

PUBLIC INFORMATION OFFICE
REDSTONE ARSENAL
HUNTSVILLE, ALABAMA
PHONE JE 4-6411, EXTENSION 2722

6839

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HISTORY OF REDSTONE ARSENAL

By MARY T. CAGLE
Arsenal Historian

In 1941, after the President of the United States issued the Emergency Proclamation, it became clear to the Ordnance Department that, in the interest of national security, expansion of Ordnance facilities would be necessary in order to assure adequate production of ammunition to meet the time-objective requirements of the General Staff. Included in the initial plans was construction of a chemical shell assembly plant and related facilities.

Meanwhile, it had become apparent to the Chemical Warfare Service that the existing chemical manufacturing plants were not adequate to provide for any potential emergency. Thus, in its expansion program, the Chemical Warfare Service selected a site just outside of Huntsville, Alabama, on which was built a chemical manufacturing plant known as the Huntsville Arsenal.

Realizing the economy factors involved with a shell-loading plant located near such an arsenal, the Chief of Ordnance dispatched a member

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of his staff, Major Myron Leedy, to conduct a survey of available sites in the same vicinity. Based on Major Leedy's recommendations, the Chief of Ordnance decided to erect a shell-loading plant on the property adjacent to that of the Huntsville Arsenal.

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Early in September 1941, a general plan for the shell-loading plant was prepared and a few weeks later construction funds were approved.

October 6, 1941 saw the arrival of Major Carroll D. Hudson, who had been selected to head the new Ordnance plant. After consulting with the Area Engineer; representatives of the architects, Whitman, Requardt and Smith; and the prime contractor, Kershaw-Butler, Engineers, Ltd., Major Hudson commenced the final plans for construction of what was to be known as the Redstone Ordnance Plant---named because of the preponderance of red soil.

Upon examining the plant site, Major Hudson found a tract of land consisting of approximately 4,000 acres, located ten miles south of Huntsville, Alabama and adjacent to an extremity of the Huntsville Arsenal. It was a rolling terrain, which had been used for production of cotton, corn, peanuts, and other farm products, as well as grazing land for livestock. There were no roads except for the scraggy trails which served the farmers. The nearest highway was more than two miles from the eastern boundary of the reservation. The closest power facilities and water supply were located at the Huntsville Arsenal. The closest rail transportation at that time was at Farley, Alabama, one and one-half miles from the reservation.

The primary mission of the plant, as established by the Chief of Ordnance, included the loading and assembly of 75mm chemical shells, 81mm chemical mortar shells, 30-pound chemical bombs, and 105mm chemical shells, together with the loading and assembly of burster charges for this ammunition. Accordingly, the layout of original plans called for the construction of two burster-loading and assembly lines; two shell-loading and assembly lines; 24 inert storage warehouses; 30 igloos; 35 finished ammunition magazines; administration and utility buildings; and all necessary utilities.

The first staff officer, Lieutenant William H. Stevens, arrived on October 30, 1941 and was assigned primary duty as Adjutant. The balance of a complement of 14 officers reported over a period of several months, and it was not until the summer of 1942 that the entire quota was filled.

The first building was completed and ready for occupancy on November 11, 1941. This building, a two-story, barracks-type structure, served as temporary Redstone headquarters and was later designated as bachelor officer quarters.

Early in 1942, Major Hudson began to formulate a long-range plan for the employment of women on the ammunition production lines, in the event that manpower should become scarce. The Civil Service Commission in Atlanta, Georgia was contacted and within a short time examinations were announced for jobs known as "female trainees." At that time, the use of women in such jobs was definitely frowned upon; however, in light of subsequent events and the invaluable contribution that these female trainees made to the all-out war effort, there was no need for Major Hudson

to justify his belief or defend his actions. By December 1942, about 40 percent of the personnel working on the ammunition production lines were women.

Meanwhile, the construction program was encountering severe setbacks. The original estimates and appropriations for plant construction had been made prior to selection of the building site, and therefore, all figures were based on the supposition that the terrain would be level. The overall cost of construction increased almost two million dollars over the original estimate because of the rolling nature of the terrain, much of which was entirely unsuitable for road construction. In addition, construction work was slowed down and often completely stopped during the winter months because of extremely cold and rainy weather. Temperatures ranging from 2 to 27 degrees above zero made it impossible to pour concrete and generally retarded other construction activity. Until access roads were graveled, heavy rains would stop all traffic and, therefore, all construction work. These were only a few of the hardships experienced by construction crews throughout the winter of 1941-42.

Then came Pearl Harbor. At this time, the ammunition production lines had not been completed, arsenal administrators were still in the process of establishing a workable organization, and the total arsenal strength was less than nine civilians and three officers.

Construction work was immediately placed on a 24-hour basis instead of the former one-shift operation, and the personnel recruitment program was greatly accelerated as well as all other phases of organizational development. It was a race against time; a race between the grim determination of a group of loyal men and women, and the greatest demand

for production of war equipment the country had ever known.

The Redstone Ordnance Plant was officially activated by War Department orders on February 5, 1942. During the same month, the commanding officer of the plant, Major Carroll D. Hudson, was promoted to the rank of Lieutenant Colonel.

By March 28, 1942, when the first production line was ready for operation, the civilian strength had climbed to a total of 269. With a production quota of 40,000 ammunition units facing the plant for the month of March 1942, Line #1 began operation on March 28, and during the three remaining days produced 55,202 units.

The project as originally planned was substantially complete in the summer of 1942. By the end of December 1942, most of the ammunition production lines were in operation, the organization was functioning smoothly, and the number of civilian employees had grown from 269 to 1,666.

On February 26, 1943, the Redstone Ordnance Plant was redesignated as Redstone Arsenal. In February of the following year, Lieutenant Colonel Carroll D. Hudson received his promotion to the rank of colonel.

During the years of World War II, ending in September 1945, Colonel Hudson directed the arsenal's development into one of the best equipped Ordnance manufacturing centers in the nation. At the height of production operations, arsenal personnel including construction workers approximated 7500. In spite of the dangerous and complicated nature of its mission, Redstone Arsenal maintained one of the highest safety records in industry and never failed to meet a production quota.

For their outstanding services and high achievements in the manufacture of war equipment, Redstone employees received the coveted Army-Navy "E" Production Award five times. These awards were not easily won, nor were they lightly bestowed, and to this day they are regarded with deep pride by the gallant men and women who earned them.

Work at Redstone Arsenal during the war years included the manufacture and loading of high explosive bursters for chemically filled artillery shells and bombs; manufacture of demolition blocks for combat engineers and paratroopers; loading and assembly of medium and major caliber artillery ammunition and rifle grenades. Colored smoke rifle grenades and artillery projectiles, up to and including 155mm, were regular items of production. The technique of mass production of tetrytol was perfected at Redstone Arsenal. Tetrytol, a high explosive binary mix, was used in the loading of certain bursters, boosters and demolition blocks.

At the end of the war, Redstone Arsenal was one of the few remaining industrial arsenals being operated with Government personnel.

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Following the cessation of hostilities early in August 1945, activities at both the Huntsville Arsenal and Redstone Arsenal were greatly curtailed. At Redstone, all ammunition schedules were cancelled and production ceased on August 17, 1945.

The demobilization and readjustment activities were set in motion immediately following V-J Day, September 2, 1945. The operating buildings and equipment on all production lines were placed in standby condition;

contracts amounting to more than four and a half million dollars were cancelled; public property not required for normal standby operations was declared surplus; and large quantities of ammunition were placed in long-term storage.

By early 1946, the reduction in force and primary readjustment of arsenal activities to a peacetime basis had been accomplished. The standby organization consisted of from three to six officers and from 200 to 250 civilian employees.

The arsenal's main task during the standby period was the reconditioning of Ordnance chemical ammunition returned from overseas. About half of the peacetime crew was engaged in the administration, protection and maintenance of the arsenal as a standby facility, so that it could be put into full capacity production in the shortest possible time, if necessary.

Colonel Carroll D. Hudson remained in command of Redstone Arsenal until March 15, 1946. Major Edwin J. Grayson served as interim commander from March 15, 1946 to April 23, 1946.

Colonel Duncan G. McGregor assumed command of the arsenal on April 23, 1946 and served in this capacity until July 28, 1947. Captain Louie Miller, Jr. was in temporary command until August 4, 1947.

Lieutenant Colonel James O. Branch assumed command of the arsenal on August 4, 1947 and was relieved of this assignment on September 11, 1948. Captain Vernon W. Morgan served as interim commander until the return of Colonel Carroll D. Hudson in November 1948.

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During the post-war years prior to 1949, when the Army Ordnance guided missile program was still being conducted from the Pentagon, the rocket program had progressed to a point where a permanent field establishment was needed. During the summer of 1948, an extensive survey was made of all available Ordnance installations, including Redstone Arsenal which was then in standby status. From this survey, it was determined that Redstone Arsenal had suitable land and facilities to permit activation for rocket research and development at an earlier date and at less cost than any other available facility.

Colonel Carroll D. Hudson was relieved of his overseas assignment with the Ryukyus Command and returned to Redstone Arsenal on November 30, 1948 to begin his second tour as arsenal commander.

Early in December 1948, the Chief of Ordnance, Major General E. S. Hughes, officially designated Redstone Arsenal as a center for Ordnance Department research and development activities pertaining to rockets and related items.

Redstone Arsenal officially came back to life on June 1, 1949, when it was once again declared an active arsenal. The new mission was established in Ordnance Department orders dated July 18, 1949. Briefly, the mission included operation of facilities for the research and development of rockets and related items; maintenance of the chemical ammunition loading plant in a standby condition; and operation of facilities for the storage, maintenance and handling of ammunition items.

For about one year, or until November 1, 1949, the command responsibility for the arsenal rested with the Commanding General, Third Army. It was during

this period that the initial technical staff of the Ordnance Rocket Center was formed. (This activity is now known as the Rocket Development Division of the Ordnance Missile Laboratories.)

The Thiokol Corporation, under contract with the Ordnance Department to perform research and development work on rocket propellants, was moved from Elkton, Maryland to Redstone Arsenal. The facilities of Line 1, formerly used for assembly of chemical ammunition, were remodeled and turned over to this activity, which is now known as the Redstone Division of the Thiokol Chemical Corporation. The Thiokol administration building, a brick-veneer structure costing approximately \$170,000, was completed and ready for occupancy in October 1951.

Meanwhile, a contract was negotiated with the Rohm & Haas Company of Philadelphia, Pennsylvania, for the performance of research and development work in the field of solid propellants. Lines 3 and 4 were remodeled for use by this activity, which is now known as the Redstone Arsenal Research Division of the Rohm & Haas Company. The Josiah Gorgas Laboratory, constructed by the Government for use by the Rohm & Haas Company, was completed in February 1952. This million dollar research laboratory, one of the most modern in the entire south, was named in honor of Josiah Gorgas, the Confederate Brigadier General who achieved Civil War production miracles as Chief of Ordnance.

Late in 1948, the Chemical Corps decided to abandon its facilities at the Huntsville Arsenal and the property was advertised for lease. Late in 1949, however, decision was made to consolidate the Huntsville Arsenal area with that of Redstone Arsenal, to be used as an Ordnance Guided Missile

Center, which was then being considered as an additional Redstone mission. The consolidation of the two arsenals was made official on April 1, 1950, at which time the Redstone reservation was expanded to include a ten by twelve-mile area, comprising about 40,000 acres.

In September 1949, it was decided that, in the interest of economy and efficiency, the Ordnance Research and Development Division Sub-office (Rocket) should be moved from Fort Bliss, Texas to Redstone Arsenal. The Secretary of the Army gave official approval on October 28, 1949 and the movement directive was issued by the General Staff on March 21, 1950. Shortly after this, Major James P. Hamill, officer-in-charge of the activity at Fort Bliss, arrived with an advance detachment and on April 15, 1950, the Ordnance Guided Missile Center was officially established. (This activity is now known as the Guided Missile Development Division of the Ordnance Missile Laboratories.)

The movement of this activity from Fort Bliss, Texas involved the transfer of general supplies and extensive scientific laboratory equipment, as well as an operating staff of 500 military personnel, 130 German-born scientists, 180 General Electric Company contractor employees, and about 120 Civil Service employees. The primary mission of the Ordnance Guided Missile Center was to serve as the Ordnance center for research and development of guided missiles, including component and systems development in the fields of aerodynamics, guidance and control, propulsion, assembly techniques, transport, test and launching.

During the summer of 1950, work was started on a four million dollar construction program, which was to provide the initial research and development requirements for the expanded arsenal mission.

Early in 1951, the Ordnance Corps began a training program for personnel in the guided missile field, and decision was made to establish a service school for this purpose at Redstone Arsenal. The Provisional Redstone Ordnance School was officially established on March 3, 1952. In December of the same year, this activity was redesignated as the Ordnance Guided Missile School, a Class II Activity located at Redstone Arsenal and operated under jurisdiction of the Chief of Ordnance. On August 11, 1953, the school was placed under jurisdiction of The Ordnance Training Command.

In August 1951, the Field Service Division and National Procurement Division (now Industrial Division) were activated at Redstone Arsenal. These national mission agencies were assigned responsibility for field service and procurement activities in connection with guided missiles and rockets on a nation-wide basis.

Colonel Carroll D. Hudson concluded his second tour as arsenal commander on May 7, 1952. From May 8 to June 15, 1952, the arsenal was under temporary command of the ranking officer present for duty.

Brigadier General Thomas K. Vincent, the first general officer ever to be in command of Redstone Arsenal, assumed duties as Commanding General on June 16, 1952.

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The mushrooming expansion from a standby ammunition plant to a permanent arsenal engaged in a radically new field, created many new and complex problems for the arsenal. Some of these problems concerned adequate housing for incoming military and civilian personnel; wage stabilization; adequate research and development facilities; recruitment of clerical, technical and professional personnel; and the establishment of adequate support facilities to provide for troop morale and welfare.

When Colonel Hudson began his second tour as commanding Officer on November 30, 1948, he found the arsenal much the same as he had left it in March 1946. The installation was still in standby status, with only 245 civilian and less than 10 military personnel on the rolls. In order to carry out the complex assignments of the new mission, it was necessary to establish a new organization with a staff of clerical and administrative personnel, in addition to a special staff of physicists, chemists, metallurgists, mathematicians, and other technical and professional personnel in about fifteen different engineering fields. By the end of 1949, the arsenal had been completely reorganized and the operating strength had climbed to a total of 698 civilian and 342 military personnel. During the next several years the arsenal strength continued to expand as the assigned mission broadened in scope. During calendar year 1954, the average arsenal strength reached an all-time high of 7,087 military and civilian personnel, excluding contractor employees.

The Redstone Arsenal payroll for calendar year 1954 totaled more than 33 million dollars, an increase of more than four million dollars over that of the previous year. The total gross pay to all personnel in 1954 was about \$33,878.637. This included pay to Civil Service and contractor employees and military personnel.

The close of calendar year found Redstone Arsenal in the middle of its biggest construction boom since the early days of World War II. Construction work amounting to approximately \$23,250,000 was either started, in progress, or completed during 1954. Construction projects in progress during the current year include new buildings for the Ordnance Guided Missile School; a research and development engineering building, which will cost approximately \$3,637,000 and have floor area of about 200,000 square feet; a guidance and control building for the Guided Missile Development Division, which will cost approximately \$2,000,000; and many other facilities smaller in size, but nevertheless important to the arsenal mission.

The year 1954 brought the sixth and most recent change in arsenal commanders. Brigadier General H. N. Toftoy assumed command of Redstone Arsenal on September 1, 1954. He succeeded Brigadier General Thomas K. Vincent, who retired from the Army on August 31, 1954.

General Toftoy has been a key figure in the Army's rocket and guided missile program since its inception. He became interested in rocketry during World War II, and after being ordered to the Pentagon to take charge of the development of rockets and guided missiles, he personally carried the load of "selling" the Army on the idea of a progressive guided missile program and sparking the development of these revolutionary new weapons. This has earned him the title of "Mr. Missile" throughout the Army.

Under General Toftoy's direction, the superbazooka, Nike, Corporal, Honest John, and other rocket weapons were developed. He was also responsible for a number of experimental rockets including the two-stage Bumper

launched at White Sands Proving Ground, N. M., which in 1949 flew outside the earth's atmosphere and set altitude and velocity records which still stand. In addition, he obtained authority to select and bring to the United States a group of outstanding German scientists to contribute their experience to the missile program. The majority of these former German V-2 scientists are still engaged in important work at Redstone Arsenal.

General Toftoy came to Redstone as a colonel in May 1952, and was appointed Director of the Ordnance Missile Laboratories, remaining in this assignment until shortly before assuming command of the arsenal. He was promoted to the rank of Brigadier General on November 1, 1952, and had the distinction of being the first officer to be appointed to such rank while serving at Redstone. His appointment marked still another first for Redstone, as it was the first time in arsenal history that two general officers had been stationed here.

As the Commodity Arsenal for rockets and guided missiles, Redstone's primary objective is to control and supervise the research, development, and production of rockets and guided missiles for the entire Army. In addition, Redstone is responsible for the storage, issue, and maintenance of these new weapons, and the training of Ordnance specialists which accompany and support the using troops in the field. The magnitude and intricate nature of the operations of the Army's guided missile and rocket control and coordination center necessitates expenditure of millions of dollars annually throughout the nation.

Redstone Arsenal now has five national mission agencies, including the recently established Research and Development Division. The primary objective of this new mission agency is to control and supervise rocket and guided missile projects under contract for development by major industrial firms

throughout the country. The other national mission agencies are the Field Service Division, Industrial Division, Ordnance Missile Laboratories, and Ordnance Guided Missile School.

Although Redstone Arsenal is now mainly in the rocket and guided missile business, the Ammunition Division production lines are still contributing heavily to the country's defense program. The ammunition lines have been in operation since the beginning of World War II; however, between 1945 and 1950, most of the work consisted of reconditioning Ordnance ammunition returned from overseas. Production of new explosive items got under way again when the Korean conflict broke out in June 1950. Among the major items now being produced are mortar shells, 3.5-inch rockets, 105 and 155mm shells, and 81mm illuminating shells.

Another important mission agency located here is the Redstone Depot. This activity receives, stores, and ships a large volume of ammunition, Ordnance general supply items, industrial reserve machine tools, and strategic and critical raw materials.

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Today, Redstone Arsenal is the nerve center not only for the research and development of rockets and guided missiles, but also for the procurement, storage, and repair of the entire family of Army Ordnance missiles. Redstone Arsenal is one of eight permanent Ordnance Corps arsenals, and is the only one devoted almost exclusively to the guided missile program. From the scientists and technicians at Redstone, decisions affecting the missile program are sent daily to all parts of the country, and policies are determined which will affect the development and production of rockets and missiles for years to come.

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