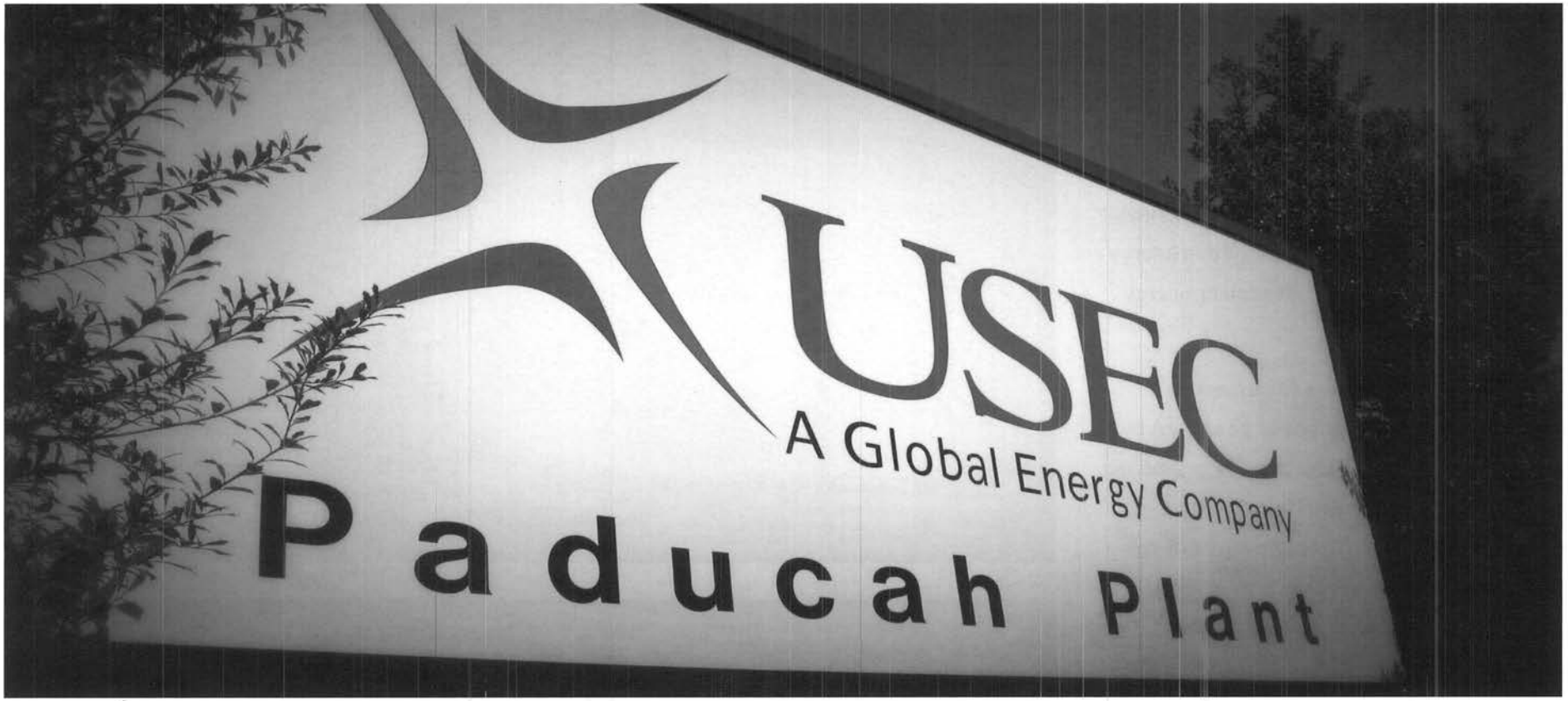
By 2013, when the program is completed, 500 metric tons of Russian highly enriched uranium, the equivalent of 20,000 warheads, will have been recycled into nuclear fuel, enough material to produce fuel to power the entire United States for about two years. (1)

In addition to destructive capabilities, mankind has invented beneficial uses for atomic energy. Nuclear research has led to the ability to generate electricity from its power. In the 1960s, the mission of the PGDP shifted to a commercial focus as nuclear energy emerged as an important power source. Civilian energy demands were increasing and nuclear energy helped meet this demand.

Today, millions of homes and businesses around the world receive power generated by nuclear power plants. There are 104 operating nuclear reactors in the United States, operating in 31 states. Twenty percent of our nation's electricity is generated by nuclear power. In addition, there are 436 nuclear power plants operating in 30 countries, supplying fourteen percent of the world's electricity. (28)

Medical isotopes have been found useful in medical testing and treatment of various diseases. Nuclear medicine was developed in the 1950s and has become an important diagnostic tool. In the United States alone there are about 18 million nuclear medicine procedures per year. Additionally, external irradiation and internal radionuclide therapy are administered to treat some cancers. (29)





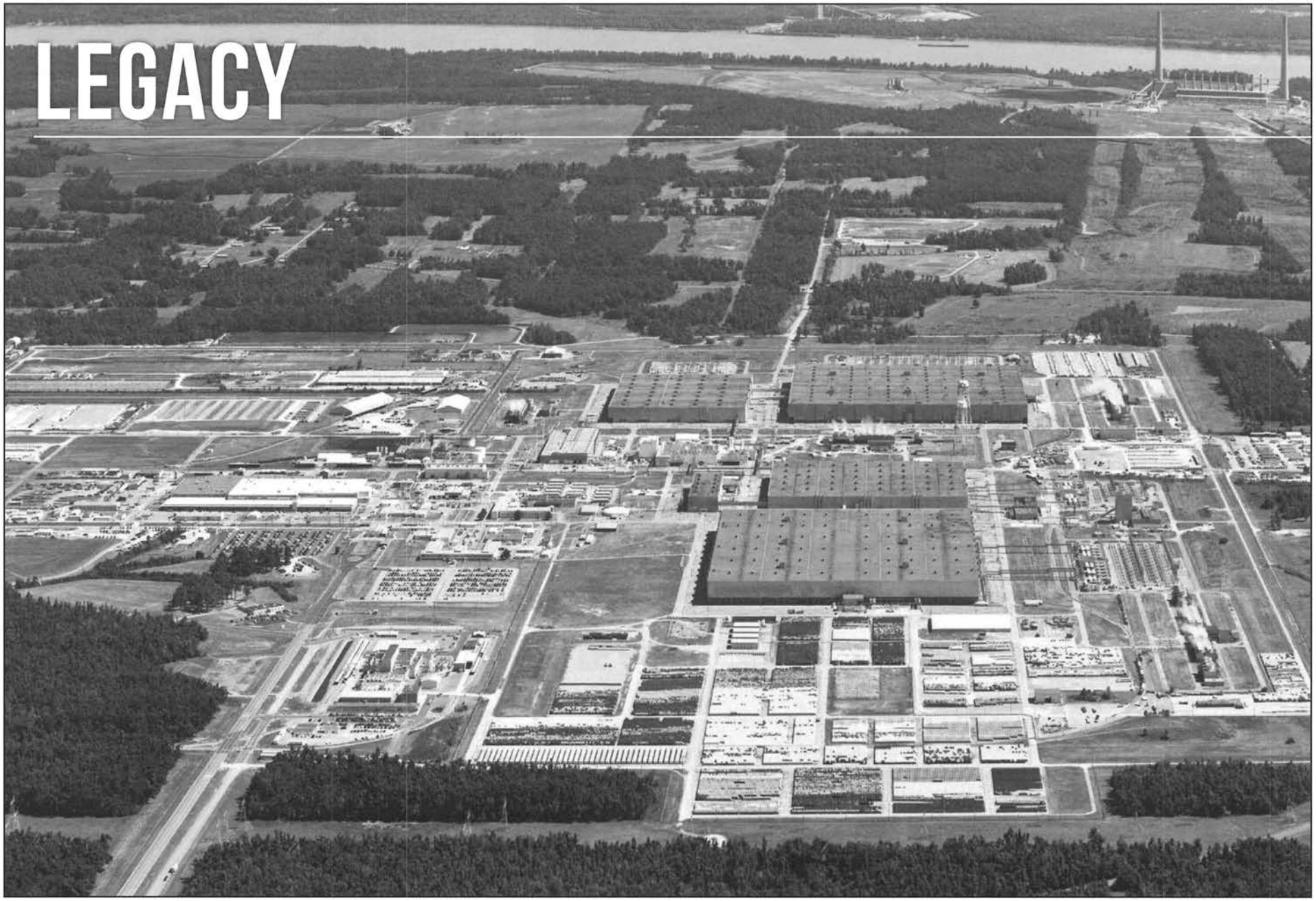
The Atomic Energy Act of 1954, as amended by the Energy Policy act of 1992, created the United States Enrichment Corporation (USEC), a government corporation, as a first step in transferring the government's uranium enrichment operation to the private sector. The Act transferred the Department of Energy's uranium enrichment enterprise, including the two uranium gaseous diffusion enrichments plants in Paducah, Kentucky, and Piketon, Ohio, to USEC with the requirement that "within two years after the transition date, the corporation shall prepare a strategic plan for transferring ownership of the corporation to private investors."

USEC began operations July 1, 1993, and contracted with Martin Marietta Utility Services, and subsidiary of Martin Marietta, to operate and maintain both enrichment plants. That continued until May 1999 when USEC took over direct operation of the GDPs when, for the first time, Paducah Plant employees worked directly for the plant operator rather than for a contractor.

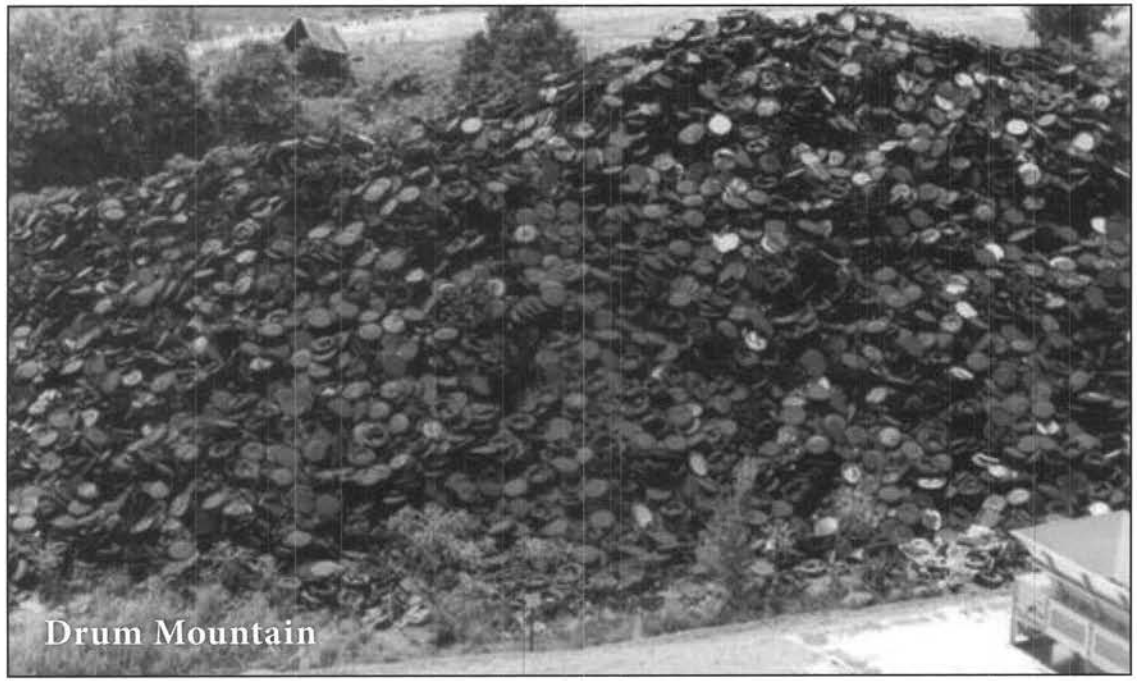
On June 30, 1995, USEC presented President Clinton and Congress with their plan for privatization. On April 26, 1996, the USEC Privatization Act (Public Law 1014-134) was signed into law. On July 25, 1997, President Clinton approved initiation of USEC privatization. USEC privatization was completed on July 28, 1998, through an initial public offering of stock and USEC officially changed its name to USEC Inc.

As part of the privatization, there was an enormous effort to prepare the plants for the transition of regulatory oversight from DOE to the Nuclear Regulatory Commission. On completion of the required upgrades, NRC granted both plants certificates of compliance in November 1996. NRC continues to provide oversight for enrichment operations at Paducah and maintains a resident inspector at the site.

LEGACY



Although USEC is the private operator of the PGDP, the Department of Energy is the site landlord and owns the physical plant. DOE is responsible for environmental restoration and waste management activities.



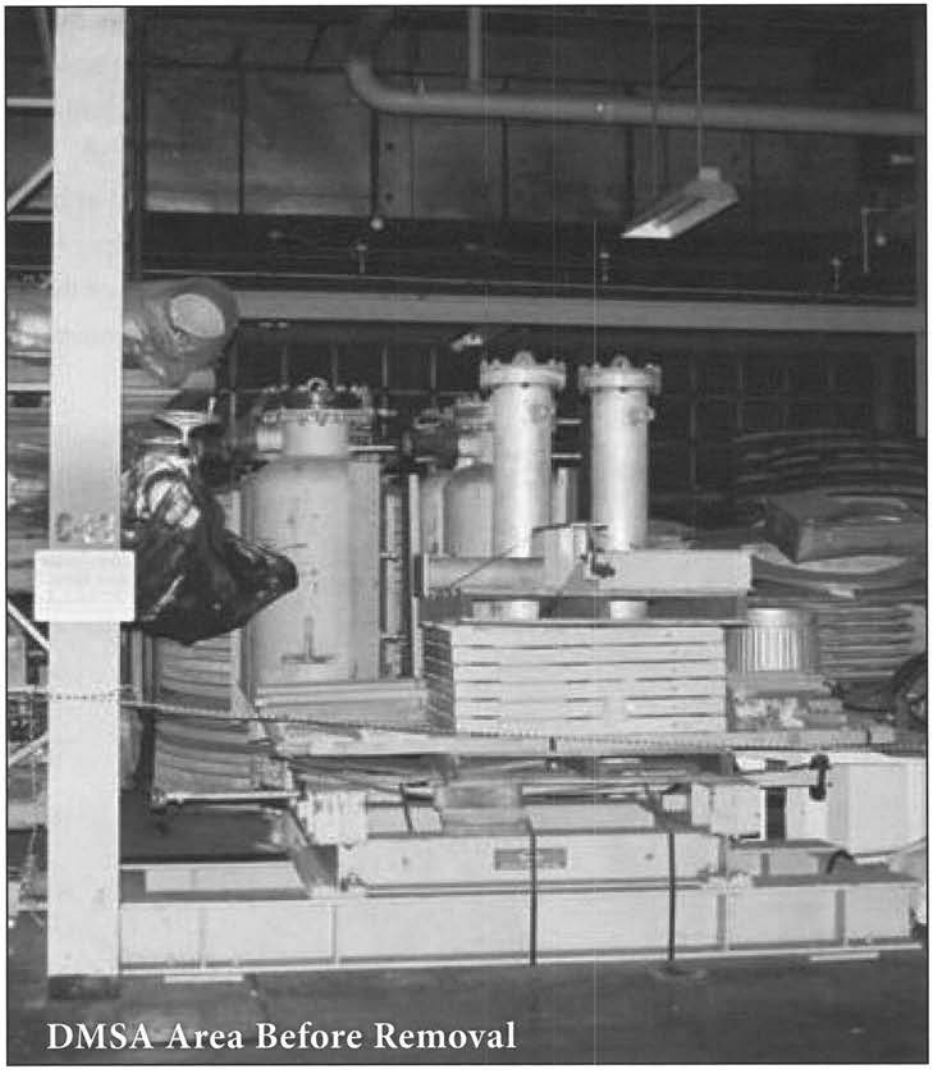
Drum Mountain

Sixty years ago there was a significantly smaller body of knowledge about radiation, chemical, and other industrial hazards and their effects on humans and the environment. Air emissions, liquid effluents, and solid waste disposal were consistent with practices in general industry and the DOE complex at that time, but resulted in significant adverse impacts on the environment.

"Drum mountain" was one such disposal practice. After being emptied in the C-340 Metals Plant, contaminated 55-gallon drums were crushed and piled in a heap in the scrap yard. Parts discarded from previous upratings were disposed of in the same manner. In total, scrap yards covered 27 acres. DOE spent millions of dollars cleaning up the waste, and today it is a green field.

Scrap Yards

Clean Scrap Yard Area



DMSA Area Before Removal

DMSA Area After Removal

The Paducah Site once contained more than a half-billion cubic feet of waste, some of which had been stored for 50 years or more. This material was stored because of a lack of treatment or disposal options. These wastes were stored both outdoors and inside various facilities around the plant site. These stored wastes have been removed and properly disposed.

At the end of 1996, 160 areas were established for storage of unused material and equipment at indoor and outdoor locations, called Department of Energy Material Storage Areas, or DMSAs. Examples of these materials include process gas coolers, ladders, converters, fans, plywood, railcars, chairs, wood pallets, containers of uranium fluoride, and tool box frames. Characterization and disposal of all the waste, originally totaling about 836,000 cubic feet, was completed in 2009.

Field Sampling

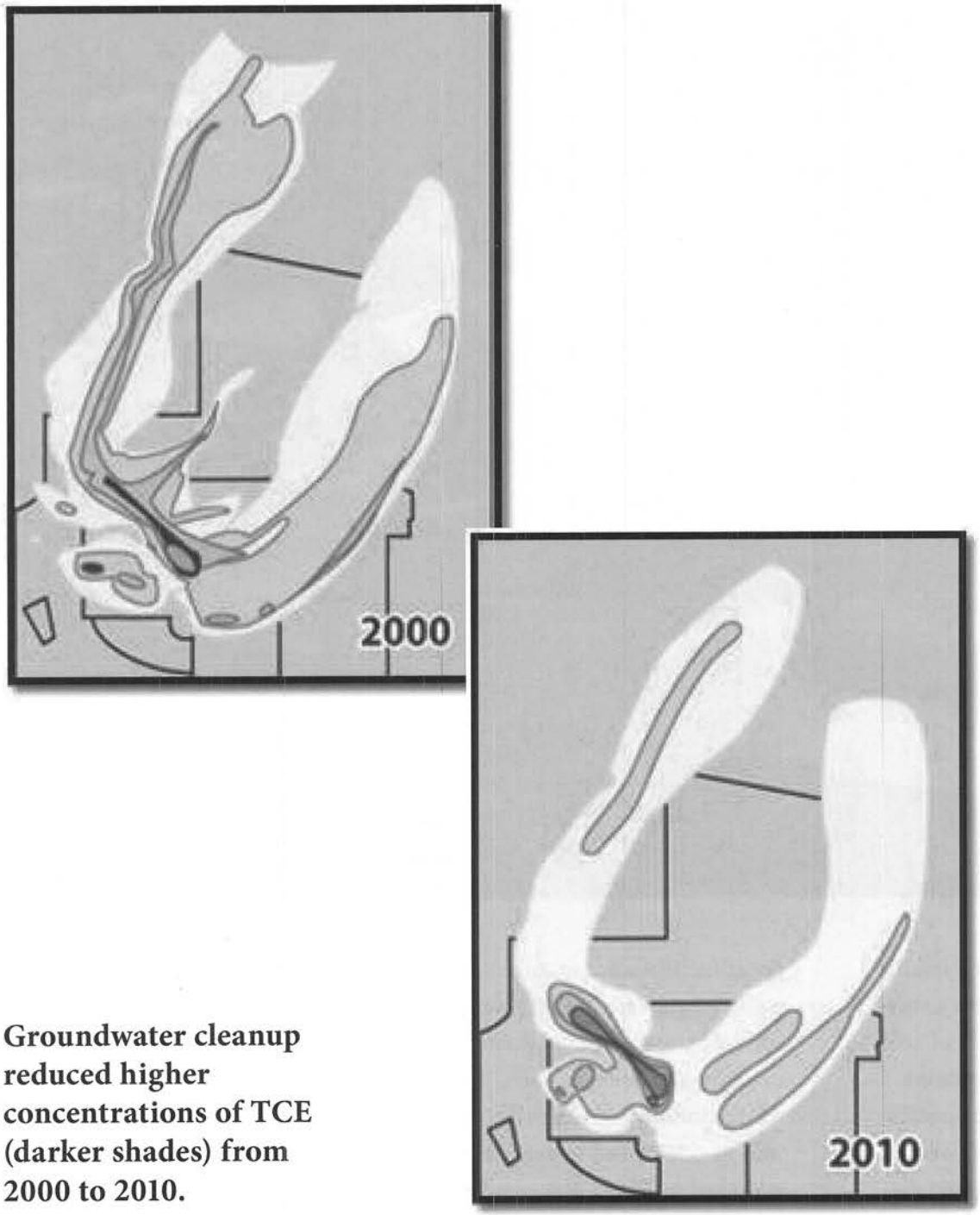

C-404 Burial Ground

Burial grounds cover more than 60 acres at the Paducah site. The areas contain a mix of materials, from typical household or commercial waste to radioactive, hazardous, and flammable items. Releases from these burial grounds may have affected, or have the potential to affect, the groundwater underneath the areas. Field sampling has been conducted and cleanup actions evaluated. As of this writing, no final decision has been made on the cleanup of these burial grounds.


Field Sampling

Drum Mountain Removal Project

In addition to the PGDP burial grounds, the site also has three landfills that could be sources of groundwater contamination. Regulatory standards for the characterization, treatment, storage, and disposal of solid and hazardous wastes are established by the Resource Conservation and Recovery Act (RCRA). Waste generators must follow the specific requirements outlined in RCRA regulations for handling such wastes. Owners and operators of hazardous waste treatment, storage, and disposal facilities are required to obtain operating and closure permits for waste treatment, storage, and disposal activities. The PGDP generates solid waste, hazardous waste, and mixed waste (i.e., hazardous waste mixed with radionuclides). The plant operates four permitted hazardous waste storage and treatment facilities (the K, S, T, and U landfills), as well as one closed hazardous waste landfill (C-404), all of which are managed under RCRA regulations and permitting.



Groundwater cleanup reduced higher concentrations of TCE (darker shades) from 2000 to 2010.

Trichloroethene (TCE), a common degreaser, is the primary contaminant of concern at the site. Leaks and spills have contaminated groundwater beneath and north of the site. Groundwater is also contaminated with trace amounts of technetium-99, a radioactive fission product. Other contaminates include polychlorinated biphenyls (PCBs). Through normal operations, portions of the plant are contaminated with uranium.

In 1988, TCE and trace amounts of technetium-99 were found in the drinking water wells of residences located north of the plant site in McCracken County. To protect human health, the Department of Energy immediately supplied potable water to the affected households.

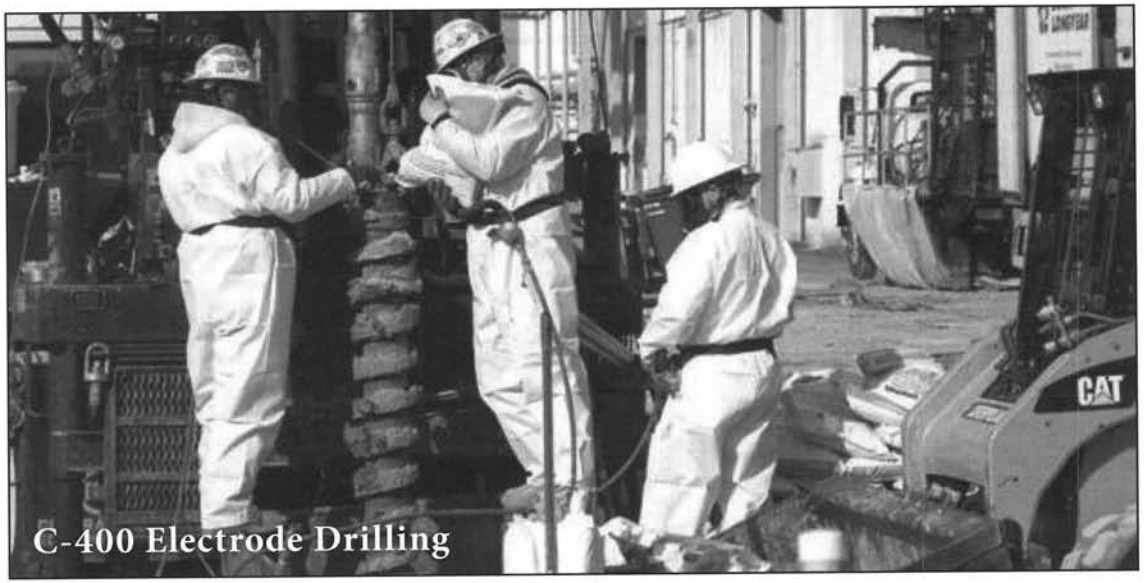
Later, the Department of Energy extended municipal water lines at no cost to those whose wells could be affected by plumes of contaminated groundwater. DOE pays reasonable monthly water bills for homes and businesses whose wells were affected by this groundwater contamination. This policy ensures that the public does not come into contact with contaminated water.

DOE launched an environmental restoration project to clean up the underground water associated with this contamination. Source removal and pumping and treating have substantially lessened the contamination and are expected to have an even greater impact over the next few decades.

The Department of Energy has devised cleanup and treatment efforts, including two pump and treat facilities that have removed over 30,000 pounds of TCE from the groundwater. Since they began operating in the mid-1990s, the two facilities together have treated nearly 3 billion gallons of water.

Additionally, projects are ongoing to remove TCE near the C-400 cleaning building in the middle of the site. C-400 is the leading source of groundwater contamination leading from the site.

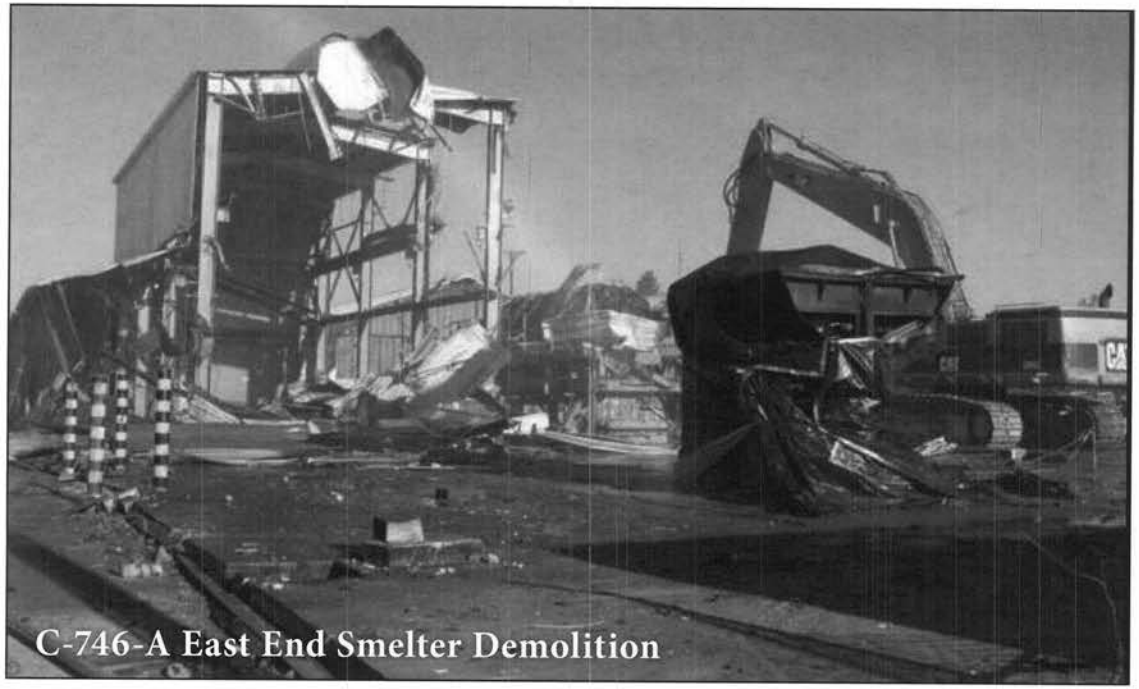
Besides contamination from leaks and spills, some groundwater contamination has occurred from wastes buried in eight different PGDP on-site burial grounds. All are located in the northwestern portion of the fenced area. The burial grounds are assigned an official US DOE solid waste management unit (SWMU) number.



C-400 Electrode Drilling


Northeast Plume Pump and Treat Facility

C-340 Metals Plant Demolition



C-746-A East End Smelter Demolition

Removal of inactive facilities is another key cleanup mission at the Paducah Site. Twenty-three of 25 facilities scheduled for removal are gone, and the last two — the C-340 Metals Plant and C-410 Feed Plant — are slated to be demolished in FY 2013.

Key demolition projects completed include the C-720-N Railroad Scalehouse, 2012; C-746-A East End Smelter, 2010; C-611-M and N Sanitary Water Storage Tanks, 2009; C-746-A West End Smelter and C-742 Ammonia Dissociator, 2008; C-405 Incinerator, 2007; C-402 Limehouse, 2006; and C-603 Nitrogen Facility, 2005. The East End Smelter project and previous substantial work on the Feed Plant and Metals Plant were funded through the American Resource and Recovery Act.

Cleanup crews have sampled more than 200 acres of soil and removed enough contaminated sediment from on-site ditches at the site to fill more than 300 railcars.

In November 2006, soil and rubble piles with elevated radiological readings were identified on the east side of the plant on the DOE land licensed to the West Kentucky Wildlife Management Area. Sixteen of the more than 100 soil and rubble areas investigated require further evaluation as part of soils cleanup.

Future cleanup work involves about six miles of contaminated creeks and ditches, and about 115 acres of contaminated soil.

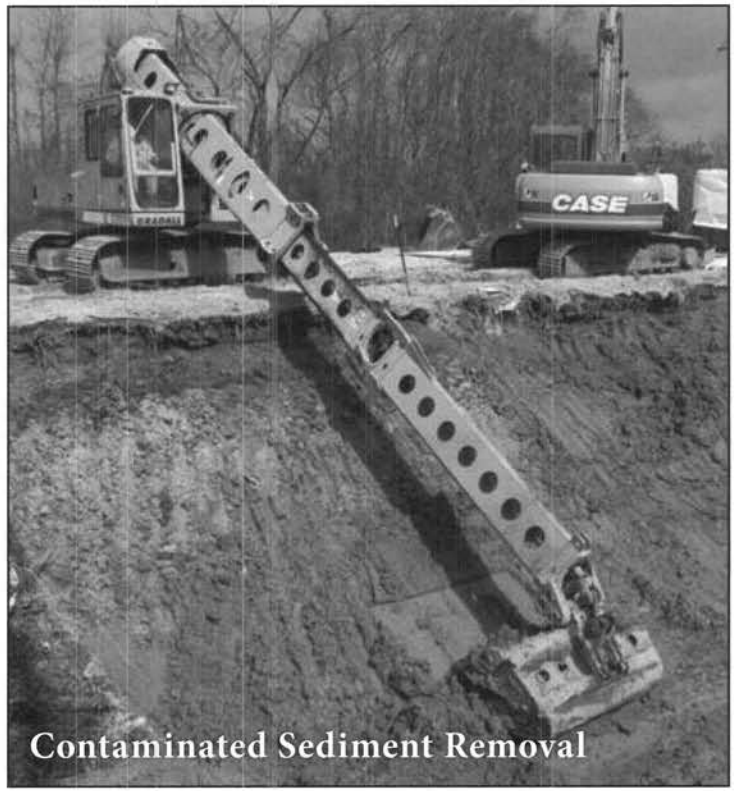
The depleted stream of uranium hexafluoride is condensed, liquefied, and drained into cylinders in the C-315 Building. This is considered as a waste product from the enrichment process due to the much lower concentration or assay of the uranium isotope 235 present. However, a considerable amount of potential energy remains in the approximately 42,000 cylinders stored. Future technology may make it economically feasible to recover this material.

Inactive Facilities Removal

Waste Removal

Through 2012, DOE has spent about $2.14 billion on cleanup activities at the PGDP. These actions have included: 1) the completion of numerous scientific and engineering investigations to identify the extent and nature of the pollution, 2) installation of pump and treat facilities in both the northeast and northwest groundwater plumes to control the spread of the plumes, 3) extension of municipal water to affected residences, 4) removal of large amounts of contaminated materials from the site, and 5) demolition of several older facilities. Despite these efforts, much additional work remains. In 2013, the projected total cost for remediation of the site was about $5 billion.* Sitewide cleanup is to be completed by 2040.

*Includes DUF6 conversion costs but not D&D of PGDP.



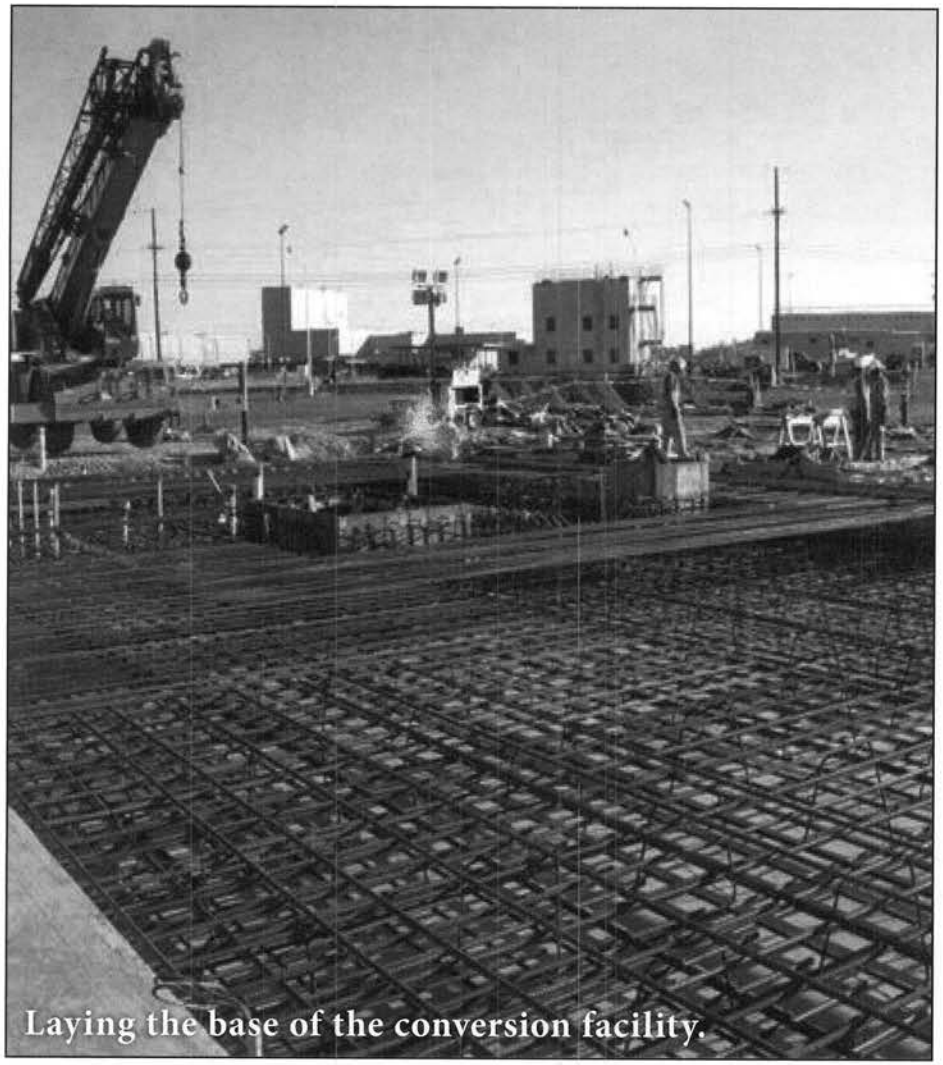
Contaminated Sediment Removal

FUTURE

DUF6 Facility

After more than two decades of planning and construction, the DUF6 facility began operations in 2011. The project mission is to convert 440,000 metric tons of depleted uranium hexafluoride (DUF6) into more stable forms for disposal or long-term storage.

The DUF6 is currently stored in 42,000 protected steel cylinders on site. More than 180 workers are employed by the Project, which will operate for about 25 years. (30)



Laying the base of the conversion facility.

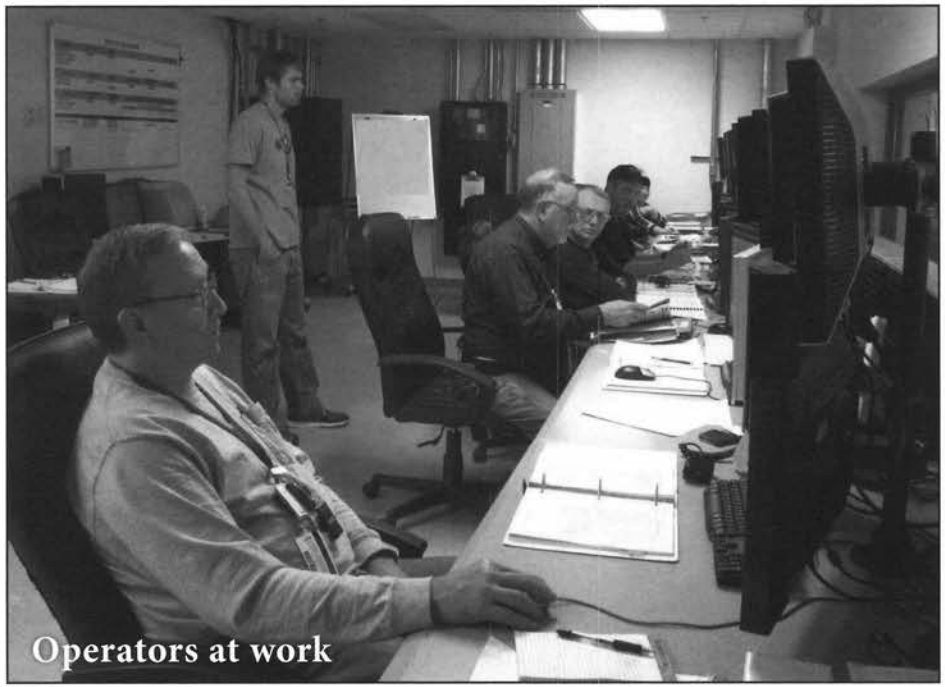
Conversion building construction.

The conversion process is complex, highly regulated, and procedural-ized to protect employees, the public, and the environment. One of the products of conversion is uranium oxide, a benign uranium product which is being returned to cleaned cylinders for storage awaiting a permanent disposal site or reuse.

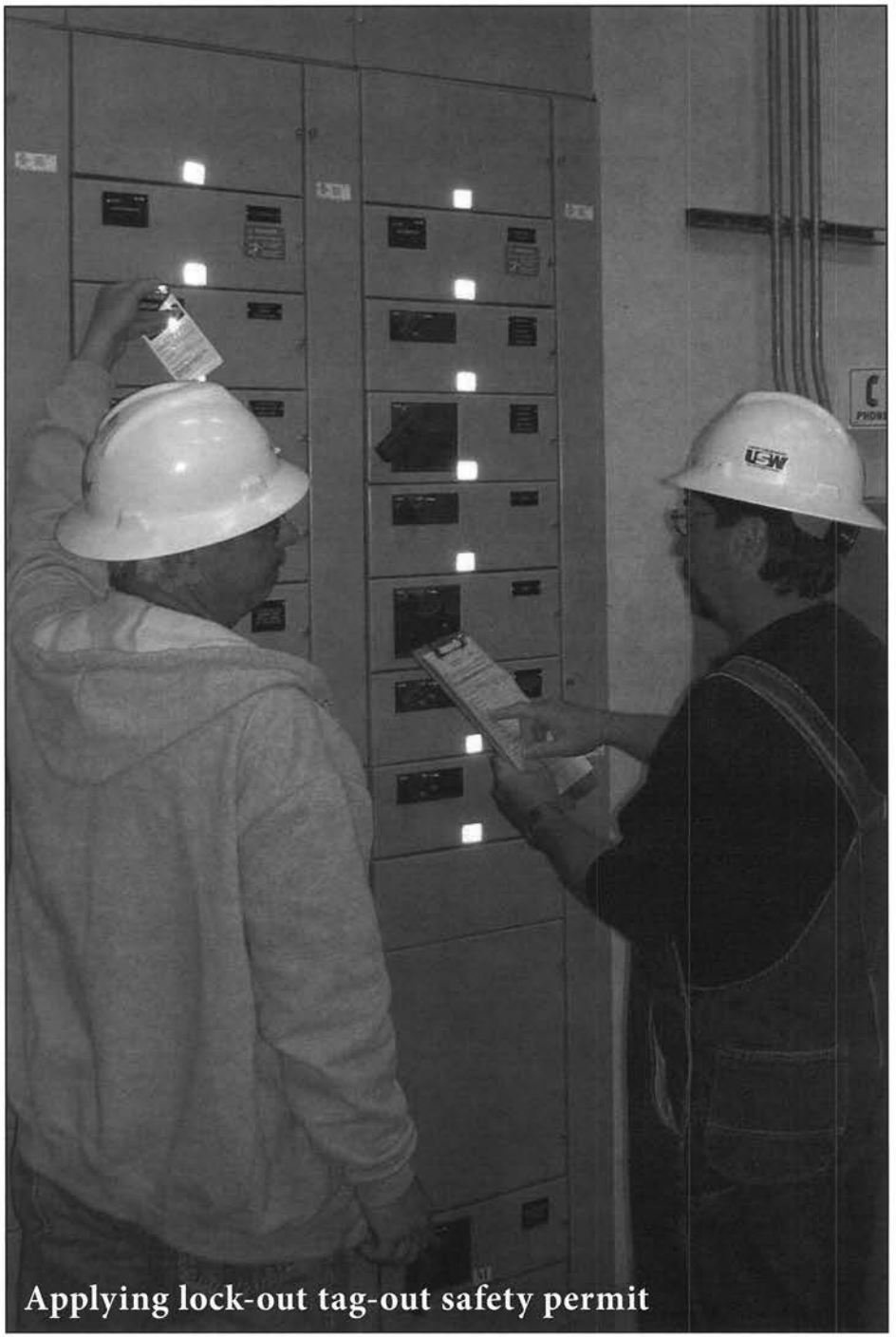
The DUF6 conversion process has five parts that result in two products, uranium oxide (UOX) and hydrofluoric acid (HF). The oxide is stored for eventual disposal or reuse, and the HF is sold for industrial applications.

Operation of the plant is quite complex and calls for the integration of multiple mechanical, chemical, temperature, scrubbing, recycling, and storage systems. (30)

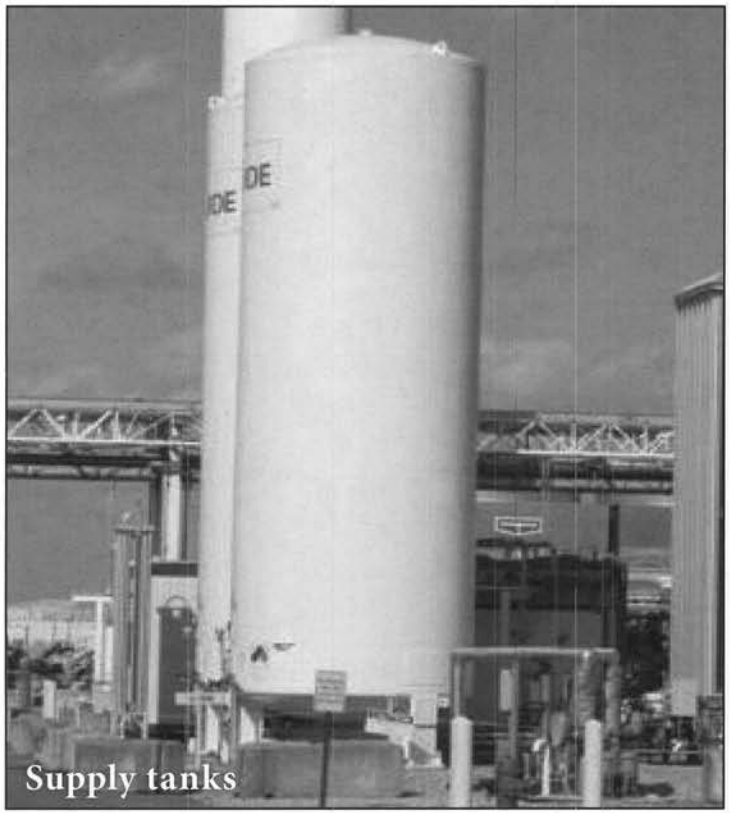
Operators monitoring conversion operations from control room



Operators at work

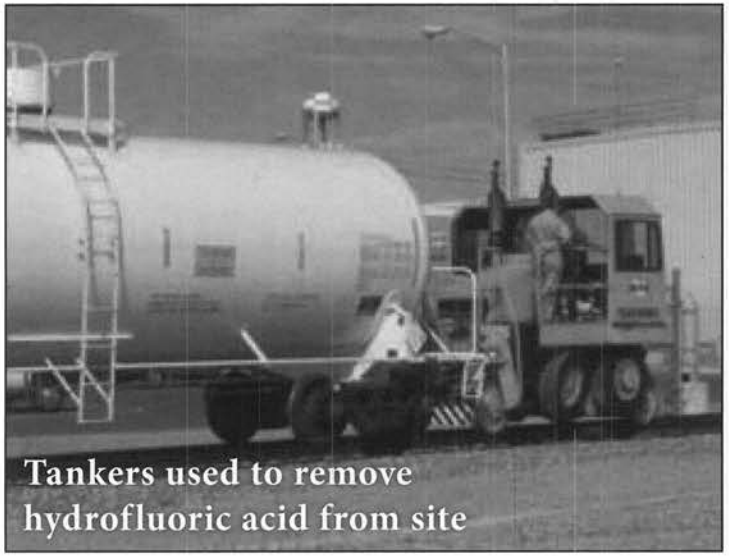


Applying lock-out tag-out safety permit

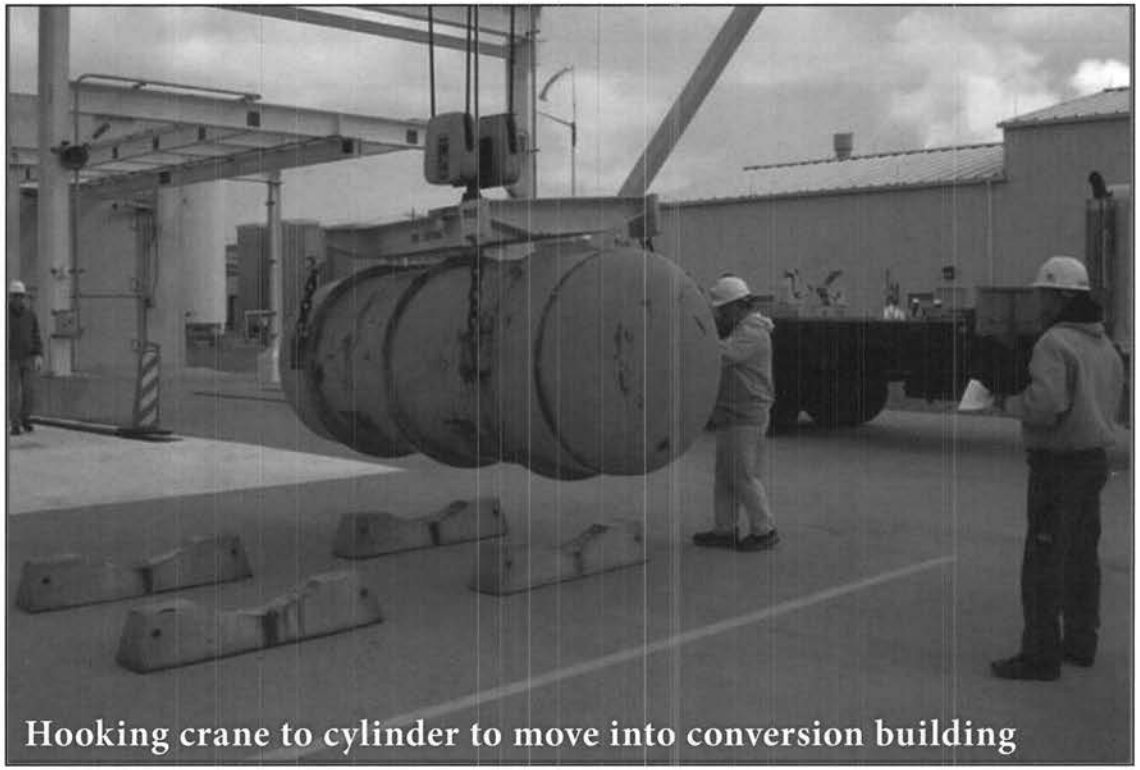


Supply tanks

Cylinder storage yard



Tankers used to remove hydrofluoric acid from site



Hooking crane to cylinder to move into conversion building

CONCLUSION

The Paducah Gaseous Diffusion Plant was constructed in a time when America's national leaders perceived an immediate threat to our national security. The plant was constructed in record time and built from specifications from some of the most brilliant engineers this country had to offer. Due to the credit of the construction workers, design engineers, and plant employees, the plant has successfully stood the test of time. In 2011 the plant is still operating and producing enriched uranium which can be used to power 20 to 25 percent of the nation's electricity.

Along the way worker families and the community have been supported. Economic stability unknown to this area previous to the plant's construction has caused this community to prosper.

Due to the nature of the operation there has been and will be waste issues with the plant for some time. Many of the chemicals used throughout the world that were commonly acceptable to use are now creating health and environmental issues. The Department of Energy is committed to cleaning the plant and is making progress each day to accomplish this goal.

ENVIRONMENTAL INFORMATION CENTER

The public has access to Administrative Records and programmatic documents at the DOE Environmental Information Center (EIC) in the Barkley Center, 115 Memorial Drive, Paducah, Kentucky. The EIC is open Monday through Friday from 8 a.m. to 12 p.m. and by appointment. The EIC's telephone number is (270) 554-3004. You may also access the records by website: www.paducaheic.com.

Documents for public comment also are placed in the McCracken County Public Library (formerly the Paducah Public Library), 555 Washington Street, Paducah, Kentucky. The library is open Monday through Thursday from 9 a.m. to 9 p.m., Friday through Saturday from 9 a.m. to 6 p.m. and Sunday from 1 p.m. to 6 p.m.

BIBLIOGRAPHY

1. www.USEC.com
2. http://en.wikipedia.org/wiki/Attack_on_Pearl_Harbor
3. http://www.factualhelp.com/article/World_War_II_casualties
4. *History and Families* 1824-1989, McCracken County, Kentucky, Turner Publishing Company, pages 26–28 and 351
5. BJC/PAD-691/R1, 2006
6. U.S. Army Corps of Engineers
7. www.newworldencyclopedia.org/entry/Manhattan_Project
8. http://en.wikipedia.org/wiki/Korean_War
9. Durfee, Kristopher 2005. *Why Paducah?: An analysis of the Selection Site for the Gaseous Diffusion Plant in Paducah, KY*, manuscript on file at the McCracken County Public Library, Paducah, Kentucky, pp. 2 and 5–8.
10. Boom!, *The Paducah Sun*, August 4, 1956.
11. *"Phase II Independent Investigation of the Gaseous Diffusion Plant Environmental, Safety, and Health Practices, 1952–1990"*, Department of Energy, February 2000
12. U.S. Department of Energy. Paducah Gaseous Diffusion Plant (PGDP) Industry Workshop, William Murphie.
13. *Industry Week*, October 20, 1997
14. "A Fantastic Power User", *The Paducah Sun-Democrat*, April 17, 1955
15. "PADUCAH..., The Atomic City", *Kentucky Business*, September 1952
16. ORAU Team NIOSH Dose Reconstruction Project, 2004
17. "Inside the A-Plant", *The Paducah Sun Democrat,* April 17, 1955
18. "Atomic Plant Made Paducah Double in size", *The Paducah Sun,* September 15, 2000, page 5
19. DOE issues Two Reports on Cold War Era Activities at the Paducah Site, News Release, December 21, 2000
20. "Behind closed doors–Almost 50 years ago, Paducah workers built a monkey's space capsule", *The Paducah Sun*, January 28, 2007
21. DOE/ORO-2105, *Report on the Paducah Gaseous Diffusion Plant, Metals Recovery Program*

BIBLIOGRAPHY, CONTINUED

22. "Plant put Paducah in atomic age," *The Paducah Sun*, November 3, 1992
23. "Fond Memories, Gaseous diffusion plant employees, retirees reminisce on 40 years", *The Paducah Sun*, November 4, 1992
24. "Progressive Paducah Keeps Astride With Boom Brought By Atomic Plant", *In Kentucky*, 1951
25. House in a Box: Prefabricated Housing in the Jackson Purchase Cultural Landscape Region, 1900 to 1950, Kentucky Heritage Council, June 2006
26. "The Growing Pains and Successes of a Real Boomtown", *The Paducah Sun*, October 19, 2002, page 6
27. "Paducah Changes its Way of Life", *Life*, Vol. 33, No. 2, July 14, 1952, pages 21 – 24
28. http://www.nei.org
29. http://www.world-nuclear.org/info/Non-Power-Nuclear-Applications/Radioisotopes/Radioisotopes-in-Medicine/#.UVRbNFwo6mQ
30. Babcock & Wilcox Conversion Services, LLC

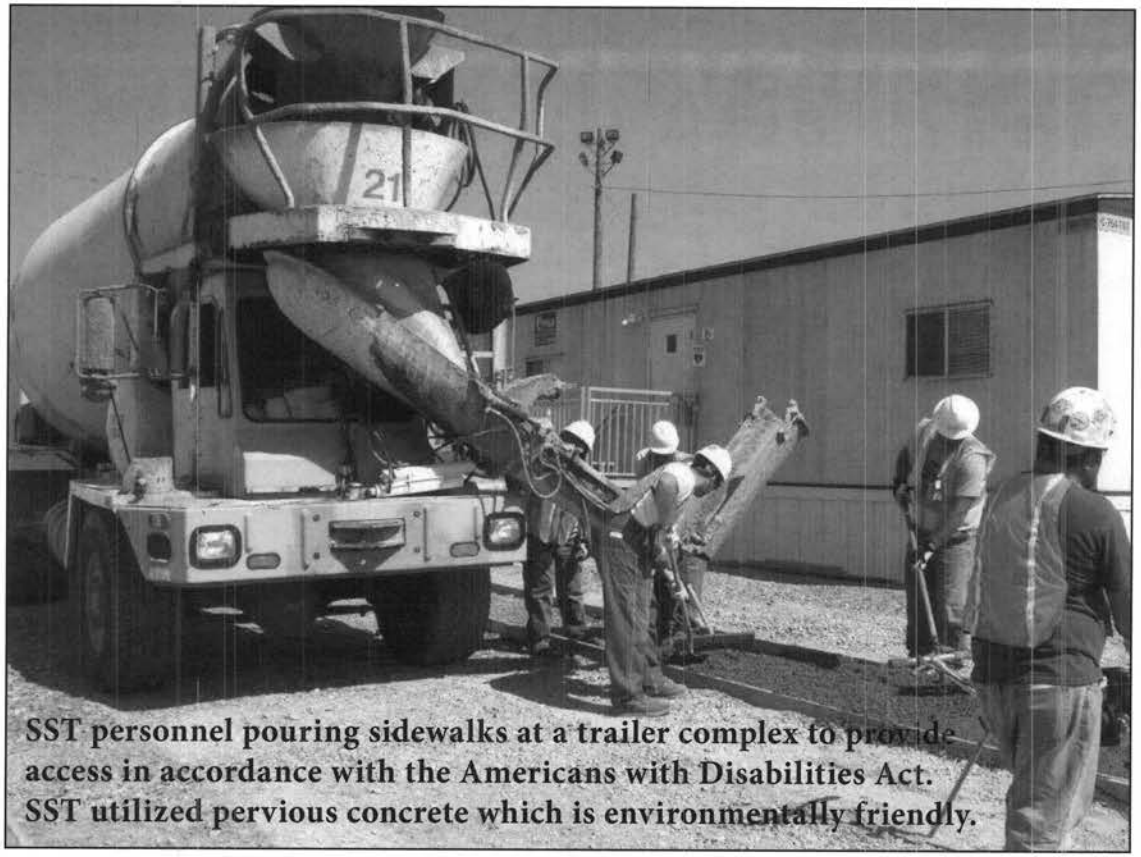
SWIFT & STALEY, INC.

SST employee sharpening bush hog blades in support of mowing activities.

Swift & Staley, Inc. (SST) is an exceptional small business Prime Contractor for the U.S. Department of Energy (DOE) Portsmouth/Paducah Project Office which has displayed a holistic strategic vision for the DOE Paducah Site. SST not only executes its contract below budget and on time, but looks for synergistic opportunities with other Paducah contractors which allows cost savings across the entire Paducah Site budget and enhances the entire site's Performance Work Scope. This overall management vision is evidenced by their recent 99% award fee score and by providing excellent service to other on site contractors in their Decommissioning and Demolition (D&D) projects. SST provides security, information technology, and other support services allowing these projects to meet or exceed their schedules. SST's overall management vision has allowed a level of effort contract to come in under budget and ahead of schedule, even when specific schedule-driven projects have been implemented.

SST provided 100% of their deliverables on or ahead of schedule and by far provided the highest quality deliverables of any contractor at the Paducah site. Almost every deliverable was accepted as written. SST truly delivers superior performance with a small business mentality. For example, the Information Technology (IT) staff actually reduced their full time employee numbers through significant cross training of staff, yet the number of Help Desk requests increased by over 23% from the previous

year. Despite this increase in volume, response time actually decreased. SST also sent out a customer survey to all its on-site customers and the response was overwhelmingly positive, so much so that the survey will be modified to try and elicit specific comments for improvement next year as there was no negative feedback.



SST personnel pouring sidewalks at a trailer complex to provide access in accordance with the Americans with Disabilities Act. SST utilized pervious concrete which is environmentally friendly.

As a small business, SST manages its work with a determined focus on cost control and performance. A prime example of this small business focus is the lean, yet proficient, SST IT organization. SST implemented a Data Loss Prevention tool which has prevented numerous inadvertent cyber incidents. SST also successfully completed a DOE-HQ Continuous Monitoring Visit Assessment, especially considering the lean staff performing multiple responsibilities. SST also reconfigured numerous physical servers to a virtual environment, saving a great deal of physical space in the server room, allowing reuse of the servers, saving the cost of purchasing new servers, and saving on power costs.

SST has by far the best labor relations on the Paducah Site. During their tenure at Paducah, SST has twice been able to renegotiate their union contract without a labor stoppage while maintaining a very good relationship. In both renegotiations, SST was able to implement increased employee cost sharing for benefit costs while reducing the overall cost of benefits. This was accomplished without reducing benefit levels. SST's excellent labor relations efforts have also resulted in no grievances having gone to arbitration in over ten years.

SST has and continues to demonstrate a commitment to positive labor relations. For example, SST worked with West Kentucky Community & Technical College to develop and implement an educational initiative to provide for college educations for its employees. In May 2012, five SST United Steelworkers of America represented workers graduated with Associate in Science Degrees in Industrial Maintenance and Chemical Operator Certificates.

Their good relationship is also evidenced by SST's pursuit and achievement of DOE Voluntary Protection Program (VPP) Merit Status. Whereas some programs can take a number of years to earn Star status at this point, the DOE VPP assessment board stated that SST was in excellent shape and anticipated returning within approximately 12 months for a final Star assessment. This takes a close partnership between management and the workforce, including Union personnel. SST formed a VPP council consisting of both management and workforce personnel, and has also shown a commitment to this effort and their workforce by sending their workers to VPP regional and national meetings despite severe federally-imposed travel restriction. This commitment has fostered a strong management-worker partnership which has enhanced worker feedback and safe execution of work, as evidenced by over one million hours of work without a lost time accident. This took over 6.5 years and is a remarkable achievement. SST is the first contractor in the history of the Paducah Site to achieve DOE VPP status.

SST's contract is mostly a Level of Effort Contract. Despite this, their Estimates at Completion (EAC) are below contract value. SST continually finds ways to save

money, both on a small scale and by looking holistically across the entire site, as well as by partnering with other onsite contractors when possible. This year alone, SST reorganized their Security department and cross-trained personnel, saving two full time equivalents (FTEs) without a layoff and almost $140K. Another Paducah site organization provides security guard services at a cost to the site, yet SST was able to negotiate extra patrols at no cost.

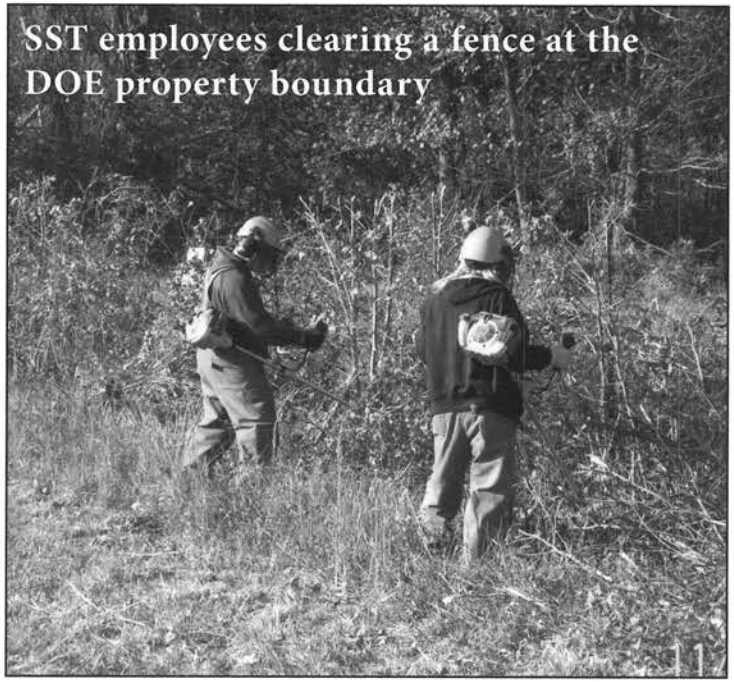
SST continually performs numerous project efficiencies which do not show up as cost savings, but have resulted in the ability to take on additional work without increased EACs. Examples include purchasing new HSPD-12 badging equipment in lieu of continuing with lease of the equipment from GSA. Instead of moving the equipment into the limited area, then out into a new facility, they waited until the new facility was ready and saved the cost of the second move.

SST continually monitors GSAXcess for equipment which can be used on site as this equipment can be quickly taken by other sites. SST found almost new computers at the Census Bureau and 5x8 sheets of heavy duty laydown material which can be used by the D&D contractor. SST also found computer equipment that was ultimately used at Paducah and shared with the DOE Portsmouth site. This shows that SST looks out not only for themselves, but other onsite and offsite contractors. SST truly takes a holistic approach for cost performance.

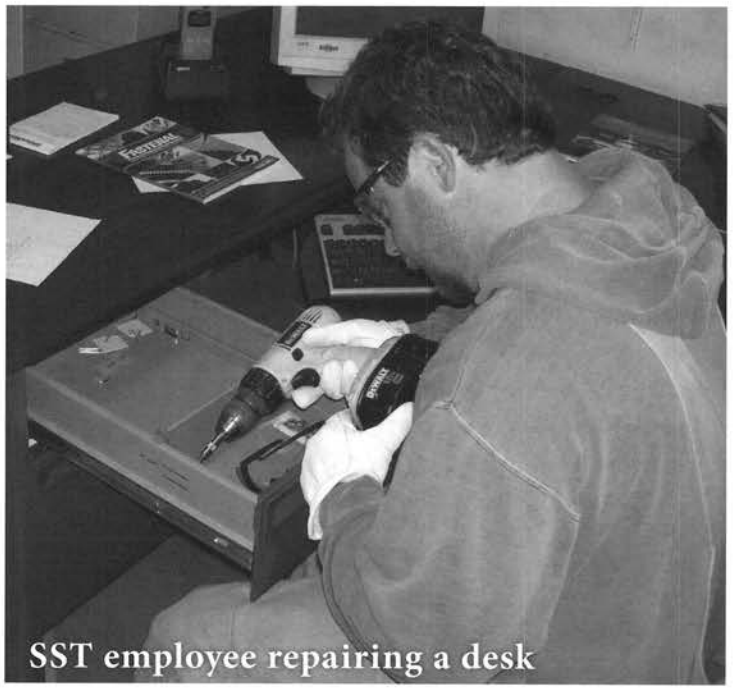
SST implemented the Energy Independence and Security Act (EISA) 432 Energy and Water Evaluation requirement on an annual basis with 100% completion. In completing the 100% evaluation requirement, SST has established a baseline from which future conservation measures can be evaluated, implemented, and tracked. Paducah was the only DOE Environmental Management (EM) site that achieved and exceeded the requirements without additional funding. DOE-EM used SSTs approach as the "Best Practice" for implementing the EISA 432 requirement and shared it with other EM and non-EM sites.

Special achievements include earning the Kentucky Governor's Safety and Health Award for achieving over one million hours worked without a lost time incident. Because SST is a small business with few employees, this took over six years to achieve. SST also has earned four Federal Electronics Challenge Awards from the Environmental Protection Agency, earning a Silver award in 2012. The FEC Award is based on SSTs electronics recycling efforts. In addition, SST was awarded the 2012 DOE Bonze Green-Buy Award for reaching the Leadership Goal for three products in two different categories and achieving excellence in Sustainable Acquisition. By purchasing products in this manner, SST is able to influence environmentally friendly fabrication techniques and waste minimization.

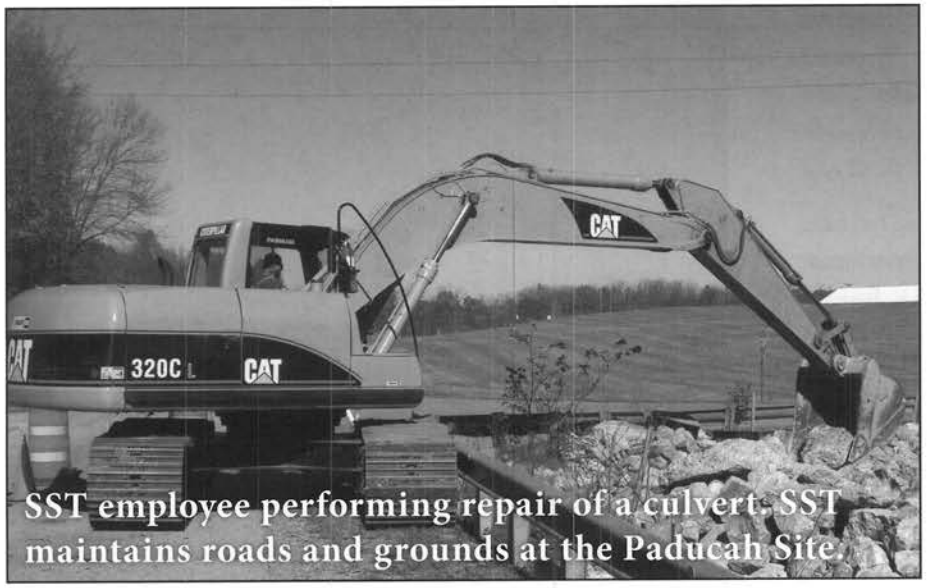
Additionally, SST achieved DOE Laboratory Accreditation Program (DOELAP) certification, which will allow them to provide internal and external dose monitoring services to all the Paducah site contractors at a substantial savings over previous services. SST employed a unique approach in designing and implementing its internal and external dose monitoring programs through the use of commercial, as opposed to government, laboratories and dosimetry providers. SST is the first contractor in the history of



SST employees clearing a fence at the DOE property boundary



SST employee repairing a desk



SST employee performing repair of a culvert. SST maintains roads and grounds at the Paducah Site.


SST employee mowing at the Paducah Site. SST mows in excess of 700 acres.

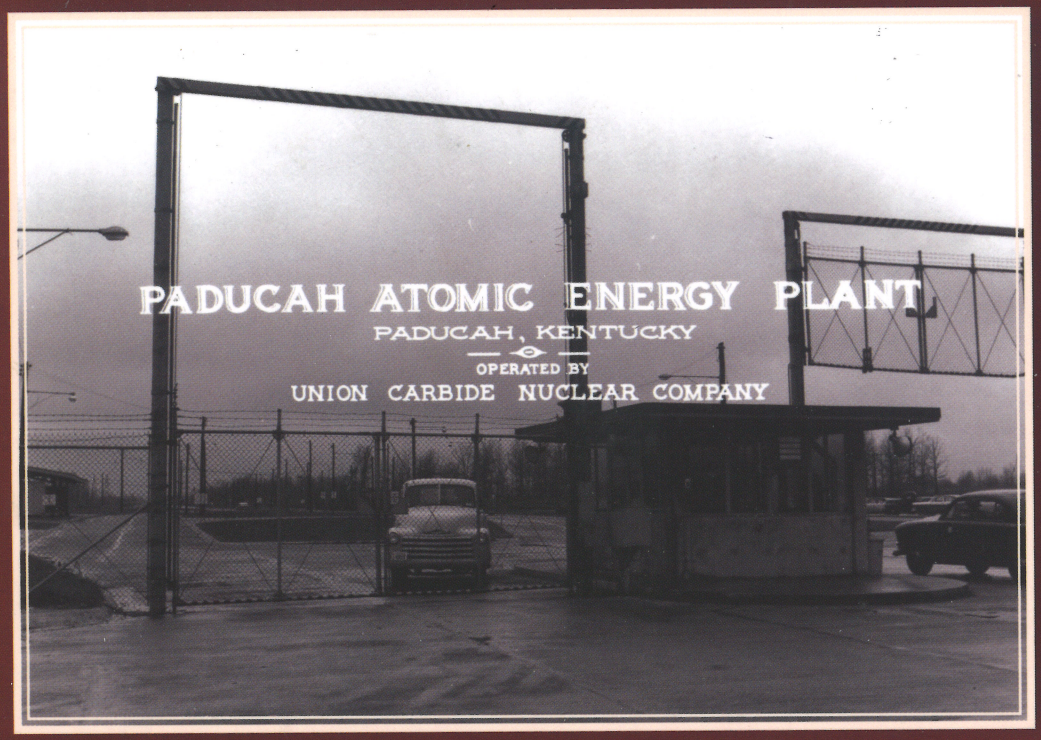
the Paducah Site to receive a primary DOELAP accreditation. This is another example of SST taking the extra step to provide valuable services and across the board savings to DOE.

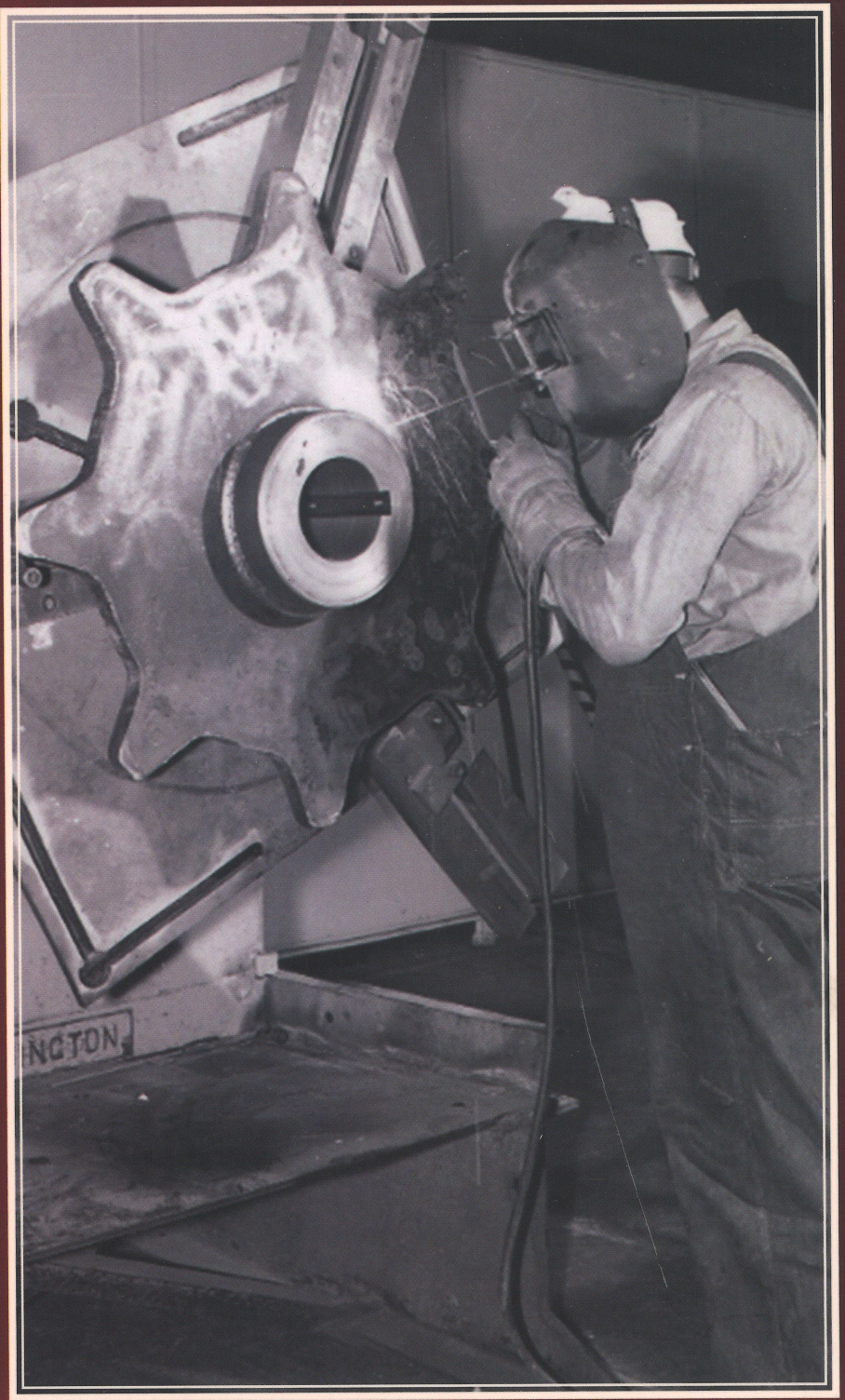
SST has continually assessed their organization, cross-trained personnel, and utilized their resources to the maximum extent possible. This has resulted in a streamlined organization, reduced EACs, redundancy in personnel capabilities, and maximum utilization of personnel capabilities. Two examples include SST's Security and IT Departments. As mentioned above, SST cross-trained their Security personnel, resulting in the reduction of two FTEs, but no reduction in services. In fact, the cross-training has resulted in increased services because required services now have redundancy and services can still be provided when personnel are away from the site while on travel or personal leave. The IT staff is similarly cross-trained, resulting in an organization that is staffed below what would normally be expected, but a recent Continuous Monitoring Visit resulted in their best report to date, a very good evaluation, and local Help Desk response times have reduced from the previous year despite no increase in personnel.

SST is specifically evaluated in their Award Fee Criteria in Support to DOE and also provided a Customer Survey to its onsite Customers, both of which are examples of Customer Interface. In both cases, SST received the highest evaluations possible. From DOE, SST earned the highest evaluation possible in that rating criterion and from their onsite customers received only positive feedback. SST is extremely responsive when provided feedback on any deliverable or field work and never requires multiple direction. SST fixes issues the first time and interfaces directly with DOE to elicit feedback to continually improve work products and deliverables.

Financial strength is exceptionally strong. SST's Business Department is a real foundation. They recently had to go through a Baseline Change and reconfigure their work and spend plans. SST reconfigured their plans smoothly and efficiently such that they were able to be approved and implemented the first time they were submitted to the Portsmouth/Paducah Project Office Manager. Additionally, despite this being mainly a Level of Effort contract and SST taking on additional work within their contract scope at times, SST's EACs are below contract cost. SST manages their scope and cost exceptionally well.

SST's results are exceptional. SST has just completed their best year to date achieving 99% of their available award fee, including achievement of a very challenging stretch goal. SST was asked to install Americans with Disability Act compliant sidewalks at another contractor's facility. Rather than installing the minimally compliant sidewalks, SST installed eco-friendly sidewalks that allow the free flow of water and are safer in the winter as they reduce the ability of water to pond and freeze. This is just one example of how SST continually goes beyond the minimum in the performance of their job, provides excellent services to all site customers, and performs these services in an environmentally friendly and efficient way.


PADUCAH ATOMIC ENERGY PLANT
PADUCAH, KENTUCKY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY


NGTON